

Jan Gyllenbok

# Encyclopaedia of Historical Metrology, Weights, and Measures

Volume 3

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# **Science Networks. Historical Studies**

Science Networks. Historical Studies  
Founded by Erwin Hiebert and Hans Wußing  
Volume 58

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# Encyclopaedia of Historical Metrology, Weights, and Measures

Volume 3

Jan Gyllenbok  
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## Preface

With this third and final part of the Encyclopaedia, a project I have been working on for many years finally ends. My heartfelt hope is that the work will benefit many people who are interested in cultural history.

August 2017

Jan Gyllenbok

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## List of Symbols and Abbreviations

!	A symbol for the factorial expression, i.e., $8! = 8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1$ .
%	A symbol for percentage.
*	An alternative multiply symbol.
cf.	compare
depr.	deprecated
D	Dutch
Dan	Danish
e.g.	for example
Fr	French
Fin	Finnish
G	German
Gr	Greek
Heb	Hebrew
i.e.	that is
Imp	Imperial
L	Latin
N	Norwegian
OE	Old English
OF	Old French
ON	Old Norwegian
OS	Old Swedish
q.v.	which see
Sp	Spanish
Swe	Swedish
UK	United Kingdom
US	United States
W	Welsh

# National Systems of Units and Currencies: J–S

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## 1 Emirate of Jabal Shammar

See also *Emirate of Nejd, Saudi Arabia* and *Mutawakkilite Kingdom of Yemen*.

This Emirate was established in 1836, and annexed to Saudi Arabia in 1921.

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## 2 Jalayirid Sultanate (1335–1432)

See also *Chobanid Sultanate* and *Ilkhanate*.

The Jalayirid dynasty ruled much of present-day Iraq and western Pakistan from the fall of the Ilkhanate in the mid-1330s until 1432.

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## 3 Jamaica

Christopher Columbus discovered Jamaica in 1494. The Spanish took possession of the island in 1509. Jamaica was conquered by a British expeditionary force in 1655 and became a British possession in 1670. Jamaica became a crown

colony in 1866, gained self-government in 1944, and was part of the Federation of the West Indies from 1958 until 1962. In 1962, Jamaica gained its independence.

The metric system was legally adopted in 1973, and has now been totally adopted since 1998.

*Main sources:* [BAUE], [CLAR], [LUNA], [MART3], [UN55], and [UN66]

### 3.1 Currency

1969–: 1 Jamaican dollar = 100 cents

1840–1969: 1 Jamaican pound = 20 shillings  
= 240 pence = 960 farthings

### 3.2 Units of Dry Capacity

Dry commodities were, in general, measured by the Winchester bushel.

3.3 Units of Liquid Capacity

For beer

					British	Metric
butt					108 gal	490.978 L
2	hogshead				54 gal	245.489 L
3	1½	barrel			36 gal	163.659 L
6	3	2	kilderkin		18 gal	81.830 L
12	6	4	2	firkin	9 gal	40.915 L

3.4 Units of Weight

Biscuits, butter, flour, candles, rice, soap, and tallow were sold by weight.

British Imperial scale

		Metric
hundredweight		45.359 265 kg
100	pound	453.592 65 g

4 Jan Mayen

See *Norway*.  
Jan Mayen is part of the Kingdom of Norway.

5 Japan

See also *Bonin Islands*.  
Between 300 CE and 700 CE, the Yamato clan consolidated its power in what was then known as the Kingdom of Wa. During the mid-sixth century, Buddhism was introduced into Japan from Korea. Until the end of the 1500s, a series of more or less strong imperial regimes followed, usually under the strict guidance of a shogun, a form of military dictator who had an extensive network of feudal lords, vassals, and samurais. During the mid-sixteenth century, the Portuguese first arrived in Japan, bringing firearms and Christianity. Ending the chaos of the Warring States period, Toyotomi Hideyoshi unified Japan in 1590. In 1638, Japan closed itself off to the outside world

and remained closed until 1853, when Commodore Matthew Perry of the United States Navy, who came with four warships, requested that Japan open itself up to trade with the West. These ships became known as the *kurofune*, the Black Ships. Japan’s sovereignty over Taiwan was recognized in a peace agreement in 1895. In 1905, Japan defeated Russia in the Russo-Japanese War.

In ancient Japan, linear measures appear to have consisted principally of parts of the human body, such as the *tsuka* (palm), *ata* (span), and *hiro* (fathom). During the seventh century, the Chinese systems of weights and measures gradually began to influence the Japanese systems. The system of units originated in China in the thirteenth century BC, and was later called the *shakukan* system (尺貫法). During the Tokugawa era (1603–1868), in 1655, the East and West Measure Guilds were established. The Shogunate exerted strong control over the standard, but it was difficult to maintain, as the country was divided into about 250 han (county), and each of these alone could impose their standards of weights and measures (and money). Measurement systems could also vary in the same area and at different periods—or appear to do so because of different measurement devices. Japan ratified the *Convention du Mètre* in 1886. In a law of 1891, the traditional units *shaku* and *kan* were taken as the fundamental units of length and mass, and were defined by metric equivalents. This law came into effect in 1893. On July 1, 1909, the units of the British Imperial system were also adopted as legal. The metric system was

stated as being the unique system in March 1921. A measurement law enforced on March 1, 1952, allowed the use of the shaku-kan system and the British Imperial system until December 31, 1958. The shaku-kan system was abolished on March 31, 1966. In December 1981, the Japanese Standards Association stated that the metric system had been completely adopted. A new Measurement Law that went into effect on November 1, 1993, adopted the SI and abolished the use of any other measuring system in commercial transactions and certifications by the end of the twentieth century. However, Japanese chisels are still manufactured in sizes of sun and bu, and bathrooms are built in fractions of tsubo.

*Main sources:* [ALLI], [CARD], [ECON], [FLÜG], [HALL2], [KELL], [MART3], [MILL3], [RICA], [SCAP], [SOCI2], [STAR], [UN55], [UN66], [WASH], and [WINS3]

## 5.1 Currency

1953–: 1 yen  
 1871–1953: 1 yen (gold coin) = 100 sen (copper coin) = 1000 rin  
 1868–1871: 1 kanmon = 100 hiki = 1000 mon

1603–1868: 1 ryō = 4 bu = 16 shu (gold coins)  
 1 kamme = 1000 momme = 10,000 fun = 100,000 rin = 1,000,000 mo (silver coins)  
 1 kammon = 100 hiki = 1000 mon (copper coins)

There was no fixed exchange rate between the various gold, silver and copper coins. Each coin was exchanged on the basis of its own merits and the prevailing market conditions. Through Japanese history, there were many different currencies in use. During the early Edo period, even a koku of rice was used as currency.

## 5.2 Units of Length

In 701, Japan introduced two Chinese measuring systems, based on large and small linear measures, which came into use during the Tang dynasty. The large scale was 1.2 times as long as the small scale. The small scale, which was mainly used for astronomy, music and ceremonial items, gradually dropped out of use. Later, during the Edo period, the larger system became known as *kanejaku* (曲尺), and was widely used among Japanese carpenters.

Average values during the seventh, eighth, ninth, tenth, twelfth, fourteenth, and eighteenth centuries

				Metric	Metric	Metric	Metric	Metric	Metric	Metric
<b>ri</b> <sup>a</sup>				3836.16 m	3849.12 m	3862.08 m	3875.04 m	3900.96 m	3913.92 m	3926.88 m
36	<b>chō</b>			106.56 m	106.92 m	107.28 m	107.64 m	108.36 m	108.72 m	109.08 m
1296	36	<b>jō</b>		2.96 m	2.97 m	2.98 m	2.99 m	3.01 m	3.02 m	3.03 m
12,960	360	10	<b>shaku</b> <sup>b</sup>	296 mm	297 mm	298 mm	299 mm	301 mm	302 mm	303 mm

<sup>a</sup>Varied during ancient times between 5 and 70 chō

<sup>b</sup>During the third century, reported as about 294.1 mm

shaku-kan system in Tokyo before 1891, based on [MART3]

里	町 or 丁	間	尺	寸	分	厘	Metric
<b>ri</b>							3935.209 742 m
36	<b>chō</b>						109.311 382 m
2160	60	<b>ken</b>					1.821 856 m
12,960	360	6	<b>shaku</b>				303.643 mm
129,600	3600	60	10	<b>sun</b>			30.364 mm
1,296,000	36,000	600	100	10	<b>bu</b>		3.036 mm
12,960,000	360,000	6000	1000	100	10	<b>rin</b>	304 μm

For cloth in Tokyo before 1891, based on [MART3]

		寸	分	厘	Metric
<b>tang</b>					3.795 534 m
10	<b>tsune sasai</b>				379.553 mm
100	10	<b>sun</b>			37.955 mm
1000	100	10	<b>bu</b>		3.796 mm
10,000	1,000	100	10	<b>rin</b>	380 μm

shaku-kan system for general use until 1924, as defined in 1891 (1 kanejaku = 10/33 m)<sup>a</sup>

里	町 or 丁	丈	間	尋	尺	寸	分	厘	毛	Metric
<b>ri</b>										3927.273 m
36	<b>chō</b>									109,090 91 m
1296	36	<b>jō<sup>b</sup></b>								3.030 303 m
2160	60	1⅓	<b>ken<sup>c</sup></b>							1.818 181 m
2592	72	2	1⅓	<b>hiro<sup>d</sup></b>						1.515 151 m
12,960	360	10	6	5	<b>shaku or kanejaku</b>					303.030 mm
129,600	3600	100	60	50	10	<b>sun</b>				30.303 mm
1,296,000	36,000	1000	600	500	100	10	<b>bu</b>			3.030 3 mm
12,960,000	360,000	10,000	6000	5000	1000	100	10	<b>rin</b>		303.03 μm
129,600,000	3,600,000	100,000	60,000	50,000	10,000	1,000	100	10	<b>mō</b>	30.3 μm

<sup>a</sup>Two more units have sometimes been reported: 1 **yabuki** = 2½ kanejaku = 757.575 mm, and 1 **shi** = 1/100,000 kanejaku = 3.03 μm

<sup>b</sup>Also reported as 3.819 6 m and as 3.817 8 m

<sup>c</sup>Also reported as 6⅔ shaku = 1.909 m, and as 6¼ shaku = 1.894 m

<sup>d</sup>The hiro was normally used at sea, for measuring depth. Sometimes reported as equal to the ken [ALLI, p. 61]

Other measures reported during the nineteenth to twentieth centuries:

- 1 **kai-ri** (nautical mile) = 1852 m;
- 1 **tan** (for cloth, used by the Ainu people) = 25–30 shaku = 9.46–11.35 m;
- 1 **amoini** or **amunin** (used by the Ainu people) = a cubit;
- 1 **shaku** (for cloth, used by the Ainu people) = 378.46 mm.

Various shaku were developed for various purposes. In the medieval era, linear measures for sewing were arranged into a scale called *kujirajaku* (鯨尺), later mainly used by the clothing industry, that was 1¼ as long as the kanejaku, and a scale called *gofukujaku* (呉服尺), used for traditional Japanese clothes such as kimonos, that was 1⅓ times as long as a kanejaku. The *gofukujaku* gradually dropped out of use during

the first half of the eighteenth century, and was abolished in 1875. Anyhow, both systems were defined in 1891, related to the French metric system.

For fabric (also known as *kujira shaku system*), as defined in 1891 (1 kujirajaku = 25/66 m)

				Metric
<b>kujira shaku jo</b>				3.787 87 m
10	<b>kujirajaku or kujira shaku shaku</b>			378.787 mm
100	10	<b>kujira shaku sun</b>		37.878 7 mm
1000	100	10	<b>kujira shaku bu</b>	3.787 87 mm

For kimonos, as defined in 1891 (1 gofukujaku = 4/11 m)

				Metric
<b>gofuku jo</b>				3.636 36 m
10	<b>gofukujaku or gofuku shaku</b>			363.636 mm
100	10	<b>gofuku sun</b>		36.363 6 mm
1000	100	10	<b>gofuku bu</b>	3.636 36 mm

For the width of cloth rolls

				Metric
<b>yohaba</b>				1.515 148 m
1⅓	<b>mihaba</b>			1.136 361 m
2	1½	<b>ohaba</b>		757.574 mm
4	3	2	<b>kohaba</b>	378.787 mm

For the length of cloth rolls

		Imperial	Metric
<b>5 jō 6 shaku</b>		18½ yd	16.916 4 m
2	<b>2 jō 8 shaku</b>	9¼ yd	8.458 2 m

### 5.3 Units of Area

During the sixth century

<b>shiro</b>	
30	<b>shaku<sup>2</sup></b>

After 646

				Metric
<b>chō<sup>a</sup></b>				11,880 m <sup>2</sup>
10	<b>tan<sup>b</sup></b>			1188 m <sup>2</sup>
3600	360	<b>bu<sup>c</sup></b>		3.3 m <sup>2</sup>
21,600	2160	6	<b>shaku<sup>2</sup></b>	5.5 dm <sup>2</sup>

<sup>a</sup>A square, 60 bu (=108 m) to a side

<sup>b</sup>Always a rectangular area, typically 30 × 12 bu (54 × 21.6 m)

<sup>c</sup>This gave 1 **bu** = the área of land sufficient to produce one shō of hulled rice. 1 bu = a square, 1.82 m to a side

A number of regulations were introduced during the seventh century in order to define the payment burden in the number of sheaves per surface. The official rate was set at 1 *soka* 5 *ha* per *tan*.

Payment system according to the ritsuryō texts<sup>a</sup>

<b>so</b>			
1½	<b>soku</b>		1 <i>to</i> of unhulled rice or 5 <i>shō</i> of hulled rice
150	10	<b>ha</b>	5 <i>gō</i> of hulled rice

<sup>a</sup>1 **tan** was defined as 25 bu × 10 bu = 250 bu = about 82.6 m<sup>2</sup>

In 702, the Taihō ryō code called for the payment of 2 *soku* 2 *ha* per *tan*, but only four years later, the old rate was reestablished.

Payment system according to the Taihō and Yōrō codes<sup>a</sup>

<b>so</b>			
2⅔ <sub>25</sub>	<b>soku</b>		1 <i>to</i> of unhulled rice or 5 <i>shō</i> of hulled rice
21⅓ <sub>5</sub>	10	<b>ha</b>	5 <i>gō</i> of hulled rice

<sup>a</sup>1 **tan** became defined as 30 bu × 12 bu = 360 bu = about m<sup>2</sup>

During the twelfth century

				Metric
<b>chō<sup>a</sup></b>				9915 m <sup>2</sup>
3600		<b>bu</b>		2.75 m <sup>2</sup>
21,600	6		<b>shaku<sup>2</sup></b>	45.8 dm <sup>2</sup>

<sup>a</sup>Because chō used the same character as a unit of length, when used to refer to an área of land, it is often expressed as **chōbu**

For land surveying after 1584, introduced by Hideyoshi

<b>chō</b>					
10	<b>tan</b>				
100	10	<b>se</b>			
3000	300	30	<b>bu<sup>a</sup></b>		
9000	900	90	3	<b>sun<sup>2</sup></b>	
18,000	1800	180	6	2	<b>shaku<sup>2</sup></b>

<sup>a</sup>Equal to a square ken. During the Edo period, the length of the ken was shortened

Toyotomi Hideyoshi (1536–1598), a powerful daimyo, politician and general, also divided land áreas into those that were expressed as “large”

(240 *bu*), “middle” (180 *bu*), and “small” (120 *bu*), and introduced the *kokudaha* system. The *kokudaha* system was a method of assessing the yield of each parcel of land. This system also included residential land and sometimes even undeveloped land, forests, and marshland. The yield was expressed as the assessed productive capacity of rice in *koku* units.

tsubo scale

			Metric
<b>shaku<sup>2</sup></b>			9.182 7 m <sup>2</sup>
100	<b>sun<sup>2</sup></b>		9.182 7 cm <sup>2</sup>
10,000	100	<b>bu<sup>2</sup></b>	9.182 7 m <sup>2</sup>

shaku-kan scale in Tokyo before 1891, based on [MART3]

町	段 or 反	畝	坪		Metric
<b>chō</b>					9957.481 m <sup>2</sup>
10	<b>tan</b>				995.748 2 m <sup>2</sup>
100	10	<b>se</b>			99.574 818 m <sup>2</sup>
3000	300	30	<b>tsubo or bu</b>		3.319 161 m <sup>2</sup>
108,000	10,800	1080	36	<b>tsci cacoi sasci</b>	2.919 9 m <sup>2</sup>

shaku-kan scale, as defined in 1891

	町	段 or 反	畝	坪	量	合	勺	Metric
<b>ri<sup>2</sup></b>								1542.347 105 587 2 ha
15 <sup>69/125</sup>	<b>chō</b>							99.173 553 6 a
155 <sup>13/25</sup>	10	<b>tan</b>						991.735 536 m <sup>2</sup>
1555 <sup>1/5</sup>	100	10	<b>se</b>					99.173 553 6 m <sup>2</sup>
46,656	3000	300	30	<b>tsubo<sup>a</sup> or bu<sup>b</sup></b>				100/30.25 m <sup>2</sup> = 3.305 785 12 m <sup>2</sup>
93,312	6000	600	60	2	<b>jō<sup>c</sup></b>			1.652 892 56 m <sup>2</sup>
466,560	30,000	3000	300	10	5	<b>gō</b>		33.057 851 2 dm <sup>2</sup>
4,665,600	300,000	30,000	3000	100	50	10	<b>shaku<sup>2</sup></b>	3.305 785 12 dm <sup>2</sup>

<sup>a</sup>Used in construction, etc.

<sup>b</sup>Used in agriculture

<sup>c</sup>The standard size of a tatami mat. In practice, it varies with locality and type of dwelling

Other measures reported during the nineteenth century:

1 **sai** (for cloth) = 1 square shaku = 9.182 7 dm<sup>2</sup>;

1 **saburokuhan** (for plywood) = 3 × 6 shaku = 182 × 91 cm.





For rice during the late eighteenth century, reported by [RICA]

					Metric
<b>managoga</b>					2,700,000,000 L
10,000	<b>ikmagoga</b> or <b>ickmagog</b>				270,000 L
10,000,000	1000	<b>ikgoga</b> or <b>ickgoga</b>			270 L
1,000,000,000	100,000	100	<b>ganta</b>		2.7 L
3,000,000,000	300,000	300	3	<b>coca</b> <sup>a</sup>	0.9 L

<sup>a</sup>The size of the coca is unknown, but refers to a coconut-shell basket. Usually, a coconut shell has been reported to contain about 0.9 L. [DOUR] reported one managoga as 5,000,000,000 cocas = about 4.5 L

For rice during the late nineteenth century, reported by [WINS3]

				Metric
<b>managoga</b>				240,000 kg
100	<b>ikmagoga</b>			2400 kg
10,000	100	<b>ikgoga</b>		24 kg
100,000	1000	10	<b>gantang</b> <sup>a</sup>	2.4 kg

<sup>a</sup>Gantang was a Malay measure for rice and nyiru that was used for winnowing rice throughout eastern Asia. Later said to equal 4.546 L

In Tokyo before 1891, based on [MART3]

石	斗	升		合		勺	才		Metric
<b>koku</b>									181.481 700 L
10	<b>tō</b>								18.148 170 L
100	10	<b>shō</b>							1.814 817 L
500	50	5	<b>go ngō</b>						907.408 mL
1000	100	10	2	<b>gō</b>					181.482 mL
5000	500	50	10	5	<b>go shaku</b>				90.741 mL
10,000	1000	100	20	10	2	<b>shaku</b>			18.148 mL
100,000	10,000	1000	200	100	20	10	<b>sai</b>		1.815 mL
1,000,000	100,000	10,000	2000	1000	200	100	10	<b>sat</b>	0.181 mL

As defined in 1891 (1 shō = 2 401/1 331 L) and rounded values used by many scholars

石	斗	升	合	勺	才	Metric	Metric
<b>koku</b> <sup>a</sup>						180.390 683 7 L	180 L
10	<b>tō</b>					18.039 068 37 L	18 L
100	10	<b>shō</b> <sup>b</sup>				1.803 906 837 L	1.8 L
1000	100	10	<b>gō</b> <sup>c</sup>			180.390 683 7 mL	180 mL
10,000	1000	100	10	<b>shaku</b>		18.039 068 37 mL	18 mL
100,000	10,000	1000	100	10	<b>sai</b>	1.803 906 837 mL	1.8 mL

<sup>a</sup>1 **koku** = traditionally said to equal the amount of rice a person would eat in one year

<sup>b</sup>This is a common size for a sake bottle

<sup>c</sup>A common serving size of sake

5.6 Units of Weight

Traditional system before 1868

	貫		百目				Metric
<b>hyakkin</b>							37.696 kg
16	<b>kwan or kan</b>						2.356 kg
64	4	<b>kin</b>					589.00 g
256	16	4	<b>hyaku-me</b>				147.25 g
2560	160	40	10	<b>niyo</b>			14.725 g
12,800	800	200	50	5	<b>momme</b>		2.945 g

In Tokyo before 1891, based on [MART3]

								Metric
<b>tan</b>								60.479 020 kg
100	<b>ching</b>							604.790 g
1600	16	<b>rio</b>						37.799 g
4000	40	2½	<b>riomeh</b>					15.120 g
16,000	160	10	4	<b>meh</b>				3.780 g
160,000	1600	100	40	10	<b>pun</b>			378 mg
1,600,000	16,000	1000	400	100	10	<b>rin</b>		38 mg
16,000,000	160,000	10,000	4000	1000	100	10	<b>mo</b>	3.8 mg

British Imperial-linked system before 1891, based on [CARD]

							Imperial	Metric
<b>its 'ko-koo</b>							333⅓ lbs	151.198 kg
10	<b>itho</b>						33⅓ lbs	15.120 kg
100	10	<b>ischo</b>					3⅓ lbs	1.512 kg
250	25	2½	<b>its-go</b>				1⅓ lbs	604.79 g
2500	250	25	10	<b>pun</b>			2/15 lb	60.48 g
40,000	4000	400	160	16	<b>rin</b>		1/120 lb	37.80 g

British Imperial scale mainly used before 1891

英トン	ハンドレッドウェイト	ストーン	ポンド	オンス	ドラム	スクルーブル	グレーン	Metric
<b>ton</b>								1016.047 kg
20	<b>hundredweight</b>							50.802 38 kg
160	8	<b>stone</b>						6.350 30 kg
2240	112	14	<b>pound</b>					453.592 65 g
35,840	1792	224	16	<b>ounce</b>				28.349 54 g
573,440	28,672	3584	256	16	<b>dram</b>			1.771 85 g
1,720,320	86,016	10,752	768	48	3	<b>scruple</b>		590.61 mg
15,680,000	784,000	98,000	7000	437½	27 <sup>1</sup> / <sub>32</sub>	9 <sup>1</sup> / <sub>96</sub>	<b>grain</b>	64.80 mg

Scale<sup>a</sup> used during the late nineteenth century among international merchants, based on the momme as defined in 1891 (=15/4 g)

				貫 or 貫目	斤	百目	両		Metric
<b>komma</b>									150 kg
2 $\frac{3}{4}$	<b>karus</b>								67.5 kg
2 $\frac{1}{2}$	1 $\frac{1}{8}$	<b>hyakkin</b> or <b>kiyak</b>							60 kg
5 $\frac{5}{7}$	2 $\frac{4}{7}$	2 $\frac{2}{7}$	<b>ninsoku</b>						26.25 kg
40	18	16	7	<b>kan</b> or <b>kanme</b>					3.75 kg
250	112 $\frac{1}{2}$	100	43 $\frac{3}{4}$	6 $\frac{1}{4}$	<b>kin</b>				600 g
400	180	160	70	10	1 $\frac{3}{5}$	<b>hyaku-me</b>			375 g
4000	1800	1600	700	100	16	10	<b>ryō</b> <sup>b</sup>		37.5 g
10,000	4500	4000	1750	250	24	25	2 $\frac{1}{2}$	<b>niyo</b>	15 g

<sup>a</sup>Reported by, among others, [CARD] and [WASH]

<sup>b</sup>Among Chinese merchants, also known as **tael**

Scale used by the international pearl industry

匁	分		毛		Metric
<b>momme</b>					3.75 g
10	<b>fun</b> <sup>a</sup>				375 mg
100	10	<b>rin</b>			37.5 mg
1000	100	10	<b>mō</b>		3.75 mg
10,000	1000	100	10	<b>shi</b>	0.375 mg

<sup>a</sup>Among Chinese merchants, also known as **candereen**

Other measures reported during the nineteenth to twentieth centuries:

1 **koku** = 187.5 kg (for rough rice), 150 kg (for brown rice), and 136.5 kg (for milled rice);  
1 **shō** (for milled rice) = 1.425 kg.

For charcoal

		Metric
<b>rō</b>		22.5 kg
6	<b>kan</b>	3.75 kg

Metric scale

キログラム	ヘクトグラム	デシグラム	グラム	Metric
<b>kiroguramu</b>				1 kg
10	<b>hecutguramu</b>			100 g
100	10	<b>deshiguramu</b>		10 g
1000	100	10	<b>guramu</b>	1 g

## 6 Jarvis Island

See *United States of America*.

One of the United States Minor Outlying Islands. The only human population consists of temporarily stationed scientific and military personnel.

## 7 Jersey (Bailiwick of Jersey)

Jersey was part of Neustria before it fell to the Duke of Brittany. In 933, it became part of the Norman Islands, as it had been annexed to the Duchy of Normandy. The Germans occupied Jersey from 1940 until 1945.

*Main sources:* [BLAC], [BRIT], [CHAN2], [DOUR], [GODE], and [SIMM]

7.1 Currency

- 1971–: 1 Jersey pound = 100 pence
- 1835–1970: 1 Jersey pound = 4 crowns = 20 shillings = 240 pence
- 1729–1834: 1 Jersey livre = 5 liards = 20 sous
- 1720s: 1 French livre = 20 sous = 240 deniers

7.2 Units of Length

For land sales

		Imperial	Metric
<b>perche</b>		22 ft	6.705 6 m
24	<b>pied de perche</b>	11 in	279.4 mm

Other reported measures:

1 **aune** = 4 f. = 1.22 m.

7.3 Units of Area

For land sales

		Imperial	Metric
<b>perche</b> <sup>2</sup>		484 ft <sup>2</sup>	44.965 07 m <sup>2</sup>
576	<b>pied de perche</b> <sup>2</sup>	121 in <sup>2</sup>	780.643 6 cm <sup>2</sup>

7.4 Units of Dry Capacity

Jersey scale, based on [CHAN2] and [BLAC]

									Metric	Metric
<b>Jersey bushel</b>									39.50 L	40.50 L
2	<b>cabot</b> <sup>a</sup>								19.75 L	20.25 L
10	5	<b>Jersey gallon</b>							3.950 L	4.050 L
12	6	1⅓	<b>sixtonnier</b> <sup>b</sup>						3.292 L	3.375 L
20	10	2	1⅔	<b>pot</b> <sup>c</sup>					1.975 L	2.025 L
40	20	4	3⅓	2	<b>quart</b>				987.50 mL	1.012 5 L
80	40	8	6⅓	4	2	<b>pint</b>			493.75 mL	506.25 mL
160	80	16	13⅓	8	4	2	<b>half-pint</b>		246.87 mL	253.12 mL
320	160	32	26⅓	16	8	4	2	<b>noggin</b>	123.44 mL	126.56 mL

<sup>a</sup>Stated as equal to 10 Jersey pots by an Act of the Jersey Court on January 19, 1625. According to [CHAN2], it was legalized by Acts of the Royal Court of Jersey on December 11, 1593, March 7, 1617, and January 19, 1625, and finally confirmed by the Sovereign in Council in 1717

<sup>b</sup>According to [CHAN2] = 2 pots 2⅔ noggins = 4.22 L

<sup>c</sup>The Jersey pot was, according to [BLAC, p. 48], stated as exactly 123.558 cu in = about 2.024 753 L. [CHAN2] reported the cabot as 4 Imperial gallons, 1 Imperial quart and 3 gills = about 19.747 L, making the pot about 1.975 L. [SIMM] reported 19 cabots to the Imperial quarter, making the pot about 15.31 L

There was also a larger cabot used for barley. According to [CHAN2], the large barley cabot was 12 pots, 3 pints and 1⅓ noggins = about 25.346 L. [BRIT] reported that 3 large cabots were equal to 4 ordinary cabots, making the large cabot = 79/3 L = about 26⅓ L, while [SIMM] reported that there were 11 cabots to a quarter of barley, making the large cabot = 26.45 L.

Other reported measures:

- 1 **hogshead** (for cider) = 60 Jersey gallons = about 237 L;
- 1 **cabot** (for potatoes) = 9 pots 2 ½ pints = about 19 L;
- 1 **Jersey quart** (after metrification) = 1 L.

7.5 Units of Weight

During the fourteenth to nineteenth centuries

			Metric
<b>Jersey quarter</b>			13.718 448 kg
28	<b>Jersey pound</b>		489.944 558 g
448	16	<b>Jersey ounce</b>	30.621 535 g

For apples

		Jersey pounds	Metric
<b>quarter</b>		456	223.425 kg
12	<b>cabot</b>	38	18.618 kg

Other reported measures:

- 1 **cabot** (for potatoes) = 40 Jersey pounds = about 19.60 kg;
- 1 **cabot** (for barley) = 36 Jersey pounds = about 17.64 kg;
- 1 **cabot** (for wheat) = 32 Jersey pounds = about 15.68 kg;
- 1 **cabot** (for oats) = 30 Jersey pounds = about 14.70 kg;
- 1 **siextonny** or **sixtonneier** (for potatoes) = about 7 lb = about 3.2 kg.

## 8 Kingdom of Jimma [Formerly: Jimma Abba Jifar]

See also *Ethiopia*.

This kingdom was established in 1790. In 1830, it was renamed Jimma Abba Jifar. The area was annexed by the Ethiopian Empire in 1932.

### 8.1 Currency

1913–1932: 1 Maria Therea Thaler  
–1913: amoleh (salt blocks)

## 9 Johnston Atoll

See *United States of America*.

One of the United States Minor Outlying Islands. The only human population consists of temporarily stationed scientific and military personnel.

## 10 Jordan [Formerly: Transjordan]

This area was part of the first Islamic Caliphates, including Rashidun (632–661), Umayyad

(661–750) and Abbasid (750–1258). After the decline of the Abbasid, the area was ruled by several conflicting powers, including the Mongols, the Crusaders, the Ayyubids and the Mamluks. It became part of the Ottoman Empire in 1516. After the First World War, the area was, along with Israel and the West Bank, a mandate territory administered by Britain. The area was called Palestine, but most of the area east of the Jordan River was named “Trans-Jordan.” In 1921, the territory was divided into two parts, and the area east of the Jordan River became the Emirate of Transjordan. In 1946, it became the Kingdom of Transjordan. Transjordan became an independent constitutional state in 1927 and gained its independence in 1948. In 1950, it was renamed the Hashemite Kingdom of Jordan. In 1967, Jordan lost its territories west of the Jordan River, since they, along with Egypt and Syria, lost to Israel in the Six Day War.

The metric system has been compulsory since 1953–1954.

*Main sources:* [ARES], [ECON], [UN66], and [ZIMM]

### 10.1 Currency

1993–: 1 Jordanian dinar = 100 piastres  
1950–1992: 1 Jordanian dinar = 10 dirham  
= 100 qirsh = 1000 fils  
1927–1950: 1 Palestine pound = 1000 mils  
1918–1930: 1 Egyptian pound = 100 piastres  
= 1000 milliemes

### 10.2 Units of Length

1 **dra** (for fabric) = 68 cm;  
1 **dra** (for buildings) = 75.80 cm.

### 10.3 Units of Area

1 **metric dönüm** = 1000 m<sup>2</sup>;  
1 **dönüm**, **dunam** or **dunum** = 900 m<sup>2</sup>.

## 10.4 Units of Dry Capacity

1 **mound** (for wheat) = 37.4 kg.

## 10.5 Units of Liquid Capacity

For cooking oil in the Agloun and Kerak districts

		Metric
<b>mid</b>		18 L
3	<b>saa or saah</b>	6 L

## 10.6 Units of Weight

At Nabulsi

					Metric
<b>kantar<sup>a</sup></b>					288.675 kg
112½	<b>rot'l</b>				2.566 kg
225	2	<b>okka</b>			1.283 kg
1200	10⅔	5⅓	<b>uqiya or oquia<sup>b</sup></b>		240.56 g
90,000	800	400	75	<b>dirhem</b>	3.208 g

<sup>a</sup>[ZIMM] reported 288.44 kg, [ECON] reported 288.44 kg, and [UN66] reported 288.50 kg

<sup>b</sup>[ZIMM] reported 240.37 g and [UN66] reported 240.38 g

At Nabulsi, based on [LLOY]

					Metric
<b>kantar</b>					288.764 kg
100	<b>rot'l</b>				2.887 6 kg
225	2¼	<b>okka</b>			1.283 4 kg
1200	12	5⅓	<b>uqiya or oquia</b>		240.637 g
90,000	900	400	75	<b>dirhem</b>	3.208 5 g

At Shami (followed in the Amman area)

					Metric
<b>kantar<sup>a</sup></b>					256.408 kg
100	<b>rot'l</b>				2.564 kg
200	2	<b>okka</b>			1.282 kg
1200	12	6	<b>uqiya or oquia<sup>b</sup></b>		213.673 g
80,000	800	400	66⅔	<b>dirhem</b>	3.205 1 g

<sup>a</sup>[ZIMM] reported 256.44 kg, [ECON] reported 256.41 kg, and [UN66] reported 256.40 kg

<sup>b</sup>[ZIMM] reported 213.66 g, [LLOY] reported 213.659 g, and [UN66] reported 213.67 g

Metric scale

		Metric
<b>quintal</b>		100 kg
100	<b>kilo</b>	1 kg

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**11 Kingdom of Joseon  
(1392–1897)**

See *Korea*.

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**17 Kamarupa Kingdom  
(350–1140)**

See *India*.

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**12 Juan de Nova Island [Formerly:  
Galega, Joa Nova and Saint-  
Christophe]**

This island is an uninhabited tropical island in the western Indian Ocean, named after João da Nova, a Galician admiral who discovered and named it Galega in 1501. It has been a French overseas possession since 1897.

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**18 Kamerun**

See *Cameroon*.

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**19 Kampuchea**

See *Cambodia*.

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**13 Kaabu Empire (1537–1867)**

See also *Fouta Djallon*, *Mali Empire* and *Mali*.

This Empire was conquered by Fouta Djallon in 1867.

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**20 Kanem Empire (c. 700–c. 1376)**

Located in the area of the present-day countries of Chad and Libya. I have not found anything about the weights and measures used in this state.

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**13.1 Currency**

cowries

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**21 Kasanje Kingdom**

See also *Angola*.

This kingdom lasted between c. 1630 and late 1910, when it became part of Portuguese Angola.

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**14 Kadamba Empire (345–525)**

See *India*.

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**21.1 Currency**

nzimbu shells

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**15 Kakatiya Dynasty (1083–1323)**

See *India*.

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**22 Khazar Khaganate (618–1048)**

This state emerged out of the the breakdown of the Göktürk Khagnate during the early sixth century. The state was conquered by Sviatoslav I of Kiev in 967, and later became part of the Kievan Rus. I have not found anything about the weights and measures used in this state.

*Main source:* [PRIT]

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**16 Khanate of Kalat (1666–1955)**

See also *Pakistan*.

This princely state was established in 1666, and lasted until early 1955, when it was ceded to Pakistan.

## 22.1 Currency

1 yarmaq

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## 23 Katanga

See also *Congo*.

In 1960, the province of Katanga was attempting to separate itself from the newly independent Congo, and declared independence under Moise Tshombe. Tshombe surrendered in 1963.

### 23.1 Currency

1960–1963: 1 Katangan franc = 100 centimes

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## 24 Kazakhstan [Formerly: Kazakh Soviet Socialist Republic]

In 1456, many Uzbeks moved under Mongol auspices into what is now Kazakhstan, where they established an independent Khanate. In 1920, the area became part of the Kyrgyz Autonomous Republic, after the Kazakh khan asked the Russian Tsar for aid against the hostile public. In 1925, the Soviet government changed the republic's name to the Kazakh Autonomous Soviet Socialist Republic, and it subsequently became the Kazakhstan Soviet Socialist Republic in 1936. Kazakhstan declared its independence from the Soviet Union in 1991.

The metric system has been in force since the early twentieth century.

*Main source:* [SIMM]

### 24.1 Currency

1993–: 1 tenge = 100 tïzn or tiyin

1918–1993: 1 Russian ruble = 100 kopeks

## 24.2 Units of Weight

1 **churap** = about 1.1 kg.

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## 25 Kediri

See also *Indonesia* and *Majapahit*.

Kediri was a kingdom based in East Java from 1045 until 1221. I have not found anything about the weights and measures used in this state.

### 25.1 Currency

Native gold and silver coins

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## 26 Keeling Islands

See *Cocos (Keeling) Islands*.

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## 27 Kenya [Formerly: British East Africa]

See also *Uganda*.

While Swahili culture flourished on the coast beginning in the late eighteenth century, a number of small kingdoms arose in the hinterland. Luo dominated in the southwest, Luhya in the northwest, Kikuyu in the central parts of the country, and Embu, Kamba and Meru in the eastern parts. The Maasai culture reached their greatest period in the mid-1800s, when they controlled most of present-day southern Kenya and northern Tanzania. The Sultan of Zanzibar granted the coastal lands, which included present-day Kenya, to the British East African Association in 1887. The British East African Company got involved in a civil war in Uganda and lacked the resources to develop the territory, so the British government declared a protectorate over Bugunda in 1894 and offered to buy the Company's concession. This area became the British East Africa Protectorate in 1895, which was separated into British East Africa and the Uganda Protectorate in

1903. British East Africa was renamed the Kenya Colony and Protectorate in 1920. Kenya gained its independence in 1963.

The metric system became officially accepted when the Weights and Measures Act, Cap. 513, was enacted in 1951, and became compulsory by the Metric System Act, Cap. 523, in 1967–1968.

*Main sources:* [BROW] and [SUND]

## 27.1 Currency

1967–:	Kenyan shilling = 100 cents
1921–1967:	1 East African shilling = 100 cents
1920–1921:	1 East African florin = 2 shillings = 100 cents
1906–1920:	1 East African rupee = 100 cents
–1906:	1 Indian rupee = 16 anna = 64 pice

## 27.2 Units of Length

Traditional system among the Meru people, based on [SUND]

			Metric
<b>doti</b>			~1.2 m
2	<b>shuka</b>		~0.6 m
4	2	<b>mikono</b> <sup>a</sup>	~0.3 m

<sup>a</sup>The distance from the elbow to the tip of the fingers

British Imperial-linked system, mainly based on [BROW]

					Imperial	Metric
<b>maili</b>					1 mile	1609.344 m
880	<b>pima</b>				2 yd	1.828 8 m
1760	2	<b>wari</b> or <b>yadi</b>			1 yd	0.914 4 m
3520	4	2	<b>thiraa</b> or <b>mkono</b>		½ yd	457.2 mm
63,360	72	36	18	<b>wanda</b> or <b>inchi</b>	1 in	25.4 mm

Other measures reported during the twentieth century:

1 **jora** (for cloth) = a roll about 32 yd long.

Metric system

				Metric
<b>kilometa</b>				1000 m
1000	<b>meta</b>			1 m
100,000	100	<b>sentimeta</b>		1 cm
1,000,000	1000	10	<b>milimeta</b>	1 mm

## 27.3 Units of Area

Some reported measures during the twentieth century:

1 **hekta** = 10,000 m<sup>2</sup>;  
1 **eka** = 1 acre = about 4047 m<sup>2</sup>.

## 27.4 Units of Capacity

British Imperial-linked system

					Metric
(ma) <b>debe</b>					18.184 L
4	<b>galoni</b>				4.546 L
32	8	<b>painti</b>			568.261 mL
128	32	4	<b>shavu</b> (la samaki)		142.065 mL
640	160	20	5	<b>aunzi</b>	28.413 mL

Metric system

			Metric
<b>Lita</b>			1 L
2	<b>kibaba</b>		500 mL
1000	500	<b>mililita</b>	1 mL

27.5 Units of Weight

Traditional system

		Metric
<b>gisla</b>		163.293 kg
10	<b>frasila or frassla</b>	16.329 3 kg

British Imperial-linked system

				Imperial	Metric
<b>gisla</b>				350 lbs	158.757 kg
10	<b>frasila or frassla</b>			35 lbs	15.876 kg
350	35	<b>ratili</b>		1 lb	453.592 g
5600	560	16	<b>wakia, wakea, or wakiah</b>	1 oz	28.349 5 g

Metric system

			Metric
<b>tan</b>			1000 kg
1000	<b>kilo</b>		1 kg
1,000,000	1,000	<b>Gram</b>	1 g

28 Kerguelen Islands  
[or Desolation Islands]

See also *Madagascar*.

These islands were discovered by the French navigator Yves-Joseph de Kerguelen de Trémarec in 1772. The islands were officially annexed by France in 1893, and until 1955, they were part of the French colony of Madagascar. Today, the islands are French overseas territory.

29 Khazar Khagnate

See also *Tatarstan* and *Volga-Kama Bulgaria*.

30 Khiva

See also *Uzbekistan*.

Khiva was established as a Khanate in 1511, but later fell under Russian influence. Khiva gained its independence in 1918, but Soviet forces established the Khorazmian People’s Soviet Republic in 1920. The Khorazmian Soviet Socialist Republic was established in 1923, and became part of the Uzbekistan SSR in 1925.

*Main source:* [NEDH]

30.1 Currency

- 1920–: 1 Russian ruble = 100 kopeks
- 1918–1920: 1 Khivan tenga = 20 rubles
- 1918: 1 Russian ruble = 100 kopeks
- 1 Khivan ducat = 1500 tangas

30.2 Units of Length

1 **gaz** = 12 English inches = 304.8 mm.

30.3 Units of Weight

- 1 (small) **batman** (in 1641) = 4.914 kg;
- 1 (small) **batman** (in 1669) = 4.095 kg;
- 1 (great) **batman** (in 1740) = 18 Russian funt = 7.4 kg;
- 1 (small) **batman** (in 1740) = 9¼ Russian funt = 3.8 kg.

### 31 Kiauchau [Present-day Jiaozhou]

Following the murder of two missionaries in Shantung in 1897, Germany occupied Klaowchow Bay. The area was transferred to Germany on a 99-year lease. The enclave was established as a free port in 1899, and a customs house set up to collect tariffs on goods moving to and from China. The Japanese laid siege to the port in 1914. Japan retained possession until 1922, when it was restored to China.

### 32 Khmer Republic

See *Cambodia*.

### 33 Kingman Reef

See *United States of America*.

One of the United States Minor Outlying Islands. The only human population consists of temporarily stationed scientific and military personnel.

### 34 Kiribati [Formerly: Gilbert Islands]

These islands were first sighted by Spanish mutineers in 1537. The Gilbert and Ellice Islands were proclaimed a British protectorate in 1892, and became the crown colony of the Gilbert and Ellice Islands in 1915. In 1937, the Phoenix islands were added to the group. The Japanese occupied the Gilbert and Ellice Islands from 1941 until 1943. The Central and Southern Line Islands were administratively attached to the Gilbert and Ellis Islands colony in 1972, and remained attached to the Gilbert Islands when the Ellice Islands were granted internal self-government by Britain in 1975. In 1978, the Ellice Islands gained their independence as Tuvalu. The Gilbert Islands, which include the Gilbert, Phoenix,

Ocean and Line Islands, gained their independence as the Republic of Kiribati in 1979.

The British Imperial system of weights and measures is still used, despite the fact that the metric system has been officially adopted.

#### 34.1 Currency

1979–:	1 Kiribati dollar = 100 cents
1966–1979:	1 Australian dollar = 100 cents
1945–1966:	1 Australian pound = 20 shillings = 240 pence
1942–1945:	1 Oceanian pound = 20 shillings
1892–1942:	1 Australian pound = 20 shillings = 240 pence

### 35 Kingdom of Kongo

See also *Congo Free State*, *French Equatorial Africa*, and *Portuguese West Africa*.

This Kingdom was established in the 1390s. A civil war divided and weakened the empire between 1665 and 1709. In 1857, it became a Portuguese vassal state, and in 1914, the state was completely dissolved by Portuguese authority. Today, the area comprises northern Angola, the Republic of Congo, and the western portion of the Democratic Republic of Congo.

*Main sources:* [MAMB], [SJÖH], and [SUND]

#### 35.1 Currency

1651–1857:	1 mpusu (napkin-sized cloth made of leaves from the raffia palm, <i>Raphia taedigera</i> )
fifteenth century–1880s:	1 nzimbu (the Kikongo name of a small shell from <i>olivancillaria nana</i> )

Rate of exchange in 1782, based on Darteville (1953)

				Portuguese real
<b>bondo</b> <sup>a</sup>				5000
10	<b>lifucu</b> or <b>lufucu</b>			500
100	10	<b>funda</b>		50
100,000	10,000	1000	<b>nzimbu</b>	0.05

<sup>a</sup>Equivalent to one cofo = a small basket in which the nzimbu shells were placed upon collection from the sea. The normal weight of one cofo, according to Bontinck (1987), was about 30 kg. One cofo has also been reported as 20,000 nzimbus

Other shells used as a medium of exchange were conus shells, achatina shells, and cypraea shells. There was also a unit called a quiranta = 6 musanga = 6 strings of achatina shell slices = 2000 Portuguese reals (as reported in 1857). Apart from these shells, various other commodities were simultaneously used as a medium of exchange, such as fabrics, wooden and metal objects, salt, and livestock.

Fabrics used as a medium of exchange:

- 1 cortade = a piece of fabric, about three feet long, made of mbongo;
- 1 didiba (*pl.* madiba) = a piece of fabric, 600 × 400 mm, made of dibondo;
- 1 ipeko = a piece of fabric, 1 – 1.2 m × 400 mm, made of raffia;

Some other commodities used as a medium of exchange, based on [MAMB, pp. 34–40]:

- 1 kas'uyu (in Kasai, iron or copper axes);
- 1 shoka or iwenga (in Bankutu, spearhead-shaped axes) = 10 mitako;
- 1 linganda (in Lomami, spearheads) = 100 mitako;
- 1 boloko = 10 large kundjas (in Lukenie, dagger-shaped spearheads) = 20 small kundjas;
- 1 ntsengo (in Bakongo, hoes) = 300 nzimbu;
- 1 libako (sort of adze used to make pirogues) = 9 mitako;
- 1 lukano (in Katanga and Kasai, flat ingot St Andrew-shaped cross);
- 1 nsambu (in Bayeke, ring of copper wires);
- 1 mitako (in Bateke, Bayanzi, and Bobangi, red copper cylinder);

- 1 bongombwa (in Wangata, brass necklace about 1–10 kg) = 400–1000 mitakos.

## 35.2 Units of Quantity

- 1 “ten” = a bundle containing twelve lengths of cloth;
- 1 “five” = a bundle containing six lengths of cloth.

## 35.3 Units of Length

Some reported measures during the nineteenth century:

- 1 **doti** (among the Bemba people in Lamba) = 4 yards = 3.66 m;
- 1 **doti** (among the Rega people, the Tumbwe people, and the Sukuma people) = 3.6 m;
- 1 **doti** (among the Luba people) = 2 m;
- 1 **brasse** (in the Upper Congo area) = 2 m;
- 1 **doti** (among the Bango-Bango people) = 1.62 m;
- 1 **brasse** (in the Alima area) = 1.20 m;
- 1 **brasse** (in the Kasai-Kwango area) = varied between 0.75 and 1.5 m.

## 35.4 Units of Capacity

In general, the volume of grain was judged by eye alone.

## 35.5 Units of Weight

In general, weight was determined by holding two different objects and judging their relative weights.

## 36 Korea

See also *North Korea* and *South Korea*.

The Three Kingdoms of Korea refer to the kingdoms of Baekje, Goguryeo, and Silla, which

dominated the Korean peninsula from about 57 CE until 668 CE, when the area was unified under the Silla Dynasty. The Goryeo state was founded in 918 by Taejo (877–943), and lasted until the abdication of Gongyang (1345–1394) in 1392. The Joseon state was established by Taejo Yi Seong-gye (1335–1408) in 1392, and lasted until the Korean Empire was declared in 1897. The area remained one nation until 1910, when Korea was annexed by Japan. In 1945, Soviet troops and US troops divided Korea into North Korea and South Korea.

Before modern times, there were various measures in use that were not standardized. The Korean system of weights and measures was overhauled and standardized during the reign of Sejong the Great (b. 1397, r. 1418–1450) in the Joseon Dynasty. The base unit and physical rule for length was the *cheok*, which was derived from the ancient decimal Chinese scale of 1 jang = 10 cheok = 100 chon = 1000 bun = 10,000 ri. These units were used in everyday life, along with units stemming from the human body, such as the *gil* and the *bal*. Dry commodities were measured by vessels called *mal* and *seung*. Traditional weight units were the *nyang*, the *geun*, and the *don*. The traditional system, usually called *do-ryang-hyeong*, indicating length, volume, and weight, was linked to the metric system in 1902 and 1905 by 대한제국 도량형법 (Weights and Measures Act for the Daehan jeguk (Great Korean Empire)). During the early twentieth century, weights and measures gradually began to resemble those used in Japan. In 1926, the metric system was legally adopted by laws and regulations of Chosensōtokufu (Japanese Government-General of Colonial Korea). The customary weights and measures were prohibited

in 1961, but the use of these units was not reported to have been completely eradicated until mid-2007.

*Main sources:* [CHÖN], [DAEH], [DAIG], [GRAY3], [GUKR], [HA], [JUEH], [KORE], [LEE2], [PARK3], [REPO], [SINA], [UN55], [UN66], and [YAGY]

*Korean source:*李宗峯. 한국중세도량형제연구. 혜안, 2001. Series: 민족 문화 학술 총서, 23.

36.1 Currency

- 1902–1945: 1 Korean Yen (Hangul: 원) = 100 sen
- 1902–1910: 1 Korean won (Hangul: 원/Hanja: 원) = 100 chŏn (Hangul: 천/Hanja: 錢)
- 1892–1902: 1 Korean yang (Hangul: 양/Hanja: 兩) = 10 jeon (전/錢) = 100 bun (분/分); 1 hwan (환/圓) = 5 yang
- 1633–1892: 1 Korean mun (Hangul: 문/Hanja: 文)

36.2 Units of Quantity

Apples and garlic were sold in a basic unit of 100;  
Cucumbers were sold in packs of 50;  
Dried laver was sold in a basic unit of 40 sheets;  
Paper was sold in packs of 20 sheets;  
Dried croaker was sold in strings of 20;  
Croaker was sold in strings of ten.

36.3 Units of Length

Estimated values for scale used during the third century and the sixth to seventh centuries

리	步	尺, 尺, or 촌	丈	分 or 寸	Metric	Metric
li or ri					434.16 m	531.18 m
300	bo, pu, or po				1.447 2 m	1.770 6 m
1800	6	cheok, cha, ch'ök, ch'ök, or ja			241.2 mm	295.1 mm
18,000	60	10	chi, ch'on, or chang		24.12 mm	29.51 mm
180,000	600	100	10	bun or pun	2.412 mm	2.951 mm

Estimated values for scale used during the seventh to tenth centuries and the tenth to fourteenth centuries

리	步	尺, 치, or 촌	치	分 or 분	Metric	Metric
<b>li or ri</b>					559.80 m	552.96 m
360	<b>bo, pu, or po</b>				1.555 m	1.536 m
1800	5	<b>cheok, cha, ch'ök, ch'ök, or ja</b>			311.0 mm	307.2 mm
18,000	50	10	<b>chi, ch'on, or chang</b>		31.10 mm	30.72 mm
180,000	500	100	10	<b>bun or pun</b>	3.110 mm	3.072 mm

During the eighth century, there were two different shaku.

Some yardsticks were deposited for safekeeping at the Department of Public Works. According to [REPO, p. 464], these were:

The *yöng jo chök* (used in measuring all lumber and building materials);

The *po-baik chök* (yardstick used for all cloth);

The *chu chök* (used in determining the values of the various musical notes [AU: I'm not sure what you mean by the 'musical notes'] and in the manufacture of musical instruments);

The *yei-gi chök* (used in connection with various ceremonial functions).

During the early nineteenth century, there was six kinds of *cheok* (of which the first five are shown in 경국대전, the Gyeonggudaejeon law, written during the early Joseon Dynasty), according to the object to be measured:

1 **jucheok** (周尺; also known as the Zhou foot, used for land surveying) = 207.0 mm or 204.5 mm;

1 **hwangjongcheok** (the length of a tube sounding a particular tone called a hwangjong) = 307.0 mm;

1 **yeongjocheok** (造營尺; was based on the Ming foot, and used for construction work) = 303.0 mm;

1 **joryegicheok** (for manufacturing sacrificial vessels) = 280.5 mm;

1 **pobaekcheok or pocheok** (布座尺; for measuring cloth) = 361.5 mm;

1 **chimcheok** (for sewing) = 257.0 mm.

As the pobaekcheok was connected with the collection of taxes, its standard length became longer over time, according to [LEE2, p. 62].

British Imperial-linked system during the late nineteenth century

리		간		尺, 치, or 촌	치	分 or 분		Metric
<b>li<sup>a</sup></b>								354.33 m
107 $\frac{1}{7}$	<b>zhang</b>							3.307 m
300	2 $\frac{1}{5}$	<b>kan</b>						1.181 1 m
952 $\frac{19}{17}$	8 $\frac{7}{85}$	3 $\frac{1}{17}$	<b>ren</b>					371.83 mm
1800	16 $\frac{1}{5}$	6	1 $\frac{9}{10}$	<b>cheok, cha, ch'ök, ch'ök, or ja<sup>b</sup></b>				196.85 mm
18,000	168	60	1 8 $\frac{1}{10}$	10	<b>chi</b>			19.685 mm
180,000	1680	600	1 88 $\frac{1}{100}$	100	10	<b>bun or pun</b>		1.968 5 mm
1,800,000	16,800	6000	1 888 $\frac{1}{1000}$	1000	100	10	<b>ri</b>	196.85 $\mu$ m

<sup>a</sup>Until 1905, usually defined as 1/10 the size of the Japanese ri. This has also been reported as 1296 new ch'ök = 392.727 mm

<sup>b</sup>Defined as 7 $\frac{3}{4}$  in. For building materials = 12 $\frac{1}{2}$  in = 307.975 mm

For general goods from 1905 to 1961

리			간	尺, 치, or 촌	치	分 or 분			Metric
li <sup>a</sup>									420 m
3 <sup>7</sup> / <sub>20</sub>	chung								109 <sup>7</sup> / <sub>11</sub> m = ~109.091 m
138 <sup>7</sup> / <sub>5</sub>	36	chang							3.030 m
231	60	1 <sup>7</sup> / <sub>5</sub>	kan						1.818 m
1,386	360	10	6	cheok, cha, ch'ök, ch'ök, or ja					10/33 m = ~303.030 mm
13,860	3,600	100	60	10	chi				1/33 m = ~30.303 mm
138,600	36,000	1,000	600	100	10	fun or pun			3 <sup>7</sup> / <sub>33</sub> mm = ~3.030 mm
1,386,000	360,000	10,000	6,000	1,000	100	10	ri		10/33 mm = ~303.03 µm
13,860,000	3,600,000	100,000	60,000	10,000	1,000	100	10	mo	1/33 mm = ~30.303 µm

<sup>a</sup>[UN66] reported the li as 3<sup>5</sup>/<sub>55</sub> km, which does not appear to be a magnitude the Korean li ever had, according to [GRAY3]. On March 21, 1905, the Weights and Measures Act defined the li as 1386 ch'ök = 420 m

### 36.4 Units of Area

During the early Silla Kingdom, land areas were measured for taxation by **tianjie**, **kyöl**, and **pu** (=a square linear pu). As the quality of the soil varied a lot from one area to another, the kyöl was said to equal a piece of farmland that produced one hundred pack-boards, *chige*, of rice.

kyöl			
100	chige		
1000	10	sheaf	
10,000	100	10	a handful of rice

Before the Koryŏ dynasty, one kyöl was said to equal one Chinese qing, and one pu, one Chinese mu. One kyöl was estimated as being equal to 33<sup>1</sup>/<sub>3</sub> pu = about 45.496 m<sup>2</sup>. During the Koryŏ dynasty, a new system for measuring land areas was introduced, in 1389, in which arable land was divided into three categories: *sangjŏnch'ök* (=20 chi), *chungjŏnch'ök* (=25 chi), and *hajŏnch'ök* (=30 chi). In this system, the smaller the unit of measure, the higher the quality of the soil. During the Chosŏn dynasty, this system was expanded to five categories. The system was based on the quality of the land, and the actual sizes of the lands were all identical. A new system of land assessment, consisting of six categories based on the degree of fertility of the land, was implemented in the late years of Sejong the Great (r. 1418–1450), in 1443, and confirmed during

the reign of King Hyojong (r. 1649–1659). The sizes of the land areas categorised by this system were established as follows: the first grade = 100 pu, the second grade = 85 pu, the third grade = 70 pu, the fourth grade = 55 pu, the fifth grade = 40 pu, and the sixth grade = 25 pu.

Since the seventeenth century, a lot of names have been given to different shapes of land areas, for example, *pangjŏn* (quadrate field), *chikjŏn* (oblong field), *kugojŏn* (right-triangle field), *chejŏn* (ladder-shaped field), *sajŏn* (spindle-shaped field), *yugojŏn* (drum-shaped field), *sabudŭngjŏn* (field whose four sides are unequal in length), *mijŏn* (eyebrow-shaped field), *ugajŏn* (cow-horn-shaped field), *wŏnjŏn* (circular field), *hwanjŏn* (loop-like field), *pogwŏljŏn* (field in the shape of an overturned moon), *hosijŏn* (bow-shaped field), *ogakjŏn* (pentagonal field), *yukgakjŏn* (hexagonal field), *sahyŏngjŏn* (snake-shaped field), and *teagojŏn* (field in the shape of a large drum). The law for measuring and assessing these types of field became obsolete during the early nineteenth century.

Traditional system for measuring rice paddies and dry fields

					Metric
gyeol					~10 371 m <sup>2</sup>
	bu				329.77 m <sup>2</sup>
		sok			
			pa	5 cheok <sup>2</sup>	

After 1891

정은	단 or 단위		평	습 or 홑			Metric
chungbo						300 × 360 cheok	9 917.36 m <sup>2</sup>
10	tan					300 × 36 cheok	991.74 m <sup>2</sup>
100	10	myo				30 × 36 cheok	99.174 m <sup>2</sup>
3000	300	30	pyong			6 × 6 cheok	3.305 8 m <sup>2</sup>
30,000	3000	300	10	hop or hob		0.6 × 6 cheok	0.330 58 m <sup>2</sup>
300,000	30,000	3000	100	10	jak	0.6 × 0.6 cheok	330.58 cm <sup>2</sup>

36.5 Units of Volume

1 세 제 곱미터(after 1926) = 1 m<sup>3</sup>.

36.6 Units of Dry Capacity

For rice in the Kingdom of Joseon

				Metric
hap				721.6 L
10	sŭng			72.1 L
100	10	tu		7.2 L
1000	100	10	kok	0.7 L

For grain (used in estimating a standing crop of grain, in order to ascertain its value)

					Taxation
kyöl					6 dollars
100	chim				6 cents
1000	10	mut			6/10 cent
6000	60	6	on-k’om		1/10 cent
36,000	360	36	6	put	1/60 cent

For grain and rice in the kernel

石	말 or 두	되 or 승	습 or 홑		Metric
sök, seok, sŏm, or seom					~144 kg
10	mal				~14.4 kg
100	10	doe, toe, toi, sheng, or sŭng <sup>a</sup>			~1.44 kg
1000	100	10	hop or hob		~144 g
10,000	1000	100	10	sa <sup>b</sup>	~14.4 g

<sup>a</sup>Mostly used for rice. Reported to vary in size by location, according to [REPO, p. 332]. If the goods were flattened off with a stick, it was called a **kkaekki**, **mase**, or **pyeongseung**. If the rice was sold by heaped measure, it was called a **gobong** or **goseung**, and was then worth 12 hops, according to [CHÖN]

<sup>b</sup>=1 pinch of rice

Other measures reported during the nineteenth century:

- 1 **areumdoe** (for chestnuts, dates and such commodities when bought directly from the farmer) = an indefinite measure in which goods were pressed down and piled up as high as possible;
- 1 **hnui** = 131.82 L.

36.7 Units of Liquid Capacity

During the third century:

1 **sŭng** = 202.3 mL.

During the sixth to tenth centuries:

1 **sŭng** = 594.4 mL.

During the tenth to fourteenth centuries:

1 **sŭng** = 948.8 mL.

After 1891

섬 or 석	말 or 두		되 or 승		습 or 홑		Metric
<b>sŏm</b> or <b>sŏk</b>							180.391 400 L
10	(large) <b>mal</b>						18.039 140 L
20	2	(small) <b>mal</b>					9.019 570 L
100	10	5	(large) <b>dwe, dai, doi, toe, or tu</b>				1.803 914 L
200	20	10	2	(small) <b>dwe, dai, doi, toe, or tu</b>			901.957 mL
1000	100	50	10	5	<b>hop or hob</b>		180.391 mL
10,000	1000	500	100	50	10	<b>jak</b>	18.039 mL

Metric system after 1926

					Metric
헥토리터					100 L
100	리터				1 L
1000	10	데시리터			100 mL
10,000	100	10	센티리터		10 mL
100,000	1000	100	10	밀리리터	1 mL

36.8 Units of Weight

Estimated scale used during the third century and the sixth to seventh centuries

		兩	Metric	Metric
<b>sŏk</b>			26.728 kg	80.183 kg
120	<b>kŭn</b>		222.73 g	668.19 g
1920	16	<b>yang</b>	13.92 g	41.76 g

Estimated scale used during the seventh to fourteenth centuries

		兩		Metric
<b>sŏk</b>				71.618 kg
120	<b>kŭn</b>			596.817 g
1920	16	<b>yang</b>		37.301 g
19,200	160	10	<b>chŏn</b>	3.73 g

Commercial system during the Joseon Dynasty

石	飾	斤	兩	誅	Metric
<b>daeching</b>					~71.4 kg
4	<b>jungching</b>				~17.9 kg
120	30	<b>geun</b>			~595.2 g
1920	480	16	<b>yang</b>		~37.2 g
46,080	11,520	384	24	?	~1.55 g

For grains, fruit, meat, vegetables and ginseng during the mid-nineteenth century

石	飾			斤		兩			Metric
daeching									~60 kg
3⅓	jungching <sup>a</sup>								~18 kg
33⅓	10	soching <sup>b</sup>							~1.8 kg
50	15	1½	du geun						~1.2 kg
100	30	3	2	geun					~600 g
200	60	6	4	2	ban geun				~300 g
1600	480	48	32	16	8	yang			~37.5 g
16,000	4800	480	320	160	80	10	chŏn, don, or jeon <sup>c</sup>		~3.75 g
160,000	48,000	4800	3200	1600	800	100	10	bun or pun <sup>d</sup>	~375 mg
1,600,000	480,000	48,000	32,000	16,000	8000	1000	100	10	ri ~37.5 mg

<sup>a</sup>Also reported as 7 geun  
<sup>b</sup>Also reported as 1 geun  
<sup>c</sup>The weight of a jeon coin  
<sup>d</sup>The weight of enough water to fill a hwangjong tube was defined as 88 bun

After 1891

			斤	兩				Metric
pikul								60 kg
16	kwan or gwan							3.75 kg
66⅔	4⅓	yi						900 g
100	6¼	1½	keun or geun					600 g
1600	100	24	16	yang or liang				37.5 g
4000	250	60	40	2½	nijo			15 g
16,000	1000	240	160	10	4	chŏn, don, or jeon		3.75 g
160,000	10,000	2400	1600	100	40	10	bun or pun	375 mg

Metric system after 1926

						Metric
메가그램						1000 kg
1000	킬로그램					1 kg
10,000	10	헥토그램				100 g
1,000,000	1000	100	데카그램			1 g
100,000,000	100,000	10,000	100	밀리그램		1 mg

37 Kosovo [Formerly part of Yugoslavia]

See Ottoman Empire and Serbia.  
This area was part of the Dardanian kingdom during the fourth century BC. It was part of the Ottoman Empire from 1455 until 1912, when the

region was incorporated into the Kingdom of Serbia. After the constitution of Yugoslavia, it became part of the Autonomous Province of Kosovo and Methohija within the Republic of Yugoslavia. In 2008, with partial international recognition, the Republic of Kosovo declared itself an independent state.

## 38 Kushan Empire (30–375)

See *India* and *Maurya Empire*.

The Kushan Empire was a former Bactrian state of ancient India that fell to the Sassanians during the late fourth century.

The Kushan rulers kept alive the influences of Hellenism in Afghanistan and northwestern India. Coins, weights, and measures used at markets were all based on Greek measures.

### 38.1 Currency

1 Kushan drachm

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## 39 Kuwait

The Al-Sabāh family, which still rules Kuwait, founded Kuwait City around 1710, and assumed the sheik position in 1756. In 1820, the representatives of the British government signed a general peace treaty with many important sheiks on the Pirate Coast, later renamed the Trucial Coast. A Treaty of Exclusive Relations was signed with Kuwait in 1899. Kuwait became a British protectorate in 1914, and gained its independence in 1961.

The metric system has been official since 1961, and compulsory since 1964.

*Main source:* [TIGN]

### 39.1 Currency

1961–: 1 Kuwaiti dinar = 1000 fils  
 1959–1961: 1 Persian Gulf rupee = 100 naye paise  
 1899–1959: 1 Indian rupee = 16 anna

### 39.2 Units of Weight

1 **maund** = 56 lb = 25.4 kg.

## 40 Kyrgyzstan [Formerly: Kara-Kyrgyz Autonomous Oblast, Kirghiz Autonomous Soviet Socialist Republic and Kirghiz Soviet Socialist Republic]

Kyrgyzia was largely nomadic before being incorporated into Russia in 1876. The area was named the Kara-Kyrgyz Autonomous Oblast from 1919 until 1924, when it became the Kirghiz Autonomous Soviet Socialist Republic within the Russian Socialist Federal Soviet Republic. In 1936, it was renamed the Kirghiz Soviet Socialist Republic within the USSR. Kyrgyzstan declared its independence in 1991.

Very little is actually known about the premetric measures used in this area. One may presume that some Persian and Russian measures were in use before 1876.

### 40.1 Currency

1993–: 1 Kyrgyzstani som = 100 tyiyn  
 –1993: 1 Russian ruble = 100 kopeks

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## 41 Laos

See also *China* and *Thailand*.

A Laotian state, Lan Xang, was established during the fourteenth century by King Fa Ngum, who ruled an area that included present-day Laos, northeastern Thailand and the southern part of China's Yunnan province. Except for rule by Burma from 1574 to 1637, the Lan Xang kingdom ruled Laos until 1713, when it split into three separate kingdoms: Champassak, Luang Prabang, and Vien Chan. These territories became French protectorates in 1893. In 1946, the King of Luang Prabang became King of an autonomous Kingdom of Laos within French Indochina. Laos gained its full independence in 1955. Civil war broke out in 1960, with the U.S. supporting the government of the Kingdom of Laos and the North Vietnamese helping the Communist Pathet Lao. The war lasted until the establishment of the Lao Peoples Democratic Republic in 1975.

The metric system has been official since 1930.

*Main sources:* [BETR], [CUMM], [FENN], [GEAR], [HEIM], [RUSS], [UN54], [UN55], and [ZIMM]

## 41.1 Currency

1979–: 1 (new) Lao kip = 100 att  
 1976–1979: 1 Pathet kip or liberation kip  
                   = 100 att  
 1952–1976: 1 Royal Lao kip = 100 att  
 1893–1955: 1 French Indochinese piaster  
                   = 100 centimes

## 41.2 Units of Length

Some traditional measures used by the Hmong-speaking people:

1 **ntsua** = the distance one can see in one view (from the eye to the horizon);

1 **daj** = the distance between the tip of the middle fingers when arms are outstretched = about 2 m.

Traditional system during the late nineteenth century

							Metric
<b>va-yiet louang</b>							~3.2 m
2	<b>hong cuk louang</b>						~1.6 m
4	2	<b>sok louang</b>					~0.8 m
8	4	2	<b>khub louang</b>				~0.4 m
16	8	4	2	<b>kam louang</b>			~0.2 m
96	48	24	12	6	<b>niou louang</b>		~33 mm
384	192	96	48	24	4	<b>kabiet louang</b>	~8 mm

British Imperial-linked system before 1930

ໂມ			ໂອ	Imperial	Metric
<b>may</b>				1 mile	1609.344 m
1760	<b>la</b>			1 yd	914.4 mm
5280	3	<b>dtin</b>		1 ft	304.8 mm
63,360	36	12	<b>niw</b>	1 in	25.4 mm

Metric-linked system before 1930

							Metric
<b>va-yiet louang</b>							2 m
2	<b>hong cuk louang<sup>a</sup></b>						1 m
4	2	<b>sok louang</b>					500 mm
8	4	2	<b>khub louang</b>				250 mm
16	8	4	2	<b>kam louang</b>			125 mm
96	48	24	12	6	<b>niou louang</b>		20.833 3 mm
384	192	96	48	24	4	<b>kabiet louang</b>	5.208 33 mm

<sup>a</sup>Also called **ken**

Metric-linked system reported after 1930

							กระเบื้อง	Metric
<b>kí-lóh-maet</b> or <b>lackilo</b>								1 km
25	<b>sénh</b>							40 m
500	20	<b>va</b> or <b>va-yiet</b>						2 m
2500	100	5	<b>sok</b> or <b>bok</b>					400 mm
5000	200	10	2	<b>khup</b> or <b>khub</b>				200 mm
10,000	400	20	4	2	<b>kam</b>			100 mm
60,000	2400	120	24	12	6	<b>niou</b>		16.67 mm
240,000	9600	480	96	48	24	4	<b>kabiet</b>	4.167 mm

Metric system since the 1960s

ກິໂລແມັດ	ແມັດ	ເຮັດຊິແມັດ	ຊັງຕີແມັດ	ມິລີແມັດ	Metric
<b>iōvāmad</b>					1 km
1000	<b>mad</b>				1 m
10,000	10	<b>ēāimad</b>			100 mm
100,000	100	10	?		10 mm
1,000,000	1000	100	10	?	1 mm

### 41.3 Units of Area

French-linked system

ເຂ or ເຖ			Metric
<b>hâi</b> or <b>rai</b>			~1024 m <sup>2</sup>
4	<b>ngáan, ngarn, or ngan</b>		~256 m <sup>2</sup>
400	100	<b>wáa</b> or <b>talangva</b>	~2.56 m <sup>2</sup>

Metric-linked system

ເຂ or ເຖ				Metric
<b>hâi</b> or <b>rai</b>				1600 m <sup>2</sup>
4	<b>ngáan, ngarn, or ngan</b>			400 m <sup>2</sup>
400	100	<b>wáa</b> or <b>talangva</b>		4 m <sup>2</sup>
1600	400	4	<b>māt mōn tōn</b>	1 m <sup>2</sup>

### 41.4 Units of Liquid Capacity

Metric-linked system, as reported before and after 1930

					Metric	Metric
<b>thang louang</b>					200 L	40 L
10	<b>bok louang</b>				20 L	4 L
40	4	<b>khanan louang<sup>a</sup></b>			5 L	1 L
80	8	2	<b>kob louang</b>		2.5 L	500 mL
160	16	4	2	<b>phaĩ mû louang</b>	1.25 L	250 mL

<sup>a</sup>After metrification, also **liit**

Metric system since 1960s

	᳚᳚				Metric
?					1 hL
100	᳚᳚				1 L
1000	10	?			1 dL
10,000	100	10	?		1 cL
100,000	1000	100	10	?	1 mL

## 41.5 Units of Weight

British Imperial-linked system

		Imperial	Metric
<b>bpohn</b>		pound	453.592 g
16	<b>kohng pohn</b>	ounce	28.349 g

Chinese-linked upper scale before 1930 and metric-linked lower scale after 1930

					Metric	Metric
<b>lane<sup>a</sup></b>					1209.6 kg	1200 kg
10	<b>sène</b>				120.96 kg	120 kg
20	2	<b>hab</b> or <b>picul</b>			60.48 kg	60 kg
100	10	5	<b>mun</b> or <b>mune</b>		12.096 kg	12 kg
1000	100	50	10	<b>phân, xang, or sang</b>	1.209 6 kg	1.2 kg

<sup>a</sup>Sometimes called **coyan**, **coyang**, **koyan**, or **koyang**

Chinese-linked lower scale before 1930 and metric-linked lower scale after 1930

				᳚᳚						Metric	Metric
<b>phân, xang, or sang</b>										1.209 6 kg	1.2 kg
1½	<b>kí-lóh</b>									1.008 kg	1 kg
2	1⅔	<b>kati</b>								604.8 g	600 g
8	6⅔	4	<b>hoī</b> or <b>hoĩ</b>							151.2 g	150 g
80	66⅔	40	10	<b>bàat</b> or <b>bath</b>						15.12 g	15 g
320	266⅔	160	40	4	<b>salung<sup>a</sup></b>					3.78 g	3.75 g
640	533⅔	320	80	8	2	<b>fuang<sup>b</sup></b>				1.89 g	1.875 g
1280	1066⅔	640	160	16	4	2	<b>kâ</b>			945 mg	937.5 mg
3200	2666⅔	1600	400	40	10	5	2½	<b>houn</b>		378 mg	375 mg
32,000	26,666⅔	16,000	4000	400	100	50	25	10	<b>li</b>	37.8 mg	37.5 mg

<sup>a</sup>Before 1930, it was equal to the Chinese *chien*, the Malaysia *chee*, and the Tonkinese *dong*

<sup>b</sup>Sometimes called **fonang**. Traditionally said to equal the weight of 96 rice grains

For opium

						Metric
<b>choi</b> or <b>joi</b>						1.6 kg
$4\frac{1}{15}$	<b>pong</b>					375 g
$42\frac{2}{3}$	10	<b>bia</b> or <b>hong</b>				37.5 g
$426\frac{2}{3}$	100	10	<b>phun</b> or <b>bak</b>			3.75 g
$4266\frac{2}{3}$	1,000	100	10	<b>houn</b>		375 mg
$42,666\frac{2}{3}$	10,000	1,000	100	10	<b>li</b>	37.5 mg

Other measures for drugs reported during the nineteenth century:

1 tael = 270 g.

Metric system since 1960s

	நிலை					Metric
<b>dton</b>						1000 kg
1000	<b>gilo</b>					1 kg
1,000,000	1000	?				1 g
10,000,000	10,000	10	?			100 mg
100,000,000	100,000	100	10	?		10 mg
1,000,000,000	1,000,000	1000	100	10	?	1 mg

42 Later Three Kingdoms of Korea

See *Korea*.

43 Latvia [Formerly: Latvian Soviet Socialist Republic]

Latvia was originally divided into the smaller states of Livonia, Lettgallia and Courland. In the middle ages, these states formed part of a branch of the Teutonic Order. In 1561, the area became part of Poland-Lithuania. In 1621, most of Livonia became Swedish, while Lettgallia remained Polish. Hanseatic German merchants ruled over Riga, which ruled over the hinterlands of Latvia. Livonia was annexed by Russia from Sweden in 1721. Lettgallia was annexed by Russia in 1773 and Courland-Semigallia in 1795. Latvia declared its freedom in 1918, although independence was not formally recognised by Russia until 1920. In 1940, Latvia was forcibly incorporated into the USSR.

Germany occupied Latvia from 1941 to 1944 and made it part of Ostland (Estonia, Latvia, Lithuania, and parts of Belarus). The Republic of Latvia declared its independence in 1991.

The main influences on the systems for weights and measures have been the Swedish and Russian systems, but some measures used in Nuremberg also survived well into the nineteenth century. The metric system has been officially in use since 1918.

*Main source:* [MART3]

43.1 Currency

- 1993–: 1 Latvian lats = 100 santims
- 1992–1993: 1 Latvian rublis = 100 kapeikas
- 1940–1992: 1 Soviet ruble = 100 kopeks
- 1922–1941: 1 Latvian lats = 100 santims
- 1919–1922: 1 Latvian rublis = 100 kapeikas
- 1839–1919: 1 Russian ruble = 100 kopeks
- 1839: 1 Albertsthaler = 3 Albertsgulden = 90 Albertsgroschen

## 43.2 Units of Length

Old Livonian system

				Metric
<b>süld or faden</b>				2.438 4 m
3	<b>arssin</b>			812.8 mm
4	1 $\frac{1}{3}$	<b>künnar</b>		609.6 mm
7	2 $\frac{1}{3}$	1 $\frac{3}{4}$	<b>jalg or foute</b>	348.3 mm

In Courland and Livonia during the seventeenth century

		Metric
cubit		609.6 mm
2	<b>pēda</b>	304.8 mm

Russian-linked system during the early nineteenth century

				Metric
<b>miil</b>				7467.46 m
7	<b>verste</b>			1066.78 m
13, 906 $\frac{1}{5}$	1986 $\frac{3}{5}$	<b>küünarluu</b>		536.99 mm
55, 624 $\frac{4}{5}$	496 $\frac{13}{20}$	4	<b>kvartal</b>	134.25 mm

In Riga, based on [MART3]

						Metric
<b>Meile</b>						7467.532 968 m
7	<b>Werst</b>					1066.790 424 m
12,250	1750	<b>Landmesser Elle</b>				609.595 mm
24,500	3500	2	<b>Fuss</b>			304.797 mm
294,000	42,000	24	12	<b>Zoll</b>		25.400 mm
3,528,000	504,000	288	144	12	<b>Linie</b>	2.117 mm

At Liepāja, based on [MART3]

		Metric
<b>Faden</b>		1.612 836 m
6	<b>Fuss</b>	268.806 mm

Russian-linked system in Jelgava

				Metric
<b>Meile</b>				7467.532 968 m
7	<b>Werst</b>			1066.790 424 m
12,250	1750	<b>Landmesser Elle</b>		609.594 mm
24,500	3500	2	<b>Fuss</b>	304.797 mm

Courland system in Jelgava

			Metric
<b>Elle</b>			537.612 mm
2	<b>Fuss</b>		268.806 mm
4	2	<b>Quartier</b>	134.403 mm

Other reported measures:

- 1 **Elle** (in Riga) = 4 Quartier = 537.612 mm;
- 1 **Fuss** (Rhine scale in Jelgava and in Riga) = 313.853 mm;
- 1 **Quartier** (in Riga) = 134.403 mm;
- 1 **Palm** (in Jelgava and in Riga) = 94.410 mm.

### 43.3 Units of Area

Old Livonian system during the seventeenth century

			Metric
<b>tonnstelle</b>			5191.9 m <sup>2</sup>
1 $\frac{1}{2}$	<b>pourvete or loofstelle</b>		3708.5 m <sup>2</sup>
35	25	<b>kapp</b>	148.34 m <sup>2</sup>

Russian-linked system in Riga during the late nineteenth century, based on [MART3]

						Metric
<b>tiin</b>						10,404.953 4 m <sup>2</sup>
2	<b>tündrimmaa or tonnstelle</b>					5202.476 7 m <sup>2</sup>
2 $\frac{1}{2}$	1 $\frac{1}{2}$	<b>vakamaa or loofstelle<sup>a</sup></b>				3716.054 8 m <sup>2</sup>
70	35	25	<b>kapp</b>			148.642 2 m <sup>2</sup>
–	–	816 $\frac{1}{2}$	–	<b>ruutsüld</b>		4.552 1 m <sup>2</sup>
28,000	14,000	10,000	400	–	<b>ruutkünnar<sup>b</sup></b>	37.160 5 dm <sup>2</sup>
112,000	56,000	40,000	1600	–	4	<b>ruutjalg<sup>c</sup></b> 9.290 1 dm <sup>2</sup>

<sup>a</sup>According to *Meyers Großes Konversations-Lexikon*, Volume 10. Leipzig 1907, p. 601, equal to 3715.99 m<sup>2</sup>

<sup>b</sup>Also reported as **Quadrat Landmesser Elle**

<sup>c</sup>Also reported as **Quadrat Fuss**

Russian-linked system in Jelgava during the late nineteenth century, based on [MART3]

					Metric
<b>tonnstelle</b>					5202.476 7 m <sup>2</sup>
1 $\frac{1}{2}$	<b>loofstelle</b>				3716.054 8 m <sup>2</sup>
35	25	<b>kappe</b>			148.642 2 m <sup>2</sup>
14,000	10,000	400	<b>quadrat landmesser elle</b>		37.160 5 dm <sup>2</sup>
56,000	40,000	1600	4	<b>quadrat fuss</b>	9.290 1 dm <sup>2</sup>

### 43.4 Units of Volume

Russian-linked system for timber in Riga

		Metric
<b>faden</b>		4.077 516 m <sup>3</sup>
144	<b>kubik fuss</b>	28.316 dm <sup>3</sup>

### 43.5 Units of Dry Capacity

Old system for general use

		Metric
<b>koormus or last</b>		2892.246 L
42	<b>loof</b>	68.863 L

For barley, wheat, rye and peas at Liepāja, based on [MART3]

		Metric
<b>last</b>		3148.554 L
15	<b>chetvert</b>	209.903 6 L

In Riga during the early nineteenth century

			Metric
<b>vakk</b>			33.474–66.948 L
3–6	<b>külmit</b>		11.158 L
27–54	9	<b>stoof</b>	1.239 8 L

For cereals in Riga during the late-nineteenth century, based on [MART3]

									Metric
<b>last</b> <sup>a</sup>									4131.884 800 L
1¼	<b>last</b> <sup>b</sup>								3305.499 840 L
1⅓	1⅓	<b>last</b> <sup>c</sup>							3098.906 100 L
		1⅓	<b>last</b> <sup>d</sup>						1652.749 920 L
20	16	15	8	<b>chetvert</b>					206.594 240 L
30	24	22½	12	1½	<b>bochka or tonne</b>				137.729 160 L
60	48	45	24	3	2	<b>loof</b>			68.864 747 L
360	288	270	144	18	12	6	<b>külmit or kilmit</b>		11.477 430 L
1620	1296	1215	648	81	54	27	4½	<b>kanne</b>	2.550 546 L
3240	2592	2430	1296	162	108	54	9	2	<b>stoof</b> 1.275 270 L

<sup>a</sup>For malt, oats and peas

<sup>b</sup>For barley and wheat

<sup>c</sup>For rye

<sup>d</sup>For lime, tar, butter and flaxseed

For coal in Riga

			Metric
<b>last</b>			7565.921 856 L
12	<b>tonne</b>		630.493 488 L
5932⅔	494⅔	<b>stoof</b>	1.275 270 L

For salt in Riga

			Metric
<b>last</b>			2434.649 838 L
18	<b>salztonne</b>		135.258 324 L
1909⅔	106⅔	<b>stoof</b>	1.275 270 L

For herring in Riga

			Metric
<b>last</b>			1469.111 040 L
12	<b>salztonne</b>		122.425 920 L
1152	96	<b>stoof</b>	1.275 270 L

Other measures reported during the nineteenth century:

1 **last** (for lime and seeds) = 24 loof = 1653.600 L;

1 **tonne** (for coal) = 494⅔ stoof = 630.855 L;

1 **tonne** (for lime) = 2 loof = 137.8 L;

1 **tonne** (for salt) = 106¾ stoof = 136.213 L;

1 **tonne** (for fish) = 96 stoof = 122.406 L;

1 **tonne** (for apples) = 92 stoof = 117.392 L.

In Riga before 1923 and after 1923

						Metric	Metric
<b>sālitus</b>						2817.504 L	3187.92 L
24	<b>tūnder</b>					117.396 L	132.83 L
48	2	<b>vakk</b>				58.698 L	66.41 L
288	12	6	<b>kūlmit</b>			9.783 L	11.07 L
2592	108	54	9	<b>toop</b>		1.087 L	1.230 L
192,000	8000	4000	666 $\frac{2}{3}$	74 $\frac{7}{27}$	<b>kanttoll</b>	–	16.6 mL

## 43.6 Units of Liquid Capacity

In the country

								Metric
<b>oxhoft<sup>a</sup></b>								229.680 L
1½	<b>aam or tonne<sup>b</sup></b>							153.12 L
		<b>brügger tonne or brautonne<sup>c</sup></b>						
2	1⅓	1⅙	<b>tonne<sup>c</sup></b>					
6	4	3½	3	<b>enkurs<sup>d</sup></b>				38.28 L
30	20	17½	15	5	<b>felts</b>			7.656 L
180	120	105	90	30	6	<b>stops or shtoff</b>		1.276 L
720	480	420	360	120	24	4	<b>kortel</b>	319 mL

<sup>a</sup>For wine<sup>b</sup>It was called a tonne when used for spirits<sup>c</sup>For beer<sup>d</sup>In Courland = 28 stops or stoof = 35.708 L

Swedish-linked system in Riga during the seventeenth century

									Metric
aam									153.024 L
1⅙	tonne								137.722 L
2⅔	2	poure or loof							68.861 L
4	3⅕	1⅓	ankur or enkur						38.256 L
13⅓	12	6	3⅓	kulmet					11.476 8 L
20	18	9	5	1½	felts				7.651 2 L
60	54	27	15	4½	3	Kanne			2.550 4 L
120	108	54	30	9	6	2	stops or shtoff		1.275 2 L
480	432	216	120	36	24	8	4	kortel	318.8 mL

For wine in Riga during the late nineteenth century, based on [MART3]

								Metric
<b>oxhoft</b>								229.548 600 L
1½	<b>ohm</b>							153.032 400 L
6	4	<b>anker</b>						38.258 100 L
30	20	5	<b>viertel</b>					7.651 620 L
90	60	15	3	<b>kanne</b>				2.550 540 L
150	100	25	5	1⅓	<b>pegelstoof</b>			1.530 324 L
180	120	30	6	2	1⅕	<b>stoof</b>		1.275 270 L
720	480	900	24	8	4⅕	4	<b>quartier</b>	318.817 mL

For brandy in Riga during the late nineteenth century, based on [MART3]

		Metric
<b>schiffkast</b>		1836.388 800 L
12	<b>fass</b>	153.032 400 L

For beer in Riga during the late nineteenth century, based on [MART3]

		Metric
<b>brautonne</b>		133.903 350 L
105	<b>stoof</b>	1.275 270 L

Russian-linked system in Riga during the late nineteenth century

						Metric
<b>vaat</b>						434.8 L
10	<b>ankur</b>					43.48 L
40	4	<b>pang or wedro</b>				10.87 L
400	40	10	<b>toop or kruschka</b>			1.087 L
1600	160	40	4	<b>kortel</b>		271.75 mL
30,000	3000	750	75	18¾	<b>kanttoll</b>	14.49 mL

In Jelgava

			Metric
<b>tonne</b>			114.774 300 L
3⅞	<b>ankur</b>		35.707 560 L
90	28	<b>shtoff</b>	1.275 270 L

## 43.7 Units of Weight

In Riga

							Metric
<b>schiffspfund</b>							167.532 600 kg
1 $\frac{1}{3}$	<b>ton</b>						100.519 560 kg
3 $\frac{1}{3}$	2	<b>centner</b>					50.259 780 kg
20	12	6	<b>liespfund</b>				8.376 630 kg
400	240	120	20	<b>pfund</b>			418.831 g
12,800	7680	3840	640	32	<b>loth</b>		13.088 g
51,200	30,720	15,360	2560	128	4	<b>quentchen</b>	3.272 g

At Liepāja and in Jelgava

					Metric	Metric
<b>schiffspfund</b>					167.144 000 kg	167.444 800 kg
20	<b>liespfund</b>				8.357 200 kg	8.372 240 kg
400	20	<b>pfund</b>			417.860 g	418.612 g
12,800	640	32	<b>loth</b>		13.058 g	13.082 g
51,200	2560	128	4	<b>quentchen</b>	3.265 g	3.270 g

Some other reported measures:

- 1 **schiffslast** (for iron and copper in Riga) = 12 schiffpfund = 2010.391 200 kg;
- 1 **schiffslast** (for flour in Riga) = 11 $\frac{1}{4}$  schiffpfund = 1842.802 020 kg;
- 1 **schiffslast** (for green soap in Riga) = 10 schiffpfund = 1675.326 000 kg;
- 1 **schiffslast** (for white soap, tallow, butter, whale oil, vegetable oil and bristle in Riga) = 8 schiffpfund, netto = 1340.260 800 kg;
- 1 **schiffslast** (for wax and canape in Riga) = 6 schiffpfund, netto = 1005.195 600 kg;
- 1 **schiffslast** (for wool and plumage in Riga) = 2 $\frac{1}{2}$  schiffpfund, netto = 418.831 500 kg.

For gold and silver in Jelgava

		Metric
<b>mark</b>		209.306 g
16	<b>loth</b>	13.082 g

For gold in Jelgava

			Metric
<b>mark</b>			209.306 g
24	<b>karat</b>		8.721 g
288	12	<b>gran</b>	727 mg

For silver in Jelgava

			Metric
<b>mark</b>			209.306 g
16	<b>loth</b>		13.082 g
288	18	<b>gran</b>	727 mg

For gold and silver in Riga

					Metric
<b>mark</b>					209.415 750 g
8	<b>unze</b>				26.176 969 g
16	2	<b>loth</b>			13.088 484 g
64	8	4	<b>quentchen</b>		3.272 121 g
256	32	16	4	<b>quertlein</b>	818.030 mg

For medical use in Riga

							Metric
<b>pfund</b>							357.853 800 g
1½	<b>mark</b>						238.569 200 g
12	8	<b>unze</b>					29.821 150 g
96	64	8	<b>drachme</b>				3.727 644 g
288	192	24	3	<b>skrupel</b>			1.242 548 g
5760	3840	480	60	20	<b>gran</b>		62.127 mg
6165	4110	4 <sup>110/8</sup>	4 <sup>110/64</sup>	4 <sup>110/192</sup>	411/384	<b>ass</b>	58.05 mg

## 44 Lebanon

After the death of Alexander the Great (356–323 BCE), dominion over Lebanon was disputed between the Seleucid and Ptolemaic kings. Phoenicia was annexed by Rome in 64 BCE. During the twelfth and thirteenth centuries, modern Lebanon was part of the two Crusader kingdoms. In 1516, Lebanon became part of the Ottoman Empire. Lebanon briefly allied with Egypt between 1832 and 1840, but again became part of the Ottoman Empire in 1842. After World War I, the State of Grand Lebanon was declared under French Mandate in 1920. The Lebanese Republic gained independence in 1944.

The metric system was officially adopted on March 1, 1871, and became compulsory on March 1, 1874. It was once again stated as the only legally accepted system for weights and measures on August 22, 1935.

### 44.1 Currency

1948–:	1 Lebanese pound = 100 piastres
1920–1948:	1 Lebanese-Syrian pound = 100 centimes
1918–1920:	1 Egyptian pound = 1000 milliemes
–1917:	1 Ottoman piaster = 40 para

### 44.2 Units of Length

For fabric

		Metric
<b>drah, pic, piq, or zirah</b>		680 mm
24	<b>kirat</b>	28.33 mm

For agriculture and construction

		Metric
<b>drah, pic, piq, or zirah</b>		758 mm
24	<b>kirat</b>	31.58 mm

Other reported measures:

- 1 **pic Hâlebi** = 685.80 mm;
- 1 **draâ** (in Beirut) = 677.50 mm.

### 44.3 Units of Area

Traditional measures:

- 1 **kadne, kadneh, or cadné** = in concept, equal to one day’s work by a pair of oxen.

During the nineteenth century

					Metric
<b>kadne<sup>a</sup>, kadneh, or cadné</b>					2298.255 m <sup>2</sup>
2½	<b>dönüm or denum</b>				919.302 m <sup>2</sup>
50	20	<b>marasseh</b>			45.965 m <sup>2</sup>
100	40	2	<b>qassabeh<sup>b</sup></b>		22.982 m <sup>2</sup>
4000	1600	80	40	<b>pic murebba</b>	57.456 dm <sup>2</sup>

<sup>a</sup>The **kadne** varied between 2½ and 3¼ dönüm

<sup>b</sup>Also reported as 23.814 m<sup>2</sup>

In Beirut

		Metric
<b>dönüm or denum</b>		734.41 m <sup>2</sup>
1600	<b>draâ murebba</b>	45.900 625 dm <sup>2</sup>

Metric-linked system

		Metric
<b>cadastral dönüm</b>		1000 m <sup>2</sup>
20	<b>marasseh</b>	50 m <sup>2</sup>

#### 44.4 Units of Dry Capacity

		Metric
<b>chile or cheleh</b>		36.103 L
2	<b>mud</b>	18.051 5 L

Another reported measure:

1 **mocuc** = 756.0 L.

#### 44.5 Units of Liquid Capacity

Liquids were usually sold by weight.

1 **chile** or **cheleh** (for castor oil in Beirut) = 36.103 L.

#### 44.6 Units of Weight

In Beirut during the mid-nineteenth century, based on [MART3]

			Metric
<b>rotolo</b>			2.550 282 kg
2	<b>okka</b>		1.275 141 kg
800	400	<b>dirhem</b>	3.187 8 g

Other reported measures:

1 **kantar** (for wool) = 180 okka = 229.525 373 kg;

1 **rotolo** (for silk from Syria) = 1½ okka = 2.295 254 kg;

For coffee, sugar, and drugs in Beirut

				Metric
<b>okka</b>				1.281 036 kg
4	<b>litra</b>			320.259 g
400	100	<b>dirhem</b>		3.202 59 g
6400	1600	16	<b>chirat</b>	200.2 mg

During the early twentieth century

					Metric
<b>kantar</b>					256.397 kg
100	<b>rotl or rotolo</b>				2.563 97 kg
200	2	<b>okka</b>			1.281 99 kg
1200	12	6	<b>okiya</b>		213.664 g
80,000	800	400	66⅔	<b>dirhem</b>	3.205 g

Other reported measures:

- 1 **qilli** or **kollé** (for olive oil) = 33.345 kg;
- 1 **med**, **mudd**, or **dirhem** (for wheat) = 18–20 kg.

Metric-linked system for cereals during the twentieth century

		Metric
<b>chinbul</b> or <b>chombol</b>		150 kg
10	<b>tablé</b>	15 kg

45 Kingdom of León (910–1230)

See also *Kingdom of Asturias*, *Crown of Castile*, *Kingdom of Castile*, *Portugal*, and *Spain*.

The Kingdom of León was founded in 910. In 1139, the County of Portugal separated to form the Kingdom of Portugal. The eastern part of León joined the Kingdom of Castile in 1230.

46 Lesotho [Formerly: Basutoland]

This area was sparsely populated until the end of the sixteenth century. The area was united as a single polity by the Basotho King Moshoeshoe I in 1822. In 1843, Moshoeshoe I negotiated British protection over the Basotho people to protect them from falling under the control of the Boers in South Africa. The area became a British Protectorate, known as Basutoland, in 1868, and was annexed by the British Cape Colony in 1871. In 1884, Basutoland was restored to direct control and became a British High Commission Territory. In 1966, Basutoland gained its independence as Lesotho.

The British Imperial system was introduced in the mid-nineteenth century, but the metric system has been compulsory since 1970.

Main source: [GBCO3]

46.1 Currency

- 1980–: 1 Lesotho loti (*pl.* maloti) = 100 lisente or licente
- 1961–1980: 1 South African rand = 100 cents
- 1920–1961: 1 South African pound = 20 shillings = 240 pence
- 1920: 1 pound sterling = 20 shillings = 240 pence

47 Levant

Traditionally, an area in Western Asia formed by the lands bordering the eastern shores of the Mediterranean, bounded on the north by the Taurus Mountains, on the south by the Arabian Desert, on the west by the Mediterranean Sea, and on the east by the Zagros Mountains. The present-day countries that are together equivalent to the concept of the Levant are Israel, Jordan, Lebanon, Syria, the Gaza Strip and the West Bank.

Main source: [HARM]

47.1 Units of Weight

Traditional system

<b>qantar</b>			
44	<b>oka</b>		
100	2 $\frac{3}{11}$	<b>rotl</b>	
1760	400	176	<b>dirhem</b>

Another reported measure:

- 1 **bale** (for cotton) = ~300 lbs = 136.1 kg.

48 Liberia [Formerly: Grain Coast]

The Liberian coast was explored by Portuguese navigator Pedro de Cinta in 1461. The Kru people traded goods and food with the Portuguese. The

most important trading commodity was the melegueta pepper (*Aframomum melegueta*), also known as “the grain of paradise.” This led to the area first being known as the Grain Coast. Portuguese traders visited the area until the early nineteenth century.

During the sixteenth century, Mandingo traders from Mali traded salt, iron tools and cloth for ivory, but also took control of several territories in Liberia. They also started trading slaves with Europeans, and many slaves ended up in the British colonies of North America. The Mandingo traders used Persian- and Abyssinian-linked measures. During the seventeenth century, some Kpelle tribes emigrated from present-day Mali to Liberia. In 1821, the American Colonization Society, which was intended to indemnify the former slaves by returning them to Africa, created the Cape Mesurado Colony in the area. In the subsequent years, about six thousand freed slaves, mainly from cotton plantations in the southern American states of Virginia, Georgia and Maryland, were shipped here. In 1839, the various settlements united to form the Commonwealth of Liberia. The colony gained its independence, as Liberia, in 1847.

*Main sources:* [BAUE], [GAY], [KLIM], [LLOY], [MART3], [STRE], [UN55], and [UN66]

**48.1    Currency**

- 1943–:            1 Liberian dollar = 100 cents
- 1907–1943:    1 British West African pound =  
                    20 shillings = 240 pence
- 1847–1907:    1 Liberian dollar = 100 cents
- 1821–1907:    1 US dollar = 100 cents
- 1850s:        cowrie shells and *koli gŋli*  
                    (= twisted iron rods; their value  
                    was often set by the elders in the  
                    secret Poro Society)

**48.2    Units of Quantity**

Some measures reported by [GAY] as used among the Kpelle tribes:

Rice, which was the staple food, was generally measured in various ways whenever the amount of it was important.

When the rice had been harvested, it was cut into a rice bundle, a **mɔlɔŋ fiyen**, representing the size of a bundle that a woman could conveniently hold in her left hand between her thumb and fingers, while she cut the stalks with her right hand. These bundles were tied together, usually two or three of them at a time, to make a **mɔlɔŋ kōon**, and these were further stacked together into a pile, a **mɔlɔŋ kolon**. Finally, these piles were placed in a small, open-sided hut called a **mɔlɔŋ-kere**.

**48.3    Units of Length**

Some traditional measures used among the Kpelle tribes:

- 1 **sege-wulo** (=“bunch,” used for cloth) = 9–11  
                    nuu-nwan for a chief’s gown or 21–24  
                    nuu-nwan for a blanket;
- 1 **nuu-nwan** or **lapa** = an arm-span = about 1.8 m;
- 1 **nuu-kpasa** or **kpasa** = ½ nuu-nwan = the  
                    distance from the centre of the chest to the tip  
                    of the middle finger of the outstretched  
                    arm = about 0.9 m;
- 1 **nuu-koo-laa** (for measuring shorter distances  
                    like a mat, a grave, a floor or a bridge) = the  
                    length of the foot of a grown man;
- 1 **nuu-yée-laa** (for cloth, cutlasses, hoe handles  
                    and other short objects) = a hand-span.

US-linked system

			Metric
<b>jacktau</b>			3.657 6 m
6⅓	<b>covado</b>		577.5 mm
12	1⅞ <sub>19</sub>	<b>foot</b>	304.8 mm

Metric-linked system:

- 1 **pik** = 1 m.

## 48.4 Units of Area

The Kpelle tribes did not have measures for area. Instead, they used the term for a rice (*mōlōŋ*) farm, **mōlōŋ kpalan**, as a family normally planted only enough to satisfy its need for the coming year. Other crops, like bananas (*gōi*), cassava (*manan*), cocoa, coffee, corn, greens (*tuma-laa*), peanuts, peppers, pineapples, potatoes, rubber and sugar cane, were also measured in *kpalan*, but the size of the unit differed in each case.

## 48.5 Units of Dry Capacity

Persian-linked system

				Metric
<b>ardeb</b> <sup>a</sup>				4.402 5 L
10	<b>madega</b>			440.25 mL
120	12	<b>uckieh</b>		36.69 mL
1440	144	12	<b>dirhem</b>	3.06 mL

<sup>a</sup>During the nineteenth century, there was also a larger *ardeb* in use, referred to as the *ardeb of Gondar*, = 63½ *ardeb* = about 279.7 L

For rice and other commodities among the Kpelle tribes, based on [GAY]

				Metric
<b>boro</b> <sup>a</sup>				41.662 L
2	<b>tin</b> <sup>b</sup>			20.831 L
3⅔	1%	<b>bōke</b> or <b>bōki</b> <sup>c</sup>		11.362 L
88	44	24	<b>kōpu</b> or <b>kōpi</b> <sup>d</sup>	473.437 mL

<sup>a</sup>Some sources reported that a *bōro* (= “bag”) of rice, imported from the U.S., contained almost 100 *kōpis* of rice

<sup>b</sup>The name is clearly derived from the English “tin”

<sup>c</sup>Probably derived from the English “bucket.” This measure was also used for measuring bananas (*gōi*), cassava (*manan*), greens (*tuma-laa*), meat (*kpālaa*), plantains and yams

<sup>d</sup>Often called **sāmo-ko** (“salmon cup”) among local traders. The traders used cups with the bottom rounded out, but the cup used when selling rice had no rounded bottom. This difference was the source of the profit. As the cup almost equalled the English pint, it was sometimes called **pāi** (= “pint”), or **pāu** (= “pound”), as it weighed about a pound when filled with dry rice. A “salmon cup” contained about 16.70 oz av = 473.6366 5 g of water at 68 F (see [www.cancentral.com/standard.cfm](http://www.cancentral.com/standard.cfm))

US-linked system for rice and peppers

		Metric	Metric	Metric
<b>crue</b>		15.141 240 L	13.607 780 kg	9.071 853 kg
4	<b>gâlōŋ</b>	3.785 31 L	3.401 945 kg	2.267 963 kg

Other measures reported as used among the Kpelle tribes:

- 1 **kinja**, **ɣiri**, or **kpiri** (= “load”; used for bananas, cassava, charcoal (*tilŋ*), kola nuts, meat, palm nuts, peanuts, plantains and yams) = the amount that could be put into a back-pack frame. The back-pack was made by tying palm thatch around a frame of sticks that contained the goods to be transported.

- 1 **Coca-Cola cap** (for snuff).

## 48.6 Units of Liquid Capacity

Traditionally, liquids were sold by weight.

Some beer measures used by the Bassa speaking people:

- 1 **i-hilwe u-kpobo** = a penny pot;

- 1 **i-hilwe u-deri** or **i-hilwe u-zagwu** = ½ penny-pot;

- 1 **i-hilwe ɔ-meme** = 1/10 penny pot.

US-linked system for palm oil

			Metric
<b>crue</b>			15.141 240 L
4	<b>gâlōŋ</b>		3.785 31 L
32	8	<b>pāi</b>	473.16 mL

Another reported measure:

- 1 **kuba** = 1.788 7 Imp. pints (according to [LLOY]) = about 1.016 4 L.

## 48.7 Units of Weight

The Kpelle tribes did not have measures for weight.

## Persian-linked system

				Metric
<b>Ardeb</b>				4.61 kg
10	<b>madega</b>			460.8 g
120	12	<b>uckieh</b>		38.4 g
1440	144	12	<b>dirhem</b>	3.2 g

## US-linked system

				Metric
<b>ton</b>				907.184 7 kg
2000	<b>pâu</b>			453.592 g
32,000	16	<b>usanos</b>		28.349 g

## For gold

			Metric
<b>usanos</b>			20.396 g
16		<b>aki</b>	1.274 75 g

## 48.8 Units of Time

Basic measures among the Kpelle tribes:

- 1 **kóran** = a year;
- 1 **gálon** = a month;
- 1 **lôku** = a week;
- 1 **gele-kuu** = a day.

## 49 Libya [Formerly states ("muhafazah" or "wilayah") Cyrenaica, Fezzan, and Tripolitania]

Libya is made up of the three states of Tripolitania, Cyrenaica, and Fezzan. In ancient times, Cyrenaica was settled by the Greeks. In the sixth century BCE, Cyrenaica became part of the Persian Empire. After the death of Alexander, Cyrenaica was absorbed into the Ptolemaic kingdom of Egypt. Cyrenaica was bequeathed to the Romans in 96 BCE. The area became part of the

Ummayyad Caliphate in 655. This was superseded by the Abbasid Caliphate in 750. Their rule ended in 1261, when they were conquered by the Mongols. They continued to claim authority in religious matters from their base in Mamluk Egypt up to 1519, when power was formally transferred to the Ottomans. The three States, or "wilayah," of Tripolitania, Cyrenaica, and Fezzan were incorporated into the Ottoman Empire in 1553. The area became a Turkish vilayet in 1835. In 1911, Tripolitana was occupied by Italy, who annexed Fezzan. Italy claimed sovereignty over Cyrenaica in 1920, and Tripolitania was formally annexed by Italy in 1922. From 1912 to 1927, the area was known as Italian North Africa. From 1927 to 1934, the territory was split into two colonies, Italian Cyrenaica and Italian Tripolitania. In 1934, the three states were finally united as the colony of Libya. During World War II, the British occupied Tripolitania and Cyrenaica, while the French occupied Fezzan. Cyrenaica was briefly independent between 1950 and 1951. Libya gained its independence in 1951, incorporating the French colony of Ghadames.

The metric system has been compulsory since 1927.

*Main sources:* [BARN4], [CARD], [ECON], [FLÜG], [KELL], [MART3], [STAT1951], [UN55], [UN66], [WASH], and [WOOL]

## 49.1 Currency

- 1971–: 1 Libyan dinar = 1000 dirhams
- 1951–1971: 1 Libyan pound = 100 piastres = 1000 milliemes
- 1943–1951: 1 Algerian franc = 100 centimes (in the French mandate)
  - 1 Tripolitanian lira (in the British mandate)
- 1912–1943: 1 Italian lira = 100 centesimi
- 1844–1911: 1 Ottoman lira = 100 qirsh
- 1844: 1 piastre = 13 grimellini = 52 aspers

49.2 Units of Length

For land

			Metric
<b>habl</b>			35 m
35	<b>passo</b>		1 m
70	2	<b>draa milki</b>	500 mm

For fabric

				Metric
<b>gana</b>				1.587 m
2⅓	<b>pic, pik, or handaza<sup>a</sup></b>			680 mm
3½	1½	<b>draa<sup>b</sup></b>		453.3 mm
7	3	2	<b>palmo</b>	226.7 mm

<sup>a</sup>After metrification, also reported as 0.25 m

<sup>b</sup>As **draa Arbi**, reported as 482.5 mm

Other reported measures:

1 **dhira** or **dhraá** = 671 mm;

1 arab **dhraá** = 483 mm.

49.3 Units of Area

Traditional system

			Metric
<b>jabia</b> or <b>giabia</b>			832.32 m <sup>2</sup>
1⅓	<b>denum</b> or <b>dönüm</b>		739.84 m <sup>2</sup>
1800	1600	<b>handaza<sup>2</sup></b> or <b>pik<sup>2</sup></b>	0.462 4 m <sup>2</sup>

During the late nineteenth to mid-twentieth centuries

						Metric
<b>sāa</b>						9555 m <sup>2</sup>
3	<b>keila</b>					3185 m <sup>2</sup>
7⅓	2⅓	<b>jabia</b> or <b>giabia</b>				1225 m <sup>2</sup>
10⅔	3⅞	1⅓	<b>denum</b> or <b>dönüm</b>			918.75 m <sup>2</sup>
780	260	100	75	<b>gadula</b>		12.25 m <sup>2</sup>
16,640	5546⅔	2133⅓	1600	21⅓	<b>dhra<sup>2</sup></b>	57.422 dm <sup>2</sup>

Metric-linked system

		Metric
<b>sāa</b> or <b>sāa</b>		9600 m <sup>2</sup>
3	<b>keila</b>	3200 m <sup>2</sup>

49.4 Units of Dry Capacity

Two reported scales, based on [WASH] and [WOOL]

				Metric	Metric
<b>ueba</b> or <b>wheba</b>				121.6 L	107.342 L
4	<b>temen</b> or <b>teman</b>			30.4 L	26.836 L
16	4	<b>orba</b>		7.6 L	6.709 L
32	8	2	<b>nufsorbah</b>	3.8 L	3.354 L

For cereals

		Metric
<b>ueba</b>		290.5 L
14	<b>marta</b>	20.75 L

In Benghazi and Ghadames

		Metric	Metric
<b>sāa<sup>a</sup></b>		70.80 L	120 L
2	<b>nusfie</b>	35.40 L	60 L

<sup>a</sup>In the 1850s, in Benghazi, reported as = 70.9 L

Other reported measures

			Metric
<b>sāa</b>			118.8 L
3⅔ <sub>10</sub>	<b>kilé</b>		36 L
6	1 <sup>27</sup> / <sub>33</sub>	<b>misura</b>	19.8 L

49.5 Units of Dry Capacity (Measured by Weight)

							Metric
ueba							164.096 kg
4	temen						41.024 kg
5⅓	1⅓	kele or kilé					30.768 kg
10⅔	2⅔	2	marta <sup>a</sup>				15.384 kg
21⅓	5⅓	4	2	orba			7.692 kg
42⅔	10⅔	8	4	2	nufsorba		3.846 kg
128	32	24	12	6	3	oka	1.282 kg

<sup>a</sup>Varied by location between 11 and 14 oka

49.6 Units of Liquid Capacity

Traditional System

							Metric
cafiz or caffiso							326.802 L
–	barile						62.497 5 L
–	1 <sup>21</sup> / <sub>50</sub>	jarra or giarra					44.011 L
–	2 <sup>7</sup> / <sub>5</sub>	1 <sup>49</sup> / <sub>71</sub>	teman				26.041 L
20	–	–	–	tibera			16.340 L
–	5	3 <sup>37</sup> / <sub>71</sub>	2 <sup>7</sup> / <sub>12</sub>	–	goraff or guraff		12.500 L
125½	24	16 <sup>64</sup> / <sub>71</sub>	10	–	4 <sup>4</sup> / <sub>5</sub>	bozze	2.604 L

Alternative scale reported during the late nineteenth century

		Metric
jarra or giarra		14.13 L
6⅞	goraff or guraff	2.307 L

British Imperial-linked scale

		Imperial	Metric
barile		3956 cu in	64.8 L
24	bozze	164½ cu in	2.7 L

For wine at Tripoli

				Metric
barile				64.385 9 L
6	seechy			10.731 0 L
24	4	bozze		2.682 7 L
96	16	4	quartucci	670.69 mL

For beer at Tripoli

		Metric
barile		64.385 9 L
36	caraffe	1.788 5 L

Other reported measures:

1 qafiz (for olive oil) = 7 L.

49.7 Units of Liquid Capacity (Measured by Weight)

Traditional system

			Metric
jarra or giarra			74.997 kg
6	goraff or guraff <sup>a</sup>		12.500 kg
58½	9¾	oka	1.282 kg

<sup>a</sup>1 goraff = 9¾ oka of pure water

For oil in Tripoli

		Metric
<b>mattaro</b>		21.31 kg
42	<b>rottolo</b>	507.38 g

49.8 Units of Weight

Old scale in Benghazi

						Metric
<b>kantar</b>						51.203 kg
40	<b>oka</b>					1.280 kg
120	3	<b>rottolo</b>				426.692 g
1920	48	16	<b>ukia</b>			26.668 g
19,200	480	160	10	<b>dirhem</b>		2.667 g
307,200	7680	2560	160	16	<b>kharub</b>	16.7 mg

Two reported new scales in Benghazi

						Metric	Metric
<b>kantar</b>						62.20 kg	61.040 kg
50	<b>oka</b>					1.244 kg	1.220 8 kg
125	2½	<b>rottolo</b>				497.6 g	488.32 g
2000	40	16	<b>ukia</b>			31.1 g	30.52 g
20,000	400	160	10	<b>dirhem</b>		3.11 g	3.052 g
320,000	6400	2560	160	16	<b>kharub</b>	194.4 mg	190.75 mg

In Cyrenaica

				Metric
<b>kantar</b>				64.10 kg
50	<b>oka</b>			1.282 kg
150	3	<b>rottolo</b>		427.3 g
2400	48	16	<b>ukia</b>	26.7 g

In Tripolitania

					Metric
<b>kantar</b>					49.760 kg
40	<b>oka</b>				1.244 kg
100	2½	<b>rattol<sup>a</sup></b>			497.6 g
1600	40	16	<b>ukia</b>		31.1 g
16,000	400	160	10	<b>dirhem</b>	3.11 g

<sup>a</sup>1 ratl attary = 508 g

## Old scale in Tripoli

						Metric
<b>kantar</b>						48.833 944 kg
40	<b>oka</b>					1.220 848 6 kg
100	2½	<b>rottolo</b>				488.339 44 g
1600	40	16	<b>ukia</b>			30.521 215 g
10,256	256⅔	102¼ <sub>25</sub>	6¼ <sub>100</sub>	<b>metikal</b>		4.761 150 4 g
246,144	6153⅓	2461⅓	153¾ <sub>100</sub>	24	<b>kharouba</b>	198.396 mg

## New scale in Tripoli

							Metric
<b>kantar</b>							51.280 kg
2⅔ <sub>21</sub>	<b>mattaro</b>						21.538 kg
40	16⅓	<b>oka</b>					1.282 kg
100	42	2½	<b>rottolo</b>				512.80 g
1600	672	40	16	<b>ukia</b>			32.05 g
12,800	5376	320	128	8	<b>termino</b>		4.006 g
16,000	6720	400	160	10	1¼	<b>dram or dirham</b>	3.205 g
256,000	107,520	6400	2560	160	20	16	<b>kharouba</b> 200.31 mg

## British Imperial-linked scale in Tripoli

						Imperial	Metric
<b>kantar</b>						112 lbs	50.797 kg
40	<b>oka</b>					—	1.270 kg
100	2½	<b>rottolo</b>				—	507.97 g
1600	40	16	<b>ukia</b>			—	31.75 g
16,000	400	160	10	<b>dram or dirham</b>		—	3.175 g

## For ostrich feathers and spinning wood

		Metric
<b>ratl</b>		512.80 g
16	<b>ukie</b>	32.05 g

## For silver and silk

				Metric	Metric
<b>rotl</b>				306.72 g	305.20 g
10	<b>ukia or uckiah</b>			30.672 g	30.52 g
100	10	<b>derhem, dirhem, or dramma</b>		3.067 2 g	3.052 g
1600	160	16	<b>charruba or kharub</b>	191.708 mg	190.75 mg

## For gold in Ghadames, based on [MART3]

		Metric
<b>metical aghadesi</b>		4.069 000 g
3	<b>mahbub</b>	1.356 333 g

For crafted gold and gemstones

			Metric	Metric
<b>metikal mumeni<sup>a</sup></b>			4.601 g	4.578 g
1½	<b>derhem, dirhem or dramma</b>		3.067 2 g	3.052 g
24	16	<b>charruba or kharub</b>	191.708 mg	190.75 mg

<sup>a</sup>Also reported as 4.665 g. For gold powder = 4.082 g. [KELL] reported 1 **metical** (for gold and silver in Tripoli) = 4.77 g

## 50 Liechtenstein

The Lordship of Schellenberg was purchased by the Counts of Vaduz in 1437 and the two states were merged into the principality of Liechtenstein, as a sovereign member state of the Holy Roman Empire, in 1719. Liechtenstein was a member of the German Confederation from 1815 until 1866, and an independent principality thereafter. It was externally administered by Austria until 1918, and under Swiss administration beginning in 1921.

The metric system has been official since 1871, and compulsory since 1876.

### 50.1 Currency

1921–: 1 Swiss Franken = 100 Rappen  
1868–1921: 1 Austro-Hungarian krone = 100 heller  
1857–1868: 1 Vereinsthaler = 1½ florins

### 50.2 Units of Volume

1 **grosser Heuklafter** (for hay, = 7 × 7 × 7 Fuss = 343 Kubikfuss) = 9.626 878 1 m<sup>3</sup>;  
1 **Heuklafter** (for hay, = 6 × 6 × 6 Fuss = 216 Kubikfuss) = 6.062 417 5 m<sup>3</sup>.

### 50.3 Units of Liquid Capacity

At Vaduz, as reported in 1843

					Metric
<b>Eimer</b>					37.724 L
4	<b>Viertel</b>				9.431 L
32	8	<b>Ortsmass</b>			1.178 875 L
128	32	4	<b>Schappl</b>		294.718 75 mL
256	64	8	2	<b>Pfiff</b>	147.359 37 mL

## 50.4 Units of Weight

For cheese in Vaduz

		Metric
<b>Wert</b>		16.351 44 kg
30	<b>Pfund</b>	545.048 g

## 51 Ligurian Republic

See also *Austria, France, Republic of Genoa, Italy and Kingdom of Sardinia*.

This Republic, formed by Napoleon in 1757, consisted of the Republic of Genoa and minor imperial fiefs owned by the House of Savoy. The area was briefly occupied by Austria in 1800, and directly annexed by France in 1805. In 1815, the Congress of Vienna awarded it to the Kingdom of Sardinia.

### 51.1 Currency

1757–1805: 1 Genoan lira

52 Lithuania [Formerly:  
Lithuanian Soviet Socialist  
Republic]

In the 1200s, Lithuania was united under a king, Mindaugas, and emerged as a grand duchy in the fourteenth century. In 1569, the area was incorporated into a union with Poland, the Polish-Lithuanian Commonwealth, but lost Chemihiv, Smolensk, and the Cossack lands east of the Dnieper to Russia in 1667, while the left bank remained under Polish-Lithuanian rule until 1793. Lithuania fell to Russia as part of the Third Partition of the Polish-Lithuanian Commonwealth in 1795. Lithuania did not regain its independence until 1918, and became part of the USSR, as the Lithuanian Soviet Socialist Republic, in 1940. Germany occupied Lithuania from 1941 to 1944 and made it part of Ostland (Estonia, Latvia, Lithuania, Courland and parts of Belarus). Lithuania declared its independence from the USSR in 1990.

52.1 Currency

1993–: 1 Lithuanian litas = 100 centu  
1991–1993: 1 talonas  
1940–1991: 1 Russian ruble = 100 kopeks  
1922–1940: 1 Lithuanian litas = 100 centu  
1919–1922: 1 Lithuanian auksinas =  
100 skatiku  
seventeenth 1 Lithuanian auksinas =  
century: 10 taleris = 30 grašis

52.2 Units of Length

From the mid-thirteenth century

				Metric
<b>preť</b>				4.548 m
7½	<b>łokieć</b>			649.7 mm
14	2	<b>stópa</b>		324.8 mm
168	24	12	<b>cal</b>	27.07 mm

52.3 Units of Dry Capacity

For general use

			Metric
<b>ketvirtis or tchetwert</b>			209.907 L
64	<b>gorcius</b>		3.279 8 L
128	2	<b>pusgorciu</b>	1.639 9 L

For grain

		Metric
<b>puras</b>		67.2 L
24	<b>gorcius</b>	2.8 L

52.4 Units of Liquid Capacity

1 **bonka** or **kruschka** = 1.229 9 L.

53 Lombardy-Venetia

See also *Austria* and *Italy*.

In 1815, the Congress of Vienna combined the territories of Lombardy and Venetia into a single unit under the Austrian Habsburgs. The Kingdom ceased to exist when the remaining portion of it was annexed to the Kingdom of Italy in 1866.

*Main source:* [COLI]

53.1 Currency

1862–1866: 1 Lombardy-Venetia florin = 100 soldi  
1816–1862: 1 Lombardy-Venetia lira or pound  
= 100 centesimi

53.2 Units of Length

In Bergamo, at Tortona and at Vigevano

					Metric	Metric	Metric
<b>pertica</b>					252.154 m	274.320 m	266.333 m
24	<b>tavole</b>				10.506 4 m	11.430 m	11.097 1 m
96	4	<b>cavezzo</b>			2.626 6 m	2.857 5 m	2.774 3 m
576	24	6	<b>piede</b>		437.767 mm	476.25 mm	462.383 mm
6912	288	72	12	<b>oncia</b>	36.480 6 mm	39.687 mm	38.532 mm

For general use at Castiglione delle Stiviere

			Metric
<b>cavezzo</b>			2.852 m
6	<b>braccio</b>		475.3 mm
72	12	<b>oncia</b>	39.6 mm

For cloth at Castiglione delle Stiviere

		Metric
<b>braccio da panno</b>		674 mm
17	<b>oncia da panno</b>	39.65 mm

For silk at Castiglione delle Stiviere

		Metric
<b>braccio da seta</b>		640 mm
16	<b>oncia da seta</b>	40 mm

At Voghere

							Metric
<b>gettata</b>							5.663 448 m
2	<b>trabucco pavese</b>						2.831 724 m
9	4½	<b>braccio pavese</b>					629.272 mm
12	6	1⅓	<b>piede pavese</b>				471.954 mm
144	72	16	12	<b>oncia</b>			39.329 mm
1728	864	192	144	12	<b>punto</b>		3.277 mm
20,736	10,368	2304	1728	144	12	<b>atomo</b>	273.1 mm

Other reported measures:

- 1 **braccio lungo da tela** (for canvas at Voghera) = 668.787 mm;  
1 **braccio mercantile** (in Bergamo) = 659.320 mm;

- 1 **braccio milanese** = 594.936 mm;  
1 **braccio architetonico** (in Bergamo) = 531.40 mm;  
1 **braccio corto da seta** (for silk) = 528.00 mm.

53.3 Units of Area

For agricultural use at Castiglione delle Stiviere

					Metric
<b>piò</b>					3194.393 m <sup>2</sup>
100	<b>tavola</b>				31.943 93 m <sup>2</sup>
400	4	<b>pertica</b>			7.985 98 m <sup>2</sup>
14,400	144	36	<b>piede</b>		22.18 dm <sup>2</sup>
28,800	288	72	2	<b>mezzo piede</b>	11.09 m <sup>2</sup>

For architectural use at Castiglione delle Stiviere

		Metric
<b>braccio quadrato</b>		22.6 dm <sup>2</sup>
12	<b>oncia quadrata</b>	1.9 dm <sup>2</sup>

In the Province of Mantova

		Metric
<b>biolca mantovana</b>		3138.596 9 m <sup>2</sup>
100	<b>tavola</b>	31.385 969 m <sup>2</sup>

Other reported measures:

1 **giornata** = 3810.394 8 m<sup>2</sup>.

53.4 Units of Volume

For timber

		Metric
<b>pilotto or carro pavese</b>		3.986 901 m <sup>3</sup>
16	<b>braccio cubo pavese</b>	249.181 dm <sup>3</sup>

Other reported measures:

1 **carro tortonese** (for firewood) = 52½ piedi cubi tortonesi = 5.671 060 m<sup>3</sup>.

53.5 Units of Dry Capacity

				Metric
<b>carro</b>				1712.8 L
10	<b>soma or sacco</b>			171.28 L
80	8	<b>staio</b>		21.41 L
320	32	4	<b>quartaro</b>	5.352 L

At Castiglione delle Stiviere

			Metric
<b>soma</b>			152 L
12	<b>quarta</b>		12.667 L
48	4	<b>coppo</b>	3.167 L

At Vigevano

				Metric
<b>sacco</b>				123.192 L
6	<b>staio</b>			20.532 L
24	4	<b>quartaro</b>		5.133 L
72	12	3	<b>coppo</b>	1.711 L

At Voghera

							Metric
<b>sacco</b> (heaped)							135.000 L
$1\frac{1}{8}$	<b>sacco</b> (striken)						120.000 L
6	$5\frac{1}{3}$	<b>emina</b> (heaped)					22.500 L
$6\frac{3}{4}$	6	$1\frac{1}{8}$	<b>emina</b> (striken)				20.000 L
$13\frac{1}{2}$	12	$2\frac{1}{4}$	2	<b>quartaro</b>			10.000 L
54	48	9	8	4	<b>eminella</b>		2.500 L
108	96	18	16	8	2	<b>coppo</b>	1.250 L

Other reported measures:

1 **rubbio** or **peso** (for grain at Bergamo) =  
8.15 L.

53.6 Units of Liquid Capacity

							Metric
<b>anfora</b>							518.4 L
4	<b>biconcia</b>						129.6 L
8	2	<b>concia</b> or <b>mastello</b>					64.80 L
48	12	6	<b>secchio</b>				10.80 L
192	48	24	4	<b>bozza</b>			2.7 L
512	128	64	$10\frac{2}{3}$	$2\frac{2}{3}$	<b>boccale</b>		1.012 L
769	192	96	16	4	$1\frac{1}{2}$	<b>quartuccio</b>	675 mL

In Bergamo

					Metric
<b>brenta</b>					70.690 5 L
6	<b>secchio</b>				11.781 8 L
54	9	<b>pinta</b>			1.309 1 L
108	18	2	<b>boccale</b>		654.54 mL
432	72	8	4	<b>zaina</b>	163.63 mL

At Castiglione delle Stiviere

			Metric
<b>soglio</b>			51 L
55	<b>boccale</b>		773 mL
110	2	<b>mezzo boccale</b>	386.5 mL

In the Lomellina valley

		Metric
<b>quartino</b>		372.10 mL
2	<b>saina</b>	186.05 mL

For milk in the Lomellina valley

		Metric
<b>staio</b>		28.814 L
32	<b>pinte</b>	900.44 mL

53.7 Units of Weight

Traditional system

				Metric
<b>rubbio</b>				8.128 221 kg
10	<b>libbra grossa</b>			812.822 1 g
25	$2\frac{1}{2}$	<b>libbra sottile</b>		325.128 8 g
300	30	12	<b>uncia</b>	27.094 1 g

For mercantile use at Castiglione delle Stiviere

				Metric
<b>soma</b>				160.406 kg
20	<b>peso</b>			8.020 3 kg
500	25	<b>libbra</b>		320.812 g
6000	300	12	<b>oncia</b>	26.734 g

For lime at Castiglione delle Stiviere

		Metric
<b>stajo</b>		48.121 kg
12	<b>peso</b>	4.010 kg

At Magasa before 1839, after 1839, after 1841 and after 1850

						Metric	Metric	Metric	Metric
<b>carro</b>						802.067 5 kg	802.170 kg	802.047 5 kg	798.480 kg
100	<b>peso</b>					8.020 675 kg	8.021 7 kg	8.020 47 kg	7.984 8 kg
2500	25	<b>libra</b>				320.827 g	320.868 g	320.819 g	319.392 g
30,000	300	12	<b>oncia</b>			26.736 g	26.739 g	26.735 g	26.616 g
480,000	4800	192	16	<b>dramme</b>		1.671 g	1.671 g	1.671 g	1.663 5 g
1,920,000	19,200	768	64	4	<b>quarto</b>	417.7 mg	417.8 mg	417.7 mg	415.9 mg

At Voghera

				Metric
<b>libbra piccola</b>				319.38 g
12	<b>oncia</b>			26.615 g
288	24	<b>denaro</b>		1.109 g
6912	96	24	<b>grano</b>	46.21 g

For gold and silver at Voghera

					Metric
<b>marco</b>					234.997 300 g
8	<b>oncia</b>				29,374 662 g
192	24	<b>denaro</b>			1.223 944 g
4608	576	24	<b>grano</b>		50.998 mg
110,592	13,824	576	24	<b>granotto</b>	2.125 mg

For medical use

					Metric
<b>libbra</b>					420.009 g
12	<b>oncia</b>				35.000 75 g
96	8	<b>dramma</b>			4.375 94 g
288	24	3	<b>scrupolo</b>		1.458 36 g
5760	480	60	20	<b>grano</b>	72.92 mg

54 Lucca

See also *Lucca* and *Piombino*.  
The Most Serene Republic of Lucca was an independent state from 1160 to 1805, when it became a part of the Principality of Lucca and Piombino.

54.1 Currency

–1800: 1 Luccan lira = 20 soldi = 60 quattrini  
= 240 denari

55 Lucca

See also *Lucca* and *Piombino*.  
The Duchy of Lucca was formed in 1815 out of the former Republic of Lucca and the Principality of Lucca and Piombino. In 1847, Lucca was annexed by the Grand Duchy of Tuscany.

55.1 Currency

1826–1847: 1 Luccan lira = 20 soldi = 60 quattrini = 240 denari

56 Lucca and Piombino

See also *Italy*, *Lucca* and *Tuscany*.  
A Principality created by Napoleon in 1805, through annexation of the Principality of Piombino by the Republic of Lucca. In 1809, the area became part of the Grand Duchy of Tuscany.

56.1 Currency

1805–1809: 1 French franc = 100 centimes

57 Luxembourg

See also *Netherlands*.  
The history of Luxembourg begins with the acquisition of Lucilinbuhuc by Siegfried, Count of Ardennes, in 963. In 1060, Conrad, a descendant of Siegfried, took the title count of Lützelburg. It became one of the largest fiefs in the Holy Roman Empire and rose to prominence when its ruler was elected as Henry VII in 1308. His grandson, the emperor Charles IV, raised it to the dignity of a duchy in 1354. The Duchy was passed to Philip the Good of Burgundy in 1443 and ceased to exist as a separate country. In 1482, it passed to the House of Habsburg. The area was then ruled by Spain between 1506 and 1684, France between 1684 and 1697, Spain again between 1697 and 1714, Austria between 1714 and 1793, and France again between 1793 and 1814. The Congress of Vienna made it a Grand Duchy in 1815, and gave it to William I, king of the Netherlands. In 1839, the western part of Luxembourg was lost to Belgium. The eastern part, continuing in personal union with the Netherlands and a member of the German Confederation, became autonomous in 1848, and a neutral territory by decision of the London Conference of 1867. The personal union with the Netherlands was dissolved in 1890, when Wilhemina acceded to the Dutch throne and, as a woman, could not inherit the Grand Duchy by compact. Germany annexed Luxembourg in 1942. It regained its independence in 1944.  
The metric system has been official since 1816, and compulsory since January 1, 1820.

57.1 Currency

1999–: 1 euro = 100 euro-cent  
1944–2002: 1 Luxembourg franc = 100 centimes  
1941–1944: 1 German Reichmark = 100 Reichspfennig  
1854–1941: 1 Luxembourg franc = 100 centimes

- 1848–1854: 1 Belgian franc = 100 centimes  
1842–1848: 1 Preussian Thaler = 30 Silbergroschen = 360 Pfennige  
1839–1842: 1 Belgian franc = 100 centimes  
1815–1839: 1 Dutch guilder or gulden = 100 cents

57.2 Units of Area

1 **food**<sup>2</sup> (used in hide processing) = 0.304 8 m<sup>2</sup>.

57.3 Units of Weight

1 **Zollpfund** (after 1842) = 500 g.

58 Macau

See also *China*.

The Portuguese arrived in Macau in 1516, began leasing the territory from the Chinese in 1557, and signed the Sino-Portuguese Treaty in

1887, which ceded Macau to Portugal. Macau became an overseas province in 1951, and in 1979, it was made a Chinese territory under Portuguese administration. In 1987, after many years of negotiations, it was decided that Macau should be handed over to China in 1999, when it became a Special Administrative Region within China.

Both Chinese and Portuguese systems of weights and measures have been in use since the sixteenth century. During the early nineteenth century, the British system of weights and measures also became used. The metric system has been official since 1957.

*Main sources:* [UN55] and [UN66]

58.1 Currency

- 1906–: 1 Macanese pataca = 10 ho = 100 avos  
1901–1906: 1 Chinese yuan = 10 jiǎo = 100 fēn  
1894–1901: 1 Macanese rupee = 78 avos  
1887–1894: 1 Potuguese milréis = 1000 réis

58.2 Units of Length

Chinese-linked scale (two reported scales)

尺	寸	分		Portuguese names	Metric	Metric
<b>chek</b>				<b>côvado</b>	371.475 mm	376 mm
10	<b>tsun</b>			<b>ponto</b>	37.147 5 mm	37.6 mm
100	10	<b>fan</b>		<b>condorim</b>	3.714 75 mm	3.76 mm
1000	100	10	<b>li</b>	–	371.475 μm	376 μm

Portuguese-linked scale

							Metric
<b>braça</b>							2.20 m
1½	<b>toesa</b>						1.98 m
2	1½	<b>vara</b>					1.10 m
3⅓	3	1⅓	<b>côvado</b>				660 mm
6⅔	6	3⅓	2	<b>pé</b>			330 mm
10	9	5	3	1½	<b>palm</b>		220 mm
80	72	40	24	12	8	<b>polegada</b>	27.5 mm

## British Imperial-linked scale

								Portuguese names	Metric
<b>lei</b>								<b>milha terrestre</b>	1609.344 m
8	<b>long</b>							–	201.168 m
80	10	<b>lin</b>						–	20.116 8 m
220	27½	2¾	<b>kon</b>					<b>percha</b>	5.029 2 m
880	110	11	4	<b>chan</b>				<b>braça</b>	1.828 804 m
1760	220	22	8	2	<b>ma</b>			<b>jarda</b>	914.4 mm
5280	660	66	24	6	3	<b>chek</b>		<b>pé</b>	30.48 mm
63,360	7920	792	288	72	36	12	<b>chun</b>	<b>polegada</b>	2.54 mm

Other measures reported during the late nine-  
teenth and mid-twentieth centuries:

1 **hoi lei** (for maritime use) = 1852 m;

1 **jarda** = 895 mm.

### 58.3 Units of Area

## Chinese linked scale

畝	分	丈	鋪	尺	Portuguese names	Metric
<b>tsin</b>					<b>maz or mau</b>	761.400 m <sup>2</sup>
10	<b>fan</b>				<b>condorim</b>	76.140 m <sup>2</sup>
60	6	<b>cheong</b>			<b>braça</b>	12.690 m <sup>2</sup>
240	24	4	<b>pu</b>		–	3.172 5 m <sup>2</sup>
6000	600	100	25	<b>chek</b>	<b>côvado</b>	12.690 dm <sup>2</sup>

## British Imperial-linked scale

							Portuguese names	Metric
<b>peng fong lei</b>							<b>milha quadrada</b>	258,999.8 m <sup>2</sup>
640	<b>mao</b>						<b>acre</b>	4046.8 73 m <sup>2</sup>
2560	4	<b>lou tak</b>					<b>cruz</b>	1011.714 m <sup>2</sup>
102,400	160	40	<b>peng fon kon</b>				<b>percha quadrada</b>	25.292 85 m <sup>2</sup>
3,097,600	4840	1210	30¼	<b>peng fon ma</b>			<b>jarda quadrada</b>	83.612 74 dm <sup>2</sup>
27,878,400	43,560	10,890	272¼	9	<b>peng fon chek</b>		<b>pé quadrada</b>	9.290 304 dm <sup>2</sup>
4,014,489,600	6,272,640	1,568,160	39,204	1296	144	<b>peng fon chun</b>	<b>polgada quadrada</b>	6.451 6 cm <sup>2</sup>

## 58.4 Units of Volume

British Imperial-linked scale

			Portuguese names	Metric
<b>lap fong ma</b>			<b>jarda cúbica</b>	764.554 90 dm <sup>3</sup>
27	<b>lap fong chek</b>		<b>pé cúbico</b>	28.316 85 dm <sup>3</sup>
64	1728	<b>lap fong chun</b>	<b>polegada cúbica</b>	16.387 06 dm <sup>3</sup>

## 58.5 Units of Capacity

Chinese-linked scale

石	甘特	撮		Metric
<b>seak</b>				103.1 L
10	<b>ganta</b>			10.31 L
100	10	<b>chupa</b>		1.031 L
1000	100	10	<b>hap</b>	103.1 mL

British Imperial-linked scale for liquids

								Portuguese names	Metric
<b>kua tak</b>								<b>quarta</b>	290.949 768 L
8	<b>pou sek i</b>							–	36.368 721 L
32	4	<b>pui hak</b>						<b>celemim or salamim</b>	9.092 180 4 L
64	8	2	<b>ka lon</b>					<b>galão</b>	4.546 090 2 L
256	32	8	4	<b>kua tut</b>				<b>quarto de galão</b>	1.136 522 5 L
512	64	16	8	2	<b>pan tut</b>			<b>pinto</b>	568.261 2 mL
2048	256	64	32	8	4	<b>kat i</b>		–	142.065 4 mL
10,240	1280	320	160	40	20	5	<b>iek on si</b>	<b>onça fluída</b>	28.413 07 mL

## 58.6 Units of Weight

Chinese-linked scale

						Portuguese names	Metric
<b>tam</b>						<b>pico</b>	60.478 982 kg
100	<b>kan</b>					<b>cate</b>	604.789 82 g
1600	16	<b>leung</b>				<b>tael</b>	37.799 31 g
16,000	160	10	<b>tsin<sup>a</sup></b>			<b>maz</b>	3.779 931 g
160,000	1600	100	10	<b>fan<sup>a</sup></b>		<b>condorim</b>	377.993 1 mg
1,600,000	16,000	1000	100	10	<b>lei<sup>a</sup></b>	<b>liz</b>	37.799 31 mg

<sup>a</sup>Used for precious metals

## Portuguese-linked scale

											Metric
<b>tonelada</b>											793.152 kg
13½	<b>quintal</b>										58.752 kg
54	4	<b>arroba</b>									14.688 kg
1728	128	32	<b>arrétel</b>								459 g
3456	256	64	2	<b>meios- arratel</b>							229.50 g
6912	512	128	4	2	<b>quarta</b>						114.75 g
27,648	2048	512	16	8	4	<b>onça</b>					28.687 5 g
221,184	16,384	4096	128	64	32	8	<b>oitava</b>				3.585 9 g
663,552	49,152	12,288	384	192	96	24	3	<b>escupulo</b>			1.195 3 g
3,981,312	294,912	73,728	2304	1152	576	144	18	6	<b>quilate</b>		199.2 mg
15,925,248	1,179,648	294,912	9216	4608	2304	576	72	24	4	<b>grão</b>	49.8 mg

## British Imperial-linked scale

									厘	Metric
<b>ton</b>										1,016.047 kg
80/13	<b>ieng tam</b> (cheong)									165.107 6 kg
20	¾	<b>ieng tam</b> (tun)								50.802 3 kg
80	13	4	<b>kua tak</b>							12.700 6 kg
160	26	8	2	<b>seak</b>						6.350 3 kg
2,240	364	112	28	14	<b>pong</b>					453.592 37 g
35,840	5,824	1,792	448	224	16	<b>on si</b>				28.349 5 g
573,440	93,184	28,672	7,168	3,584	256	16	<b>ieng chin</b>			1.771 8 g
9,175,040	1,490,944	458,752	114,688	57,344	4,096	254	16	<b>lei</b>		110.7 mg

## 59 Macedonia [Formerly part of Yugoslavia]

The Slavs in this area were conquered by the non-Slav Bulgars, who formed a Macedo-Bulgarian empire in the ninth century. The area became part of the Ottoman Empire in 1355. The Treaty of San Stefano in 1878, ending the Russo-Turkish War, gave the largest part of the historic territory of Macedonia to Bulgaria. The area was, after the end of the Balkan wars in 1913, divided between Greece, Serbia, Bulgaria and Albania. In 1918, Serbia, which included most of Macedonia, joined in union with Croatia, Slovenia, and Montenegro to form the kingdom of Serbs, Croats, and Slovenes, which was renamed Yugoslavia in 1929. Bulgaria occupied parts of Yugoslavia, including Macedonia, in 1941. Macedonia was occupied by German

troops in 1944. In 1945, Macedonia was reintegrated into Yugoslavia, and in 1946, it became an autonomous Yugoslavian Republic. In 1991, Macedonia declared its independence from Yugoslavia.

The metric system has been compulsory since 1876.

### 59.1 Currency

1993–:	1 new Macedonian denar = 100 deni
1992–1993:	1 Macedonian denar = 100 deni
1945–1992:	1 Yugoslav dinar = 100 paras
1941–1944:	1 Bulgarian lev = 100 stotinki
1919–1992:	1 Serbian dinar = 100 paras
1918–1919:	1 Austro-Hungarian krone = 100 heller

1913–1918:	1 Serbian dinar = 100 paras
1878–1913:	1 Bulgaian lev = 100 stotinki
–1878:	1 Ottoman Empire piaster

1945–1963:	1 Madagascar-Comores CFA franc = 100 centimes
1925–1945:	1 Malagasy franc = 100 centimes
c.1890–1925 :	1 French franc = 100 centimes
c.1855–c.1890:	1 Spanish piaster = 16 volmens
–c.1855:	1 faransa = 2 loths = 4 kirobos = 8 sikadsis = 12 prohyvoménas = 24 waoménas = 48 ilas = 72 iranambatrys

60 Madagascar [Formerly Malagasy Republic]

Since the late fifteenth century, the Saklava Kingdom ruled the western island, the Betsimisaraka tribe the eastern parts and the Merina Kingdom the inaccessible center of the island. During the late 1700s, the Merina Kingdom expanded through conquest and intermarriage, and soon controlled virtually the entire island. King Andrianampoinimerina controlled about two-thirds of the island, and the island was virtually united in 1824 under his successor Radama I. France invaded Madagascar in 1883, and it became a French Protectorate in 1896 and a French colony in 1897. Diego-Suarez (present-day Antsiranana) became a French colony in 1885, and in 1893, its two dependencies of Nosy-Be (formerly Assada) and Nosy Boraha became separate French Colonies. All three colonies were incorporated into Madagascar in 1906, and in 1908, the Comoro Islands were also incorporated. The Comoros broke away in 1950. Madagascar became a French overseas territory in 1946, autonomous within the French Community as the Malagasy Republic in 1958, and gained its independence in 1960.

The metric system has been compulsory since 1897.

*Main sources:* [BAUE], [BEAW], [BEAW2], [BROW], [CHVO], [CLAR], [DOUR], [JACK], [KRÜG], [NOBA2], [ROCH], [SALE], [SAVA3], [SILB2] and [WAGN2]

60.1 Currency

1963–2005:	1 Malagasy franc = 100 centimes
1961–:	1 Malagasy aiary = 5 iraimbilanja

60.2 Units of Quantity

1 **mamina** = a bundle of sticks or rushes, small enough to be compressed between the end of the thumb and the forefinger.

They used the word ‘mamito’ to describe the act of sharing something by dividing it into seven parts.

60.3 Units of Length

Only one unit of length was used by name, according to [BEAW].

[WAGN2] reported that the unit of length, called a rahf, varied between 1 and 2 m, and was determined annually for one year.

During the late nineteenth century, it was generally reported as:

1 **rahf** or **refe** (on the southern part of the island) = ~1.765 m.

The rahf was reported as being about 3.53 m on the northern part of the island.

60.4 Units of Dry Capacity

Dry commodities were usually measured by weight.

## 60.5 Units of Liquid Capacity

1 **almud** = ~17.7 L.

## 60.6 Units of Weight

According to [BEAW], gold, silver and rice were sold by weight, but other commodities were generally sold by value.

For husked rice, mainly based on [DOUR] and [KRÜG]

					Metric
<b>kanan</b>					~311 kg
12 $\frac{2}{5}$	<b>zatou, satu, or satuto</b>				~25.41 kg
102	8 $\frac{2}{3}$	<b>troubahouache, moncha, or monka</b>			~3.049 kg or ~4 L
204	16 $\frac{2}{3}$	2	<b>bambou</b>		~1.524 kg or ~2 L
1224	100	12	6	<b>voule</b>	~254 g

Alternative upper scale

			Metric
<b>kanan</b>			312.1 kg
12 $\frac{3}{4}$	<b>satuto</b>		24.48 kg
102	8	<b>moncha<sup>a</sup></b>	3.060 kg

<sup>a</sup>According to [ROCH] = 3.062 kg

Other measures during the late nineteenth century:

1 **bambou** (for gunpowder) = varying between 187.5 g and 250 g.

For gold and silver during the mid-nineteenth century, based on [DOUR] and on [WAGN2] and [NOBA2]

					Metric	Metric
<b>sompaye, sompay, or sompi</b>					3.887 5 g	3.824 g
3	<b>wari or vari</b>				1.295 8 g	1.274 7 g
6	2	<b>sacare</b>			647.9 mg	637.3 mg
12	4	2	<b>nanki, nanchi, or nanqui</b>		324.0 mg	318.7 mg
24	8	4	2	<b>nangue or nanke</b>	162.0 mg	159.3 mg

For gold and silver during the mid-nineteenth century, based on [JACK] and [SALE]

					Metric
<b>sompaye, sompay, or sompi</b>					3.824 g
2	<b>wari or vari</b>				1.912 g
3	1 $\frac{1}{2}$	<b>sacare</b>			1.275 g
6	3	2	<b>nanki, nanchi, or nanqui</b>		637.3 mg
12	6	4	2	<b>nangue or nanke</b>	318.7 mg



61.2 Units of Dry Capacity

Commercial scale and as reported at Funchal before 1868

							Metric	Metric
<b>moio</b>							846.15 L	845.714 880 L
15	<b>fanega</b>						56.41 L	56.380 992 L
60	4	<b>alqueire</b>					14.102 L	14.095 248 L
120	8	2	<b>meio</b>				7.051 L	7.047 624 L
240	16	4	2	<b>quarta</b>			3.526 L	3.523 812 L
480	32	8	4	2	<b>oitava</b>		1.763 L	1.761 906 L
960	64	16	8	4	2	<b>salamin</b>	881.4 mL	880.953 mL

61.3 Units of Liquid Capacity

At Funchal before 1868

							Metric
<b>pipa</b>							416.384 100 L
9 <sup>7</sup> / <sub>8</sub>	<b>barril</b>						44.296 181 L
23 <sup>1</sup> / <sub>2</sub>	2 <sup>1</sup> / <sub>2</sub>	<b>amalde or almude</b>					17.718 847 L
47	5	2	<b>pote</b>				8.859 236 L
94	10	4	2	<b>canada</b>			4.429 618 L
376	40	16	8	4	<b>quartilho</b>		1.107 404 L

61.4 Units of Weight

At Funchal before 1868

								Metric
<b>quintal</b>								58.694 016 kg
128	<b>aratel</b>							458.547 g
256	2	<b>marco or meio aratel</b>						229.273 5 g
512	4	2	<b>quart</b>					114.636 75 g
2048	16	8	4	<b>onça</b>				28.659 19 g
16,384	128	64	32	8	<b>oitava</b>			3.582 40 g
49,152	384	192	96	24	3	<b>escrupulo</b>		1.194 13 g
1,179,648	9216	4608	2304	576	72	24	<b>grao</b>	49.75 mg

Other reported measures:

1 **barrel** (for flour from the U.S.) = netto 196 lbs  
av = 88.904 159 kg.

Majapahit was an empire based on the island  
of Java from 1293 until 1527.

62 Majapahit

See also *Indonesia*.

62.1 Currency

Native gold and silver coins, along with chinese  
kêpengs or pîsis.

## 62.2 Units of Dry Capacity

For winnowed rice and other dry commodities

		Metric
<b>gantang</b>		~4.4 L
4	<b>cupak</b> <sup>a</sup>	~1.1 L

<sup>a</sup>Defined as a coconut shellful

## 62.3 Units of Weight

1 **kati** = ?;

1 **tahil** = ?

1953–1967: 1 Malaya and British Borneo dollar = 100 cents

1939–1952: 1 Malayan dollar = 100 cents

1904–1939: 1 Straits dollar = 100 cents

1641–1840s: 1 Melaka guilder = 12 fanams = 120 doits

1571–1641: 1 patachine or patacões = 6 tangas = 240 challaines = 480 chazzas

–1571: 1 tin ingot; 1 “small bundle” = 10 tin ingots; 1 “large bundle” = 40 tin ingots.

## 63 Malacca [Formerly: Dutch Melaca and Straits of Melaka]

See also *Malaysia* and *Straits Settlements*.

Once a powerful Sultanate that extended its rule over the southern Malay Peninsula and much of Sumatra, Malacca became a separate Government in 1571. The Dutch ruled Malacca from 1641 to 1798. From 1826 to 1946, it was governed by the British East India Company as part of the Straits Settlements. It became a Crown colony in 1867. It is now a part of Malaysia.

*Main sources:* [BAXT2], [FELN], [HAKL], [HUSS], [KELL], and [MART]

### 63.1 Currency

1976–: 1 Malaysian ringgit = 100 sen

1967–1976: 1 Malaysian dollar = 100 cents

### 63.2 Units of Quantity

1 **laksa** = 10,000 pieces;

1 **corgie** (for cloth) = 20 pieces.

### 63.3 Units of Length

Traditional measures:

1 **děpa** = the span of a man’s body and outstretched arms measuring from fingertip to fingertip.

For cloth

			Metric
<b>jumba</b>			3.656 m
2	<b>depa</b>		1.828 m
8	4	<b>astah or covid</b>	457 mm

British Imperial-linked system

						Imperial	Metric
<b>jumba</b>						12 ft	3.658 m
2	<b>depa</b>					6 ft	1.828 m
4	2	<b>ēla</b>				1 yd	914.4 mm
8	4	2	<b>covid</b>			½ yd	457.2 mm
12	6	3	1½	<b>péw</b>		1/3 yd	304.8 mm
64	32	16	8	5⅓	<b>gheria</b>	1/16 yd	57.15 mm

### 63.4 Units of Area

British Imperial-linked system

		Metric
<b>orlong</b>		5352.386 m <sup>2</sup>
400	<b>jumba</b>	13.381 m <sup>2</sup>

### 63.5 Units of Capacity

For rice during the sixteenth century

		Metric	Metric
<b>dachim, datckin, or dachem</b>		232.23 kg	244.82 L
140	<b>ganta, guanta, or ganton</b>	1.66 kg	1.75 L

For fruit, grain, nyiru and liquids during the nineteenth century

			Metric
<b>gantang</b>			~4.4 L
2	<b>bamboo</b>		~2.2 L
4	2	<b>chupa</b>	~1.1 L

British-linked system for rice during the nineteenth century

				Imperial	Metric
<b>coyan</b>				5400 lbs	2449.367 kg
	<b>coyan</b>			5200 lbs	2358.678 kg
–	1⅓	<b>last</b>		3250 lbs	1474.174 kg
–	800	500	<b>gantang</b>	6½ lbs	2.948 kg

Chinese-linked system during the nineteenth century (two reported scales)

						Metric	Metric
<b>coyan</b>						2419.162 kg	2449.20 kg
13⅓	<b>bahar</b>					181.437 kg	183.69 kg
40	3	<b>pecul or pikul</b>				60.479 kg	61.23 kg
80	6	2	<b>bos</b>			30.239 kg	30.615 kg
4000	300	100	50	<b>tampang or catty</b>		604.790 g	612.30 g
64,000	4800	1600	800	16	<b>taël</b>	37.799 g	38.27 g

### 63.6 Units of Weight

During the late eighteenth century

			Metric
<b>quintal</b>			27.26 kg
4	<b>roue</b>		6.81 kg
128	32	<b>rotilo</b>	212.9 g

Other reported measures during the late eighteenth century:

1 **barre** = 97.53 kg;

1 **cate** = 940.7 g.

For tin during the nineteenth century

			Metric
<b>kip</b>			18.455 kg
15	<b>bedoor</b>		1.230 kg
30	2	<b>tampang</b>	615.2 g

For gold

				Metric
<b>catty</b>				1.078 24 kg
20	<b>buncal or bongkal</b>			53.912 g
320	16	<b>miam</b>		3.369 5 g
3840	192	12	<b>saga</b>	280.79 mg

British Imperial-linked system

								Imperial	Metric
<b>bahar</b>								405 lbs	183.704 760 kg
3	<b>pecul</b> or <b>pikul</b> <sup>a</sup>							135 lbs	61.234 920 kg
20	6⅔	<b>kip</b>						20¼ lbs	9.185 238 kg
150	50	7½	<b>bedur</b>					–	1.224 698 kg
300	100	15	2	<b>tampang</b> or <b>catty</b>				–	612.349 g
375	1600	18¾	2½	1¼	<b>tale</b>			–	489.879 g
6000	2000	300	40	20	16	<b>buncal</b> or <b>bongkal</b>		–	30.617 g
96,000	32,000	4800	640	320	256	16	<b>miam</b>	–	1.914 g

<sup>a</sup>According to [KELL], there was also a Chinese **pecul** = 125 lbs av = about 56.699 kg

Some other reported measures:

1 **kranjang** = 72.575 kg (for gambir (*Uncaria gambir*)), 30.239 kg (for Chinese tobacco), 12.096 kg (for Javanese tobacco) and 60.479 kg (for other commodities).

64 Malagasy Republic

See *Madagascar*.

65 Malawi [Formerly: Nyasaland Protectorate, British Central African Protectorate, Nyasaland]

Between late 1400 and the early 1700s, the Maravi state ruled most of current Malawi. The Maravis traded with both Arab and Portuguese sailors. Dr. David Livingstone arrived at Lake Malawi in 1859. Subsequent clashes between settlements of Scottish missionaries and Arab slave traders, and the procurement of development rights by Cecil Rhodes, stimulated British interest in the area. The area was known as the Nyasaland Protectorate from its establishment in 1891 until 1893, the British Central Africa Protectorate from 1893 until 1907, and Nyasaland

from 1907 until 1953, when it became part of the Federation of Rhodesia and Nyasaland (comprising present-day Malawi, Zambia and Zimbabwe). The Federation dissolved in 1963 and Malawi gained its independence in 1964.

In Malawi, traditionally, no standard for weights and measures was used. Only some East African measures were reported as being used in trading during the late nineteenth century. The Imperial system for weights and measures was used to some extent from the late nineteenth century, but the metric system has been official since 1979.

*Main sources:* [BURT], [FAFC], [UN55], and [UN66]

65.1 Currency

1971–: 1 Malawian kwacha = 100 tambala

1964–1970: 1 Malawian pound = 20 shillings = 240 pence

1955–1963: 1 Rhodesian and Nyasaland pound = 20 shillings = 240 pence

1932–1954: 1 Southern Rhodesian pound = 20 shillings = 240 pence

1890s–1954: 1 pound sterling = 20 shillings = 240 pence = 960 farthings

## 65.2 Units of Length

East African system and British Imperial-linked system

				Metric	Metric
<b>mtunda</b>				–	1609.344 m
440	<b>pima</b>			~3.6 m	3.657 6 m
1760	4	<b>mkono or wari</b>		~0.9 m	0.914 4 m
3520	8	2	<b>shibiri</b> <sup>a</sup>	~0.45 m	457.2 mm

<sup>a</sup>The span from the tip of the thumb to the tip of the little finger

After metrification:

1 **mita** [in Chichewan dialect] = 1 m.

## 65.3 Units of Dry Capacity

Grain was usually measured in local markets on tin plates of about 10 mm radius. The degree to which those piles of grain were heaped was very important.

East African system and British Imperial-linked system

				Metric	Metric
<b>pishi</b>				~2.4 L	2.273 044 L
2	<b>kisaga</b>			~1.2 L	1.136 522 L
4	2	<b>kibabah</b>		~0.6 L	568.261 mL
6	3	1½	<b>rattel</b>	~0.4 L	378.841 mL

## 65.4 Units of Weight

East African system and British Imperial-linked system

			Metric	Metric
<b>frasila</b>			~16.5 kg	16.329 kg
36	<b>ratli</b>		~458 g	453.592 g
576	16	<b>wakia</b>	~28.6 g	28.349 g

For corn in Khuto and Nandalanda during the nineteenth century, based on [BURT]

		Metric
<b>pishi or kisaga</b>		1.14–1.36 kg
2	<b>kibabah or kubabah</b>	0.57–0.68 kg

Other measures reported during the twentieth century:

1 **sack or bag** (for milled rice) = 200 lbs = 90.718 kg;

1 **sack or bag** (for rough rice) = 150 lbs = 68.039 kg.

Eleven different types of bag size were used during the late twentieth century, according to [FAFC].

The usual sizes for bags with maize were bags containing 10 kg, 50 kg and 90 kg.

By focusing on volume instead of weight, traders insured themselves against most weight losses due to desiccation.

## 66 Malaysia [Formerly: Federated Malay States, Malay Union, Federation of Malaya]

See also *Malacca, Penang Island, Sarawak and Singapore*.

In 1896, Negeri Sembilan, Pahang, Perak (an independent state from 1824 to 1874) and Selangor (under British control since 1874) joined to form the Federated Malay States. In 1946, Johor, Kedah (part of Thailand from 1821 to 1909), Kelantan (part of Thailand from 1780 to 1909), Malacca (ceded to Britain in 1824), Penang (ceded to Britain in 1791), Perlis and

Terengganu (became a British dependency in 1909) joined to form the Malay Union. In 1948, the Malay States were renamed the Federation of Malaya and became a British Protectorate, while Malacca and Penang remained British Colonies. Malaya gained its independence within the British Commonwealth in 1957. In 1963, British North Borneo, Sarawak and Singapore joined Malaya to found Malaysia, but in 1965, Singapore was expelled from Malaysia.

The metric system has been compulsory since 1971–1972.

*Main sources:* [CLIF], [HARR3], [REEV], [SUTL], [SWET], and [UN66]

66.1 Currency

- 1976–: 1 Malaysian ringgit = 100 sen
- 1967–1976: 1 Malaysian dollar = 100 cents
- 1953–1967: 1 Malayan and British Borneo dollar = 100 cents
- 1942–1945: 1 Japanese government-issued dollar = 100 cents
- 1939–1952: 1 Malayan dollar = 100 cents
- 1867–1939: 1 Straits Settlements dollar = 100 cents
- 1858–1867: 1 Indian rupee = 100 paises
- 1788–1858: 1 East Indies Company dollar = 100 cents

British Imperial-linked system in George Town

						Imperial	Metric
<b>rělong<sup>a</sup></b>						80 yd	73.151 343 m
20	<b>jěmba<sup>b</sup></b>					4 yd	3.657 567 m
40	2	<b>děpa</b>				2 yd	1.828 784 m
80	4	2	<b>ěla</b>			1 yd	914.392 mm
160	8	4	2	<b>hasta<sup>c</sup></b>		18 in	457.196 mm
320	16	8	4	2	<b>jěngkal</b>	9 in	228.598 mm

<sup>a</sup>Also spelled **orlong**

<sup>b</sup>Also spelled **giamba**, **giumba**, and **jumba**

<sup>c</sup>Also spelled **hesta** and **astah**

fifteenth century: tin animal money, shaped like crocodiles, tortoises, beetles, fish and elephants, was used in trading

In Kelantan:

- 1909–1939: 1 Straits dollar = 100 cents
- 1909: 1 Kelantan keeping = 10 pitis

In Păhang:

- 1 bungkal păhang = 16 mas = 64 kûpang
- 1 ringgit = 3 kûpang = 6 buso = 12 săga = 24 kěnĕri = 48 itam tengko

In Penang:

- 1909–1939: 1 Straits dollar = 100 cents
- 1826–1909: 1 Indian rupee = 100 paise
- 1786–1826: 1 Penang dollar = 100 cents or pices

66.2 Units of Quantity

1 **kadi** or **kodi** = 20 kayu (pieces).

66.3 Units of Length

Chinese system

			Metric
<b>cheung</b>			3.746 5 m
10	<b>check</b>		374.650 mm
100	10	<b>chum</b> or <b>chhun</b>	37.465 mm

Other measures reported during the late nineteenth century:

1 **marhala** (मरहला) = a day's journey;

1 **batu** (in West Malaysia) = 1 mile = 1.609 m;

1 **rělong** (in West Malaysia) = 53.64 m.

## 66.4 Units of Area

British Imperial-linked system

								Imperial	Metric
<b>rělong</b> <sup>a</sup>								57,600 sq ft	5351.119 200 m <sup>2</sup>
4	<b>pěn-juru</b>							14,400 sq ft	1337.779 800 m <sup>2</sup>
24	6	<b>lelong</b>						2400 sq ft	222.963 300 m <sup>2</sup>
400	100	16 $\frac{2}{3}$	<b>jěmba</b>					144 sq ft	13.377 798 m <sup>2</sup>
1600	400	66 $\frac{2}{3}$	4	<b>děpa</b>				36 sq ft	3.344 449 m <sup>2</sup>
6400	1600	266 $\frac{2}{3}$	16	4	<b>ěla</b>			9 sq ft	83.611 2 dm <sup>2</sup>
9600	2400	400	24	6	1 $\frac{1}{2}$	<b>kâki</b>		6 sq ft	55.740 8 dm <sup>2</sup>
25,600	6400	1066 $\frac{2}{3}$	64	16	4	2 $\frac{2}{3}$	<b>jěngkal</b>	2 $\frac{1}{4}$ sq ft	20.902 8 dm <sup>2</sup>

<sup>a</sup>Also spelled **orlong**. Sometimes reported as equal to 30,976 sq ft = 2873.88 m<sup>2</sup>

## 66.5 Units of Dry Capacity

British Imperial-linked system during the early nineteenth century

					Metric
<b>kôian</b>					2225.700 L
5	<b>kuncha</b>				445.140 L
50	10	<b>naleh</b>			44.514 L
500	100	10	<b>gantang</b> <sup>a</sup>		4.451 40 L
2000	400	40	4	<b>chûpak</b>	1.112 85 L

<sup>a</sup>1 gantang of washed rice was estimated as weighing 7 katis

For cereals in Quêda or Kedah

					Metric
<b>bahar</b>					~288 L
15	<b>hali or nali</b>				~19.2 L
240	16	<b>ganta or guanta</b>			~1.20 L
960	64	4	<b>guppa</b>		~300 mL

British Imperial-linked system

							Imperial	Metric
<b>koyan or coiang</b>							800 gal	3636.9 L
80	<b>naleh or para</b>						10 gal	45.46 L
100	1 $\frac{1}{4}$	<b>passu</b>					8 gal	36.368 L
800	10	8	<b>gantang</b>				1 gal	4.546 L
3200	40	32	4	<b>chûpak or shupah</b>			1 qt	1.136 5 L
6400	80	64	8	2	<b>lang</b>		1 pt	568.26 mL
12,800	160	128	16	4	2	<b>pau</b>	2 gills	2.84 dL

Other reported measures:

1 tun = 252 gal = 1 145.6 L.

66.6 Units of Liquid Capacity

British Imperial-linked system during the early nineteenth century

						Metric
kôian						3561.120 L
40	pîkul					89.028 L
80	2	pâra				44.514 L
800	20	10	gantang			4.451 40 L
3200	80	40	4	chûpak		1.112 85 L
12,800	320	160	16	4	pau	278.212 mL

British Imperial-linked system

					Imperial	Metric
bandu					10 gal	45.461 L
10	gantang				1 gal	4.546 1 L
40	4	chûpak or shupah			1 qt	1.136 5 L
160	16	4	pau		½ qt	284.13 mL
320	32	8	2	gill	¼ qt	142.07 mL

66.7 Units of Weight

During the sixteenth century

		Metric
bhāra		145 kg
2000	pala <sup>a</sup>	72.5 g

<sup>a</sup>This value is uncertain

In George Town

					Metric
bhāra or bahar					193.532 865 kg
3	picol <sup>a</sup>				64.510 955 kg
300	100	catty <sup>b</sup>			645.110 g
4800	1600	16	tale		40.319 g

<sup>a</sup>According to [MART3], often equal to 142⅔ lbs av = 64.712 552 kg, but when used for rice = 164 lbs av = 74.389 195 kg. Rice was also sold by sacks containing 100 lbs av = 45.359 265 kg

<sup>b</sup>According to [MART3], often equal to 647.126 kg

In Quéda or Kedah

					Metric
bhāra or bahar					217.701 kg
15	hali or nali				14.513 kg
240	16	ganta or guanta			907.086 g
296	19 <sup>11</sup> / <sub>15</sub>	1 <sup>7</sup> / <sub>30</sub> (~1¼)	catty		735.5 g
962 (~960)	64 <sup>7</sup> / <sub>15</sub> (~64)	4 <sup>7</sup> / <sub>120</sub> (~4)	¾	guppa	226.3 g

## In Selangor

			Metric
<b>bhāra or bahar</b>			183.69 kg
1¼	<b>bahar</b> (small)		146.95 kg
300	240	<b>catty</b>	612.30 g

## British Imperial-linked upper scale for general use

					Imperial	Metric
<b>koyan</b>					5333⅓ lb	2419 kg
13⅓	<b>bhāra or bahar</b>				400 lb	181.44 kg
40	3	<b>pikul</b>			133⅓ lb	60.479 kg
59⅞ <sub>27</sub>	4⅞	1⅓ <sub>27</sub>	<b>para</b>		90 lb	40.823 kg
1000	75	25	16⅞	<b>gantang</b>	5⅓ lb	2.419 kg

## British Imperial-linked lower scale used in the opium trade and for general use

							Imperial	Metric
<b>gantang</b>							5⅓ lb	2.419 kg
2 <sup>26</sup> / <sub>27</sub>	<b>chapah</b>						1⅓ lb	816.4 g
4	1 <sup>7</sup> / <sub>20</sub>	<b>kati</b>					1⅓ lb	604.8 g
64	21⅓	16	<b>tahil</b>				1⅓ oz	37.8 g
400	135	100	6¼	<b>mace</b>			93⅓ gr	6.047 9 g
640	216	160	10	1⅓	<b>chee or chi</b>		58⅓ gr	3.78 g
6400	2160	1600	100	16	10	<b>hoon or hun</b>	5% gr	378 mg

## British Imperial-linked system for gold and silver

							Imperial	Metric
<b>catty or kati<sup>a</sup></b>							9984 gr	646.963 2 g
12	<b>bongkal or buncal</b>						832 gr	53.913 6 g
144	12	<b>emas</b>					208/3 gr	4.492 8 g
192	16		1⅓	<b>mayam or meham</b>			52 gr	3.369 6 g
2304	192	16	12		<b>saga</b>		4⅓ gr	280.8 mg

<sup>a</sup>Also reported as 20 buncals = 1.078 272 kg ([MART3] reported = 1.079 340 g)

Other measures reported during the twentieth century:

- 1 **bag** (for milled rice) = 225 lb = 102.06 kg;
- 1 **sack** (for rice when traded) = 164 lb = 74.389 195 kg;
- 1 **basket** (for milled rice) = 75 lb = 34.02 kg;
- 1 **basket** (for rough rice) = 46 lb = 20.86 kg;
- 1 **kip** (for tin) = 18.5 kg;
- 1 **gantang** (for rough rice) = 2.54 kg;
- 1 **pyi** (for milled rice) = 2.13 kg.

## 67 Maldives [Formerly: Maldiv Islands]

In 1153, the population of this area converted from Buddhism to Islam. Over the next 800 years, it was a Sultanate, except for the years 1558–1573, when the Portuguese controlled the islands. The Maldiv Islands was a British protectorate from 1887 until 1965, but administratively, the islands were part of Ceylon. It became a republic in 1953, but the Sultanate

was restored in 1954. The Maldives gained its independence in 1965.

Officially, the Maldives has converted to the metric system, but imperial measures were widely used well into the twenty-first century.

*Main sources:* [BEAW], [BELL2], [CAIN], [FRIT], [REYN], and [SIMM]

## 67.1 Currency

1981–:	1 Maldivian rufiyaa = 100 laari
1947–1981:	1 Maldivian rupee = 100 cents
1887–1951:	1 Ceylonese rupee = 100 cents
–nineteenth century:	1 rufiyaa = 25 boḍa lárís (silver coin, ~135 g) = 100 kuḍa lárís (small silver, coin ~20 g)
	1 lárín = 12,000 coquilles (= cowrie shells ( <i>Cypraea moneta</i> ))

## 67.2 Unit of Quantity

For fish catch

			Metric
<b>dolissa</b>			144
1½	<b>hiya</b>		96
96	64	<b>dolu</b>	1½ shares of a fish catch

Other reported measures:

1 <b>bostôu</b>	= 100,000 cowrie shells;
1 <b>cotta</b>	= 1200 cowrie shells;
1 <b>fâl</b>	= 700 cowrie shells;
1 <b>syáh</b>	= 100 cowrie shells;
1 <b>agi</b>	= 5 cowrie shells.

## 67.3 Units of Length

British Imperial-linked scale

			Metric
<b>gazu</b>			914.4 mm
2	<b>muĩ</b>		609.6 mm
3	1½	<b>fuutu</b>	304.8 mm

## 67.4 Units of Dry Capacity

Other measures reported during the nineteenth century:

1 **naaliek hai handuu** = a handful of rice.

Traditional system for rice, based on [CAIN]

			British	Metric
<b>naaji</b>			~2 lbs	~0.91 kg
4	<b>laahi</b>		~½ lb	~0.23 kg
16	4	<b>oobu</b>	~1/8 lb	~0.06 kg

## 67.5 Units of Liquid Capacity

Traditional system, based on [CAIN]

		British	Metric
<b>adubaa</b>		~2 lbs	~0.91 kg
4	<b>laahi</b>	~½ lb	~0.23 kg

## 67.6 Units of Weight

Traditional system, based on [BELL2] and [CAIN]

								British	Metric
<b>manu</b>								~84 lbs	~38 kg
3	<b>faulaa</b> <sup>a</sup>							~28 lbs	~13 kg
3½	1⅙	<b>tulu</b> or <b>toolaa</b>						~24 lbs	~11 kg
7	2⅓	2	<b>kulandu</b>					~12 lbs	~5.4 kg
8⅘	2⅘	2⅘	1⅓	<b>diha</b>				~10 lbs	~4.5 kg
42	14	12	6	5	<b>nāil, bodi, or seru</b>			~2 lbs	~0.91 kg
84	28	24	12	10	2	<b>rátalu</b> or <b>raataa</b>		~1 lb	~0.45 kg
336	112	96	48	40	8	4	<b>gaa, gau, or galé</b> <sup>b</sup>	~¼ lb	~0.11 kg

<sup>a</sup>Usually used for sugar

<sup>b</sup>A *Cypraea mauritiana* shell bearing the Sultan's seal in wax was a standardized weight in the Southern Atola

67.7 Units of Time

The old A’ryan system of chronology was in use.  
Days of the week:

Monday = Hóma, Tuesday = Aṅgára,  
Wednesday = Buda, Thursday = Burasfati,  
Friday = Hukuru, Saturday = Honihiru,  
and Sunday = A’dita.

Between 1933 and 1947, part of Upper Volta was attached to French Sudan. French Sudan gained its independence in 1958 and was renamed the Sudanese Republic. It then joined with Senegal in 1958 to form the Mali Federation, which was dissolved in 1960. The Sudanese Republic was renamed the Republic of Mali in 1960.

The metric system has been official since 1984, and compulsory since 1907.

*Main sources:* [DUPU], [HACQ], [LAND], [MART9], and [SUND]

68 Mali [Formerly: French Sudan, Mali Federation, Sudanese Republic]

See also *Mali Empire*.

This area became part of French West Africa in 1895. It was a French colony until 1899, when it was divided between Côte d’Ivoire, Dahomey, Guinea and Senegal. Senegambia and Niger were administrative units of the French holdings in Africa, formed in 1902 and reorganized in 1904 into a colony named Upper Senegal and Niger. In 1920, Niger became a separate French Colony, and the remainder became part of French Sudan.

68.1 Currency

1969–: 1 CFA franc = 100 centimes  
1962–1969: 1 Mali franc = 100 centimes  
1945–1962: 1 CFA franc = 100 centimes  
1901–1945: 1 West African franc = 100 centimes  
c.1880–1901: 1 French franc = 100 centimes  
eighteenth 1 faravel = narrow cotton strips  
century: (in Timbuktu)

68.2 Units of Dry Capacity

					Metric
sawal					~4 L
2	artel				~2 L
4	2	mude or moudd			~1 L
8	4	2	attumun		~500 mL
16	8	4	2	nustumum	~250 mL

68.3 Units of Weight

For silk in Timbuktu during the mid-nineteenth century

						Metric
wakiah fo						2.138 g
1½	wakiah arrobo					1.604 g
2	1½	wakia dyere				1.069 g
4	3	2	arrobo			534.6 g
8	6	4	2	attumun		267.3 mg
16	12	8	4	2	nustumun	133.6 mg

For gold and salt in Timbuktu during the mid-nineteenth century

								Metric
wakiah								27.489 g
5½	mutukal							4.998 g
7⅓	1⅓	mutukal arrobo						3.748 g
11	2	1½	mutukal dyere					2.499 g
16½	3	2¼	1½	tultu				1.666 g
22	4	3	2	1⅓	arrobo			1.249 g
33	6	4¼	3	2	1½	suda <sup>a</sup>		882.7 mg
132	24	18	12	8	6	4	giratu or bani fo <sup>b</sup>	208.2 mg

<sup>a</sup>A wheat kernel  
<sup>b</sup>A small mimosa seed

- Other reported measures:
- 1 **arubo** or **arrobo** (at Djenné) = ~7⅞ g;
  - 1 **atumo** (at Djenné) = ~5.0 g;
  - 1 **bant** (for gold) = a pebble about the size of a pea.

69 Mali Empire

See also *Kaabu Empire* and *Mali*.  
The Malinke Kingdom of Mali was established c. 1230, and existed until the early 1600s, when the area was divided among the emperor’s sons.

69.1 Currency

Gold dust and cowries

from 1798, but they lost it two years later when the Maltese revolted, aided by the British. Malta was a crown colony between 1814 and 1922. It gained its independence in 1964.

The Roman system of weights and measures used there was probably influenced by Byzantine and Arabian units of measures until the late twelfth century. Between 1194 and 1530, the island was ruled by the Kingdom of Sicily, and hence also significantly influenced by the Sicilian measurement systems. During the early eighteenth century, the British system gradually influenced the values of many units of measure. In 1921, all surviving units were defined legally by British equivalents. The metric system has been official since 1910 and compulsory since 1914 and 1921.

*Main sources:* [AQUI], [AQUI2], [BAUE], [BOWE], [BROW], [CARD], [DOUR], [ECON], [LETA], [MART], [MART3], [NELK], [PURD], [UN55], [UN66], [VERE], and [ZUPK4]

70 Malta [Formerly: Malta (and Gozo)]

See also *Crown of Aragon* and *Spain*.  
Malta was held by the Phoenicians, Greeks, Carthaginians, and the Roman Empire. After the fall of the Roman Empire, Malta was ruled in turn by the Byzantines, the Arabs, the Normans, the Swabians, the Angevins, the Aragonese and the Castilians. In 1530, Charles V of Spain donated the Maltese Islands in fief to the Order of St John of Jerusalem. Malta was under French control

70.1 Currency

- 2008–: 1 euro = 100 euro-cents
- 1983–2007: 1 Maltese lira = 100 cents = 1000 mils
- 1972–1983: 1 Maltese pound = 20 shillings = 240 pence
- 1914–1972: 1 Maltese pound = 20 shillings = 240 pence = 960 farthings

1855–1949: 1 British pound sterling = 20 shillings = 240 pence = 960 farthings  
1798–1855: 1 Spanish doubloon = 2 escudos = 32 reales  
1 Maria Theresa dollaru  
c.1550–1798: 1 scudo = 12 tari = 24 carlinis  
= 240 grani = 1 440 piccioli  
1 pezza = 2½ scudi

70.2 Units of Quantity

1 **hemel** or **somma** = 10 qattiet (bundles) in Malta and 8 qattiet (bundles) in Gozo;  
1 **qatta**, **xibka**, or **xkora** = a sheaf of sulla, thistles, or wheat.

70.3 Units of Length

Longer distances were traditionally measured in terms of travel time, such as 1 **vjaġġi ta 'gurnata** = one day’s travel.

Sicilian/Spanish scale<sup>a</sup> until the nineteenth century

						Metric
<b>qasba</b> or <b>canna</b> <sup>b</sup>						2.090 04 m
8	<b>xiber</b> or <b>palma</b>					261.255 mm
16	2	<b>fitel</b>				130.627 mm
96	12	6	<b>pulzier, pollice, or oncia</b>			21.771 mm
1152	144	72	12	<b>linea</b>		1.814 mm
13,824	1728	864	144	12	<b>punto</b>	151 µm

<sup>a</sup>Qasba/canna, xiber/palma, fitel, and pulzier/pollice, often reported as used for cloth and linen

<sup>b</sup>[CARD] reported one **canna** as 2.088 m, and [BOWE] 2.095 m

British Imperial-linked scale during the late nineteenth century

					Metric
<b>miglio</b>					1286.549 m
3	<b>leghe</b>				428.850 m
660	220	<b>tesa or qasba</b> <sup>a</sup>			1.949 m
1407	469	–	<b>jarda</b>		914.392 mm
4536	1512	–	–	<b>pied</b>	283.631 mm

<sup>a</sup>Usually used for masonry and real estate

British Imperial-linked scale after 1921

				Imperial	Metric
<b>qasba</b>				82½ in	2.095 500 m
8	<b>xiber</b>			–	261.937 500 mm
16	2	<b>fitel</b> <sup>a</sup>		–	130.968 750 mm
96	12	6	<b>pulzier</b>	–	21.828 125 mm

<sup>a</sup>Not defined in the 1921 Act

## 70.4 Units of Area

Sicilian/Spanish scale before 1921

									Metric
<b>salma</b>									16,779.925 094 m <sup>2</sup>
4	<b>wejba</b>								4194.981 274 m <sup>2</sup>
16	4	<b>tomna</b>							1048.745 318 m <sup>2</sup>
96	24	6	<b>siegh</b>						174.790 886 m <sup>2</sup>
960	240	60	10	<b>kejla</b>					17.479 089 m <sup>2</sup>
3840	960	240	40	4	<b>qasba kwadru</b>				4.369 772 m <sup>2</sup>
245,760	61,440	15,360	2560	256	64	<b>xiber kwadru</b>			6.827 77 dm <sup>2</sup>
983,040	245,760	61,440	10,240	1024	256	4	<b>fitel kwadru</b>		1.706 94 dm <sup>2</sup>
35,389,440	8,847,360	2,211,840	368,640	36,864	9216	144	36	<b>pulzier kwadru</b>	4.741 cm <sup>2</sup>

British Imperial-linked scale after 1921

									Imperial	Metric
<b>modd</b>									4 $\frac{1}{2}$ ac	17,986 m <sup>2</sup>
4	<b>wejba</b>								1 $\frac{1}{2}$ ac	4496.5 m <sup>2</sup>
16	4	<b>tomna</b> <sup>a</sup>							5/18 ac	1124.124 m <sup>2</sup>
96	24	6	<b>siegh</b> <sup>b</sup>						5/108 ac	187.354 m <sup>2</sup>
960	240	60	10	<b>kejla</b>					1/216 ac	18.735 4 m <sup>2</sup>
3840	960	240	40	4	<b>qasba kwadra</b> <sup>c</sup>				1/864 ac	4.683 85 m <sup>2</sup>
245,760	61,440	15,360	2560	256	64	<b>xiber kwadru</b>				7.318 dm <sup>2</sup>
983,040	245,760	61,440	10,240	1024	256	4	<b>fitel kwadru</b>			1.830 dm <sup>2</sup>
35,389,440	8,847,360	2,211,840	368,640	36,864	9216	144	36	<b>pulzier kwadru</b>		5.08 cm <sup>2</sup>

<sup>a</sup>Also reported as **tummolo**. During the early twenty-first century, still used for real estate

<sup>b</sup>Also reported as **mondello**

<sup>c</sup>[BOWE] reported it as 4.391 m<sup>2</sup>

## 70.5 Units of Volume

Sicilian/Spanish-linked scale for timber

		Metric
<b>tratto</b>		214.0 dm <sup>3</sup>
12	<b>palma cuadrada</b>	17.83 dm <sup>3</sup>

Sicilian/Spanish-linked scale before 1921, and British-linked scale after 1921 (not defined in the 1921 Act)

				Metric	Metric
<b>qasba kubu</b>				9134.572 L	9201.592 L
512	<b>xiber kubu</b>			17.841 L	17.972 L
4096	8	<b>fitel kubu</b>		2.230 L	2.246 L
884,736	1728	216	<b>pulzier kubu</b>	10.32 mL	10.40 mL

## 70.6 Units of Dry Capacity

Sicilian/Spanish-linked scale for almonds, charcoal, olives, pulse, salt, and cereals before 1921

								Metric
<b>tonnellata</b> <sup>a</sup>								1448.0 L
5	<b>modd</b> or <b>salma</b> <sup>b</sup>							289.60 L
20	4	<b>wejba</b> <sup>c</sup>						72.40 L
80	16	4	<b>tomna</b>					18.10 L
480	96	24	6	<b>ghabara</b> or <b>mondell</b>				3.02 L
800	160	40	10	1 $\frac{2}{3}$	<b>siegh</b>			1.812 L
4800	960	240	60	10	6	<b>misura</b> <sup>d</sup>		302 mL
48,000	9600	2400	600	100	60	10	<b>lumino</b>	30.2 mL

<sup>a</sup>For cereals. Wheat and barley were sold by the stricken and all other commodities by the heaped measure (assessed at 16% more than the stricken measure, according to [MART3])

<sup>b</sup>1 **salma** (as a stricken measure for barley and wheat) = 290.944 L. According to [DOUR], = 289.61 L, [NELK], = 288.5 L, [BAUE] = 288.52 L, and [MART3] = 286.43 L

<sup>c</sup>Also called **sacco**

<sup>d</sup>When used for dry food stuff, such as capers and pepper, usually called **kejla**. Sometimes a half measure was used, such as **nosf misura** = about 151 mL

British Imperial-linked scale for almonds, charcoal, olives, pulse, salt, and cereals after 1921

					Imperial	Metric
<b>modd</b>					64 gal	290.950 L
16	<b>tomna</b> or <b>tumolo</b>				4 gal	18.184 L
96	6	<b>siegh</b>				3.031 L
960	60	10	<b>kejla</b>			303.1 mL
9600	600	100	10	<b>lumin</b>		30.3 mL

Other units used during the nineteenth to twentieth century:

1 **tonnellata** (for flour) = 40 cu ft = about 1133 L;

1 **salma colma** (heaped measure for beans, chick peas, green beans, maize, lentils, salt, charcoal, hemp, and the seeds of flax) = 16 heaped tomna = about 335 L. According to [DOUR], = 335.95 L.

Metric-linked lower scale

		Metric
<b>mondell</b>		300 mL
10	<b>lumin</b>	30 mL

## 70.7 Units of Liquid Capacity

Sicilian/Spanish-linked scale for wine, brandy, and vinegar

										Metric
<b>botta or botte</b>										936.589 L
2	<b>pipa</b>									468.294 L
22	11	<b>barile</b>								42.572 L
44	22	2	<b>quartara</b>							21.286 L
88	44	4	2	<b>mezza quartara</b>						10.643 L
836	418	38	19	9½	<b>quartino</b>					1.120 L
1672	836	76	38	19	2	<b>mezzo quartino</b>				560.2 mL
3344	1672	152	76	38	4	2	<b>terzo</b>			280.1 mL
6,688	3,344	304	152	76	8	4	2	<b>pinta</b>		140.0 mL
13,376	6,688	608	304	152	16	8	4	2	<b>mezza pinta</b>	70.0 mL

Sicilian/Spanish-linked scale and British Imperial-linked scale for oil and milk

									Metric	Imperial	Metric
<b>barile<sup>a</sup></b>									39.80 L	8⅔ gal	40.892 2 L
2	<b>qafiz<sup>b</sup></b>								19.90 L	4½ gal	20.446 1 L
4	2	<b>nofs qafiz</b>							9.95 L	18 pt	10.222 5 L
8	4	2	<b>kwarta</b>						4.975 L	9 pt	5.111 25 L
32	16	8	4	<b>kartoċċ</b>					1.244 L	2¼ pt	1.277 88 L
64	32	16	8	2	<b>nofs (kartoċċ)</b>				621.89 mL	1⅞ pt	638.94 mL
128	64	32	16	4	2	<b>terz</b>			310.94 mL	1/16 pt	319.47 mL
320	160	80	40	10	5	2½	<b>misura</b>		124.38 mL		127.79 mL
1280	640	320	160	40	20	10	4	<b>quartino</b>	31.09 mL		31.95 mL

<sup>a</sup>[CARD] reported 1 **barile** as 43.162 L. When used for oil, sometimes called **barmil**

<sup>b</sup>For cooking oil, also spelled **capso**, and reported as about 19.89 L. [CARD] reported it as **caffiso** equal to 20.457 L

British Imperial-linked scale for beer, wine, and spirits after 1921

									Imperial	Metric
<b>tonnellata<sup>a</sup></b>									1596 pt	906.948 L
21	<b>barile<sup>b</sup></b>								76 pt	43.188 L
84	4	<b>garra</b>							19 pt	10.797 L
168	8	2	<b>kwarta</b>						9½ pt	5.398 L
798	38	9½	4¾	<b>kartoċċ</b>					2 pt	1.136 5 L
1596	76	19	9½	2	<b>nofs (kartoċċ)</b>				1 pt	568.3 mL
3192	152	38	19	4	2	<b>terz</b>			½ pt	284.1 mL
6384	304	76	38	8	4	2	<b>pinta</b>		¼ pt	142.1 mL

<sup>a</sup>Not defined in the 1921 Act

<sup>b</sup>Defined as 1 **barmil** in the 1921 Act

## 70.8 Units of Weight

Sicilian/Spanish-linked upper scale before 1921

						Metric
<b>tonnellata</b>						992.233 kg
$4\frac{3}{84}$	<b>salma</b>					222.261 kg
$12\frac{1}{2}$	$2\frac{2}{5}$	<b>qantar</b> or <b>cantàro</b>				79.379 kg
250	56	20	<b>wizna</b> or <b>peso</b>			3.969 kg
1250	280	100	5	<b>rotolo</b>		793.786 g
1875	420	150	$7\frac{1}{2}$	$1\frac{1}{2}$	<b>libbra grosso</b>	529.19 g

Sicilian/Spanish-linked lower scale before 1921

										Metric
<b>libbra grosso</b>										529.19 g
$1\frac{2}{3}$	<b>libbra</b>									317.52 g
20	12	<b>uqiya</b>								26.46 g
80	48	4	<b>quarta</b>							6.615 g
160	96	8	2	<b>dramma</b>						3.307 g
320	192	16	4		<b>parto</b>					1.654 g
480	288	24	6	3	$1\frac{1}{2}$	<b>scrupolo</b>				1.102 g
640	384	32	8	4	2	$1\frac{1}{3}$	<b>trapeso</b>			826.9 mg
9600	5760	480	120	60	30	20	15	<b>acino</b>		55.1 mg
11,520	6912	576	144	72	36	24	18	$1\frac{1}{2}$	<b>grano</b>	45.9 mg

Sicilian/Spanish scale for dry commodities before 1921

							Metric
<b>pesata</b>							238.136 kg
3	<b>cantaro</b>						79.379 kg
60	20	<b>pesa</b>					3.969 kg
300	100	5	<b>rotolo</b>				793.786 g
9000	3000	150	30	<b>oncia</b>			26.459 g
36,000	12,000	600	120	4	<b>quarta</b>		6.615 g
5,184,000	1,728,000	86,400	17,280	576	144	<b>cocci</b>	45.9 mg

British Imperial-linked upper scale after 1921

						Imperial	Metric
<b>ton<sup>a</sup></b>						2240 lbs	1016.046 kg
$4\frac{2}{15}$	<b>pezata</b>					525 lbs	238.137 kg
$12\frac{2}{5}$	3	<b>qantar</b>				175 lbs	79.379 kg
256	60	20	<b>wizna<sup>b</sup></b>			$8\frac{3}{4}$ lbs	3.969 kg
1024	240	80	4	<b>qsima<sup>b</sup></b>		35 oz	922.2 g
1280	300	100	5	$1\frac{1}{4}$	<b>ratal</b>	28 oz	793.8 g

<sup>a</sup>[BOWE] reported it as 1016.128 kg. Not defined in the 1921 Act

<sup>b</sup>Not defined in the 1921 Act

British Imperial-linked lower scale after 1921

					Imperial	Metric
<b>ratal</b>					28 oz	798.8 g
4	<b>kwart (ratal)<sup>a</sup></b>				7 oz	198.4 g
30	7½	<b>uqija</b>			14/15 oz	26.46 g
120	30	4	<b>kwart (uqija)</b>		7/30 oz	6.615 g
240	60	8	2	<b>ottav (uqija)</b>	7/60 oz	3.307 g

<sup>a</sup>Not defined in the 1921 Act

Sicilian/Spanish scale for timber and firewood before 1921

			Metric
<b>pesata</b>			261.949 kg
3	<b>quintale or cantaro</b>		87.317 kg
330	110	<b>rotolo</b>	793.786 g

Sicilian/Spanish scale for gold, silver, pearls, jewels and gemstones before 1921

											Metric
<b>cantaro</b>											79.379 kg
20	<b>pesa</b>										3.969 kg
90 <sup>10</sup> / <sub>11</sub>	4 <sup>9</sup> / <sub>11</sub>	<b>rotolo grosso</b>									873.169 g
100	5	1 <sup>1</sup> / <sub>10</sub>	<b>rotolo</b>								793.786 g
250	12½	2¾	2½	<b>libbra</b>							317.515 g
3000	150	33	30	12	<b>oncia</b>						26.459 g
12,000	600	132	120	48	4	<b>quarta</b>					6.615 g
24,000	1200	264	240	96	8	2	<b>octavo<sup>a</sup></b>				3.307 g
48,000	2400	528	480	192	16	4	2	<b>sedicesimo</b>			1.654 g
96,000	4800	1056	960	384	32	8	4	2	<b>trapesa</b>		826.9 mg
1,728,000	86,400	19,008	17,280	6912	576	144	72	36	18	<b>coeci<sup>b</sup></b>	45.9 mg

<sup>a</sup>Also called **dramma**

<sup>b</sup>Also called **cocca**. 4 coeci was also reported as 1 **carat** = 183.7 mg

Other reported measures:

1 **qafiz** or **caffiso** (for oil) = 19.877 5 kg.

Metric linked system for potatoes, grapes, vegetables, and cheese

				Metric
<b>qantar</b>				80 kg
20	<b>wizna</b>			4 kg
100	5	<b>ratal</b>		800 g
400	20	4	<b>kwart</b>	200 g

71 Maluku Islands [Formerly: Moluccan Islands and Spice Islands]

See also *Indonesia*.

In 1513, the Portuguese landed in Ambon. In 1599, the islands were under control of the Dutch East India Company. During WWII, the islands were occupied by Japan, and then became part of Indonesia in 1945. From 1950, the islands were a single province of Indonesia, but in 1999, it was divided into two provinces.

Chinese, Dutch, and British systems of weights and measures have all been used for commercial purposes.

*Main sources:* [CAMP2], [DOUR], [KELL], [KELL4], [KLIM], [MART3], and [THOR]

## 71.1 Currency

At Ambon

1 rixdollar = 8 shillings = 12 dubbeltjees = 48 stivers = 192 doits

At Banda

1 rixdollar = 8 shillings = 48 stivers = 768 pennings

At Ternate

1 rixdollar = 48 stivers

## 71.2 Units of Length

1 **covid** (at Ambon Island) = 460.583 mm;

1 **covid** (at Timor) = 400.58 mm.

## 71.3 Units of Liquid Capacity

1 **can** or **kanne** (at Ambon Island) = 1.491 L.

## 71.4 Units of Dry Capacity

All dry commodities were sold by weight.

## 71.5 Units of Weight

For salt and rice at Ambon Island and Banda

					Metric
<b>coyang</b>					1476.503 kg
25	<b>pecul</b>				59.060 kg
40	1 $\frac{3}{5}$	<b>maat</b> or <b>maaton</b>			36.913 kg
666 $\frac{2}{3}$	26 $\frac{2}{3}$	16 $\frac{2}{3}$	<b>gantang</b>		2.214 75 kg
2500	100	62 $\frac{1}{2}$	3 $\frac{3}{4}$	<b>catty</b>	590.601 1 g

For cloves (*Syzygium aromaticum*) at Ambon Island and Ternate

		Metric
<b>bahar</b>		270.692 246 kg
50	<b>barottie</b>	5.413 845 kg

For cloves (*Syzygium aromaticum*) at Banda

		Imperial	Metric
<b>bahar</b>		610 lbs	276.7 kg
100	<b>catty</b>		2.767 kg

For mace and nutmeg blossoms at Banda

		Imperial	Metric
<b>soekel</b>		170 $\frac{1}{5}$ lbs	77.46 kg
28	<b>catty</b>		2.767 kg

For rice at Ternate

			Imperial	Metric
<b>caban</b>			100 $\frac{1}{3}$	45.51 kg
60 $\frac{2}{3}$	<b>bamboo</b>			750.17 g
91	1 $\frac{1}{2}$	<b>pond trooisch</b>		500.11 g

At Ternate and Timor

			Metric
<b>tale</b>			37.58 g
10	<b>mas</b>		3.758 g
100	10	<b>condorine</b>	375.8 mg

For gold and silver at Ambon Island and Ternate

				Metric
<b>catty</b> <sup>a</sup>				590.601 1 g
20	<b>tale</b> or <b>tehl</b>			29.530 g
320	16	<b>mace</b> or <b>meh</b>		1.845 6 g
1280	64	4	<b>copang</b> or <b>cubang</b>	461.4 mg

<sup>a</sup>The Chinese catty = 1 $\frac{1}{3}$  lbs = 604.79 g

Other measures reported during the nineteenth century:

- 1 **bahar** (at Ambon Island) = 270.69 kg;
- 1 **gedang** or **gedeng** (for pepper at the Spice Islands) = 1.976 kg;
- 1 **bamboo** (for rice at Ternate) = 1½ lbs Dutch Troy = 738.251 g;
- 1 **pound Dutch troy** (for nutmeg) = 1 lb 1 oz 5¼ dr av = ?
- 1 **livre** (at Banda) = 492.2 g.

tanate survived until 1517, when it was conquered by the Ottoman Empire.

*Main sources:* [HINZ], [POPP2], and [SAUV]

## 72.1 Units of Length

Average values of the Nilometer and common values ([POPP2] and [HINZ])

		Metric	Metric	Metric
<b>dhirā<sup>c</sup></b>		541 mm	462 mm	498.75 mm
24	<b>işba<sup>c</sup></b>	22.5 mm	19.25 mm	20.78 mm

## 72 Mamluk Sultanate

See also *Arab Egypt*, *Ayyūbid*, *Ottoman Empire* and *Syria*.

This Sultanate ruled Egypt and Israel, and parts of present-day Jordan, Lebanon, Libya, Saudi Arabia, Sudan and Syria, after they conquered the Ayyūbid forces in 1250. The Sul-

## 72.2 Units of Area

			Metric
<b>faddān</b>		20 × 20 qasabahs	3073.594 m <sup>2</sup>
4	<b>jarīb</b>	10 × 10 qasabahs	768.398 m <sup>2</sup>

## 72.3 Units of Dry Capacity

Presumed traditional values and values based on qadaḥ in Egypt reported during the nineteenth century ([SAUV])

								Metric	Metric
<b>ḥamlah<sup>a</sup></b> , <b>ḥiml</b> , or <b>ghirārah<sup>b</sup></b>								~324 L	150.161 76 L
1½	<b>irdabb</b>							~216 L	100.107 84 L
2	1½	<b>tallis<sup>c</sup></b> or <b>tillis</b>						~162 L	75.080 88 L
4	2⅔	2	<b>qafiz</b>					~81 L	37.540 44 L
6	4	3	1½	<b>baṭṭah<sup>d</sup></b> or <b>buṭṭah</b>				~54 L	25.026 96 L
9	6	4½	2¼	1½	<b>waybah</b>			~36 L	16.684 64 L
36	24	18	9	6	4	<b>ṣā<sup>c</sup></b>		~9 L	4.171 16 L
144	96	72	36	24	16	4	<b>qadaḥ</b> or <b>mudd<sup>e</sup></b>	~2.25 L	1.042 79 L

<sup>a</sup>1 **ḥamlah** of flour weighs 300 raṭls

<sup>b</sup>In Damascus = 3 irdabbs of Cairo. 1 **ghirārah** of Damascus = 2 **ghirārah** of Cairo

<sup>c</sup>1 **tallis** of flour weighs 150 raṭls

<sup>d</sup>1 **baṭṭah** of flour weighs 50 raṭls

<sup>e</sup>1 **mudd** of Damascus = 4 qadaḥs. 1 **mudd** of grain weighs 1⅓ raṭls

72.4 Units of Weight

						Metric
<b>mithqāl<sup>a</sup></b>						4.250 g
1 $\frac{1}{7}$	legal <b>dirham</b>					2.975 g
8 $\frac{1}{7}$	6	<b>dānaq</b> or <b>dāniq</b>				495.83 mg
20	14	2 $\frac{1}{3}$	<b>qīrāṭ<sup>b</sup></b>			212.50 mg
34 $\frac{1}{7}$	24	4	1 $\frac{1}{7}$	<b>kharrūbah<sup>c</sup></b>		123.96 mg
72	50 $\frac{1}{5}$	8 $\frac{1}{5}$	3 $\frac{1}{5}$	2 $\frac{1}{10}$	<b>ḥabbah<sup>d</sup></b> or <b>khardal</b>	59.03 mg

<sup>a</sup>Legal weight of the dinar  
<sup>b</sup>Equal to 1/24 of a measure. A weight proportional to that of the legal dirham to calculate the weight of coins  
<sup>c</sup>Carob seed  
<sup>d</sup>Average-sized unshelled grain of barley, of which the extremities are cut. Reported as equal to the weight of 100 grains of mustard seeds (=1 khardal)

Other measures:

- 1 **irdabb** (for wheat in Alexandria) = 137.6 kg;
- 1 **irdabb** (for wheat in Cairo) = 68.8 kg;
- 1 **quffah<sup>1</sup>** (for fulūs) = 115 ratls.

In Jeddah during the fourteenth century

		Metric
<b>himl</b>		~250–300 kg
2	<b>adīla</b>	~125–150 kg

73 Isle of Man

In the early history of this island, it belonged alternately to Wales and Scotland. The Norwegian king Harald Fairhair conquered the island in the 800s. Since his earls made it independent, the island was conquered again by the Norwegian king Magnus Barefoot in 1093. In 1266, Alexander III of Scotland took over the taxation, and the island became part of Scotland. After his death in 1290, Edward I of England took over the taxation rights. In 1399, the island came under the feudal over-lordship of the English Crown. This lordship revested into the British Crown in 1764, but the island retained its status as an internally self-governing jurisdiction.

<sup>1</sup> This was a basket, generally used for carrying vegetables, dates, cloth and other household items.

74 Manchukuo [Formerly: Manchu State and Empire of Manchuria]

See also *China*.  
This area was formed and designated as the land of the Manchus, the ethnic group of the Qing Dynasty, in 1931. It was seized in the Soviet invasion in 1945, and formally transferred to Chinese administration in 1946.

74.1 Currency

- 1932–1945: 1 Manchukuo yuan (滿洲國圓) = 10 chiao (角) = 100 fen (分) = 1000 li (釐)
- 1932: 1 Haikwan tael or Hǎiguān tael (海關)

75 Mankessim

See also *Ghana*.  
This kingdom was established in 1252, and lasted until 1844, when it came under British protection.

76      **Mantua**

See also *Austria* and *Cisalpine Republic*.

A Duchy in Northern Italy, established in 1433 by Emperor Sigismund. The area was under Austrian rule from 1708 until 1797, when it was annexed to the Cisalpine Republic.

76.1    **Currency**

1 Mantuan tallero = 12 lire = 240 soldi = 480  
sesini = 2880 denari

76.2    **Units of Weight**

		Metric
<b>rubbio</b>		7.89 kg
25	<b>libbra</b>	315.6 g

77      **Maratha Empire or Maratha Confederacy (1674–1820)**

See *India*.

78      **Mariana Islands**

See *Northern Mariana Islands*.

79      **Marshall Islands [Formerly: German New Guinea and Marshall Islands District]**

The Marshall Islands were discovered by the Spanish explorer Alonso de Salazar in 1526, but were named after the British sea captain, John Charles Marshall, who explored them in 1788. At any rate, the islands were claimed under the Spanish sovereignty as part of the Spanish Oceania until 1884, when Germany bought them. The Marshall Islands were a German

protectorate from 1886 until 1906, when they became part of German New Guinea. The Japanese occupied the islands in 1914, and received a League of Nations mandate to administer them in 1920. The United States occupied the Marshall Islands in 1944, and they subsequently became a UN Trusteeship of the United States between 1951 and 1990, when they became part of the Federated States of Micronesia. The Marshall Islands gained their autonomy in 1979, signed a free association agreement with the United States in 1986, and gained their independence in 1990.

79.1    **Currency**

1944–:            1 US dollar = 100 cents  
1915–1944:    1 Japanese Yen = 100 sen  
1886–1915:    1 German New Guinea Mark =  
                         100 Pfennig

80      **Martinique**

See also *French West Indies*.

Martinique was discovered by Christopher Columbus in 1502. It became a French colony in 1635, and a French overseas département in 1946. It was periodically occupied by Britain between 1762 and 1814.

The metric system has been official since 1844.

*Main sources:* [DOUR], [KELL], [MART3], [MAY], and [UN55]

80.1    **Currency**

1999–:            1 euro = 100 euro-cents  
1826–2002:    1 French franc = 100 centimes  
–1826:           1 French livre colonial =  
                         20 sous = 240 deniers

80.2 Units of Length

1 **aune** = 44 pouces de Paris = 1.191 076 m.

80.3 Units of Area

1 **carré** = 122,500 pieds carrés de Paris = 12,926.28 m<sup>2</sup>.

80.4 Units of Dry Capacity

For legumes

			Metric
<b>baril</b>			102.445 000 L
4	<b>fréquin</b>		25.611 250 L
55	13¼	<b>pot</b>	1.862 636 L

80.5 Units of Liquid Capacity

								Metric
<b>barrique</b>								186.263 636 L
50	<b>gallon<sup>a</sup></b>							3.725 273 L
100	2	<b>pot or pottle</b>						1.862 36 L
200	4	2	<b>pinte</b>					931.318 mL
400	8	4	2	<b>chopine</b>				465.659 mL
800	16	8	4	2	<b>roquille</b>			232.829 mL
1600	32	16	8	4	2	<b>muce</b>		116.415 mL
3200	64	32	16	8	4	2	<b>demi-muce</b>	58.207 mL

<sup>a</sup>Based on the English wine gallon

For syrup

			English wine gallons	Metric
<b>boucaut</b>			105	391.153 636 L
1⅔ <sub>13</sub>	<b>tierçon</b>		65	242.142 727 L
3½	2⅙	<b>baril</b>	30	111.758 182 L

Other reported measures:

1 **boucaut** (for rum) = 114 gal = 424.681 090 L.

80.6 Units of Weight

				Metric
<b>tonneau</b>				979.011 693 kg
–	<b>barrique<sup>a</sup></b>			489.505 847 kg
–	–	<b>baril<sup>b</sup></b>		88.111 052 kg
2000	1000	180	<b>livre</b>	489.505 847 g

<sup>a</sup>For sugar

<sup>b</sup>For flour

81 Massa and Carrara

See also *Cispadana Republic, Italy, Lucca* and *Piambino* and *Modena and Reggio*.

The Duchy of Massa and Carrara was created in 1473 and lasted until 1829, when the area was annexed to the Duchy of Modena and Reggio.

Main source: [MART3]

81.1 Currency

1 lira = 20 soldi = 240 denari

81.2 Units of Length

							Metric
<b>pertica</b>							3.462 081 m
$1\frac{1}{24}$	<b>canna</b>						2.374 000 m
$4\frac{3}{8}$	3	<b>passetto</b>					791.333 mm
$5\frac{5}{6}$	4	$1\frac{1}{3}$	<b>braccio</b>				593.500 mm
7	$4\frac{4}{5}$	$1\frac{2}{5}$	$1\frac{1}{5}$	<b>pie</b>			494.583 mm
84	$57\frac{3}{5}$	$19\frac{1}{5}$	$14\frac{2}{5}$	12	<b>oncia</b>		41.215 mm
1008	$691\frac{1}{5}$	$230\frac{3}{5}$	$172\frac{4}{5}$	144	12	<b>punto</b>	3.435 mm

81.3 Units of Area

				Metric
<b>staio</b>				1198.602 1 m <sup>2</sup>
100	<b>pertica</b>			11.986 021 m <sup>2</sup>
700	7	<b>braccio di pertica</b>		1.712 289 m <sup>2</sup>
4900	49	7	<b>settimo</b>	24.461 1 dm <sup>2</sup>

81.4 Units of Volume

For timber

		Metric
<b>braccio</b>		3.344 892 m <sup>3</sup>
16	<b>bracciolo</b>	209.056 dm <sup>3</sup>

81.5 Units of Dry Capacity

					Metric
<b>sacco</b>					75.507 900 L
3	<b>staio</b>				25.169 300 L
12	4	<b>quarra</b>			6.292 325 L
24	8	2	<b>colmo</b>		3.146 162 L
72	24	6	3	<b>coppello</b>	1.048 720 L

## 81.6 Units of Liquid Capacity

For wine

				Metric
<b>barile grosso</b>				42.372 500 L
$1\frac{1}{15}$	<b>barile piccolo</b>			39.724 200 L
$21\frac{1}{3}$	20	<b>fiasco</b>		1.986 210 L
32	30	$1\frac{1}{2}$	<b>boccale</b>	1.324 141 L

For oil

		Metric
<b>barile da frantoio</b>		37.628 100 L
18	<b>boccale</b>	2.090 450 L

Other reported measures:

1 **barile da piazza** = 36.890 300 L.

## 81.7 Units of Weight

				Metric
<b>libbra</b>				329.724 g
12	<b>oncia</b>			27.477 g
288	24	<b>denaro</b>		1.145 g
6912	576	24	<b>grano</b>	48 mg

For medical use

					Metric
<b>libbra</b>					329.724 400 g
12	<b>oncia</b>				27.477 033 g
96	8	<b>dramma</b>			3.434 629 g
288	24	3	<b>scrupolol</b>		1.144 876 g
6912	576	72	24	<b>grano</b>	47.703 mg

gold and slaves with Portuguese, Dutch, English and French traders until the late nineteenth century. The Senegal Treaty of 1817 recognized Mauritania as being in the French sphere of influence. Mauritania became a French protectorate in 1903, part of French West Africa in 1920, and a French colony in 1921. It gained its autonomy as the Islamic Republic of Mauritania in 1958 and its independence in 1960.

The metric system has been official since 1884, and compulsory since 1907.

*Main source:* [GOIT]

## 82 Mauritania

See also *Ghana Empire*.

The indigenous inhabitants were driven out of present-day Mauritania by Berber invaders in the eleventh century. The area became a transit point for African gold from Senegal to Morocco in the Middle Ages. The Portuguese visited Mauritania in the 1400s and established the fort of Arguin. The Berbers were conquered by Arab invaders in the sixteenth century. The Arabs traded in gum,

### 82.1 Currency

1973–: 1 Mauritanian ouguiya or ougiya = 5 khoums  
 1958–1973: 1 CFA franc = 100 centimes  
 –1958: 1 French franc = 100 centimes

### 82.2 Units of Quantity

1 **saam** (Wolof) = a bunch of cereal;  
 1 **huure** (Fula) = a bundle of threads;  
 1 **saaudu** (Fula) = a bundle of vegetables.

### 82.3 Units of Length

British-linked system (Wollof)

			Metric
jaar			914.4 mm
3	tanka		304.8 mm
36	12	baaraam	25.4 mm

Some reported measures:

1 meetar (Wollof) = 1 m.

### 82.4 Units of Area

Some reported measures:

1 waar (Wollof) = 1 english acre.

### 82.5 Units of Dry Capacity

Some reported measures in Fulda, Mandinka and Wollof:

- 1 saṅkilo (Fula) or sankiloo (Mandinka) = a large sack;
- 1 caṅaral (Fula) = a basket used for carrying groundnuts;
- 1 kisiṅ (Fula) or kisingoo (Mandinka) = a basket of palm fronds;
- 1 saire (Fula) = a handful (usually for food).

### 82.6 Units of Liquid Capacity

Some reported measures in Fulda and Wollof:

- 1 bórig (Wollof) = an English barrel;
- 1 gaali (Fula) = a large round container with handles;
- 1 liitar (Wollof) = 1 L;
- 1 dyoogire (Fula) = a load of water.

### 82.7 Units of Weight

The Arabian system was probably used in trading during the sixteenth to seventeenth centuries. The values probably varied according to the goods to be weighed.

Arabian system

				Metric
ḳintār				45 kg
100	rotl			450 g
1200	12	ūḳiyya		37.5 g
14,400	144	12	dirhem	3.125 g

Metric-linked system

		Metric
kiló		1 kg
2	liibar	500 g

Some other reported measures:

1 liibar or sooxa (Wollof) = 1 lbs av.

## 83 Mauritius [Formerly: Mauritius Island, Île de France]

This island was discovered by the Portuguese in 1505. The Dutch settled the island in the 1600s and named it Mauritius. The French settled the island in 1721 and renamed it the Île de France. The British captured Mauritius in 1810, whereupon it became a British colony in 1814, and gained its independent in 1968.

The metric system has been used since 1876 and was adopted by law on May 1, 1878. By proclamation of September, 1894, all weights and measures were to be based on the metric system. The metric system has been compulsory since 1945.

Main sources: [BOLT], [EUR2], [MART3], [RUGG], [UN55], and [UN66]

### 83.1 Currency

1877–: 1 Mauritian rupee = 100 cents  
 c.1820–1934: 1 Indian rupee = 16 anna  
 1820–1877: 1 Mauritian dollar = 100 cents  
 1810–c.1878: 1 pound sterling = 240 pence

### 83.2 Units of Quantity

1 **ton** (for shingles) = 3000;  
 1 **saaudu** [Fula] = a bundle of cereal;  
 1 **huure** [Fula] = a bundle of threads.

### 83.3 Units of Length

French colonial system during the nineteenth century

									Metric
<b>perche</b>									6.496 788 m
1 $\frac{1}{3}$	<b>praxes</b>								4.872 591 m
2	1 $\frac{1}{2}$	<b>gaulette<sup>a</sup></b>							3.248 394 m
3 $\frac{1}{3}$	2 $\frac{1}{2}$	1 $\frac{2}{3}$	<b>toise<sup>b</sup></b>						1.949 036 m
4	3	2	1 $\frac{1}{5}$	<b>faden</b>					1.624 197 m
5 $\frac{1}{11}$	4 $\frac{1}{11}$	2 $\frac{8}{11}$	1 $\frac{7}{11}$	1 $\frac{1}{11}$	<b>arene or aune<sup>c</sup></b>				1.191 076 m
20	15	10	6	5	3 $\frac{1}{3}$	<b>pied</b>			324.839 mm
240	180	120	72	60	44	12	<b>pouce<sup>d</sup></b>		27.070 mm
2880	2160	1440	864	720	528	144	12	<b>ligne</b>	2.256 mm

<sup>a</sup>For land

<sup>b</sup>For masonry

<sup>c</sup>For textiles

<sup>d</sup>During the early twenty-first century, [EUR2] reported it as equal to 1 British inch = 25.4 mm

Other reported measures:

1 **lieue** = 4.0 km.

### 83.4 Units of Area

French colonial system

			Metric
<b>arpent</b>			42.208 a
1111 $\frac{1}{2}$	<b>toise<sup>2</sup></b>		3.799 m <sup>2</sup>
40,000	36	<b>pieds<sup>2</sup></b>	0.105 5 m <sup>2</sup>

### 83.5 Units of Volume

For fuel wood:

1 **corde** (during the nineteenth century) = 80  
 pieds<sup>3</sup> = 2.742 m<sup>3</sup>;  
 1 **corde** (during the twenty-first century) = 128  
 cu ft = 3.624 m<sup>3</sup>.

### 83.6 Units of Dry Capacity

Some traditional containers for various commodities:

1 **gaali** [Fula] = a large iron container with handles;  
 1 **saṅkilo** [Fula], **sankiloo** [Mandinka], or **sankilo** [Wolof] = a large sack;  
 1 **caṇaral** [Fula] = a basket used to carry groundnuts;  
 1 **kisiṇ** or **kisingoo** [Mandinka] = a basket of palm fronds;  
 1 **kaleera** [Fula] or **kaleeroo** [Mandinka] = an iron pot;  
 1 **sasa** [Fula and Mandinka] = a leather bag;  
 1 **caaungél** [Fula] = a little load;  
 1 **saire** [Fula] = a handful.

### 83.7 Units of Liquid Capacity

Some traditional containers and measures used for liquids:

1 **dyoogire** [Fula] = a load of water;

1 **kaba** [Fula] = a bottle.

British Imperial-linked system for wine

				Metric
<b>cask, cash or oxhoft</b>				227.118 600 L
30	<b>velt or velte</b>			7.570 620 L
60	2	<b>gallon</b>		3.785 310 L
240	8	4	<b>quart</b>	946.327 mL

For beer

			Metric
<b>quart de bouteille</b>			757.2 mL
2		<b>pinte</b>	378.6 mL

French colonial system

			Metric
<b>cask or cash</b>			223.516 363 L
30	<b>velt or velte<sup>a</sup></b>		7.450 545 L
240	8	<b>pot</b>	931.318 mL

<sup>a</sup>For coconut oil

Metric-linked system

		Metric
<b>bouteille</b>		800 mL
2	<b>chopine</b>	400 mL

Other measures reported during the nineteenth century:

1 **barrique** (used in sugar mills for measuring the juice drawn from the cane) = 50 gal = c. 227.3 L;

1 **tierçon** (f. molasses) = 190–192 L.

### 83.8 Units of Weight

French colonial system before 1876

								Metric
<b>ton</b>								979.011 693 kg
20	<b>quintal</b>							48.950 585 kg
2000	100	<b>livre<sup>a</sup></b>						489.505 846 g
4000	200	2	<b>marc</b>					244.752 923 g
32,000	1600	16	8	<b>once</b>				30.594 115 g
256,000	12,800	128	64	8	<b>gros</b>			3.824 264 g
768,000	38,400	384	192	24	3	<b>denier</b>		1.274 755 g
18,432,000	921,600	9216	4608	576	72	24	<b>grain</b>	53.115 mg

English system used in transactions with the Military Commissariat Department after 1814

							Metric
<b>ton</b>							1016.21 kg
20	<b>hundredweight</b>						50.81 kg
80	4	<b>quarter</b>					12.703 kg
2240	112	28	<b>pound<sup>a</sup></b>				453.665 g
35,840	1792	448	16	<b>ounce</b>			28.354 g
573,440	28,672	7168	256	16	<b>drachm</b>		1.772 g

<sup>a</sup>1 pound was said to approximately equal 1 livre/1.079 = c. 0.926 8 livre

Other measures reported during the nineteenth century:

- 1 quintal (for ebony and sugar) = 2000 livres = 979.011 693 kg;
- 1 ton (for coffee and grain) = 1400 livres = 685.308 186 kg;
- 1 ton (for gloves, nails and carnations) = 1000 livres = 489.505 847 kg;
- 1 ton (for cotton) = 750 livres = 367.129 385 kg;
- 1 bale (for cotton) = 250 livres = 122.376 462 kg;
- 1 bag (for rice and wheat) = 164 lbs av = 74.389 195 kg;
- 1 bag (for coffee) = 100 livres = 48.950 585 kg.

Metric-linked system after 1876

				Metric
ton				1000 kg
20	quintal			50 kg
2000	100	livre		500 g
4000	200	2	marc	250 g

For medical use until the early twentieth century

					Metric
pound					373.242 g
12	ounce				31.103 5 g
96	8	drachm			3.887 9 g
288	24	3	scruple		1.296 0 g
5760	480	60	20	grain	64.8 mg

Goldsmith’s weight for gold and silver until the early twentieth century

					Metric
pound					373.242 g
12	ounce				31.103 5 g
240	20	pennyweight			1.555 2 g
5760	480	24	grain		64.8 mg
23,040	1920	96	4	carat	16.2 mg

84 Mayotte (Departmental Collectivity of Mayotte; Shimaore: Maore)

Mayotte is an overseas department of France.

85 Median Empire (c. 678–550 BCE)

See also *Achaemenid Empire*.  
This was an ancient Iranian kingdom that was conquered by Cyrus the Great in 550 BCE.

85.1 Units of Weight

Late Median system

		Metric
schiras		~588 kg
2	charvar	~294 kg

Late Median system

					Metric
harwar					~83.3 kg
10	fetr				~8.33 kg
100	10	mān			~833.0 g
1000	100	10	karša or karschā		~83.30 g
10,000	1000	100	10	daric or dareik	~8.33 g

86 Medri Bahri

See also *Eritrea*.  
This kingdom was established in 1137, and lasted until 1889, when it became part of the Italian Eritrea.

## 87 Merina Kingdom

See *Madagascar*.

## 88 Mexico [Formerly: New Spain]

See also *Aztec Empire*, *Maya Civilization*, *Costa Rica*, *Guatemala*, *Honduras* and *Totonac culture*.

Spanish conquistador Hernando Cortes conquered the Aztec empire of Montezuma in 1519–1521, and founded a Spanish colony. Present-day Mexico was part of the Vice-Royalty of New Spain from 1535 until it gained its independence in 1821.

After the Conquest, Andalusian and Castilian measures were adopted by the Aztecs, and given names in the Nahuatl language. In Ordinances of 1524, Cortés decreed that each city must have a standard for the arroba, the cuartillo and the medio cuartillo. In a decree of March 9, 1536, viceroy Antonio de Mendoza stated the values in Mexico City to be a *vara* of three feet, a *paso* of five feet, a *cabazeda* of 96 by 192 varas and a *caballería* of 192 by 384 varas. In a resolution of January 12, 1543, the values for the *media arroba*, *azumbre* (for oil and wine), *media azumbre*, *media fanega* and *celemin* were all standardized for use in the capital. On May 7, 1545, one pipa for wine was standardized as 27½ arrobas. In a decree of 1574, all merchants were commanded to use these units in all of the towns of New Spain. In 1589, viceroy Manrique stated the *vara de Burgos* as the standard vara for the Vice-Royalty of New Spain. After 1620, standard iron weights were obtained. Certain weights made of wood and the use of such measurements were also prohibited by this regulation. In 1667, it became illegal not to use punched weights. A decree from January 26, 1801, stipulated the *vara de Burgos* as being standard for linear dimensions, the *media fanega de Avila* as standard for dry capacity measurement, the *cuartillo de Toledo* as standard for usual liquids, and the *libra de Castilla* as the base unit for weights. The

metric system has been legally optional since 1857, and compulsory since 1862 and 1896. It was legally adopted again on December 4, 1928.

*Main sources:* [ALON], [ANDR2], [BION], [CANC], [CAST], [CRUM2], [DIRE2], [ESTA], [EWAL], [FITT], [GRAN2], [KAHN], [MCCA], [PEÑA], [POLZ], [RIVI], [ROBE], [ROME], [ROYS], [SPOR], [STAM], [UN55], [UN66], [WECK], and [WHEL]

### 88.1 Currency

1996–:	1 Mexican peso = 100 centavos
1993–1996:	1 Mexican nuevo peso = 100 centavos
1863–1993:	1 Mexican peso = 100 centavos
1822–1863:	1 Mexican escudo = 2 pesos = 16 reales = 64 tiacos = 96 granos
1772–1821:	1 Mexican peso = 8 reales = 272 maravedises

### 88.2 Units of Quantity

During the late nineteenth to twentieth century for various commodities:

- 1 **jiquipil** (for cobs in Chiapas) = 8000;
- 1 **chiquihuite** (for fruit) = 250 pieces;
- 1 **gruesa** (for fruits and vegetables) = 144–150 pieces;
- 1 **cacaxtle** (for fruits and sugar) = a crate-like back-pack about 4 peds high;
- 1 **mancuerna** (for garlic and onions) = two bunches or strings (often said to equal about 100 pieces);
- 1 **tercio** (for fruits and sugar) = a bale or a bundle;
- 1 **ristra** (for garlic, chilies, and onions) = a string on which foodstuffs are threaded or tied for storage;
- 1 **jicara** (for plums) = the number of plums that would fit in a jicara bowl. Varied by location between 10 and 20.
- 1 **cadejo** (for ixtle and henequén) = 12 pieces;

1 **gajo** (for bananas) = a small group or bunch, varying in number of units per group, but usually 11 pieces;

1 **mancorna** or **mancuerna** = a pair of cows or oxen;

1 **atado** (for panelas) = two plants;

1 **paxtle** (for fruits and sugar) = a plant.

For paper

				Sheets
<b>balón</b>				10,000
20	<b>resma</b>			500
400	20	<b>mano</b>		25
2000	100	5	<b>cuaderno</b>	5

### 88.3 Units of Length

During the seventeenth and eighteenth centuries:

1 **cordel** (for house building) = 141 feet, and later 150 feet.

Before 1801

						Metric
<b>legua</b>						4190.092 2 m
100	<b>cordel</b>					41.900 922 m
5000	50	<b>vara</b>				838.018 44 mm
15,000	150	3	<b>pie</b>			279.339 48 mm
20,000	200	4	1 $\frac{1}{3}$	<b>palmo</b>		209.504 61 mm
30,000	300	6	2	1 $\frac{1}{2}$	<b>sesma</b>	139.669 74 mm

Upper scale for general use between 1801 and 1862

								Metric
<b>legua</b>								4190.000 m
3	<b>milla</b>							1396.667 m
500	166⅔	<b>cordel</b> <sup>a</sup>						8.380 000 m
2500	833⅓	5	<b>braza</b> <sup>b</sup> or <b>estado</b> <sup>c</sup>					1.676 000 m
5000	1666⅔	10	2	<b>vara de Burgos</b>				838.000 mm
10,000	3333⅓	20	4	2	<b>codo</b>			419.000 mm
15,000	5000	30	6	3	1½	<b>pie</b> <sup>cd</sup>		279.333 mm
20,000	6666⅔	40	8	4	2	1⅓	<b>palmo</b>	209.500 mm

<sup>a</sup>For measuring the criadero. When employed in laying out plots of land = 1/100 legua = 50 varas = 41.9 m, and when applied to the measurement of caballerías of land = 69 varas = 57.822 m

<sup>b</sup>In Yucatán, used for measuring cloth

<sup>c</sup>Reported as 2 $\frac{1}{3}$  varas = about 1.955 3 m, when used in measuring depth and altitude

<sup>d</sup>1 **pie de ribera** ("riverside") = 302.611 mm

Lower scale for general use between 1801 and 1862

									Metric
palmo <sup>a</sup>									209.500 mm
1½	sesma or jeme								139.667 mm
3	2	palmo menor							69.833 mm
9	6	3	pulgada						23.28 mm
12	8	4	1⅓	dedo					17.46 mm
36	24	12	4	3	paja				5.82 mm
48	32	16	5⅓	4	1⅓	grano			4.36 mm
108	72	36	12	9	3	2¼	línea <sup>b</sup>		1.94 mm
1296	864	432	144	108	36	27	12	punto	0.16 mm

<sup>a</sup>According to [STAM], there was also a **palmo mayor** or **palmo romano**, equal to 221.8 mm (= 12 $\frac{2}{10}$  dedo)

<sup>b</sup>There was also a wide **línea** used in measuring land, = 2 $\frac{1}{8}$  varas = about 2.409 m

For surveying and mining

					Metric
<b>legua</b>					4179.5 m
100	<b>cordel</b>				41.795 m
$5\frac{3}{4}$	$17\frac{7}{23}$	<b>marca</b>			2.403 2 m
5000	50	$2\frac{7}{8}$	<b>vara de Toledo</b> <sup>a</sup>		835.9 mm
240,000	2 400	138	48	<b>dedo</b>	17.41 mm

<sup>a</sup>Also referred to as 1 **antigua vara** or 1 **paso de Salomón**

## 88.4 Units of Area

When it comes to measures of land areas, these were usually defined by use, such as places for large or small livestock, stables, and house-plots. In the Actas del Cabildo de México, there are numerous petitions for *heridos* (water grants), a term for land areas that were large enough to sustain a watermill. A decree of Ferdinand V on June 18, 1513, provided for granting land for conquered areas in the New World. The veterans received estates after the conquest of their lands to supply them. A foot soldier (peon) received one *peonia* and a horseman one *caballería*. A *caballería* was four to five times larger than a *peonia*, which was considered to be the amount of land area that a person could cultivate in a day.

The actual size of these units depended on the productivity of the land and the merit of the veteran. Frequently, changes in the dimensions allowed these landowners to become enriched at the expense of the indigenous peasants. The Viceroy of New Spain, Antonio de Mendoza, issued a decree on March 9, 1536, according to [RIVI], defining the *caballería* as 384 varas long and 192 varas wide.

There was also a subdivision of plots with respect to the earth's crop quality:

*tierra de negro* = good farmland, *tierra de cojer* = open landscape without irrigation, and *tierra de panllevar* = land suitable for horticultural puposes.

During the seventeenth century, according to [SPOR, p. 160]

							Metric
<b>parcel</b> <sup>a</sup>							54,862.8 m <sup>2</sup>
$1\frac{1}{3}$	<b>parcel</b> <sup>b</sup>						32,917.7 m <sup>2</sup>
$2\frac{1}{2}$	$1\frac{1}{2}$	<b>parcel</b> <sup>c</sup>					21,945.1 m <sup>2</sup>
$20\frac{1}{2}$	$12\frac{1}{2}$	$8\frac{1}{3}$	<b>parcel</b> <sup>d</sup>				2633.4 m <sup>2</sup>
$31\frac{1}{4}$	$18\frac{3}{4}$	$12\frac{1}{2}$	$1\frac{1}{2}$	<b>parcel</b> <sup>e</sup>			1755.6 m <sup>2</sup>
12,500	7500	5000	600	400	<b>mecatl</b>		4.39 m <sup>2</sup>
78,125	46,875	31,250	3750	2500	$6\frac{1}{4}$	<b>vara cuadrada</b>	70.22 dm <sup>2</sup>

<sup>a</sup>At San Tlapilcayan

<sup>b</sup>At San Francisco Ayotuchso and San Martin Tecpan

<sup>c</sup>At San Cristobal Texculucan

<sup>d</sup>At San Bartolomé Coatepec, in present-day Mexico State

<sup>e</sup>At Tepemaxalco, in present-day Puebla

Upper scale

			vara cuadrada	Metric
<b>labor</b>			914,112	641,930.4 m <sup>2</sup>
$1\frac{1}{2}$	<b>caballería</b>		609,408	427,953.6 m <sup>2</sup>
18	12	<b>fanega</b>	50,784	35,662.8 m <sup>2</sup>

Lower scale

						Metric
<b>labor di tierra</b>						702.244 m <sup>2</sup>
1000	<b>vara cuadrada</b>					70.224 4 dm <sup>2</sup>
9000	9	<b>pie cuadrada</b>				7.802 7 dm <sup>2</sup>
16,000	16	1%	<b>palmo cuadrada</b>			4.389 0 dm <sup>2</sup>
1,296,000	1296	144	81	<b>pulgada cuadrada</b>		5.418 5 cm <sup>2</sup>
186,624,000	186,624	20,736	11,664	144	<b>linea cuadrada</b>	3.763 mm <sup>2</sup>

In Quintana Roo during the sixteenth century, based on [ROYS]

				Metric
<b>caballería</b>				453,736.914 5 m <sup>2</sup>
64.581 6	<b>manzana</b>			7025.792 4 m <sup>2</sup>
1033.305 6	16	<b>cuerda</b>		439.112 025 m <sup>2</sup>
645,816	10,000	625	<b>vara cuadrada</b>	70.257 924 dm <sup>2</sup>

Other measures used for measuring land areas, such as the acre, cordel, cuerda, estatal, hera, pancel, and pantle, were never fixed in relation to the standard units above.

1 **cuerda** (in Soconusco, Chiapas) = 625 varas cuadradas = about 438.9 m<sup>2</sup>, according to [ROME, p. 417];

1 **pantle** (for irrigated land) = 5000–1250 m<sup>2</sup>, according to [FITT, p.133].

For estate areas (see also [RIVI] and [GIBS])

	vara cuadrada	Metric
<b>hacienda<sup>a</sup></b>	5000 × 25,000	87,780,500 m <sup>2</sup>
<b>sitio de ganado mayor</b> or <b>sitio de estancia de ganado mayor<sup>b</sup></b>	5000 × 5000	17,556,080 m <sup>2</sup>
<b>sitio de ganado menor</b> or <b>sitio de estancia de ganado menor<sup>b</sup></b>	3333⅓ × 3333⅓	7,802 711.11 m <sup>2</sup>
<b>criadero de ganado mayor</b> = 6¼ labores	2500 × 2500	4,389 020 m <sup>2</sup>
<b>criadero de ganado menor</b> = 2% labores	1666⅔ × 1666⅔	1,950,675.55 m <sup>2</sup>
<b>criadero</b>	1250 × 1250	1,097 256.25 m <sup>2</sup>
<b>fundo legal para pueblos</b>	1200 × 1200	1,011,231.36 m <sup>2</sup>
<b>solar</b>	1000 × 1000	702,244 m <sup>2</sup>
<b>caballería de tierra<sup>a</sup></b> = 609,408 varas cuadradas	1104 × 552	427,953.1 m <sup>2</sup>
<b>media caballería</b>	552 × 552	213,976.31 m <sup>2</sup>
<b>suerte de tierra</b> or <b>cuarto caballería<sup>a</sup></b>	552 × 276	106,988.16 m <sup>2</sup>
<b>fanega de sembradura de maíz<sup>a</sup></b>	376 × 184	48,584.05 m <sup>2</sup>
<b>cuartilla de sembradura<sup>a</sup></b>	250 × 100	17,556.1 m <sup>2</sup>
<b>estajo</b>	100 × 100	7022.44 m <sup>2</sup>
<b>etoper</b> = 100 estajos	100 × 50	3511.22 m <sup>2</sup>
<b>solar para molin, casa o venta</b>	50 × 50	1755.61 m <sup>2</sup>
<b>estajo</b>	50 × 10	35.112 2 m <sup>2</sup>

<sup>a</sup>Right-angled parallelogram

<sup>b</sup>Legalized by the Mexican Ordinance for Land and Sea, September 15, 1837, Article 20. See also [WHEL]

## In Mérida

			Metric
<b>Mecatl</b>			421.346 4 m <sup>2</sup>
24	<b>jarocho cudrada</b>		17.556 1 m <sup>2</sup>
600	25	<b>vara cuadrada</b>	70.224 4 dm <sup>2</sup>

## In Veracruz

			Metric
<b>tarca</b>			632.019 6 m <sup>2</sup>
36	<b>jarocho cudrada</b>		17.556 1 m <sup>2</sup>
900	25	<b>vara cuadrada</b>	70.224 4 dm <sup>2</sup>

During the nineteenth and twentieth centuries:

1 **apantle** = 1 hectare = 10,000 m<sup>2</sup>;

1 **jícara** = the amount of land that would be sown  
with a jícara of seed.

## 88.5 Units of Volume

For general use

						Metric
<b>brazada</b> <sup>a</sup>						4.707 843 776 m <sup>3</sup>
8	<b>vara cúbica</b>					588.480 472 dm <sup>3</sup>
216	27	<b>píe cúbico</b>				21.795 573 dm <sup>3</sup>
512	64	2 <sup>10/27</sup>	<b>palmo cúbico</b>			9.195 007 dm <sup>3</sup>
373,248	46,656	1728	729	<b>pulgada cúbica</b>		12.613 cm <sup>3</sup>
644,972,544	80,621,568	2,985,984	1,259,712	1728	<b>línea cúbica</b>	7.3 mm <sup>3</sup>

<sup>a</sup>For masonry

For firewood and charcoal

			Metric
<b>zontle</b>			8.72 m <sup>3</sup>
100	<b>mano</b>		87.2 dm <sup>3</sup>
400	4	<b>trozo, raja, or pedazo</b>	21.8 dm <sup>3</sup>

Other measures used during the eighteenth and nineteenth centuries:

1 **brazada** (for building materials and paving projects) = 8 varas cúbicos = about 4.71 m<sup>3</sup>;

1 **burrada** (for firewood and sugar) = the load of  
a burro = ~1 m<sup>3</sup>;

1 **estereo** (for lumber) = ~1 m<sup>3</sup>.

For water irrigation

						Area of rectangular opening	Metric
<b>buey</b>						1296 pulgadas cuadradas	9331.20 L/min
48	<b>surco</b> or <b>sulco</b> <sup>a</sup>					27 pulgadas cuadradas	194.40 L/min
144	3	<b>naranja</b> <sup>b</sup>				9 pulgadas cuadradas	64.80 L/min
1152	24	8	<b>limón</b> or <b>real de agua</b>			–	8.10 L/min
3920 <sup>7</sup> / <sub>3</sub>	81 <sup>147</sup> / <sub>216</sub>	27 <sup>49</sup> / <sub>216</sub>	3 <sup>588</sup> / <sub>1728</sub>	<b>merced</b>		–	2.38 L/min
20,736	432	144	18	5 <sup>1699</sup> / <sub>5881</sub>	<b>paja</b>	–	450 mL/min

<sup>a</sup>Equal to the trench left by the plough for water to run in, reckoned at 6 dedos × 8 dedos<sup>b</sup>An orifice of 2 dedos × 8 dedos

## 88.6 Units of Dry Capacity

Customary system

									Metric
<b>cahiz</b>									1089.778 656 L
6	<b>carga</b>								181.629 776 L
12	2	<b>fanega</b>							90.814 888 L
24	4	2	<b>media fanega</b>						45.407 444 L
48	8	4	2	<b>cuartilla</b>					22.703 722 L
144	24	12	6	3	<b>ahmuer, almud, or celemín</b>				7.567 907 L
576	96	48	24	12	4	<b>cuartillo</b>			1.891 977 L
2304	384	192	96	48	16	4	<b>cuarteron</b>		472.994 mL
4608	768	384	192	96	32	8	2	<b>ochavo</b>	236.497 mL

For unshelled corn in Chiapas

		Metric	Metric
<b>jiquipil</b>		1 570 L	1100 kg
20	<b>zontle</b>	78.5 L	55 kg

Metric-linked system for grain among the Tzotzil people in Chiapas, based on [CRUM2]

						Metric
<b>tonelada</b> <sup>a</sup>						1920 kg
10	<b>fanega</b> <sup>b</sup>					192 kg
120	12	<b>litro</b> <sup>c</sup>				16 kg
480	48	4	<b>cuarto</b> <sup>c</sup>			4 kg
1920	192	16	4	<b>kilogram</b> <sup>d</sup>		1 kg
7680	768	64	16	4	<b>cuartillo</b> <sup>e</sup>	250 g

<sup>a</sup>Used in bulk sales to government stores<sup>b</sup>For measuring the harvest<sup>c</sup>For measuring the grain for sowing<sup>d</sup>Used when dealing with outsiders<sup>e</sup>For retail sales within the Indian community

Metric-linked system for grain among the Tzotzil people in Zinacantan, based on [CANC]

					Metric
<b>tonelada<sup>a</sup></b>					1920 kg
10	<b>fanega<sup>b</sup></b>				192 kg
120	12	<b>almud<sup>c</sup></b>			16 kg
1920	192	16	<b>kilogram<sup>d</sup></b>		1 kg
7680	768	64	4	<b>cuartillo<sup>e</sup></b>	250 g

<sup>a</sup>Used in bulk sales to government stores

<sup>b</sup>For measuring the harvest

<sup>c</sup>For measuring the grain for sowing

<sup>d</sup>Used when dealing with outsiders

<sup>e</sup>For retail sales within the Indian community

Other measures reported during the nineteenth and twentieth centuries:

1 **fanega** (for cereals in Mérida) = 60.566 L;

1 **cuarterón** = 25 L;

1 **jícara** (in Chiapas and Oaxaca) = a gourd bowl, about 8 in tall, made of the dried fruit of the jicaro tree. The size varied by location. It has been reported as about 1½ L and in another location as about ¼ L.

## 88.7 Units of Liquid Capacity

Customary system

								Metric
<b>pipa</b>								456.24 L
1 <sup>23</sup> / <sub>477</sub>	<b>botija</b>							435.7 L
6	5 <sup>181</sup> / <sub>250</sub>	<b>barril<sup>a</sup></b>						76.04 L
36 <sup>18</sup> / <sub>50</sub>	34 <sup>38</sup> / <sub>55</sub>	6 <sup>3</sup> / <sub>55</sub>	<b>cántara</b>					12.56 L
55%	53	9¼	1 <sup>19</sup> / <sub>36</sub>	<b>jarra</b>				8.22 L
998¾	954	166½	27½	18	<b>cuartillo</b>			456.7 mL
1997½	1908	333	55	36	2	<b>medio (cuartillo)</b>		228.4 mL
7990	7632	1332	220	144	8	4	<b>cuarta</b>	57.1 mL

<sup>a</sup>1 **barril** (for brandy in Coatepec, Córdoba, Jalapa, and Orizaba) = 160 cuartillos = c. 73.1 L

Scale based on [MART3]

									Metric
<b>barril<sup>a</sup></b>									81.673 110 L
—	<b>barril<sup>b</sup></b>								76.631 560 L
—	—	<b>barril<sup>c</sup></b>							75.623 250 L
—	4¾	—	<b>arroba</b>						16.132 960 L
9	10 <sup>7</sup> <sub>15</sub>	10	2 <sup>7</sup> <sub>15</sub>	<b>jarra</b>					9.074 790 L
27	30 <sup>3</sup> <sub>5</sub>	30	6 <sup>3</sup> <sub>5</sub>	3	<b>frasco</b>				2.520 775 L
33¾	38	37½	8	4½	1¼	<b>azumbre</b>			2.016 620 L
162	152	150	32	18	5	4	<b>cuartillo</b>		504.155 mL
324	304	300	64	36	10	8	2	<b>medio</b>	252.077 mL

<sup>a</sup>For spirits

<sup>b</sup>For most liquids, except spirits, wine and oil

<sup>c</sup>For wine

Alternative system in some districts

				Metric
<b>mojo</b>				258.24 L
16	<b>cántara de Ávila</b>			16.140 L
128	8	<b>azumbre</b>		2.017 5 L
512	32	4	<b>cuartillo</b>	504.375 mL

For wine in some districts

		Metric
<b>jarra</b> or <b>boltja</b>		8.212 77 L
18	<b>cuartillo</b>	456.265 mL

For custom milk

		Metric
<b>azumbre</b>		3.026 L
4	<b>cuartillo</b>	756.6 mL

For oil

				Metric
<b>arroba</b> or <b>cántara</b>				16.133 L
2½	<b>surco</b>			6.453 2 L
7½	3	<b>naranya</b>		2.151 067 L
31⅞	12¾	4¼	<b>cuartillo</b>	506.133 L

1 **jarra** (for oil) = 18 cuartillos = 9.11 L. [MCCA] reported 1 **jarra** (for oil) = 20 cuartillos = 9.126 L, and [KAHN] reported 1 **jarra** = 16 cuartillos = 8.08 L

For oil, based on [MART3]

		Metric
<b>arroba</b>		12.563 000 L
25	<b>libra</b>	502.520 mL

Other measures reported during the nineteenth to twentieth centuries:

- 1 **caneca** (for wine, alcohol, and other liquids) = ~35 L;
- 1 **damazana** or **garrafa** (for wine) = ~20 L;
- 1 **damajuana** (for alcohol) = 17–20 L;
- 1 **garrafón** (for brandy) = 17–20 L;
- 1 **quelli** (for pulque in Oaxaca) = ~15 L;
- 1 **quelli** (for chinguirito, pulque, and tepache, in Tehuantepec and Puebla) = 13.85 L;
- 1 **botija** (for wine, alcohol, and other liquids) = 5–8 L;
- 1 **galón** (for alcohol) = 3.5–5 L.

### 88.8 Units of Weight

Traditional measures reported during the eighteenth to nineteenth centuries:

- 1 **carga** = the load of a mule (the weight of the load was determined by the distance to the customer, the availability of pasture en route, and the nature of the roads) = about 1½–2 fanegas.

## Customary system

[illegible]

<sup>a1</sup>During the eighteenth century, also reported as the space occupied by three pipas de vino of 27½ arrobas each = 82½ arrobas = 949.245 kg

<sup>b</sup>Usually for meat and fish

Based on [MART3]

[illegible]<sup>a</sup>For iron, copper and zinc

Upper scale during the late nineteenth to early twentieth centuries

						Metric
<b>carretada</b> <sup>a</sup>						1380.75 kg
1½	<b>tonelada</b>					920.50 kg
5	3⅓	<b>carga doble</b>				276.15 kg
10	6⅔	2	<b>carga</b> <sup>b</sup>			138.075 kg
30	20	6	3	<b>quintal</b>		46.025 kg
120	80	24	12	4	<b>arroba</b>	11.506 25 kg

<sup>a</sup>Roughly the same as the **carreta** and the **guallín**, used for gravel, lime, sand, sugar, and wood

<sup>b</sup>1 **carga** (for honey in Oaxaca, Mexico City, and Valladolid) = 18 arrobas = 207.11 kg, 1 **carga** (for grain) = 16 arrobas = 184.10 kg, 1 **carga** (for sand) = 14 arrobas = 161.09 kg, 1 **carga** (for gravel and lime) = 12 arrobas = 138.075 kg, 1 **carga** (for cochineal) = 9 arrobas = 103.56 kg. In 1912–1913, one carga of salt from Colima was calculated at 161 kg, but lowered to 140 kg in 1916–1917 (see [EWAL])

Lower scale during the late nineteenth to early twentieth centuries

						Metric
<b>arroba</b>						11.506 25 kg
25	<b>libra</b>					460.25 g
400	16	<b>onza</b>				28.76 g
6400	256	16	<b>adarme</b>			17.98 g
19,200	768	48	3	<b>tomín</b>		5.99 g
230,400	9216	576	36	12	<b>grano</b>	50 mg

Metric-linked system

			Metric
<b>tonelada</b>			1000 kg
80	<b>arroba</b>		12.5 kg
2000	25	<b>libra</b>	500 g

For “new” salt in Yucatán during the eighteenth century, based on [EWAL]

		Metric
<b>carga</b>		115–126.5 kg
10–11	<b>arroba</b>	11.5 kg

For salt in Tehuantepec as reported in 1751, based on [EWAL]

		Metric
<b>carga</b>		161 kg
14	<b>arroba</b>	11.5 kg

For salt in Oaxaca after 1832, as stated by the Governer of Oaxaca (see [EWAL])

		Metric
<b>carga</b>		92 kg
8	<b>arroba</b>	11.5 kg

For cochineal in Iztepex as reported in 1751, based on [EWAL]

		Metric
<b>carga</b>		103.5 kg
9	<b>arroba</b>	11.5 kg

For “old” salt in Yucatán during the eighteenth century, based on [EWAL]

		Metric
<b>carga</b>		103.5 kg
9	<b>arroba</b>	11.5 kg

For medical use

							Metric
<b>libra medicinal</b>							345.047 040 g
12	<b>onza</b>						28.753 920 g
96	8	<b>dracma</b>					3.594 240 g
288	24	3	<b>escrupulo</b>				1.198 080 g
576	48	6	2	<b>obolo</b>			599.040 mg
1728	144	18	6	3	<b>character</b>		199.680 mg
6912	576	72	24	12	4	<b>grano</b>	49.920 mg

For gold

				Metric
<b>Marco</b>				230.046 450 g
50	<b>castellano</b>			4.600 929 g
400	8	<b>tomín</b>		575.116 mg
4800	96	12	<b>grano</b>	49.923 mg

For silver

						Metric
<b>marco</b>						230.046 450 g
8	<b>onza</b>					28.755 806 g
64	8	<b>ochava</b>				3.594 476 g
128	16	2	<b>adarme</b>			1.797 238 g
384	48	6	3	<b>tomin</b>		599.079 mg
4608	576	72	36	12	<b>grano</b>	49.923 mg

During the nineteenth to twentieth century for various commodities:

- 1 **carretado** (for lime) = 1,380.188 160 kg;
- 1 **carga** = 160 kg (for milled rice), 140 kg (for general use) and 138 kg (for rough rice);
- 1 **carga** (for tobacco) = 138.018 816 kg;
- 1 **carga** (for salt) = about 140 kg (the cargo was often confused with the fanega; see fanega below);
- 1 **fanega** (for salt) = about 70 kg (according to [EWAL]), but many sources reported it as 115 kg, and one reported 138 kg [PEÑA];
- 1 **farina** (for wheat) = 196 libras = 90.172 293 kg;
- 1 **saco** (for coffee) = 69 kg;
- 1 **bulto** (for arracacha, beans, yuca, and wood) = 150 lbs = 68.04 kg;
- 1 **madeja** (for ixtle and henequén) = 62 kg;
- 1 **cacaxtle** (for brown sugar in Magdalena) = 55 kg;

- 1 **paca** (for raw cotton) = 42.5 kg;
- 1 **zurrón** (for wheat) = 42.5 kg;
- 1 **atado** (for bananas) = 38 kg;
- 1 **tambache** (for bananas) = 25 kg;
- 1 **cacaxtle** (for fruit in Bolaños) = ½ carga = 25 kg;
- 1 **botijuela** (for honey) = 10 kg;
- 1 **pucha** (for cereals) = 2 lbs = 907 g;
- 1 **libra** (for medical use) = 345.047 g;
- 1 **mancuerna** (for garlic and onion) = 125 g;
- 1 **jicaco** (for various commodities) = about 25 g.

### 88.8.1 Zaniza Zapotec-Speaking Culture (in Oaxaca)

This culture seems to have a mixture of traditional and old Spanish measures.

*Main source:* [eOPER]

Units of Quantity

For egg

		Metric
<b>kaj</b> <sup>a</sup>		300
10	<b>kon</b> <sup>b</sup>	30

<sup>a</sup>From Spanish *caja* = box

<sup>b</sup>From Spanish *cono* = cone

Other reported measures:

1 **ij** (for cattles) = 2;

1 **yený** (for carrots and other vegetables) = a bunch.

Units of Area

1 **tap yag** (literally “four almudes”) = the area of land that could be sown by four almudes of corn = about 1 ha.

Units of Dry Capacity

For fruit

		Metric
<b>bany</b> <sup>a</sup>		400 medium-sized <sup>b</sup> fruits or 48 large <sup>c</sup> fruits
2	<b>gix</b> <sup>d</sup>	200 medium-sized fruits or 24 large fruits

<sup>a</sup>In Spanish = ‘caballo,’ and in English = ‘horse’

<sup>b</sup>Examples of medium-sized fruits: bananas, limes, mangos, oranges and papayas

<sup>c</sup>Examples of large fruits: mamey sapotes, melons, pineapples and watermelons

<sup>d</sup>In Spanish = ‘red’ or ‘tercio,’ and in English = ‘net’ or ‘pack’

Units of Liquid Capacity

For sugar cane sap

			Metric
<b>bily bee</b>			~25 L
6¼	<b>gis</b>		~4 L
25	4	<b>bar</b>	~1 L

Units of Weight

Spanish-linked scale for corn, beans and coffee

						Metric
<b>anŉe</b> <sup>a</sup> or <b>bult</b> <sup>b</sup>						~96 kg
2	<b>bid, kwart, or tyal anŉe</b>					~48 kg
9½ <sub>11</sub>	4½ <sub>11</sub>	<b>arub</b>				~11.5 kg
25	12½	2¾	<b>yag</b> <sup>c</sup> or <b>bot</b> <sup>d</sup> (bee)			~3.8 kg
50	25	5½	2	<b>ig</b>		~1.9 kg
100	50	11	4	2	<b>ritx tyiny</b>	~960 g

<sup>a</sup>From Spanish *fanega*

<sup>b</sup>From Spanish *bulto*

<sup>c</sup>A box made of wood

<sup>d</sup>A measuring can made from an oil can containing about 4–5 L. From Spanish *bote*

89 Micronesia [Formerly: Ponape, Truk, and Yap Districts]

See also *Kiribati, Northern Mariana Islands, Marshall Islands* and *Nauru*.

A subregion of Oceania, comprising thousands of small islands in the western Pacific Ocean. The Caroline Islands, Kiribari, the Northern Mariana Islands, the Marshall Islands, Nauru and the Wake Islands are considered to be parts of Micronesia.

89.1    Currency

1944–:            1 US dollar = 100 cents  
1914–1944:    1 Japanese yen = 100 sen  
1899–1914:    1 German Mark = 100 Pfennig

90       Middle Congo

See *Congo*.

91       Midway Islands

See *United States of America*.  
One of the United States Minor Outlying Islands. The only human population consists of temporarily stationed scientific and military personnel.

92       Mingrelia or Samegrelo

See also *Georgia*.  
This area was part of the Kingdom of Colchis, the Kingdom of Lazica, and later the united Kingdom of Georgia. It became an independent principality in 1557. In late 1803, it came under the patronage of Russia and was part of the Democratic Republic of Georgia from 1918 until 1921. The area is now part of Georgia.

93       Modena and Reggio

See also *Cispadane Republic*, *Kingdom of Italy (Napoleonic)* and *Italy*.  
A small Italian state that existed from 1452 until 1796, and from 1814 until 1859, when it joined the United Provinces of Central Italy.

94       Moldavia

See also *Romania* and *Ukraine*.  
In 1354, this area was founded as the Principality of Moldavia, first as a vassal state of the Kingdom of Hungary. In 1359, under Prince Bogdan I, it became independent from Hungary, but from 1387, the area came under rule of the Kingdom of Poland. During the reign of Stephen the Great (1457–1503), the Principality was able to assert itself against Hungarian, Polish and Ottoman expansionism. In 1484, the southern portion of the area, later called Budschak, became part of the Ottoman Empire. From the second half of the eighteenth century, the area was in the spheres of interest of the three great powers in the region: the Ottoman Empire, the Russian Empire and the Habsburg monarchy. In 1812, it became the eastern part of the Budschak, as Bessarabia, part of Russia. In 1859, the remaining part of the Principality of Moldavia united with the Principality of Wallachia.  
*Main sources:* [BAUE] and [MART3]

94.1    Units of Length

The palmă measure was given the name of whosever hand was used. The **palmă domnească** for the royal hand, **palmă mijloc** for the middle man’s hand and **palmă proastă** for the poor man’s hand. In 1842, the **palmă domnească** was 283 mm, the **palmă mijloc** was 257 mm and the **palmă proastă** was only 213 mm. The royal standard of the palmă, known as **palmă domnească**, has also varied significantly over time, e.g., in 1790 = 297 mm, in 1842 = 283 mm and in 1864 = 278.75 mm.  
1 **pas mare** = 6 palme.

domnească -scale (Royal scale) in 1790, in 1842 and in 1864

				Metric	Metric	Metric
laut				23.76 m	22.64 m	–
10	stânjen			2.376 m	2.264 m	2.230 m
80	8	palmă		297 mm	283 mm	278.75 mm
640	64	8	palmac	37.125 mm	35.375 mm	–

Upper scale after 1864

				Metric
<b>poștă<sup>a</sup></b>				17,840 m
2	<b>mila</b>			8920 m
4	2	<b>leghe</b>		4460 m
$2666\frac{2}{3}$	$1333\frac{1}{3}$	$666\frac{2}{3}$	<b>prăjină</b>	6.690 m

<sup>a</sup>Varied by location between about 8 and 20 km

Lower scale after 1864

									Metric
<b>funie</b>									26.760 m
4	<b>prăjină</b>								6.690 m
12	3	<b>stânjen</b>							2.230 m
72	18	6	<b>picior</b>						371.67 mm
96	24	8	$1\frac{1}{3}$	<b>palmă</b>					278.75 mm
192	48	16	$2\frac{2}{3}$	2	<b>lat de palmă</b>				139.37 mm
800	200	$66\frac{2}{3}$	$11\frac{1}{9}$	$8\frac{1}{3}$	$4\frac{1}{6}$	<b>palmac</b>			33.45 mm
960	240	80	$13\frac{1}{3}$	10	5	$1\frac{1}{3}$	<b>deget</b>		27.88 mm
9600	2400	800	$133\frac{1}{3}$	100	50	12	10	<b>linia</b>	2.79 mm

During the late nineteenth century, based on [BAUE]

					Metric
<b>prăjină</b>					5943.48 m
3	<b>stânjen</b>				1.981 16 m
24	8	<b>palmă</b>			247.645 mm
192	64	8	<b>deget</b>		30.956 mm
2304	768	96	12	<b>linia</b>	2.580 mm

Other measures reported during the nineteenth century:

1 **khalibi** or **hâlbi** (for wool) = 671.3 mm;1 **endăseh** (for silk and linen) = 631.4 mm.

## 94.2 Units of Area

Upper scale

					Metric
<b>false</b>					14,321.952 m <sup>2</sup>
$2\frac{2}{3}$	<b>pogon or lugăr</b>				6444.878 m <sup>2</sup>
$8\frac{1}{2}$	4	<b>feredelă</b>			1611.220 m <sup>2</sup>
20	9	$2\frac{1}{4}$	<b>funie pătrată</b>		716.098 m <sup>2</sup>
2880	1296	324	144	<b>stânjen pătrat</b>	4.972 9 m <sup>2</sup>

Lower scale

				Metric
<b>stânjen pătrat</b>				4.972 9 m <sup>2</sup>
64	<b>palmă pătrat</b>			7.770 dm <sup>2</sup>
6400	100	<b>deget pătrat</b>		7.770 cm <sup>2</sup>
64,000	1000	10	<b>linia pătrat</b>	77.7 mm <sup>2</sup>

During the late nineteenth century, based on [BAUE]

			Metric
<b>falce, falltsch, or faltosch</b>			11,303.985 438 720 m <sup>2</sup>
2880	<b>stânjen pătrat</b>		3.924 994 944 m <sup>2</sup>
184,320	64	<b>palmă pătrat</b>	6.132 804 6 dm <sup>2</sup>

### 94.3 Units of Dry Capacity

At Chernivtsi (since 1940, a city in Ukraine)

				Metric
<b>kila</b>				393.60 L
2	<b>mirze</b>			196.80 L
4	2	<b>koböly or kübel</b>		98.40 L
16	8	4	<b>demerli</b>	24.60 L

For grain during the late nineteenth century, based on [BAUE]

			Metric
<b>kila</b>			435.10 L
2	<b>mirze or mierza</b>		217.55 L
20	10	<b>baniță<sup>a</sup> or dimerle</b>	21.755 L

<sup>a</sup>A vessel that contains 4 oca of barley, 4 oca of millet and 4 oca of wheat

In Chișinău, scale based on [MART3]

		Metric
<b>kila</b>		524.771 347 L
2½	<b>chetvert</b>	209.908 539 L

### 94.4 Units of Liquid Capacity

							Metric
<b>merță</b>							182.4 L
12	<b>vadră<sup>a</sup></b>						15.2 L
120	10	<b>oca</b>					1.52 L
480	40	4	<b>litră</b>				380 mL
960	80	8	2	<b>cinzec</b>			190 mL
3840	320	16	4	2	<b>ciocan</b>		95 mL
48,000	4000	400	100	50	25	<b>dram</b>	3.8 mL

<sup>a</sup>1 **vadră** (for brandy and petroleum) = 12 oca = 15.375 6 L (based on [BAUE])

## 94.5 Units of Weight

							Metric
<b>merță</b>							516.4 kg
2 $\frac{7}{11}$	<b>cechioa</b>						227.2 kg
9 $\frac{7}{11}$	4	<b>cântara</b>					56.80 kg
10	4 $\frac{7}{8}$	1 $\frac{7}{10}$	<b>baniță</b>				51.64 kg
400	176	44	40	<b>oca</b>			1.291 kg
1600	704	176	160	4	<b>litra</b>		322.75 g
160,000	7040	1760	16,000	400	100	<b>dram</b>	3.227 5 g

## 95 Moldova [Formerly: Bessarabia, Soviet Socialist Republic of Moldova and Moldavia]

See also *Transnistria*.

In the Middle Ages, this area, also known as Bessarabia, was first invaded by the Kievan Rus and later by the Mongol Empire. In 1350, the Principality of Moldavia was founded. In 1538, the principality became a tributary to the Ottoman Empire, but maintained its political autonomy until 1812, when the area came under Russian sovereignty. In 1859, the area, except for its northeastern part (Moldovan Transdnistrian), which was to remain under Russian sovereignty, merged with the neighboring state of Wallachia, and in 1861, proclaimed a nation-state of Romania. The area, known as Moldova since 1918, was incorporated into the Soviet Union in 1940 as the Moldovan SSR. When Germany invaded Russia in 1941, the area was reincorporated into Romania. The Soviet Union occupied Moldova in 1944 and it became a de jure part of the USSR in 1947. Moldova declared its independence in 1991.

*Main source:* [KAHN]

### 95.1 Currency

1993–: 1 Moldovan leu = 100 bani  
 1992–1993: 1 ruble coupon  
 1944–1991: 1 Russian ruble = 100 kopeks  
 1941–1944: 1 Romanian leu = 100 bani  
 1940–1941: 1 Russian ruble = 100 kopeks

1918–1940: 1 Romanian leu = 100 bani  
 –1918: 1 Russian ruble = 100 kopeks

### 95.2 Units of Length

				Metric
<b>arsin</b>				7.5 m
25	<b>parmace</b>			300 mm
300	12	<b>hatur</b>		25 mm
3600	144	12	<b>nothale</b>	2.08 mm

For fabric

			Metric
<b>arsin al bazarului</b>			680.0 mm
8	<b>rupi</b>		85.0 mm
16	2	<b>ghiral</b>	42.5 mm

### 95.3 Units of Liquid Capacity

For wine

		Metric
<b>vadră</b>		12.2 L
20	<b>butilka</b>	610 mL

## 96 Moldovan Transdnistrian

See also *Moldova*.

The area of Moldova east of the Dniestr River is known as Moldovan Transdnistria. The Soviet Union refused to recognize Bessarabia's

decision to join Romania, so it occupied the area east of the Dniestr, and created the Moldavian SSR. Moldovian Transdnistria was part of the Soviet Union from 1923 until 1940, and was joined to Bessarabia to create the Moldovian SSR in 1940. When Germany invaded Russia, Moldovian Transdnistria was incorporated into Romania in 1941. The USSR took back Moldovian Transdnistria in 1944, and it became a de jure part of the Soviet Union in 1947.

97 Monaco

The Grimaldi family has ruled Monaco since 1297. The Principality of Monaco was founded in 1612, and became sovereign in 1688. It was annexed by France between 1793 and 1814, when the Congress of Vienna agreed that Monaco, then renamed Fort-Hercule, would be under the protection of the Kingdom of Sardinia. During this era, the Grimaldi family gave up the claim to the two nearby cities of Menton and Roquebrune. The Franco-Monegasque treaty of 1861 placed Monaco under French guardianship. In 1886, Monaco became an autonomous state, through an agreement with France.

The metric system has been compulsory since 1853.

97.1 Currency

- 1999–: 1 euro = 100 euro-cent
- 1795–2002: 1 French franc = 100 centimes
- 1641–1795: 1 livre tournois = 20 sous
- 1637–1641: 1 lira

97.2 Units of Length

Before 1853

		Metric
<b>pan</b>		235.000 mm
12	<b>once</b>	19.583 mm

97.3 Units of Weight

Before 1853

				Metric
<b>quintal</b>				49.852 950 kg
6	<b>rub</b>			8.308 825 kg
150	25	<b>livre</b>		332.353 g
1800	300	12	<b>once</b>	27.696 g

98 Mongolia [Formerly: Outer Mongolia]


Khubilai Khan (ruled: 1259–1294) established the Mongol dynasty that ruled over China. The last great Mongol leader was Ligdan Khan (ruled: 1604–1634). After he died, the area became part of China, but the area was brought under suzerainty of the Manchus, who had conquered China in 1644. Mongolia was founded as a separate country from China in 1911. It was briefly annexed to China again from 1919 until 1921. The Mongolian People’s Republic was officially proclaimed in 1924.

The Mongols were influenced by measures from China (such as the *dou* and the *ge*) and Persia (such as the *tagār*, the *kīla* and the *sīr*), and unified the system of weights and measures in the whole area under their rule. Some Russian measures were also in use before metrification. In 1918, Mongolia became the first Asian nation to convert to the metric system. Some of the traditional system was still used, but was often linked to the metric system in the late 1960s.

*Main sources:* [BOBE], [CEVE], [CHEN], [CHVO], [CLEA], [DAL], [ECON], [FARQ], [FUCH], [HAKA], [KAHN], [MAED], [MATS], [MONG], [POZD], [SAND2], and [UN55]

*e-mail sources :* [eLHAG] and [eSVAN]

98.1 Currency

- 1925–: 1 Mongolian tögrög (Монгол төгрөг; ; old transcription: tögürig) = 100 möngö (мөнгө; old transcription: mönggö)

1921–1925: 1 Mongolian dollar (Монгол доллар) = 100 cents  
–1925: 1 Chinese yuán (元) = 10 jiǎo (角) = 100 fēn (分)

98.2 Units of Length

Chinese-linked system

газар	хувь	хос алд	алд дэлэм	алд	дэлэм	чий	ямх	пүн	лий	Metric
yajar <sup>a</sup>										579.496 m
10	qubi									57.949 6 m
181¼	18⅞	qoos alda or džan <sup>b</sup>								3.197 2 m
241⅔	24⅞	1⅓	alda delem							2.397 9 m
362½	36¼	2	1½	alda <sup>c</sup>						1.598 6 m
725	72½	4	3	2	delem <sup>d</sup>					799.30 mm
1812½	181¼	10	7½	5	2½	čhi				319.72 mm
18,120	1812½	100	75	50	25	10	imaqu or yamaqu			31.972 mm
181,200	18,120	1000	750	500	250	100	10	fün		3.197 2 mm
1,812,000	181,200	10,000	7500	5000	2500	1000	100	10	li	319.722 µm

<sup>a</sup>In Chinese, reported as shǐlǐ (= about 500 m). In [UN55], spelled **gatsar**  
<sup>b</sup>In Chinese, reported as shuānguǒ or zhàng. In [UN55] and [ECON], spelled **khos aldan**  
<sup>c</sup>In concept, the distance between the two opposite middle fingers when the arms are fully extended. In Chinese, reported as tuǒ  
<sup>d</sup>In concept, the distance from the top of the shoulder to the tip of the middle finger. In Chinese, reported as bàntuǒ

Russian-linked system

				Metric
verst				1066.8 m
500	sagene or sažen			2.134 m
1500	3	archin		711.2 mm
24,000	48	16	vershok	44.45 mm

Other measures reported as used in Mongolia:  
1 **pichi** (in the city of Sarai during the mid-fourteenth century) = 752.8 mm;

1 **too** = the distance between the thumb and the tip of the middle finger;  
1 **soom** = the distance between the thumb and the tip of the forefinger;  
1 **khuruu** = the length of the forefinger.

During his travels in Mongolia in the late 1900s, Aleksei Matveevich Pozdneev (1851–1920) observed that many groceries, such as potatoes, often were sold while lying in a row.

## Metric-linked system

газар	хувь	хорилда	хос алд	алд дэлэм	алд	дэлэм	чий	ямх	пүн	лий	Metric
<b>gadzar</b>											576 m
10	<b>xuv</b> <sup>a</sup>										57.6 m
18	1 $\frac{1}{5}$	<b>xorilda</b> <sup>b</sup>									32 m
180	18	10	<b>hos ald</b> or <b>jang</b> <sup>c</sup>								3.2 m
240	24	13 $\frac{1}{3}$	1 $\frac{1}{3}$	<b>ald delem</b>							2.4 m
360	36	20	2	1 $\frac{1}{2}$	<b>ald</b>						1.6 m
720	72	40	4	3	2	<b>delem</b>					800 mm
1800	180	100	10	7 $\frac{1}{2}$	5	2 $\frac{1}{2}$	<b>či</b>				320 mm
18,000	1800	1000	100	75	50	25	10	<b>yamh</b> <sup>d</sup>			32 mm
180,000	18,000	10,000	1000	750	500	250	100	10	<b>pün</b>		3.2 mm
1,800,000	180,000	100,000	10,000	7500	5000	2500	1000	100	10	<b>lii</b>	0.32 mm

<sup>a</sup>In [ECON] and [UN55], spelled **khubi**<sup>b</sup>In [BOBE], spelled **khorilda**<sup>c</sup>In [ECON] and [UN55], spelled **khos aldan**<sup>d</sup>In [KAHN] and [UN55], spelled **imago** or **imagu**

## Metric system

километр	метр	дециметр	сантиметр	миллиметр	Metric
<b>kilometr</b>					1000 m
1000	<b>metr</b>				1 m
10,000	10	<b>decimetr</b>			100 mm
100,000	100	10	<b>camtimetr</b>		10 mm
1,000,000	1000	100	10	<b>millimetr</b>	1 mm

## 98.3 Units of Area

## Chinese-linked system

							Metric
<b>qubiyari</b> <sup>a</sup>							91,998.790 6 m <sup>2</sup>
100	<b>ür-e</b> <sup>b</sup>						919.987 9 m <sup>2</sup>
36,000	360	<b>alda</b>					2.555 5 m <sup>2</sup>
900,000	9000	25	<b>chi</b>				10.222 dm <sup>2</sup>
90,000,000	900,000	2500	100	<b>yamaqu</b>			10.222 cm <sup>2</sup>
9,000,000,000	90,000,000	250,000	10,000	100	<b>fün</b>		10.222 mm <sup>2</sup>
900,000,000,000	9,000,000,000	25,000,000	1,000,000	10,000	100	<b>li</b>	0.102 mm <sup>2</sup>

<sup>a</sup>In Chinese, reported as qǐng. See also [CLEA, p. 31]<sup>b</sup>In Chinese, reported as mǔ

Other measures and specifications for land areas:

- 1 **desyatina** (Russian) = about 10,930 m<sup>2</sup>;
- 1 **khubi** or **qubi** = a section of land, not of any specific size;
- 1 **dalan** = a narrow strip of land, not of any specific size.

Metric-linked system

хувиар	үр	квадрат алд	квадрат чий	квадрат ямх	квадрат пүн	квадрат лий	Metric
<b>huviar</b>							92,160 m <sup>2</sup>
100	<b>ür</b>						921.60 m <sup>2</sup>
36,000	360	<b>kvadrat ald</b>					2.560 m <sup>2</sup>
900,000	9000	25	<b>kvadrat čii</b>				10.240 dm <sup>2</sup>
90,000,000	900,000	2500	100	<b>kvadrat yamh</b>			10.240 cm <sup>2</sup>
9,000,000,000	90,000,000	250,000	10,000	100	<b>kvadrat pün</b>		10.240 mm <sup>2</sup>
900,000,000,000	9,000,000,000	25,000,000	1,000,000	10,000	100	<b>kvadrat lii</b>	0.102 mm <sup>2</sup>

Metric system

Гектар	ар	квадрат метр	квадрат дециметр	квадрат сантиметр	квадрат миллиметр	Metric
<b>Gektar</b>						10,000 m <sup>2</sup>
100	<b>ar</b>					100 m <sup>2</sup>
10,000	100	<b>kvadrat metr</b>				1 m <sup>2</sup>
1,000,000	10,000	100	<b>kvadrat decimetr</b>			1 dm <sup>2</sup>
100,000,000	1,000,000	10,000	100	<b>kvadrat camtimetr</b>		1 cm <sup>2</sup>
10,000,000,000	100,000,000	1,000,000	10,000	100	<b>kvadrat millimetr</b>	1 mm <sup>2</sup>

98.4 Units of Volume

- 1 **sagholgha** (for dry commodities, varying by locality) = about 316 cu in.<sup>2</sup>

<sup>2</sup> Value according to [BOBE, p. 1373].

98.5 Units of Dry Capacity

During the thirteenth century, based on [CHEN], [CLEA2] and [MATS]

			Metric
<b>tayar</b> or <b>taghar</b>			~84.0 L
10	<b>šim</b> or <b>shim</b>		~8.4 L
100	10	<b>šingsi</b>	~840 mL

Chinese-linked system for cereals

								Metric
<b>ačiy-a</b> or <b>in</b>								207.090 L
2	<b>dang</b> <sup>a</sup> or <b>ačá</b>							103.545 L
4	2	<b>saγulaγ-a</b> <sup>b</sup> or <b>chú</b>						51.772 L
20	10	5	<b>deü</b> <sup>c</sup> or <b>súlga</b>					10.354 L
200	100	50	10	<b>šing</b> or <b>šeng</b> <sup>d</sup>				1.035 L
2000	1000	500	100	10	<b>bitegiüü</b> <sup>e</sup>			103.5 mL
4000	2000	1000	200	20	2	<b>alga</b>		51.8 mL
20,000	10,000	5000	1000	100	10	5	<b>chuv'</b>	10.3 mL

<sup>a</sup>In Chinese, reported as *dàn*  
<sup>b</sup>In Chinese, reported as *hú*  
<sup>c</sup>In Chinese, reported as *dǒu*  
<sup>d</sup>In Chinese, reported as *shēng*  
<sup>e</sup>In Chinese, reported as *gě*

Other reported measures:

- 1 **dzudzaan** or **juᡵaγan** = a brick of green tea, also used as unit of exchange;  
1 **tsybik** (Siberian) = a chest of tea or tobacco, a bale.

Metric-linked system for cereals

ачаа	дан	суулга	дүү	шин	битүү	Metric
<b>ačaa</b>						200 L
2	<b>dan</b>					100 L
4	2	<b>suulgu</b>				50 L
20	10	5	<b>düü</b>			10 L
200	100	50	10	<b>šin</b>		1 L
2000	1000	500	100	10	<b>bitüü</b>	100 mL

Traditional system for barley flour

					Metric
<b>dang</b>					164.50 L
2	<b>saγulaγ-a</b>				82.25 L
10	5	<b>deü</b>			16.45 L
100	50	10	<b>šing</b>		1.645 L
1000	500	100	10	<b>alaya-a</b> <sup>a</sup>	164.5 mL

<sup>a</sup>In concept, equal to a handful

Other reported measures, after metrification:

1 **kubmetr** (кубметр) = 1 m<sup>3</sup>.

98.6 Units of Liquid Capacity

Scale based on [MATS]

		Metric
<b>saba</b>		~840 mL
3	<b>tembin</b>	~280 mL

Other reported measures:

1 **sinc`he** = unknown size.

Metric system

гектолитр	литр	децилитр	сантилитр	миллилитр	Metric
<b>gektolitr</b>					100 L
100	<b>litr</b>				1 L
1000	10	<b>decilitr</b>			100 mL
10,000	100	10	<b>camtilitr</b>		10 mL
100,000	1000	100	10	<b>millilitr</b>	1 mL

## 98.7 Units of Weight

During the late thirteenth century, based on [CHEN], [MAED], and [MATS]

				Metric
<b>sūke</b>				1.865 kg
$3\frac{3}{8}$	<b>badman<sup>a</sup></b>			596.82 g
50	16	<b>sijir</b> or <b>shijir</b>		37.30 g
500	160	10	<b>baqir</b> or <b>bakir</b>	3.73 g

<sup>a</sup>The term *badman* occurs, according to [FUCH], on an inscribed sliding weight for a steelyard, dated 1284

In the city of Sarai, as reported c. 1350

		Metric
<b>kanter</b>		~9.7 kg
20	<b>mena</b>	~485 g

Chinese-linked system

									Metric
<b>hos dan</b>									119.364 kg
2	<b>dan<sup>a</sup></b>								59.682 kg
200	100	<b>jīng<sup>b</sup></b>							596.820 g
3200	1600	16	<b>lang<sup>c</sup></b>						37.301 g
32,000	16,000	160	10	<b>čēn</b> or <b>tsen<sup>d</sup></b>					3.730 g
320,000	160,000	1600	100	10	<b>pun<sup>e</sup></b>				373.0 mg
3,200,000	1,600,000	16,000	1000	100	10	<b>li</b> or <b>lei<sup>f</sup></b>			37.3 mg
32,000,000	16,000,000	160,000	10,000	1000	100	10	<b>quu<sup>g</sup></b>		3.73 mg
320,000,000	160,000,000	1,600,000	100,000	10,000	1000	100	10	<b>se<sup>h</sup></b>	373 μg

<sup>a</sup>In Chinese, reported as *dàn*

<sup>b</sup>When used for weighing meat, it was called 1 **köl**. In Chinese, reported as *jīn*

<sup>c</sup>In Chinese, reported as *liǎng*

<sup>d</sup>In Chinese, reported as *qián*

<sup>e</sup>In Chinese, reported as *fēn*

<sup>f</sup>In Chinese, reported as *lí*

<sup>g</sup>In Chinese, reported as *háo*

<sup>h</sup>In Chinese, reported as *sī*

Other reported measures:

1 **püü** [пүү] or **funt** (Russian) = about 16.3 kg;

1 **gin** (for cow butter) = 614 g.

## Metric-linked system

Жин	лан	цэн	пун	лий	хуу	сээ	Metric
<b>džin</b>							600 g
16	<b>lan</b>						37.5 g
160	10	<b>cen</b> <sup>a</sup>					3.75 g
1600	100	10	<b>pun</b>				375 mg
16,000	1000	100	10	<b>lii</b>			37.5 mg
160,000	10,000	1000	100	10	<b>huu</b> <sup>b</sup>		3.75 mg
1,600,000	100,000	10,000	1000	100	10	<b>see</b>	375 µg

<sup>a</sup>[ECON] reported it as **tsin**

<sup>b</sup>[ECON] reported it as **khhou**

## Metric system

тонн	килограмм	грамм	миллиграмм	Metric
<b>tonn</b>				1000 kg
1000	<b>kilogramm</b>			1 kg
1,000,000	1000	<b>gramm</b>		1 g
1,000,000,000	1,000,000	1000	<b>milligramm</b>	1 mg

## 99 Montenegro [Part of Former Yugoslavia]

See also *Dalmatia* and *Ottoman Empire*.

Montenegro became a Principality within the Ottoman Empire in 1852. It became an independent Kingdom in 1910, but merged, in 1918, with the newly formed Serb, Croat and Slovene Kingdom, which, from 1929, was known as Yugoslavia. In 2002, the two remaining republics of the former Yugoslavia decided to continue their union and take on the name of Serbia and Montenegro. In 2006, Montenegro became independent.

The metric system has been compulsory since 1876.

### 99.1 Currency

2001–:	1 euro = 100 euro-cents
1999–2002:	1 German Mark = 100 Pfennig
1994–2000:	1 new dinar = 100 para
1944–1994:	1 Yugoslav dinar = 100 para
1919–1944:	1 Serbian dinar = 100 para
1918–1919:	1 krone = 100 heller
1906–1918:	1 Montenegrin perper = 100 pare or nape

## 100 Montserrat

This island was claimed by Christopher Columbus in 1493, and colonized by the English in 1632. Montserrat was occupied by the French in 1667 and from 1782 to 1783. From 1871 to 1958, Montserrat was administered as part of the Federal Colony of the Leeward Islands, and was a province of the West Indies Federation from 1958 to 1962.

### 100.1 Currency

1965–:	1 East Caribbean dollar = 100 cents
1935–1965:	1 British West Indies dollar = 100 cents
–1935:	1 pound sterling = 20 shillings = 240 pence = 960 farthings

## 101 Moravia

See also *Bohemia*, *Czech Republic* and *Silesia*.

After January 1, 1858, the weights and measures became the same as those used in Vienna.

## 101.1 Units of Length

1 **Elle** (during the thirteenth century) =  
782.625 mm;

1 **Elle** (from 1638 to 1734) = 782.625 mm;

1 **Elle** (after 1734) = 788.891 mm.

					Metric
<b>mile</b>					6986.02 m
3660	<b>latro</b>				1.908 75 m
3934½	1 <sup>9</sup> / <sub>120</sub>	<b>sah</b>			1.775 58 m
11,803½	3 <sup>9</sup> / <sub>40</sub>	3	<b>loket</b>		591.86 mm
23,607	6 <sup>9</sup> / <sub>20</sub>	6	2	<b>stopa or strevic</b>	295.93 mm

For cloth, as reported in 1407 by margrave Jobst of Moravia (1351–1411)

					Metric
length of fine cloth					25.244 512 m
1 <sup>1</sup> / <sub>15</sub>	length of medium cloth				23.666 730 m
19 <sup>9</sup> / <sub>13</sub>	18 <sup>9</sup> / <sub>13</sub>	width of fine and medium cloth			1.281 947 8 m
21 <sup>1</sup> / <sub>3</sub>	20	1 <sup>1</sup> / <sub>12</sub>	width of ordinary cloth		1.183 336 5 m
32	30	1 <sup>3</sup> / <sub>8</sub>	1½	<b>Elle</b>	788.891 mm

For sheep's wool

					Metric
<b>Strähn or Strang</b>					1642.202 40 m
4	<b>Viertel</b>				410.550 62 m
24	6	<b>Klapp or Gebinde</b>			68.425 104 m
1056	264	44	<b>Faden</b>		1.555 116 m
2112	528	88	2	<b>Vienna Elle</b>	777.558 mm

Alternative scale for sheep's wool (1 Faden = 3 Vienna Ellen)

					Metric
<b>Strähn or Strang</b>					2463.303 70 m
4	<b>Viertel</b>				615.825 93 m
24	6	<b>Klapp or Gebinde</b>			102.637 50 m
1056	264	44	<b>Faden</b>		2.332 674 m
3168	792	132	3	<b>Vienna Elle</b>	777.558 mm

Alternative scale for sheep’s wool (1 Strähn = 20 Klapp)

					Metric
<b>Strähn or Strang</b>					1368.502 00 m
4	<b>Viertel</b>				342.125 52 m
20	5	<b>Klapp or Gebinde</b>			68.425 104 m
880	220	44	<b>Faden</b>		1.555 116 m
1760	440	88	2	<b>Vienna Elle</b>	777.558 mm

Alternative scale for sheep’s wool (1 Strähn = 22 Klapp)

					Metric
<b>Strähn or Strang</b>					1505.352 20 m
4	<b>Viertel</b>				376.338 07 m
22	5½	<b>Klapp or Gebinde</b>			68.425 104 m
968	242	44	<b>Faden</b>		1.555 116 m
1936	484	88	2	<b>Vienna Elle</b>	777.558 mm

In Brno

		Metric
<b>Klafter</b>		1.775 400 m
6	<b>Fuss</b>	295.900 mm

101.2 Units of Area

At Brno in 1250

		Metric
<b>Gewende</b> (210 × 39 Ellen)		2877.193 68 m <sup>2</sup>
8190	<b>Quadrat-Elle</b>	35.130 57 dm <sup>2</sup>

At Příbram

		Metric
<b>Acker-Holz</b>		2868.226 9 m <sup>2</sup>
128	<b>Quadrat-Rute</b>	22.408 022 m <sup>2</sup>

At Znojmo in 1300

		Metric
<b>Morgen</b>		2849.792 1 m <sup>2</sup>
3	<b>Quadrat-Seil</b>	949.930 7 m <sup>2</sup>

101.3 Units of Volume

- 1 **Klafter** (for firewood at Brno during the late nineteenth century, based on [MART3]) = 2.802 300 m<sup>3</sup>;
- 1 **Holzklafter** (for firewood at Brno after 1770, = 1 Viennan Klafter × 1 Viennan Klafter × 1 Moravian Elle) = 2.796 988 5 m<sup>3</sup>;
- 1 **Holzklafter** (for firewood at Brno before 1743, = 6 Moravian Fuss × 6 Moravian Fuss × 1 Moravian Elle) = 2.466 935 9 m<sup>3</sup>.

101.4 Units of Dry Capacity

- 1 **Metzen** (heaped measure for oats, fruit and potatoes in Hof, Hohenstadt, Loučná nad Desnaou and Rýmařov after 1856) = 92.230 23 L;
- 1 schleisischer **Scheffel** (in Frýdek-Místek and Ostrava after 1856) = 76.858 525 L;
- 1 **Metzen** (in Brno, as reported in 1639) = 70.619 5 L;
- 1 **Metzen** (in Brno, as reported in 1670) = 70.619 5 L;
- 1 **Metzen** (in Brno, as reported during the late nineteenth century) = 70.599 2 L;

- 1 **Metzen** (in Znojmo, as reported in 1670) = 68.705 L;
- 1 **Metzen** (in Jihlava, as reported in 1690) = 67.648 L;
- 1 **Metzen** (in Olomouc, as reported in 1670) = 67.295 6 L;
- 1 **Metzen** (for smooth fruit in Jihlava, as reported in 1639) = 67.251 206 L;
- 1 **Metzen** (in Olomouc, as reported in 1707) = 67.250 L;
- 1 **Metzen** (in Mikylou during the fifteenth century) = 65.534 L.

				Metric
<b>Strich</b>				93.609 8 L
4	<b>Viertel</b>			23.402 45 L
16	4	<b>Maassel</b>		5.850 61 L
192	48	12	<b>Seidel</b>	487.55 mL

In Brno

									Metric
<b>Mut</b>									2117.974 9 L
2½	<b>Malter</b>								847.190 0 L
30	12	<b>Metzen</b>							70.599 17 L
120	48	4	<b>Viertel</b>						17.649 8 L
240	96	8	2	<b>Achtel</b>					8.824 9 L
480	192	16	4	2	<b>Halbachtel</b>				4.412 4 L
960	384	32	8	4	2	<b>Massl or Metzel</b>			2.206 2 L
1920	768	64	16	8	4	2	<b>Mass or Halbmetzel</b>		1.103 1 L
3840	1536	128	32	16	8	4	2	<b>Seitl</b>	551.556 mL

101.5 Units of Liquid Capacity

In Brnu from 1545 to 1758, and after 1758

				Metric	Metric
<b>Kufe</b>				653.706 L	641.719 26 L
12	<b>Eimer</b>			53.475 50 L	53.476 605 L
600	50	<b>Mass</b>		1.089 5 L	1.069 532 1 L
2400	200	4	<b>Seitl</b>	272.377 mL	267.383 mL

For wine during the nineteenth century

			Metric
<b>Fass</b>			427.812 L
10	<b>Eimer</b>		42.781 2 L
400	40	<b>Maass</b>	1.069 53 L

For beer during the nineteenth century

		Metric
<b>Fass</b>		171.124 8 L
4	<b>Eimer</b>	42.781 2 L

101.6 Units of Weight

- 1 **Pfund** (in Olomouc in 1707) = 561.642 g;
- 1 **Pfund** (in Brno during the late nineteenth century) = 560.015 g;

- 1 **Pfund** (in Brno in 1756) = 560.014 2 g;
- 1 **Pfund** (in Brno during nineteenth century) = 559.967 g.

102 Morocco

See also *Ifni*, *Rif Republic* and *Tangier*.  
Morocco was part of the Mauritanian Empire until it was incorporated into the Roman Empire c. 40 BCE. In 699, the Arab army of Umayyad

Caliph ‘Abd al-Malik conquered Morocco. By the 780s, Morocco had become independent of the Abbasid caliphs in Baghdad and the Umayyad rule in Al-Andalus. The Sharifi Moroccan State was founded in 1666. In 1830, France invaded Morocco. The nation gained its independence in 1906. A war from 1907 to 1912 caused Morocco to be divided into four zones: Spanish Morocco, French Morocco, the Spanish enclaves of Tafaya and Ifni and the city of Tangiers. French Morocco and Spanish Morocco were merged to form the Kingdom of Morocco in 1957. Ceuta and Melilla remained parts of Spain. The Republic of the Rif, created in 1921 when the people of the Rif revolted and declared their independence, existed until 1926, when it was reabsorbed into Morocco. Tangiers became an international protectorate in 1912, but became part of Morocco again in 1956. Morocco ceded Ifni to Spain in 1860. Ifni was returned to Morocco in 1969.

The Moorish and Castilian systems for weights and measures were the main influences until the mid-nineteenth century, when the British Imperial system became increasingly important in foreign trade. During the mid-nineteenth century, weights and measures were different in almost every town in Morocco. Many travel books from the mid-nineteenth century testify to this. The metric system has been compulsory since 1923.

*Main sources:* [BEY], [CARD], [CROS], [ECON], [ENGs], [FENN], [HERI], [LEAR], [MAAR], [MART3], [PALL], [PENN2], [ROHL], [SMED], [STAT1881], [UN55], and [UN66]

102.1 Currency

1960–:	1 Moroccan dirham = 100 santimat
1921–1959:	1 Moroccan franc = 100 centimes
1921–1957:	1 Spanish peseta = 100 centimos
1882–1921:	1 Moroccan rial = 100 dirhams
–1882:	1 benduqi (in gold)
–1882:	1 dirham (in silver)
1672–1901:	1 falus (in copper)

102.2 Units of Length

Traditional system

				Metric
<b>pic</b>				4.880 m
$3^{907/999}$	<b>kama</b> or <b>gamma</b> <sup>a</sup>			1.248 75 m
8	$2^{23/488}$	<b>tonni</b>		610.0 mm
$8^{88/111}$	$2^{1/4}$	$1^{11/111}$	<b>cala</b> or <b>kala</b> <sup>b</sup>	555.0 mm

<sup>a</sup>A fathom

<sup>b</sup>[LEAR] reported it as about 0.9 m for woven tissues

During the early eighteenth century, based on [BEY]

		Metric
<b>dhra</b> or <b>dhra’ a</b> <sup>a</sup>		551.26 mm
8	<b>tomin</b> or <b>domin</b>	68.91 mm

<sup>a</sup>The distance between the tip of the elbow to the tip of the middle finger

During the late nineteenth century, based on [MART3] and [STAT1881]

		Metric	Metric
<b>dhra, dhraa, dreaah, or odo</b>		571.000 mm	571.043 mm
8	<b>tomin</b> or <b>domin</b>	71.375 mm	71.380 mm

British Imperial-linked system

		Imperial	Metric
<b>dhra, dhraa, dreaah, or odo</b>		22 in.	558.8 mm
8	<b>tomin</b> or <b>domin</b>	$2\frac{3}{4}$ in.	69.85 mm

Other reported measures:

1 **covado, covid, cadee, cubit, cuvado, canna, or canne** = 533.4 mm.

Metric-linked system

			Metric
<b>mitrū</b> or <b>kama</b>			1 m
2	<b>cala</b> or <b>kala</b>		500 mm
100	50	<b>santūm</b>	10 mm

## 102.3 Units of Area

Traditional system for agricultural use

					Metric
<b>tarialte</b>					3572.16 m <sup>2</sup>
2	<b>âbraa, izenbi, or sdal</b>				1786.08 m <sup>2</sup>
4	2	<b>aftari, saa, saah, or tmen</b>			893.04 m <sup>2</sup>
8	4	2	<b>courd, moud, rabia, or tarabiit</b>		446.52 m <sup>2</sup>
16	8	4	2	<b>tamna</b>	223.26 m <sup>2</sup>

Metric-linked system for agricultural use

		Metric
<b>gouffa</b>		5000 m <sup>2</sup>
5	<b>khedem</b>	1000 m <sup>2</sup>

## 102.4 Units of Dry Capacity

Traditional system for cereal, based on [PALL]

			Metric
<b>قفيز</b> <b>qafiz or cafiso</b>			528.40 L
16	<b>veba</b>		33.025 L
192 $\frac{1}{5}$	12 $\frac{1}{80}$	<b>sav</b>	2.749 L

Castilian-linked system, mainly based on [LEAR] and [MART3]

				Metric
<b>lauh</b>				521.709 L
2 $\frac{2}{35}$	<b>aroba</b>			194.253 L
9 $\frac{1}{5}$	3 $\frac{1}{2}$	<b>saâ, saah, zah, or fanega<sup>a</sup></b>		55.501 L
37 $\frac{1}{5}$	14	4	<b>mudd<sup>b</sup></b>	13.875 L

<sup>a</sup>Also subdivided into  $\frac{1}{2}$ ,  $\frac{1}{8}$ ,  $\frac{1}{16}$  and  $\frac{1}{32}$  parts. For corn, vegetables and seed in present-day El Jadid = about 101.0 L

<sup>b</sup>The mudd of the Prophet

Metric-linked system during the twentieth century

				Metric
<b>kharrouba, karouba, or kharouba</b>				40 L
4	<b>kard or card</b>			10 L
40	10	<b>litro</b>		1 L
80	20	2	<b>ness leetro</b>	500 mL

Other reported measures:

- 1 **saâ** or **saah** (for grain, seed and legumes in Rabat) = about 319 L;
- 1 **kharrouba** (for grain, seed and legumes in Mogador (present-day Essaouira)) = about 159 L;
- 1 **alcolla** (for cereal) = about 22 L;
- 1 **el-moude** = about 15.03 L.

## 102.5 Units of Liquid Capacity

Most liquids were measured and sold by weight.

Traditional system before 1882

				Metric
<b>saâ or saah</b>				57.548 L
4	<b>muhd</b>			14.387 L
28 $\frac{1}{8}$	7 $\frac{1}{32}$	<b>kadah</b>		2.046 L
225	56 $\frac{1}{4}$	8	<b>toummah</b>	255.8 mL

For oil, based on [MART3]

		Metric	Metric
<b>kula, kaila, kolla, or kúlah<sup>a</sup></b>		16.104 000 L	11.880 000 kg
22	<b>rotal</b>	732.000 mL	540.000 g

<sup>a</sup>[LEAR] reported it as 28.39 L. For beer, reported as 15.155 L

For oil in Rabat, based on [MART3]

		Metric	Metric
<b>kula, kaila, kolla, or kúlah</b>		15.155 000 L	11.176 000 kg
22	<b>rotal</b>	688.864 mL	508.000 g

## 102.6 Units of Weight

When it comes to the systems for weight, there was a wide range of contradictory information reported about the scales and the size of different units. I have tried to describe the commonly reported values as consistently as possible.

Moorish-linked system, during the early nineteenth century

						Metric
<b>kintar Asfi<sup>a</sup></b>						81.20 kg
$1\frac{3}{5}$	<b>kintar<sup>b</sup></b>					50.75 kg
$2\frac{29}{165}$	$1\frac{1}{3}$	<b>kintar el Arube</b>				39.062 kg
$7\frac{7}{11}$	$4\frac{9}{11}$	$3\frac{7}{22}$	<b>kúlah<sup>c</sup></b>			11.165 kg
$26\frac{2}{3}$	$16\frac{2}{3}$	$12\frac{1}{2}$	$3\frac{7}{3}$	<b>gerbe or gerba</b>		3.045 kg
160	100	75	22	6	<b>artat<sup>d</sup></b>	507.5 g

<sup>a</sup>In present-day Safi. Also reported as 63.502 kg

<sup>b</sup>Also called **cantaro**, **kutar**, or **kantar**. In various ports, reported as 50.45 kg, 51.26 kg, 51.302 kg or 53.977 kg

<sup>c</sup>Also reported as 9.98 kg. Usually used for olive oil

<sup>d</sup>Also called **rotal**, **rottle**, or **arratel**

Moorish-linked system during the late nineteenth century, based on [LEAR]

				Metric
<b>kintar<sup>a</sup></b>				91.762 kg
$1\frac{7}{15}$	<b>kintar<sup>b</sup></b>			80.966 kg
$1\frac{7}{10}$	$1\frac{1}{2}$	<b>kintar<sup>c</sup></b>		53.977 kg
170	150	100	<b>artat or rotal</b>	539.774 g

<sup>a</sup>For almonds, dates, henna and raisins

<sup>b</sup>For wax

<sup>c</sup>For gums, leather and wool

Moorish-linked system during the late nineteenth century, based on [MART3]

						Metric
<b>kharrouba</b>						108.000 kg
$1\frac{1}{3}$	<b>kintar<sup>a</sup></b>					81.000 kg
2	$1\frac{1}{2}$	<b>kintar</b>				54.000 kg
$2\frac{2}{3}$	2	$1\frac{1}{3}$	<b>kintar-el-a'rub<sup>b</sup></b>			40.500 kg
$133\frac{1}{3}$	100	$66\frac{2}{3}$	50	<b>rotat<sup>a</sup></b>		810.000 g
200	150	100	75	$1\frac{1}{2}$	<b>artat or rotal</b>	540.000 g
2800	2100	1400	1 050	21	14	<b>uchia</b> 38.571 g

<sup>a</sup>For oil, soap, butter, fruit, iron, meat, and wax

<sup>b</sup>Also reported as 67 artat = 36.180 kg. In Safi, = 125 artat = 67.50 kg, and in Sale, = 150 artat = 81.0 kg

Customary system in Mogador, present-day Essaouira, mainly based on [ENG5]

						Metric
<b>kharrouba<sup>a</sup></b>						99.857 4 kg
–	<b>kharrouba<sup>b</sup></b>					91.760 9 kg
–	–	<b>kharrouba<sup>c</sup></b>				80.965 5 kg
–	–	–	<b>kharrouba<sup>d</sup></b>			70.170 1 kg
–	–	–	–	<b>kintar</b>		53.977 0 kg
185	170	150	130	100	<b>artal or rotal<sup>e</sup></b>	539.77 g

<sup>a</sup>For durum wheat

<sup>b</sup>For Turkish wheat

<sup>c</sup>For grain import

<sup>d</sup>For barley

<sup>e</sup>Some sources reported it as about 538.4 g

For argan oil and some dry commodities in Mogador, present-day Essaouira, and Safi

		Metric	Metric
<b>saâ or saah</b>		27.2 kg	22.7 kg
4	<b>mudd<sup>a</sup></b>	6.8 kg	5.7 kg

<sup>a</sup>The mudd of the Prophet

Customary system in Rabat, based on [MART3]

						Metric
<b>kintar<sup>a</sup></b>						76.200 000 kg
1½	<b>kintar<sup>b</sup></b>					50.800 000 kg
2	1⅓	<b>kintar-el-a'rub</b>				38.100 000 kg
25	16⅔	12½	<b>gerba or gerbe</b>			3.048 000 kg
150	100	75	6	<b>artal or rotal</b>		508.000 g
1500	1400	1050	84	14	<b>uchia</b>	36.286 g

<sup>a</sup>For oil, soap, butter, fruit, iron, meat, and wax

<sup>b</sup>For peas

For corn during the nineteenth century, based on [MAAR]

				Metric
<b>'abra</b>				~14 kg
2	<b>neş 'abra</b>			~7 kg
4	2	<b>rab' a</b>		~3.5 kg
8	4	2	<b>tamna</b>	~1.75 kg

In present-day Safi, based on [MART3]

					Metric
<b>chintar<sup>a</sup></b>					67.500 000 kg
–	<b>chintar<sup>b</sup></b>				54.000 000 kg
–	–	<b>chintar-el-a'rub</b>			40.500 000 kg
125	100	75	<b>rotal</b>		540.000 g
1750	1400	1050	14	<b>uchia</b>	38.571 g

<sup>a</sup>For butter, fruit, iron, meat, oil, soap and wax

<sup>b</sup>For peas

Some other reported measures:

- 1 **fanega** (unstricken measure for durra and maize)  
= about 118 lbs = about 53.52 kg;  
1 **fanega** (stricken measure for barley and wheat)  
= about 70 lbs = about 31.75 kg;  
1 **jarroba** (for dry commodities in present-day  
Safi) = 11.502 323 kg.

For fine use

			Metric
<b>aratal</b>			508.023 g
20	<b>ougia</b>		25.401 g
10,800	540	<b>habb</b>	47 mg

Metric-linked system, mainly based on [ECON]

							Metric
<b>kantar or cantar</b>							100 kg
33½	<b>gerba or gerbe</b>						3 kg
100	3	<b>kilū</b>					1 kg
200	6	2	<b>artal, rtel, or rotal</b>				500 g
400	12	4	2	<b>rabâa</b>			250 g
800	24	8	4	2	<b>oukeia or orcaia</b>		125 g
100,000	3000	1000	500	250	125	<b>gram</b>	1 g

## 103 Mosquito Coast

See *Nicaragua*.

## 104 Mozambique [Formerly: Portuguese East Africa]

The Portuguese explorer Vasco da Gama landed in the area in 1498, and the island was colonized by Portugal in 1505. Portuguese East Africa incorporated the territories of Inhambane, Kionga, Lourenco Marques, the Mozambique Company, the Nyassa Company, Quelimane, Tete and Zambezia. Private companies administered portions of the area until 1929, when Portugal took over administration of the entire area. Portuguese East Africa became an overseas territory in 1951, and gained its independence, as Mozambique, in 1975.

Until 1860, the system for weights and measures was influenced by the system used in Lisbon. The metric system has been used since 1860, official since 1905, and compulsory since 1910.

*Main sources:* [ALTE2], [GUIL3], and [MART3]

### 104.1 Currency

2006–:	1 new Mozambican metical = 100 new centavos
1980–2006:	1 Mozambican metical = 100 centavos

1975–1980:	1 Mozambican escudo = 100 centavos
1914–1975:	1 Portuguese escudo = 100 centavos
1892–1914:	1 Portuguese milréis = 1000 réis
–1892 :	1 Mozambican peso = 10 cru- zado = 40 testõe = 4000 réis

### 104.2 Units of Length

During the mid-nineteenth and late nineteenth century

			Metric	Metric
<b>capotin</b>			3.934 m	4.400 00 m
2	<b>panno</b>		1.967 m	2.200 000 m
4	2	<b>mão</b>	983 mm	1.100 000 m

Portuguese-linked system before 1860

								Metric
<b>braca</b>								2.185 900 m
2	<b>vara</b>							1.092 950 m
3 $\frac{1}{3}$	1 $\frac{1}{3}$	<b>covado</b>						676.262 mm
5	2 $\frac{1}{2}$	1 $\frac{1}{2}$	<b>pé</b>					655.770 mm
10	5	3	2	<b>palmo</b>				327.885 mm
120	60	36	24	12	<b>pollegada</b>			27.324 mm
180	90	54	36	18	1 $\frac{1}{2}$	<b>dedo</b>		18.216 mm
720	360	216	144	72	6	4	<b>grao</b>	4.554 mm

Other reported measures during the mid-nineteenth century:

1 **yard** = 914.4 mm.

### 104.3 Units of Dry Capacity

Portuguese-linked system before 1860

							Metric
<b>moio</b>							830.445 000 L
15	<b>fanga</b>						55.363 000 L
60	4	<b>alqueire</b>					13.840 750 L
240	16	4	<b>quarta</b>				3.460 187 L
480	32	8	2	<b>oitava</b>			1.730 094 L
960	64	16	4	2	<b>salamin</b>		865.047 mL

Other reported measures:

1 **panja** (for grain, rice and seed) = 26.400 L.

### 104.4 Units of Liquid Capacity

Portuguese-linked system before 1860

				Metric
<b>tonelada</b>				860.267 L
2	<b>bota</b>			430.134 L
4	2	<b>barrique</b>		215.067 L
52	26	13	<b>almude</b>	16.543 6 L

### 104.5 Units of Weight

Traditional system and British-linked system before 1860

			Metric	Metric
<b>bahār</b>			229.602 79 kg	108.862 236 kg
20	<b>frehsil or fahrzil</b>		11.480 14 kg	5.443 112 kg
240	12	<b>mann</b>	956.678 g	453.593 g

Portuguese-linked system

							Metric
<b>tonelada</b>							793.152 kg
13½	<b>quintal</b>						58.752 kg
54	4	<b>arroba</b>					14.688 kg
1728	128	32	<b>arratel</b>				459.000 g
6912	512	128	4	<b>quarta</b>			114.750 g
27,648	2048	512	16	4	<b>onça</b>		28.687 g
221,184	16,384	4096	128	32	8	<b>oitava</b>	3.586 g

For gold and silver (two reported scales), based on [MART3] and [ALTE2]

					Metric	Metric
<b>inhamousira</b>					21.814 453 kg	19.911 kg
1½	<b>dogado</b>				21.515 625 kg	19.638 kg
2⅓	2	<b>mourouno</b>			10.757 812 kg	9.955 5 kg
4⅞	4	2	<b>chivingoue</b>		5.378 906 kg	4.977 75 kg
6½	6	3	1½	<b>outava</b>	3.585 937 kg	3.318 50 kg

For gold dust

		Metric
<b>pasta</b>		537.890 625 g
100	<b>matal</b>	5.378 906 g

105 Mthethwa Paramountcy

See also *Zulu Kingdom*.

This Southern African state, which arose during the early nineteenth century, consisted of more than 30 Nguni tribes and became part of the Zulu Kingdom in 1816.

105.1 Currency

Cattle

106 Mughal Empire (1526–1858)

See *India*.

107 Muscat and Oman

See *Oman*.

108 Kingdom of Mutapa

See also *Mozambique* and *Zimbabwe*.

This kingdom was stretched between the Zambezi and Limpopo rivers of southern Africa. The empire was established in 1430. It became a Portuguese protectorate in 1629. In 1760, it was disintegrated, and most areas became part of the Chidima Empire.

108.1 Units of Liquid Capacity

Portuguese-linked scale during the eighteenth century

		Metric
<b>panja</b>		5.520 L
8	<b>konja</b>	690 mL

108.2 Units of Weight

Portuguese-linked scale during the eighteenth century

			Metric
<b>bahār</b>			247.860 kg
20	<b>frāsila</b>		12.393 kg
300	15	<b>mann</b>	826.2 g

## 109 Mutawakkilite Kingdom of Yemen

See also *Idrisid Emirate of Asir*, *Emirate of Jabal Shammar*, and *North Yemen*.

In 1918, following the collapse of the Ottoman Empire, Imam Yahya Muhammad declared this area as an independent state. In 1926, Imam Yahya declared himself king of the Mutawakkilite Kingdom of Yemen. The kingdom lasted until 1962.

### 109.1 Currency

1918–1974: 1 Yemeni rial or riyal =  
40 buqshas or bogaches = 80  
halala = 160 zalat

## 110 Myanmar [Formerly: Socialist Republic of the Union of Burma, Burma]

See also *Kingdom of Pagan*.

The Waithali kingdom, in present-day Rakhine State, lasted from the middle of the fourth century until 818. The first kingdom to unify most of what is now Myanmar was the Kingdom of Pagan, which lasted from 849 to 1297. After the fall of the Pagan Empire, the area was broken up into several minor kingdoms and princely states. The major kingdoms were the Ava Kingdom (1364–1555) in Upper Burma, the Hanthawaddy Kingdom (1287–1539) in Lower Burma, the Myinsaing Kingdom (1297–1310) in Central Burma, the princely Shan States that came to dominate much of the northern and north-eastern parts of Burma (1215–1563), and the Kingdom of Mrauk-U (1430–1785) that ruled the Arakan area, present-day Rakhine. From the mid-sixteenth century until 1752, the major part of present-day Myanmar, except the Arakan area, was ruled by the Taungoo Dynasty. The last dynasty that ruled present-day Myanmar, the Konbaung Dynasty, was founded in 1752, and

laid the foundation for the modern state of Burma. Final unity was achieved in 1758. The area became part of British India in 1886. In 1937, it became a separate, self-governing colony. Burma gained its independence in 1948. In 1989, the military government officially changed the name of the country to Myanmar.

The main export product has long been rice in various forms and qualities. Thus, most of the commercial measures used were done so for rice. Other important export products included opium, rubies, pearls, textiles and oil. Traditional local scales for measuring rice and other commodities were influenced by Chinese, Indian, Thai, Dutch and British traders. During the seventeenth century, the Dutch East India Company traded in average quality and low price textiles (such as blue boulongs, chiaionis, coarse chintz, coarse, cortis, tampis, narrow black taffachelas and single-ply taffachelas), slaves, tin, chillies, lac, elephant tusks and beeswax. During the nineteenth century, the traditional systems were first linked to the British Imperial system, with a scale for commercial purposes later coming into use. The metric system has been legally optional since 1920, but some of the traditional units, as well as some British Imperial units (such as tje furlong, the inch and the acre), were still reported as used during the early twenty-first century.

*Main sources:* [ANNA], [BAUE], [BRAU], [BUDD], [CARD], [CRAW3], [DAUT], [DECO2], [DOUR], [FRAS], [GEAR], [GEAR2], [GEAR3], [IREL], [MART3], [MART8], [MOLL2], [MOLL3], [ORIE], [SCOT3], [SCOT5], [SPEA], [TRAP], [UN55], and [UN66]

Since the dialectal pronunciations are different, and as there are no official rules of transcription, there are different writings and names for some of the units presented below.

### 110.1 Currency

1989–: 1 Myanma kyat = 100 pyas  
1952–1989: 1 Burmese kyat = 100 pyas

- 1948–1952: 1 Burmese rupee = 16 pe = 64 pyas
- 1943–1945: 1 Burmese kyat = 100 cents
- 1942–1943; 1 Japanese rupee = 100 cents
- 1889–1942: 1 Indian rupee = 16 anna = 192 pies
- 1852–1889: 1 Burmese kyat = 4 mat = 10 mu = 20 pe = 80 pyas
- mid-sixteenth century and 1784, when they were conquered by King Bodawpaya.

110.2 Units of Quantity

1 lakh = 100,000.

The first coins were minted by the kings of the Chandra Dynasty during the seventh and eighth centuries CE. About the same time, the Mon, Pyu and Tenasserim people also issued coins. No coins were issued between the eleventh century and the sixteenth century. The kingdom of Arakan minted some coins between the

110.3 Units of Length

Traditional measures among the Karen-speaking people:

1 plah = the distance between the elbow and the tip of the middle finger.

Proposed traditional Pāli system

ယူနာ	ဂိဝုတ်		ဥသဘ				ထွာ		Metric
yojana									21,012.480 m
4	gavutassa								5253.120 m
16	4	addhakosa							1313.280 m
320	80	20	usaba						65.664 m
3840	960	240	12	yaṭṭhi					5.472 m
11,520	2880	720	36	3	vyāma				1.824 m
69,120	17,280	4320	216	18	6	carāṇa			304 mm
92,160	23,040	5760	288	24	8	1⅓	hattha		228 mm
1,105,920	276,480	69,120	3456	288	96	16	12	aṅgula <sup>a</sup>	19 mm

<sup>a</sup>Usually said to equal the length of eight barleycorns

British Imperial-linked system, upper scale

ယူနာ	ဂိဝုတ်	ကဿ	ဥသဘ	Metric
yojana or yuzana				20,482.560 m
4	gavutassa or ga-wout			5120.640 m
16	4	kawtha		1280.160 m
320	80	20	usaba or out-thaba	64.008 m

## British Imperial-linked system, lower scale

ဥသဘ	တာ	လံ	တောင်	ထွာ	မိုက်	လက်သစ်	မုယာ	နှင်း	ဆီခဲဉ်	Metric
<b>out-thaba</b>										64.008 m
20	<b>ta</b>									3.200 400 m
35	1¾	<b>lan</b> (=2 yards)								1.828 800 m
140	7	4	<b>taung<sup>a</sup></b>							457.200 mm
280	14	8	2	<b>htwa<sup>b</sup></b>						228.600 mm
420	21	12	3	1½	<b>maik<sup>c</sup></b>					152.400 mm
3360	168	96	24	12	8	<b>let thit<sup>d</sup></b>				19.050 mm
13,440	672	384	96	48	32	4	<b>mayaw<sup>e</sup></b>			4.762 mm
80,640	4032	2304	576	288	192	24	6	<b>hnan<sup>e</sup></b>		793.75 µm
806,400	40,320	23,040	5760	2880	1920	240	60	10	<b>sanchi<sup>f</sup></b>	79.375 µm

<sup>a</sup>A forearm. Sometimes reported as 18 let thits<sup>b</sup>The span of a hand. Also romanized as **twa**<sup>c</sup>The breadth of the palm with the thumb extended. Also reported as 6 let thits<sup>d</sup>The length of a grain of rice. Also romanized as **muyaw**<sup>e</sup>The length of a sesame seed<sup>f</sup>A hair's breadth

## Upper scale during the early nineteenth century, based on values presented by [CRAW3], [TRAP] and [SCOT5]

		တာ		လံ	Metric	Metric	Metric
<b>tehng, taing, tang, dain, or daing</b>					3395.98 m	3394.86 m	3387.09 m
4	<b>mât</b>				848.995 m	848.715 m	846.772 m
1000	250	<b>ta, bamboo, cole or dha</b>			3.395 98 m	3.394 86 m	3.387 09 m
1400	350	1½	<b>khan</b>		2.425 7 m	2.424 90 m	2.419 35 m
1750	437½	1¾		<b>lan</b>	1.940 56 m	1.939 92 m	1.935 48 m

## Lower scale during the early nineteenth century, based on values presented by [CRAW3], [TRAP] and [SCOT5]

လံ	တောင်	ထွာ	မိုက်	လက်သစ်	Metric	Metric	Metric
<b>lan</b>					1.940 56 m	1.939 92 m	1.935 48 m
4	<b>taung, daung, sandung, saundog, saundaum, sandong or taong</b>				485.14 mm	484.98 mm	483.87 mm
8	2	<b>twah, htwa or twa</b>			242.57 mm	242.49 mm	241.93 mm
12	3	1½	<b>maik, mak or meik</b>		161.71 mm	161.66 mm	161.29 mm
96	24	12	8	<b>let-thit or theet</b>	20.21 mm	20.21 mm	20.16 mm



## British Imperial-linked scale, based on the English mile scale

						ထွ	မိုက်		လက်သစ်		Metric
<b>tehng, dain, or taing</b>											3218.688 m
2	<b>ngayadwin<sup>a</sup></b>										1609.344 m
1000	500	<b>ta</b>									3.219 m
1750	875	1¾	<b>lan</b>								1.839 m
7000	3500	7	4	<b>daung<sup>b</sup></b>							459.8 mm
10,500	5250	10½	6	1½	<b>pe</b>						306.5 mm
14,000	7000	14	8	2	1⅓	<b>twa</b>					229.9 mm
21,000	10,500	21	12	3	2	1½	<b>meik<sup>c</sup></b>				153.3 mm
112,000	56,000	112	64	16	10⅔	8	5⅓	<b>leqma<sup>d</sup></b>			28.74 mm
168,000	84,000	168	96	24	16	12	8	1½	<b>letta thit or thit<sup>e</sup></b>		19.16 mm
672,000	336,000	672	384	96	64	48	32	6	4	grain of rice	4.79 mm

<sup>a</sup>1 English mile<sup>b</sup>Also spelled taun<sup>c</sup>The breadth of the hand with the thumb stretched out<sup>d</sup>The breadth of a thumb<sup>e</sup>The breadth of a finger

## British Imperial-linked upper scale

				Imperial	Metric
<b>yuzanar</b>				47.131 mi	78 834 m
~3.848 8	<b>garwoke</b>			12.727 mi	20 483 m
~15.394	4	<b>kawtha</b>		3.182 mi	5 121 m
~20.156	~5.236 7	~1.309 2	<b>theng, dain or taing</b>	154 000 in	3 911.6 m

## British Imperial-linked lower scale

							Imperial	Metric
tehng, dain, or taing							154,000 in.	3911.6 m
50	oke thepal						3080 in.	78.232 m
1000	20	bamboo, dha, or tar					154 in.	3.911 6 m
1750	35	1¼	lan				88 in.	2.235 2 m
7000	140	7	4	sandong, saundog or saundang			22 in.	558.8 mm
8555%	171⅓	8%	4%	1%	taim, taine, taung, tendam, covid, or cubit		18 in.	457.2 mm
38,500	770	38½	22	5½	4½	palgat	4 in.	101.6 mm
154,000	3080	154	88	22	18	palgat <sup>a</sup>	1 in.	25.4 mm

<sup>a</sup>Later-used scale, according to [MART5] and [UN66]. [MART5] romanized it as **pulgat**

110.4 Units of Area

During the early nineteenth century, based on [SCOT5]

									Metric
<b>pè<sup>a</sup></b>									7195.3 m <sup>2</sup>
~1 <sup>443/1125</sup>	<b>min pè<sup>b</sup></b>								5198.56 m <sup>2</sup>
~25 <sup>11/125</sup>	18	<b>pagadi pè<sup>c</sup></b>							286.809 m <sup>2</sup>
~62 <sup>18/25</sup>	45	2½	<b>gan<sup>d</sup></b>						114.724 m <sup>2</sup>
~627½	450	25	10	<b>ta<sup>2</sup></b>					11.472 m <sup>2</sup>
~30, 732⅓	22,050	1225	490	49	<b>taung<sup>2</sup></b>				23.413 dm <sup>2</sup>
~122, 931⅓	88,200	4900	1960	196	4	<b>twa<sup>2</sup></b>			5.853 dm <sup>2</sup>
~276, 595⅓	198,450	11,025	4410	441	9	2¼	<b>maik<sup>2</sup></b>		2.601 dm <sup>2</sup>
~17, 702, 092⅓	12,700,800	705,600	282,240	28,224	576	144	64	<b>let-thit<sup>2</sup></b>	406.48 mm <sup>2</sup>

<sup>a</sup>Used in northern Myanmar for paddy lands  
<sup>b</sup>1 “royal” pè  
<sup>c</sup>1 “people’s” pè  
<sup>d</sup>Used in northern Myanmar for alluvial formations

In Rangoon, present-day Yangon, based on [MART3]

			Metric
<b>peh</b>			7207.628 0 m <sup>2</sup>
625	<b>teh<sup>2</sup></b>		11.532 205 m <sup>2</sup>
30,625	49	<b>teong<sup>2</sup></b>	23.535 1 dm <sup>2</sup>

Other reported measures during the nineteenth century:

1 **doon** (in Akyab, present-day Sittwe) = 25,629.63 m<sup>2</sup>.

During the twentieth century, the British **acre** became the standard unit for agricultural use.

During the nineteenth century, based on [SPEA]

							Metric
<b>tsiet</b>							10.228 5 L
4	<b>pyee</b>						2.557 1 L
8	2	<b>kwet</b>					1.278 6 L
16	4	2	<b>tsa-lay</b>				639.28 mL
32	8	4	2	<b>la-may</b>			319.64 mL
64	16	8	4	2	<b>la-myek</b>		159.82 mL
128	32	16	8	4	2	<b>la-moo</b>	79.91 mL

110.5 Units of Volume

Some reported measures:

1 **ton** (for teak after 1872) = 50 cu ft (average length 28 feet) = 1.416 m<sup>3</sup>;  
1 **ton** (for teak before 1872) = 42 cu ft (average length 28 feet) = 1.189 m<sup>3</sup>.

110.6 Units of Dry Capacity

During the Middle Ages, some dry commodities were sold by weight.

British Imperial-linked system, based on [UN55]

									Imperial	Metric
<b>bag</b>									27 gal	122.744 42 L
3	<b>din<sup>a</sup>, thamardi tinn, tin-han or basket<sup>b</sup></b>								9 gal	40.914 806 L
6	2	<b>khwe</b>							2¼ peck	20.457 403 L
12	4	2	<b>seit or seik</b>						18 pt	10.228 702 L
24	8	4	2	<b>sayut<sup>a</sup></b>					9 pt	5.114 351 L
48	16	8	4	2	<b>pyi<sup>c</sup></b>				2¼ qt	2.557 175 4 L
96	32	16	8	4	2	<b>khwet</b>			1⅞ qt	1.278 587 7 L
192	64	32	16	8	4	2	<b>salé</b>		1⅞ pt	6.392 938 dL
384	128	64	32	16	8	4	2	<b>lame or nozibu<sup>d</sup></b>	2¼ gill	3.196 469 dL

<sup>a</sup>In former days, the din and the sayut varied all over the country. During the late nineteenth century, the sayut was linked to the British gallon, at 9 Imperial pints

<sup>b</sup>The basket was defined as 9 Imperial gallons by the Measuring Baskets Standardization Act , No. 1, in 1939

<sup>c</sup>For rice and condensed milk = 250 mL. According to the National Coalition Government of the Union of Burma – Human Rights Documentation Unit. *HUMAN RIGHTS YEARBOOK 2005, Burma*. Chapter: Acronyms and Abbreviations. ([www.burmalibrary.org](http://www.burmalibrary.org))

<sup>d</sup>Nozi- = “condensed milk” and -bu = “dose.” The term comes from the quantity of husked rice that fits into a milk can of the Milkmaid brand (14 oz.)

British Imperial-linked system for grain

									Imperial	Metric
<b>coyan</b>									800 gal	3636.87 L
100	<b>din or teng</b>								4 pk	36.368 L
200	2	<b>gwé, kweh, or kwai</b>							2 pk	18.184 L
400	4	2	<b>sehk or seik</b>						2 gal	9.092 L
800	8	4	2	<b>sah, sarot, or sayut</b>					1 gal	4.546 L
1600	16	8	4	2	<b>byi, peih, or pyee</b>				½ gal	2.273 L
6400	64	32	16	8	4	<b>saleh or salay</b>			¼ gal	568.26 mL

For cereal, chalk, and salt in Rangoon, present-day Yangon, based on [BAUE]

									Metric
<b>coyan</b>									3032 L
100	<b>taindang</b>								30.32 L
200	2	<b>gwé, kweh,</b> or <b>kwai</b>							15.16 L
400	4	2	<b>sehk</b> or <b>seik</b>						7.58 L
800	8	4	2	<b>sah, sarot,</b> or <b>sayut</b>					3.79 L
1600	16	8	4	2	<b>byi, peih,</b> or <b>pyee</b>				1.895 L
6400	64	32	16	8	4	<b>saleh or</b> <b>salay</b>			473.75 L
12,800	128	64	32	16	8	2	<b>lamay</b>		236.875 L
25,600	256	128	64	32	16	4	2	<b>lamyet</b>	118.437 L

Metric-linked system for cereal, chalk, and salt in Rangoon, present-day Yangon, and Mandalay, based on [MART3]

									Metric
<b>coyan</b>									3000 L
100	<b>teng<sup>a</sup></b>								30.000 L
200	2	<b>gwé, kweh,</b> or <b>kwai</b>							15.000 L
400	4	2	<b>sehk</b> or <b>seik</b>						7.500 L
800	8	4	2	<b>sah, sarot,</b> or <b>sayut</b>					3.750 L
1600	16	8	4	2	<b>byi, peih,</b> or <b>pyee</b>				1.875 L
6400	32	32	16	8	4	<b>saleh or</b> <b>salay</b>			468.750 mL
12,800	64	64	32	16	8	2	<b>lamay</b>		234.375 mL
25,600	128	128	64	32	16	4	2	<b>lamyet</b>	117.187 mL

<sup>a</sup>Also called **tendang**. In 1872, a new **teng** was introduced. This was reported as 38.836 300 L

110.7 Units of Liquid Capacity

During the Middle Ages, liquids were generally sold by weight.

Traditional system

တင်း	ခဲ	စိတ်	ပိဉ်	ခွက်	စလယ်	လမယ်	လမုက်	လမူင်	Metric
<b>tín</b>									40.913 668 L
20	<b>hkwe</b>								2.045 683 L
40	2	<b>seit</b>							1.022 842 L
160	8	4	<b>pyi</b>						255.710 mL
320	16	8	2	<b>hkwet</b>					127.855 mL
640	32	16	4	2	<b>sa le</b>				63.928 mL
1280	64	32	8	4	2	<b>la me</b>			31.964 mL
2560	128	64	16	8	4	2	<b>la myet</b>		15.982 mL
5120	256	128	32	16	8	4	2	<b>la myu</b>	7.991 mL

System based on [SIMM], [UN55] and [UN66], and British Imperial-linked system

								Metric	Imperial
gwé								–	4% gal (20.204 84 L)
5	kwai							4.04 L	8/9 gal (4.040 968 L)
10	2	seit or seik						2.02 L	4/9 gal (2.020484 L)
20	4	2	zayoot					1.01 L	8/9 qt (1.010 242 L)
40	8	4	2	byee				505 mL	8/9 pt (505.121 mL)
160	32	16	8	4	zalay			126.5 mL	4% fl oz (126.280 mL)
320	64	32	16	8	2	la many or la may		63.125 mL	2% fl oz (63.140 mL)
640	128	64	32	16	4	2	la myet	31.562 5 mL	1% fl oz (31.570 mL)

Other reported measures:  
  
1 doṇamatta-māna (in Pāli) = 1 Imperial gallon.

weighing opium during ancient times.<sup>3</sup> The usage of this weight system can be tracked back to before the twelfth century, and officially stopped when the British banned it in the late nineteenth century. The weights occur mostly in the shape of beasts and birds, and were made using the lost wax method. Besides the beast

110.8 Units of Weight

Traditional system, upper scale

အချိန်တစ်ရာ	ပိဿာ	ငါးဆယ်သား	အစိတ်သား	အဝက်သား	ကျပ်သား	Metric
achein taya						16.329 325 320 kg
10	peiththa <sup>a</sup>					1.632 932 000 kg
20	2	ngase tha				816.467 616 g
40	4	2	aseiththa			408.233 808 g
80	8	4	2	awettha		204.116 904 g
1000	100	50	25	12½	kyattha	16.329 352 g

<sup>a</sup>Traditionally called **viss** in English

Traditional system, lower scale

ကျပ်သား	ငါးမူးသား	မတ်သား	မူးသား	ဝဲသား	ရွေးကီငြ	ရွေးလေး	Metric
kyattha <sup>a</sup>							16.329 352 g
2	nga mutha						8.164 676 g
4	2	mattha					4.082 338 g
8	4	2	mutha				2.041 169 g
16	8	4	2	petha			1.020 584 g
60	30	15	7½	3¾	yway gyi		272.156 mg
120	60	30	15	7½	2	yway lay	136.078 mg

<sup>a</sup>Traditionally called **tical** in English

The seed of *abrus precatorius*, the seed of *adenanthera pavorina*, dust grain, mustard seed, sesame seed and rice grain were used for

and bird weights, which can be dated in a chronological system, special weights sculptured to resemble fish, horses, elephants, cows, rats,

<sup>3</sup> According to Bernhard Peter in “Opiumgewichte aus Birma” at [www.kultur-in-asien.de/Birma/seite90.htm](http://www.kultur-in-asien.de/Birma/seite90.htm).

tigers, garuda, turtles, spiders, naga, deer and other animals, and even humans, were created. The weights were used for weighing all kinds of commodity: smaller weights for expensive goods (opium, gems, gold, silver, ambergris, etc.), big-

ger weights for inexpensive commodities (vegetables, fruits, hides, etc.). The weights weigh from about 2 g (1/8 of a tical) to 16 kg (10 viss), however, most weights are found in a range from 80 g to 320 g. See also [GEAR].

Upper scale during the nineteenth century, based on values for candy reported by [DOUR] and [NELK]/[TRAP]

				Metric	Metric
<b>candy<sup>a</sup> or kandy</b>				226.77 kg	248.34 kg
150	<b>peiktha, pehtha, peik thar, vis or viss</b>			1.511 8 kg	1.655 6 kg
450	3	<b>catty or kati</b>		503.93 g	551.87 g
15,000	100	33 $\frac{1}{3}$	<b>kyat, baht, tical, or tikal</b>	15.12 g	16.56 g

<sup>a</sup>[KELL] reported it as 500 lbs = 226.796 kg

Lower scale during the nineteenth century, based on values for candy reported by [DOUR] and [NELK]/[TRAP]

							Metric	Metric
<b>kyat, baht, tical, or tikal</b>							15.12 g	16.56 g
2	<b>ngamu</b>						7.56 g	8.28 g
4	2	<b>math, mât or match</b>					3.78 g	4.14 g
8	4	2	<b>moo, mjuh, mu or muju</b>				1.89 g	2.07 g
16	8	4	2	<b>bai, beh, pai, paye, or phai</b>			945 mg	1.03 g
32	16	8	4	2	<b>ywegi</b>		472 mg	517 mg
64	32	16	8	4	2	<b>ywegale, ruay, or rwes</b>	236 mg	259 mg

In Rangoon, present-day Yangon, and Mandalay, mainly based on [BAUE] and [MART3]

								Metric
<b>candi or candy</b>								248.341 950 kg
150	<b>pehtha</b>							1.655 613 kg
15,000	100	<b>cheiat</b>						16.556 g
60,000	400	4	<b>math</b>					4.139 g
120,000	800	8	2	<b>muh</b>				2.069 g
240,000	1600	16	4	2	<b>beh or tubbi</b>			1.035 g
960,000	6400	64	16	8	4	<b>rueh</b>		259 mg
1920,000	12,800	128	32	16	8	2	(small) <b>rueh</b>	129 mg

For rice in Rangoon, present-day Yangon, and Mandalay, based on [MART3]

			Metric
<b>coyan</b>			2648.981 091 kg
100	<b>teng</b>		26.489 811 kg
1600	16	<b>viss or pehtha</b>	1.655 613 kg

For charcoal in Rangoon, present-day Yangon

		Metric
<b>ton</b>		1016.046 kg
2240	<b>pound</b>	453.592 g

Some measures for rice, reported as used in Rangoon, present-day Yangon, before 1861:

- 1 **old basket** or **teng** (of purified rice) = 31.75 kg;
- 1 **old basket** or **teng** (of 1/5 paddy) = 28.58 kg;
- 1 **old basket** or **teng** (of paddy) = 23.59 kg;
- 1 **new basket** or **teng** (of purified rice) = 28.12 kg;
- 1 **new basket** or **teng** (of 1/5 paddy) = 26.08 kg;
- 1 **new basket** or **teng** (of paddy) = 21.77 kg.

Some measures reported as used in Rangoon, present-day Yangon, after 1872:

As of June 17, 1872, the use of a basket was introduced, for unshelled rice, by volume 38.836 3 L.

The weight of a basket containing unshelled rice (paddy) was 23.13–23.59 kg.

The rice was sold under the names of what each basket contained:

1/6–1/7 paddy, 1/6 paddy, 1/5–1/6 paddy, 1/5 paddy, 1/4 paddy, 1/3 paddy, and 2/5–1/3 paddy.

1 basket of 1/5 paddy = 30.84 kg.

Other measures reported as used in Rangoon, present-day Yangon, during the late nineteenth century:

Iron was sold by 100 wiss = 165.56 kg;

- 1 **teng** (for shelled rice) = 100 paitha or wiss = 165.56 kg;
- 1 **hundredweight** (for rice) = 112 lbs av = 50.802 377 kg;
- 1 **basket** (for cleaned rice during the late nineteenth century) = 62 lb = 28.1 kg;

1 **basket** (for cargo rice during the late nineteenth century) = 57½ lb = 26.1 kg;

1 **basket** (for paddy during the late nineteenth century) = 48¼ lb = 21.9 kg;

1 **teng** (for unshelled rice) = 48–50 lbs = 21.772–22.680 kg;

1 **pyi** (for unshelled rice) = 2.126 kg.

In present-day Bago and Mottama during the late nineteenth century

			Metric	Metric
<b>bahār</b>			137.700 kg	162.486 kg
120	<b>bisa</b>		1.147 50 kg	1.354 05 kg
12,000	100	<b>tical</b>	1.147 50 g	1.354 05 g

For unshelled rice in Akyab, present-day Sittwe, and Arakan, present-day Rakhine State

		Metric
<b>basket<sup>a</sup></b>		11.897 040 kg
12	<b>rice-seer</b>	991.420 g

<sup>a</sup>Could vary by the quality of the rice, between 26 and 26¾ lbs, according to [BAUE]

For paddy in Akyab, present-day Sittwe, and Arakan, present-day Rakhine State

		Metric
<b>basket</b>		8.922 780 kg
9	<b>rice-seer</b>	991.420 g

Other measures reported as used in Akyab, present-day Sittwe, during the late nineteenth century:

1 **koyan** (for unshelled rice from Singapore) = 2416.407 kg;

1 **ton** = 27¼ mahnds = 2240 lbs = 1016.046 kg;

1 **pikol** or **pecul** = 133⅓ lbs = 60.479 kg;

1 **teng** (for unshelled rice) = 23 lbs = 10.433 kg;

1 **vis**, **viss**, or **pehtha** = 1.655 600 kg.

Other local measures reported during the late nineteenth century:

1 **basket** of 1/5 paddy (in Bassein, present-day Pathein) = 29.94 kg;

1 **basket** (for rice in Mawlamyine) = 29.483 kg;

- 1 **teng** (for rice in Pathein) = 51 lbs = 23.133 kg;  
 1 **teng** (for rice in Maulmein, present-day Mawlamyane) = 48 lbs = 21.772 kg.

During the twentieth century, based on [UN66]

										Metric
<b>candy</b>										244.95 kg
150	<b>viss</b>									1.633 kg
450	3	<b>catty</b>								544.33 g
15,000	100	33 $\frac{1}{3}$	<b>tical</b> <sup>a</sup>							16.33 g
30,000	200	66 $\frac{2}{3}$	2	<b>ngamu</b>						8.165 g
60,000	400	133 $\frac{1}{3}$	4	2	<b>mât</b>					4.082 g
120,000	800	266 $\frac{2}{3}$	8	4	2	<b>mû</b>				2.041 g
240,000	1600	533 $\frac{1}{3}$	16	8	4	2	<b>pè</b>			1.021 g
480,000	3200	1066 $\frac{2}{3}$	32	16	8	4	2	<b>ywegi</b>		510.3 mg
960,000	6400	2133 $\frac{1}{3}$	64	32	16	8	4	2	<b>ywegale or rweh</b>	255.1 mg

<sup>a</sup>[UN55] reported it as 16.239 g

For precious metals during the sixteenth century

		Metric
<b>viss</b>		1.14 kg
100	<b>klyap</b>	11.4 g

For gold and silver in Pegu, present-day Bagu, based on [NIEM] and [KRÜG]

							Metric
<b>agito or giro</b>							392.875 g
2	<b>abucco or abochi</b>						196.437 5 g
25	12 $\frac{1}{2}$	<b>kyat or tical</b>					15.715 g
100	50	4	<b>mât</b>				3.929 g
200	100	8	2	<b>mû</b>			1.964 g
1280	640	51 $\frac{1}{5}$	12 $\frac{1}{5}$	6 $\frac{1}{5}$	<b>moyon</b>		306.93 mg
5000	2500	200	50	25	3 $\frac{29}{32}$	<b>toque</b>	78.575 mg

For gold and silver in Pegu, present-day Bagu, based on [WINS3]

					Metric
<b>vis, hiza, or viss</b>					1.539 kg
3 $\frac{1}{33}$	<b>catty</b>				507.87 g
4	1 $\frac{8}{25}$	<b>agito or giro</b>			384.75 g
8	2 $\frac{16}{25}$	2	<b>abucco or abochi</b>		192.37 g
100	33	25	12 $\frac{1}{2}$	<b>kyat or tical</b>	15.39 g

For gold and silver in Rangoon, present-day Yangon, based on [BAUE] and [WINS3]

									Metric
<b>paitha<sup>a</sup></b>									1.655 613 kg
4	<b>agito</b>								413.903 25 g
8	2	<b>abucco</b>							206.951 62 g
100	25	12½	<b>kyat<sup>b</sup></b>						16.556 13 g
400	100	50	4	<b>màt or math</b>					4.139 03 g
800	200	100	8	2	<b>moo or mû</b>				2.069 52 g
1600	400	200	16	4	2	<b>bai</b>			1.034 76 g
6400	1600	800	64	16	8	4	<b>ruay, rwé, or rway</b>		258.69 mg
12,800	3200	1600	128	32	16	8	2	(small) <b>ruay, rwé, or rway</b>	129.34 mg

<sup>a</sup>By British traders, called **wiss** or **vis**

<sup>b</sup>Also called **kyat tha**. By British traders, called **tical**

For gold and silver during the late nineteenth century

								Metric
<b>bôl</b>								60.920 g
5	<b>kyat or tical</b>							12.184 g
20	4		<b>màt</b>					3.046 g
40	8		2	<b>mû</b>				1.523 g
80	16		4	2	<b>pè</b>			761.50 mg
1600	320		80	40	20	<b>ywêji</b>		38.075 mg
3200	640		160	80	40	2	<b>ywè</b>	19.038 mg

## 111.2 Units of Length

1 **arschin** = 977.88 mm.

## 111.3 Units of Capacity

Both dry and liquid commodities were usually sold by weight.

Traditional system

			Metric
<b>tunga</b>			3.685 6 kg
4	<b>tshurek</b>		921.402 g
9	2¼	<b>funt</b>	409.512 g

Some other reported measures:

1 **tschinach** (for wheat) = 15½–31 **funt**  
= 6.35–12.7 kg;

1 **partsch** = 1.561 262 8 kg.

## 111 Nagorno-Karabakh

See *Azerbaijan*.

Russia annexed this area from Persia in 1813. In 1923, it was established as an autonomous province of the Azerbaijan SSR. After Armenia and Azerbaijan became independent in 1991, war broke out between the two ethnic groups. In 1992, the leaders of Nagorno-Karabakh declared independence as the Republic of Mountainous Karabakh. The territory, however, is internationally recognized as being a part of Azerbaijan.

### 111.1 Currency

2004–: 1 Nagorno-Karabakh dram

**111.4    Units of Weight**

			Metric
<b>batman tilani</b>			13.821 015 kg
$1\frac{7}{25}$	<b>batman misani</b>		12.797 236 kg
54	50	<b>stil</b>	255.945 g

- 1920–1961:    1 South West African pound = 20 shillings = 240 pence = 960 farthings
- 1916–1920:    1 South West African Mark = 100 Pfennig

**112    Namibia [Formerly: German South West Africa, South West Africa]**

The Portuguese first reached the shores of present-day Namibia in the 1480s. Germans began settling the area in the 1840s, and it became a German protectorate, as German South West Africa, from 1884 to 1915, when it was occupied by South Africa. South Africa received a League of Nations mandate for South West Africa in 1920, and it became a UN trust territory in 1946. In 1968, the UN assumed direct responsibility over the territory. That same year, the UN General Assembly voted to rename the territory Namibia. Namibia obtained full independence in 1990. In 1994, Walvis Bay and several islands that had been under British protection were transferred to Namibia.

The metric system has been compulsory since 1967. For units of measurement, see *South Africa*.

**112.1    Currency**

- 1993–:            1 Namibian dollar = 100 cents
- 1961–1993:    1 South African rand = 100 cents

**113    Naples**

See also *Crown of Aragon, Italy, Sicily, and Two Sicilies*.

The Kingdom of Naples was established in 1282, as the remainder of the old Kingdom of Sicily after secession of the island of Sicily. In 1816, it again merged with the island-based Kingdom of Sicily to form the Kingdom of the Two Sicilies.

**113.1    Currency**

- 1818–1861:    1 Napolitan lira = 100 centesimi
- 1810–1818:    1    Napolitan    ducato    = 10 carlini = 100 grana = 1000 cavalli
- 1784–1814:    1 Napolitan ducato del regno = 5 tarí = 10 carlini 100 grana
- 1784:            1 Napolitan ducato = 5 tari = 100 grana

## 113.2 Units of Length

In Naples between 1480 and 1840

										Metric
<b>miglio</b>										1845.690 m
100	<b>catena</b>									18.456 9 m
700	7	<b>pertica</b> <sup>a</sup>								2.636 70 m
875	8¾	1¼	<b>canna</b> <sup>b</sup>							2.109 36 m
945 <sup>9</sup> / <sub>11</sub>	9 <sup>9</sup> / <sub>11</sub>	1 <sup>4</sup> / <sub>11</sub>	1 <sup>1</sup> / <sub>11</sub>	<b>pertica agrimensoria or passo di terra</b> <sup>c</sup>						1.854 48 m
1000	10	1⅔	1⅓	1½	<b>passo itinerario</b> <sup>d</sup>					1.845 69 m
7000	70	10	8	7⅓	7	<b>palm</b>				263.670 mm
28,000	280	40	32	29⅓	28	4	<b>quarto</b>			65.917 mm
84,000	840	120	96	88	84	12	3	<b>uncia</b>		21.972 mm
420,000	4200	600	480	440	420	60	15	5	<b>minuto</b>	4.394 mm

<sup>a</sup>For the size of factories

<sup>b</sup>For fabric

<sup>c</sup>For agricultural use

<sup>d</sup>There was also a **passo da arsenale di marina** = 6⅔ palmi = 1.757 800 m

Decimal system in Naples after 1840

							Metric
<b>miglio da 60 al grado</b>							1851.851 852 m
7000	<b>canna</b>						2.645 503 m
70,000	10	<b>palm</b>					264.550 mm
700,000	100	10	<b>decimo</b>				26.455 mm
7,000,000	1000	100	10	<b>centesimo</b>			2.646 mm
70,000,000	10,000	1000	100	10	<b>millesimo</b>		264.6 µm

## 113.3 Units of Area

In Caserta

				Metric
<b>moggio</b>				3364.858 45 m <sup>2</sup>
900	<b>passo quadro</b>			3.738 73 m <sup>3</sup>
48,400	53%		<b>palm quadro</b>	6.952 19 dm <sup>2</sup>

In Naples between 1480 and 1840

							Metric
<b>moggio</b>							3364.858 5 m <sup>2</sup>
10	<b>quarta</b>						336.485 850 m <sup>2</sup>
90	9	<b>nona</b>					37.387 316 m <sup>2</sup>
450	45	5	<b>quinta</b>				7.477 463 m <sup>2</sup>
				<b>canna quadra</b>			4.449 400 m <sup>2</sup>
900	90	10	2		<b>passo quadra</b>		3.738 732 m <sup>2</sup>
48,400	4,840	537%	107%	64	53%	<b>palm quadro</b>	69.522 dm <sup>2</sup>

Decimal system in Naples after 1840

					Metric
<b>moggio</b>					699.868 40 m <sup>2</sup>
10	<b>decima</b>				69.986 84 m <sup>2</sup>
100	10	<b>canna quadra</b> or <b>centesimo</b>			6.998 684 m <sup>2</sup>
1000	100	10	<b>millesimo</b>		699.868 40 dm <sup>2</sup>
10,000	1000	100	10	<b>palmo quadro</b>	69.986 84 dm <sup>2</sup>

At Salerno

					Metric
<b>moggio</b>					3677.706 9 m <sup>2</sup>
–	<b>canna quadra</b>				4.449 400 m <sup>2</sup>
900	–	<b>passo quadro</b>			4.086 341 m <sup>2</sup>
6900	–	7 $\frac{2}{3}$	<b>pertica</b>		2.021 470 m <sup>2</sup>
52,900	64	58 $\frac{2}{3}$	7 $\frac{2}{3}$	<b>palmo quadro</b>	69.522 dm <sup>2</sup>

Other reported measures:

1 **moggio** (at Avellino) = 4004.465 m<sup>2</sup>.

## 113.4 Units of Volume

In Naples between 1480 and 1840

							Metric
<b>pertica cuba</b>							18.330 831 m <sup>3</sup>
	<b>canna cuba<sup>a</sup></b>						9.385 386 m <sup>3</sup>
	2	<b>canna<sup>b</sup></b>					4.692 693 m <sup>3</sup>
	4	2	<b>canna<sup>c</sup></b>				2.346 346 m <sup>3</sup>
107 $\frac{1}{2}$	54 $\frac{2}{3}$	27 $\frac{1}{2}$	13 $\frac{1}{2}$	<b>soma</b>			171.088 dm <sup>3</sup>
750	384	192	96	7	<b>cofano</b>		24.441 dm <sup>3</sup>
1000	512	256	128	9 $\frac{1}{3}$	1 $\frac{1}{3}$	<b>palmo cubo</b>	18.331 dm <sup>3</sup>

<sup>a</sup>For stone, earth and wood constructions

<sup>b</sup>For firewood

<sup>c</sup>For fabric

Alternative scale in Naples before 1840

					Metric
<b>tomolo</b>					55.545 113 m <sup>3</sup>
2	<b>mezzetta</b>				27.772 557 m <sup>3</sup>
4	2	<b>quarta</b>			13.886 278 m <sup>3</sup>
24	12	6		<b>misura</b>	2.314 380 m <sup>3</sup>

Decimal system in Naples after 1840

		Metric
<b>canna cuba</b>		18.515 038 m <sup>3</sup>
1000	<b>palmo cubo</b>	18.515 038 dm <sup>3</sup>

113.5 Units of Dry Capacity

In Naples between 1480 and 1840

						Metric
<b>carro</b>						1991.480 400 L
36	<b>tomolo</b>					55.318 900 L
72	2	<b>mezzetto</b>				27.659 450 L
144	4	2	<b>quarto</b>			13.879 725 L
864	24	12	6	<b>misura</b>		2.323 288 L
3456	96	48	24	4	<b>quarteruola</b>	580.822 mL

For grain in Naples and Puglia during the fifteenth century

		Metric
<b>salma</b>		276 L
8	<b>tomolo</b>	34.5 L

In Naples after 1840

				Metric
<b>tomolo</b>				55.545 113 L
2	<b>mezzetta</b>			27.772 557 L
4	2	<b>quarta</b>		13.886 278 L
24	12	6	<b>misura</b>	2.314 380 L

113.6 Units of Liquid Capacity

For wine at Avellino and Caserta

		Metric	Metric
<b>barile</b>		43.394 70 L	45.001 86 L
60	<b>caraffa</b>	723.244 mL	750.031 mL

For oil at Bari during the nineteenth century

			Metric
<b>salma</b>			165.44 L
10	<b>staio</b>		16.544 L
320	32	<b>pignatta</b>	517 mL

For oil in Naples between 1480 and 1840

				Metric	Metric
<b>salma di Gallipoli</b>				161.297 600 L	147.312 kg
16	<b>staio</b>			10.081 100 L	9.207 kg
256	16	<b>quarto</b>		630.069 mL	575.437 g
1536	96	6	<b>misurella</b>	105.011 mL	95.906 g

For wine at Ischia

		Metric
<b>barile</b>		44.644 700 L
50	<b>caraffa</b>	892.894 mL

For wine and spirits in Naples between 1480 and 1840

					Metric
<b>carro</b>					1047.000 720 L
2	<b>botte</b>				523.500 360 L
24	12	<b>barile</b>			43.625 030 L
1440	720	60	<b>caraffa</b>		727.084 mL
4320	2 160	180	3	<b>bicchiere</b>	242.361 mL

For wine and spirits in Naples after 1840

			Metric
<b>botte</b>			523.500 360 L
12	<b>barile</b>		43.625 030 L
720	60	<b>caraffa</b>	727.084 mL

For oil at Naples after 1840<sup>a</sup>

				Metric	Metric
ship's last				2450.8 L	2238.3 kg
11	<b>salma</b>			222.8 L	203.5 kg
110	10	<b>staio</b>		22.28 L	20.35 kg
3520	320	32	<b>pignatta</b>	696.25 mL	635.88 g

<sup>a</sup>Usually sold by weight

In Puglia during the nineteenth century

		Metric
<b>salma</b>		154.05 L
10	<b>staio</b>	15.405 L

For wine at Salerno

		Metric
<b>barile</b>		41.966 040 L
60	<b>caraffa</b>	699.434 mL

Other reported measures:

- 1 **staio** (for oil at Avellino) = 97.558 7 L;  
 1 **quarantino** (for oil at Salerno, generally sold by weight) = 19.836 900 L = 18.117 kg;  
 1 **botte di mena** (for oil during the fourteenth century) = 76 saine of Constantinople = of unknown size.

## 113.7 Units of Weight

Traditional system in Naples between 1480 and 1840

									Metric
<b>cantaro</b>									89.099 720 kg
2½	<b>peso</b> <sup>a</sup>								35.639 888 kg
2⅞	1⅞	<b>cantaro piccolo</b>							32.075 900 kg
25	10	9	<b>decina</b> <sup>b</sup>						3.563 989 kg
100	40	36	4	<b>rotolo</b>					890.997 g
287½	115	103½	11½	2⅞	<b>libbra</b> <sup>c</sup>				320.759 g
3450	1380	1242	138	33⅓	12	<b>oncia</b>			26.730 g
103,500	41,400	37,260	4140	1000	360	30	<b>trappeso</b>		891 mg
2,070,000	828,000	745,200	82,800	20,000	7200	600	20	<b>acino</b>	45 mg

<sup>a</sup>For lime

<sup>b</sup>For wool

<sup>c</sup>For cochineal, persimmon, saffron, indigo, cinnamon and silk

Decimal system at Naples after 1840

								Metric
<b>cantaro</b>								89.099 720 kg
100	<b>rotolo</b>							890.997 g
1000	10	<b>decimo</b>						89.100 g
10,000	100	10	<b>centesimo</b>					8.910 g
100,000	1000	100	10	<b>illesimo or trappeso</b>				891 g

For medical use in Naples between 1480 and 1861

								Metric
<b>libbra</b>								320.738 999 g
12	<b>oncia</b>							26.729 916 g
120	10	<b>peso aureo</b>						4.009 488 g
180	15	1½	<b>dramma</b>					2.672 992 g
360	30	3	2	<b>scrupolo</b>				890.997 mg
720	60	6	4	2	<b>obolo</b>			445.498 mg
7200	600	60	40	20	10	<b>acino</b>		44.550 mg

For gold, silver and silk in Naples between 1480 and 1840

				Metric
<b>libbra</b>				320.738 999 g
12	<b>oncia</b>			26.729 916 g
360	30	<b>trappeso</b>		890.997 mg
7200	600	20	<b>acino</b> <sup>a</sup>	44.550 mg

<sup>a</sup>[DOUR] reported that 99 acini di Naples = 80 cocci de Sicile

For diamonds and jewels in Naples between 1480 and 1840

				Metric
<b>oncia</b>				26.729 916 g
130	<b>carato</b>			205.615 mg
520	4	<b>grano</b>		51.404 mg
4160	32	8	<b>sedicesimo</b>	6.425 mg

Some reported measures:

1 **staio** = 14⅓ rotoli = 13.983 400 L = 12.771 kg  
(based on [MART3]).

## 114 Colony of Natal

See also *Natalie Republic* and *South Africa*.

The area was proclaimed a British colony in 1843. In 1910, it was combined with Cape Colony, Orange River Colony and Transvaal Colony to form the Union of South Africa.

## 115 Natalia Republic

See also *Colony of Natal*.

A Boer republic established by Voortrekkers in 1839, and annexed by Britain in 1843.

## 116 Nauru [Formerly: Pleasant Island]

This island was inhabited in prehistoric times by Polynesians and Melanesians. Europeans

discovered the island in 1798. Nauru maintained its independence as a kingdom until it was annexed by Germany in 1888, became part of German New Guinea, and was made a part of the Marshall Island protectorate. The island was occupied by Australia in 1914 and placed under mandate in 1919. In 1923, Australia got a League of Nations trustee mandate to administrate the Island. After World War II, the island became a joint Australian, British and New Zealand trust territory, and remained as such until 1968, when the island gained its independence as Nauru.

The metric system has been official since 1973 and compulsory since 1980.

### 116.1 Currency

- 1966–1975: 1 Australian dollar = 100 cents  
1945–1966: 1 Australian dollar = 20 shillings = 240 pence  
1942–1945: 1 Oceanian pound = 20 shillings  
1914–1942: 1 Australian dollar = 20 shillings = 240 pence  
1906–1914: 1 New Guinea mark = 100 pfennig

## 117 Navassa Island

See *United States of America*.

One of the United States Minor Outlying Islands. The only human population consists of temporarily stationed scientific and military personnel.

## 118 Emirate of Nejd

See also *Emirate of Jabal Shammar*, *Hejaz*, *Ottoman Empire*, and *Saudi Arabia*.

The Emirate of Nejd lasted between 1818 and 1891.

*Main source:* [MART3]

## 118.1 Units of Length

Some reported measures:

1 **berri** = about 3092½ guz = 1963.736 674 m;

1 **guz** = 635 mm;

1 **cobido** = 482.6 mm.

## 118.2 Units of Dry Capacity

For rice in Mecca

		Metric	Metric
<b>tomand</b>		94.30 L	84.898 900 kg
40	<b>mecmeda</b>	2.357 5 L	2.122 472 kg

## 118.3 Units of Liquid Capacity

In Mecca

			Metric
<b>cuddi</b>			7.570 L
8	<b>nusfia</b>		946.250 mL
128	16	<b>vacheia</b>	59.141 mL

## 118.4 Units of Weight

For general use in Mecca

					Metric
<b>bahar</b>					199.327 930 kg
15	<b>frehil</b>				13.288 529 kg
150	10	<b>mahnd</b>			1.328 853 kg
400	26⅔	2⅔	<b>rotl</b>		498.320 g
6000	400	40	15	<b>vacheia</b>	33.221 g

For gold and silver in Mecca

					Metric
<b>bihk</b>					46.545 g
1½	<b>vacheia</b>				31.030 g
10	6⅔	<b>miscal</b>			4.654 5 g
15	10	1½	<b>coffala</b>		3.103 0 g
240	160	24	16	<b>chirat</b>	193.937 mg

## 119 Nejd and Hejaz

See *Hejaz*, *Ottoman Empire*, and *Saudi Arabia*.

## 120 Nepal

The Nepal Mandala region has had three kingdoms since early medieval time: Bhátgáon, Kátmandu and Pátan. The Kingdom of Nepal was unified in 1768 by Prithvi Narayan (1723–1775), the Shah ruler of the kingdom of the Gorkhas. From 1775 to 1951, Nepali politics were characterized by conflict between the royal family and several noble families. Between 1846 and 1951, the Rana family was in power in the country, while the king was stripped of political power. In 1960, King Mahendra organized a coup and imposed a royal dictatorship that lasted until the 1990 Jana Andolan democratic revolution, which led to the re-introduction of a multi-party system and parliamentarism.

Traditionally, Indian systems of measurement were widely used. King Jayasthiti Malla of the fourteenth century changed the standard length of the measuring rod from 10½ hasta to 7½ hasta = 6.4 m. During the late eighteenth century, Rana Bahadur Shah (1775–1805) systematised the system of weights and measures, and made scales of copper sealed with his stamp. However, there was no fixed measurement, as the ari or bamboo tubes of wood varied in shape. During the late eighteenth and early nineteenth centuries, many traditional measures were linked to the English system of weights and measures. The metric system has now been in official use since 1963, and compulsory since 1966 and 1971.

*Main sources:* [ACHA], [ADHI], [ADHI2], [AWAS], [CHAP], [CONL], [CROO], [DAGE], [DAVI6], [GOLD2], [HEDR], [HUMP], [KAUT], [KHĀD], [KIRK3], [LAMS], [MESS], [PAND], [PĀÑḌ], [PANI], [PANT], [REGM], [REGM2], [REGM3], [SHAR], [TURN], [UN66], and [WATA2]

*Internet source:* [www.nepalhelp.dk/filer/Projecthelp/conversion.pdf](http://www.nepalhelp.dk/filer/Projecthelp/conversion.pdf)

120.1 Currency

1932–: 1 Nepalese rupee (initially also called mohru) = 100 paisa  
c.1790–1932: 1 gold mohar = 30 silver mohar = 1500 paisa

120.2 Units of Quantity

1 **lakh** (लाख) = 1/100 crore = 10<sup>5</sup>, usually written as 100,000;  
1 **goth** = a herd of buffalo or cows.

120.3 Units of Length

Some of the most ancient texts that mention the measurement system of length, based on the hasta, are the Arthaśastra of Kauṭilya (from the fourth century) and the grammar of Pāṇini (from the fifth century). Some of the difficulties encountered when trying to reconcile the metric system and the hasta system is that the aṅgula (the

breadth of the middle part of the middle finger of a middling adult man) varied in length from one source to another, and according to the type of hasta system in use. The higher multiples of the hasta also varied over time in their length with respect to the hasta.

The Arthaśastra mentions four different measurement systems, based on **prajapatya hasta** = 24 aṅgulas, **dhanurgraha hasta** = 28 aṅgulas, **dhanurmusthi hasta** = 32 aṅgulas, and a hasta used for forest produce = 54 aṅgulas. The Manasara (written some time between the ninth and twelfth centuries) also mentions four systems, based on **sishu hasta** or **cishcu hasta** (employed in the manufacture of conches, vehicles) = 24 aṅgulas, **prājāpatya hasta** (applied in building construction) = 25 aṅgulas, **dhanurmuṣṭhi hasta** (for residences and monuments) = 26 aṅgulas, and **dhanurgraha hasta** (for the construction of villages, cities and in the division of dwelling plots) = 27 aṅgulas. Various scholars have suggested the **hasta** as being from 410 mm to 710 mm, depending upon the context of analysis.

Ancient Indian-linked system, upper scale

									Metric
<b>yojana</b>									14,592 m
2	<b>gavyuti</b>								7296 m
4	2	<b>kosa</b> <sup>a</sup>							3648 m
2500	1250	625	<b>bāhu</b>						58.368 m
2666⅔	1333⅓	666⅔	1⅓ <sub>15</sub>	<b>nivartana</b>					54.720 m
3555⅔	1777⅔	888⅔	1⅓ <sub>45</sub>	1⅓	<b>hastiyama</b>				41.040 m
4000	2000	1000	1⅔	1½	1⅛	<b>paridesha</b>			36.480 m
8000	4000	2000	3⅔	3	2¼	2	<b>rajju</b>		18.240 m
32,000	16,000	8000	128	120	90	80	40	<b>hasta or hat</b> <sup>b</sup>	456 mm

<sup>a</sup>The distance a man can travel in one day with a heavy load or the distance across which a leaf from a specific tree can remain fresh. Also spelled **kosh**, **koss** and **krosh**. Sometimes called **goruta**. Also reported as 2000 dhanusas = 9000 hat = 4104 m

<sup>b</sup>The **hasta** has usually been referred to as the **hat** in Tibet, but in late medieval times, also the **ku** (Newari language)

Ancient Indian-linked system, lower scale

	śaśa									Metric
<b>dhanusa<sup>a</sup></b>										2.052 m
1 <sup>1</sup> / <sub>8</sub>	<b>danda<sup>b</sup></b>									1.824 m
1 <sup>1</sup> / <sub>7</sub>	1 <sup>1</sup> / <sub>7</sub>	<b>paurusa<sup>c</sup></b>								1.596 m
2 <sup>1</sup> / <sub>7</sub>	2 <sup>3</sup> / <sub>7</sub>	2	<b>kisku<sup>d</sup></b>							798 mm
4 <sup>1</sup> / <sub>2</sub>	4	3 <sup>1</sup> / <sub>2</sub>	1 <sup>3</sup> / <sub>4</sub>	<b>hat</b>						456 mm
7 <sup>1</sup> / <sub>7</sub>	6 <sup>1</sup> / <sub>7</sub>	6	3	1 <sup>1</sup> / <sub>7</sub>	<b>śama<sup>e</sup></b>					266 mm
9	8	7	3 <sup>1</sup> / <sub>2</sub>	2	1 <sup>1</sup> / <sub>6</sub>	<b>vitastaa<sup>f</sup></b>				228 mm
13 <sup>1</sup> / <sub>2</sub>	12	10 <sup>1</sup> / <sub>2</sub>	5 <sup>1</sup> / <sub>4</sub>	3	1 <sup>3</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>2</sub>	<b>dhanurmuṣṭi<sup>g</sup></b>			152 mm
27	24	21	10 <sup>1</sup> / <sub>2</sub>	6	3 <sup>1</sup> / <sub>2</sub>	3	2	<b>dhanurgraha<sup>h</sup></b>		76 mm
108	96	84	42	24	14	12	8	4	<b>aṅgula</b>	19 mm

<sup>a</sup>For roads and walls  
<sup>b</sup>Sometimes called **dhanush** or **nālihā**  
<sup>c</sup>The height of a man. Also called **khatapaurusa**. It was used for moats and digging. There was also a measure for ropes, **vyāma**, equal to 84 aṅgulas  
<sup>d</sup>Used by carpenters. In some regions. it was reported as 32 aṅgula. Also called **kaṁsa**  
<sup>e</sup>Also called **śala**, **pada** or **pariraya**  
<sup>f</sup>Also called **disti**  
<sup>g</sup>The width of the fist with the thumb upraised when holding a bow for shooting  
<sup>h</sup>The length of a bow-grip, in the middle of the bow where the four fingers are clasped around it

British-linked system for general use

								Imperial	Metric
<b>yojana</b>								16,000 yd	14,630.400 m
2	<b>gavyuti</b>							8000 yd	7315.200 m
4	2	<b>kosha<sup>a</sup></b>						4000 yd	3657.600 m
8000	4000	2000	<b>danda</b>					2 yd	1.829 m
16,000	8000	4000	2	<b>guz</b>				1 yd	0.914 4 m
32,000	16,000	8000	4	2	<b>hasta<sup>b</sup></b>			18 in.	457.20 mm
64,000	32,000	16,000	8	4	2	<b>vitastaa</b>		9 in.	228.60 mm
768,000	384,000	192,000	72	36	18	12	<b>aṅgula</b>	3/4 in.	19.05 mm

<sup>a</sup>During the twentieth century, [UN66] reported it as 1760 guz = 1609.344 m. Also called **coss**, **cosh** or **kos**  
<sup>b</sup>Also called **hat**, **hāth**, **haat**, or **hdth**

British Imperial-linked system for fabric, based on [UN66]

				Imperial	Metric
<b>than</b>				6 yd	5.486 4 m
6	<b>guz</b>			1 yd	0.914 4 m
12	2	<b>hat, hāth, haat, or hdth</b>		18 in.	457.2 mm
24	4	2	<b>bitta</b>	9 in.	228.6 mm

120.4 Units of Area

When it comes to classification of land areas, Nepal has had a wide range of complex systems since the Middle Ages. Areas of land were

divided with regard to ownership, cultivation, taxable sustainability and type of terrain. Traditionally, there were three types of land system, the *Birta* (a freehold granted by the King; the tenants paid their rent to the Birtawal), the *Zemindari* (the Government got its revenue from the Zemindars, an aristocratic social class, who had their own right over the land apart from the tenancy right of the tiller), and the *Raikar* (for this type of land, the tenant himself was the master and paid his rent to the Dwaria).

Nepal’s cultivated land, in general, was traditionally divided into *khet* (= lowland land where mainly paddy is grown or low irrigated rice land),

*khoria* (= land which is cultivated after every few years of fallowing where mainly millet is grown), and *pakho* (= dry upland land where mainly maize and millet are grown). Since the late fourteenth century, agricultural land areas in the Kathmandu valley were graded according to four categories, namely:

*abal*, where the entire plot could be irrigated, and water, once used, stayed on the land for three or four days; *doyam*, where  $\frac{3}{4}$  of the plot could be irrigated, and water, once used, stayed on the land for two or three days; *sim*, where half of the plot could be irrigated, and water, once used, stayed on the land for only one day; and *chakar*, where almost no portion of the plot could be irrigated, and the entire plot was dependent upon rainfall. After 1909, the nature of the crop grown was used as the basis for tax assessment of agricultural lands in eastern Terai. The land areas were classified into two categories, namely, *dhanahar*, for lands on which jute, rice, sugar cane and oilseeds could be grown, and *bhith*, for uncultivated and pasture lands, as well as lands suitable for the cultivation of lentils and maize. In 1963, the government of Nepal standardized the formulas for the grading of taxable lands throughout the country. Then, the traditional categories were retained. Khet and dhanahar lands were divided into the four grades of *abal*, *doyam*, *sim* and *chadar*, and *bhith* and *pakho* lands were divided into the three grades of *abal*, *doyam* and *sim*.

Traditional system based on the Arthaśāstra

			Metric
<b>nivartana</b> (3 rajju × 3 rajju)			3576.997 m <sup>2</sup>
$2\frac{1}{4}$	<b>paridesha</b> (2 rajju × 2 rajju)		1589.776 m <sup>2</sup>
9	4	<b>rajju</b> (1 rajju × 1 rajju)	397.444 m <sup>2</sup>

Traditional measures used for cultivated land areas, based on seed requirement (median values for irrigated land with rice and for unirrigated land with maize), according to [CROO]

		Metric	Metric
<b>mato-muri<sup>a</sup></b>		5760 m <sup>2</sup>	42,400 m <sup>2</sup>
160	<b>mana<sup>b</sup></b>	36 m <sup>2</sup> (varying between 27 and 66 m <sup>2</sup> )	265 m <sup>2</sup> (varying between 12 and 1290 m <sup>2</sup> )

<sup>a</sup>In concept, the area that requires 1 mori of seed

<sup>b</sup>In concept, the area that requires 2 manas of seed

Other reported measures based on seed requirement:

1 **bijan** = measurement of land area (used for forestland and where land was not cultivated regularly).

Traditional measures, based on the ploughing effort (median values for irrigated land with rice and for unirrigated land with maize), according to [CROO]

		Metric	Metric
<b>pate<sup>a</sup></b>		1 180 m <sup>2</sup>	2 100 m <sup>2</sup>
2	<b>hale<sup>b</sup></b>	590 m <sup>2</sup> (varying between 180 and 1078 m <sup>2</sup> )	1050 m <sup>2</sup> (varying between 141 and 8665 m <sup>2</sup> )

<sup>a</sup>In concept, the area that could be ploughed by one yoke of oxen in half a day

<sup>b</sup>In concept, the area that could be ploughed by one yoke of oxen in one day

Other measures, based on the ploughing effort:

1 **kodale** (for areas where land could not be ploughed by oxen) = the land area that could be dug by a man in one day.

These mentioned measures, based on ploughing effort, were officially abolished in 1933, but have been reported as being used among farmers well into the late twentieth century. See also [ADHI, p. 45].

There was also a big difference between the system used in the hilly regions, often called the ropani-system, and the system traditionally used in the southern parts of Nepal, i.e., in the Terai region, which may be called the bhigha-system.

System for agricultural land in the southern parts of Nepal, based on planting efforts

बीघा	कठ्ठा	धुर	Metric
<b>bigha or biggah</b>			6771.41 m <sup>2</sup>
20	<b>kattha or katha</b>		338.57 m <sup>2</sup>
400	20	<b>dhur<sup>a</sup></b>	16.93 m <sup>2</sup>

<sup>a</sup>1 **dhur** = 1 jangir × 1 jangir = 13½' × 13½' = 182¼

British Imperial-linked bigha system for plain meadows in Terai, based on planting efforts

बिघ	कठ्ठा	धुर	Square feet	Metric
<b>bigha or biggah<sup>a</sup></b> (270 × 270 sq ft)			72,900	6772.63 m <sup>2</sup>
20	<b>kattha or katha</b>		3645	338.63 m <sup>2</sup>
400	20	<b>dhur<sup>b</sup></b>	182¼	16.928 m <sup>2</sup>

<sup>a</sup>Also spelled **beega**, **beegah** and **biga**

<sup>b</sup>1 **dhur** = 1 **mato janjir** or **mato jangir** = 81 mato hath

System used in the mountains since at least the fourteenth century, based on grain yield

रोपन	आना	पैसा	दाम	Metric <sup>a</sup>
<b>ropani or ro</b>				~500 m <sup>2</sup>
16	<b>aana</b>			~31 m <sup>2</sup>
64	4	<b>paisa</b>		~7.8 m <sup>2</sup>
256	16	4	<b>dam or daam</b>	~1.9 m <sup>2</sup>

The values above are based on certain indications that the ropani was slightly smaller at that time.

<sup>a</sup>There are no written sources from this era indicating any conversion of these units into other systems

British Imperial-linked system used in the mountain areas since the early nineteenth century, based on [KIRK3]

		रोपन		आना	पैसा	दाम	Square feet	Metric
<b>khet<sup>a</sup></b>							136,900	12,718.425 m <sup>2</sup>
5	<b>beeswa</b>						27,380	2543.685 m <sup>2</sup>
25	5	<b>ropani or ro<sup>b</sup></b>					5476	508.737 m <sup>2</sup>
100	20	4	<b>muri<sup>c</sup></b>				1369	127.184 m <sup>2</sup>
400	80	16	4	<b>aana</b>			342¼	31.796 m <sup>2</sup>
1600	320	64	16	4	<b>paisa</b>		85⅞ <sub>16</sub>	7.949 m <sup>2</sup>
6400	1280	256	64	16	4	<b>dam or daam</b>	21 <sup>25</sup> / <sub>64</sub>	1.987 m <sup>2</sup>

<sup>a</sup>According to [SHAR, p. 215], = 25 ropanis, but [TURN, p. 583] reported it as 20 ropanis

<sup>b</sup>74 × 74 sq ft

<sup>c</sup>Standardized as ¼ ropani. In concept, it was said to equal the area yielding 1 muri of grain

During the twentieth century, land was registered according to a new ropani system. On the basis of the ropani system of measurement, the land of Nepal was divided into four types of land. The division was actually done with iron

chains. A ropani of land of the first grade measured 95 hāths, the second grade of land measured 109 hāths, the third grade measured 112 hāths, and the fourth grade measured 125 hāths. See also [LAMS].

For agricultural land (for mountain meadows), based on [UN66], and metric-linked system (used by international agencies) during the twentieth century

								Metric	Metric
hectare								–	10,000 m <sup>2</sup>
10	<b>hal</b>							1017.472 m <sup>2</sup>	1000 m <sup>2</sup>
20	2	<b>ropani<sup>a</sup></b> or <b>ro</b>						508.736 m <sup>2</sup>	500 m <sup>2</sup>
80	8	4	<b>mato muri<sup>b</sup></b> , <b>jawa</b> or <b>chulchhi</b>					127.184 m <sup>2</sup>	125 m <sup>2</sup>
1600	160	80	20	<b>mato pathi</b>				6.359 2 m <sup>2</sup>	–
12,800	1280	640	160	8	<b>mato mana</b>			0.794 9 m <sup>2</sup>	–
128,000	12,800	6400	1600	80	10	<b>mato muthi</b>		7.949 dm <sup>2</sup>	
212,760	21,276	10,638	2659½	132 <sup>39/40</sup>	16 <sup>199/320</sup>	1 <sup>2119/3200</sup>	square cubit	4.78 dm <sup>2</sup>	–

<sup>a</sup>In the Kathmandu valley. Each ropani was also said to measure 4 jawas in area

<sup>b</sup>1 **muri** = 37' × 37' = 1369

## 120.5 Units of Dry Capacity

Traditional system for grain

				Metric
<b>prastha</b>				~1.92 L
1½	<b>mānika</b>			~1.60 L
4	3⅓	<b>kuḍuva</b>		~480 mL
12	10	3	handful	~160 mL

Traditional and British Imperial-linked system for cereal

				Metric	Metric
<b>muri<sup>a</sup></b>				87.215 L	90.880 L
20	<b>pathi</b>			4.361 L	4.544 L
80	4	<b>kuda</b>		1.090 L	1.136 L
160	8	2	<b>mana</b>	545 mL	568.26 mL

<sup>a</sup>At the Hills of Kathmandu, according to [PĀṆḌ], equal to 90.92 L

For paddy and rice in Western Terai, based on [KHĀD]

				Metric
<b>Gon</b>				290.940 L
4	<b>maund</b>			72.73 5L
16	4	<b>mana</b>		18.184 L
256	64	16	<b>kuruwa</b>	1.136 L

## 120.6 Units of Liquid Capacity

Traditional and British Imperial-linked system, based on [www.nepalhelp.dk](http://www.nepalhelp.dk) and [PĀÑḌ]

						Metric	Metric
<b>muri</b>						87.215 L	90.880 L
20	<b>pathi</b>					4.361 L	4.544 L
80	4	<b>kuruwa</b>				1.090 L	1.136 L
160	8	2	<b>mana</b>			545.1 mL	568 mL
640	32	8	4	<b>chouthai</b>		136.3 mL	142 mL
1600	80	20	10	2½	<b>muthi</b>	54.5 mL	56.8 mL

## 120.7 Units of Weight

Traditional measure:

1 **bhari** (a load that could be carried on the back) = ~30 kg.

Rana Bahadur Shah system for general use

							Metric
<b>dharni<sup>a</sup></b>							2.519 kg
2	<b>vissauli</b>						1.260 kg
8	4	<b>bodi</b>					314.9 g
12	6	1½	<b>pal</b>				209.9 g
216	108	27	18	<b>tola</b>			11.663 g
2160	1080	270	180	10	<b>masa</b>		1.166 g
21,600	10,800	2700	1800	100	10	<b>lal</b>	117 mg

<sup>a</sup>=2½ Indian seers

Rana Bahadur Shah system for rice

			Metric
<b>muri</b>			~89.6 kg
20	<b>pathi</b>		~4.5 kg
160	8	<b>mana</b>	~560 g

Indian-linked system in the Kathmandu valley

								Metric
<b>dharni</b>								2.393 4 kg
3	<b>seer or sher<sup>a</sup></b>							797.80 g
12	4	<b>pao or pau</b>						199.45 g
48	16	4	<b>chittack, chatak, or kanwa</b>					49.862 5 g
192	64	16	4	<b>marhi</b>				12.465 6 g
216	72	18	4½	1⅞	<b>tola</b>			11.080 5 g
3840	1280	320	80	20	17⅞	<b>pathi</b>		623.28 mg
7680	2560	640	160	40	35⅞	2	<b>kurna</b>	311.64 mg
15,360	5120	1280	320	80	71⅞	4	2	<b>mana</b> 155.82 mg

<sup>a</sup>Usually used for rice

## Indian-linked system based on the tola

						Metric
<b>mund</b>						33.581 kg
13 $\frac{1}{3}$	<b>dharni</b>					2.519 kg
40	3	<b>seer or sher</b>				839.52 g
160	12	4	<b>pao or pau</b>			209.88 g
640	48	16	4	<b>kanwa</b>		52.47 g
2880	216	72	18	4 $\frac{1}{2}$	<b>tola</b>	11.66 g

## British Imperial-linked system in Terai

				Metric
<b>maund</b> (=100 lb troy)				37.324 2 kg
16	<b>dharni<sup>a</sup></b>			2.332 8 kg
40	2 $\frac{1}{2}$	<b>seer or sher</b>		933.10 g
192	12	4 $\frac{1}{2}$	<b>pao or pau</b>	194.397 g

<sup>a</sup>[UN66] reported it as 2.332 5 kg

Some capacity units for agricultural commodities were also used as units of weight. [DAVI6] defined the muri as a sack, approximately 4 feet tall and 1 foot in diameter, weighing about 64 kg. Below are some systems for various commodities.

## British Imperial-linked system for maize

सुरी			Metric
<b>murhi, moori or muri<sup>a</sup></b>			72.57 kg
20	<b>pathi</b>		3.63 kg
160	8	<b>mana</b>	453.6 g

<sup>a</sup>[ADHI2] reported it as 72.7 kg, and [CHAP] as 68 kg

## British Imperial-linked system for barley

सुरी			Metric
<b>murhi, moori or muri<sup>a</sup></b>			67.13 kg
20	<b>pathi</b>		3.36 kg
148	7 $\frac{2}{3}$	<b>mana</b>	453.6 g

<sup>a</sup>[MESS] reported it as 67.3 kg

## British Imperial-linked system for grain

सुरी			Metric
<b>murhi, moori or muri<sup>a</sup></b>			63.50 kg
20	<b>pathi</b>		3.17 kg
140	7	<b>mana</b>	453.6 g

<sup>a</sup>[CHAP] reported it as 66 kg

## British Imperial-linked system for millet

सुरी			Metric
<b>murhi, moori or muri<sup>a</sup></b>			63.50 kg
20	<b>pathi</b>		3.17 kg
140	7	<b>mana</b>	453.6 g

<sup>a</sup>[ADHI2] reported it as 63.31 kg, [CHAP] as 62 kg, and [MESS] as 67.3 kg

## British Imperial-linked system for wheat

सुरी			Metric
<b>murhi, moori or muri<sup>a</sup></b>			63.50 kg
20	<b>pathi</b>		3.17 kg
140	7	<b>mana</b>	453.6 g

<sup>a</sup>[ADHI2] reported it as 63.2 kg, [CHAP] as 68 kg, and [MESS] as 67.3 kg

## British Imperial-linked system for paddy

सुरी			Metric
<b>murhi, moori or muri<sup>a</sup></b>			52.16 kg
20	<b>pathi</b>		2.61 kg
115	5 $\frac{3}{4}$	<b>mana</b>	453.6 g

<sup>a</sup>[ADHI2] reported it as 52.5 kg and [MESS] as 50 kg

## British Imperial-linked system for rice

सुरी			Metric
<b>murhi, moori or muri<sup>a</sup></b>			49.89 kg
20	<b>pathi</b>		2.49 kg
110	5 $\frac{1}{2}$	<b>mana</b>	453.6 g

<sup>a</sup>[CHAP] reported it as 50 kg and [MESS] as 68.6 kg

## Metric-linked system for rough rice

	सुरी			Metric
<b>quantel</b>				100 kg
2 $\frac{1}{12}$	<b>murhi, moori or muri</b>			48 kg
41 $\frac{2}{3}$	20	<b>pathi</b>		2.40 kg
100	48	2 $\frac{2}{3}$	<b>seer or sher</b>	1 kg
333 $\frac{1}{3}$	160	8	3 $\frac{1}{3}$	<b>mana</b> 300 g

## 121 Netherlands

Under Charles V, Holy Roman Emperor, this region was part of the Provinces of the Netherlands, which also included most of present-day Belgium and Luxembourg. The Netherlands came under control of the Burgundy and Austrian Hapsburgs, and was subjected to Spanish dominion in the sixteenth century. From 1581 to 1795, the provinces of Friesland, Gelre, Groningen, Holland, Overijssel, Utrecht and Zeeland formed a confederation known as the Republic of the Seven United Netherlands. From 1795 to 1806, as the Batavian Republic, the area was part of the French Empire. In 1815, the Congress of Vienna formed the United Kingdom of the Netherlands by expanding its territory with Belgium. Belgium gained its independence in 1830, and Luxembourg in 1890. Today, the Netherlands is divided into 12 provinces: Drenthe, Flevoland, Friesland, Gelderland, Groningen, Limburg, North Brabant, North Holland, Overijssel, South Holland, Utrecht and Zeeland. Since 2010, Bonaire, St Eustatius and Saba have been part of the Netherlands, but not part of any province. These municipalities, located in the Caribbean, are also known as the Caribbean Netherlands.

In late sixteenth century Netherlands, there existed great diversity and confusion around weights and measures. This bedlam of standards promoted cheating by tradesmen and was a barrier to accurate communication between scientists. In 1585, the Flemish mathematician Simon Stevin (1548–1620) proposed a primitive form of decimal fractions as an alternative to common fractions. His ideas were translated in 1586 into a pamphlet in French, *La Disme, L'arithmétique de Simon Stevin de Burges*, in which he also proposed that currency, weights, measures and the division of the circle could be

unified with a decimal base. These ideas were later adopted by John Wilkins, who created the Universal Measurement System in 1668. But it was not until the French Revolution created an atmosphere conducive to change that the decimal system was fully adopted. The old measures were used during most of the 1800s, alongside the metric. The Netherlands was long a major trading nation and had an extensive colonial empire. Hence, the old Dutch measures were used not only in the Netherlands, but also in the colonies, and in South Africa, they had been introduced by the Boers, who came from the Netherlands. For overseas trade, the sizes valid in Amsterdam were used almost exclusively. The metric system has been officially used since 1817, and compulsory since 1820 and 1832. In 1820, a collection of Dutch names was introduced by law, *Nederlandsch Metriek Stelsel*. These Dutch names were replaced in 1870 by international metric terminology.

*Main sources:* [DUBB], [FRUI], [GELD], [HOLT], [HOLT2], [HOLT3], [KEUN], [NIPP], [PELK], [STAR], [SWIN3], [VANS2], [VANS3], [VANS4], [VANS5], [VERH], and [ZEVE]

### 121.1 Currency

2002–:	1 euro = 100 euro-cent
1817–2002:	1 Dutch guilder or gulden = 100 cents
1815–1875:	1 Dutch rijksdaalder = 2½ guilders = 50 stivers or stuivers = 800 penningen
1810–1814:	1 French franc = 100 centimes
1680–1809:	1 guilder = 20 stuivers = 160 duiten = 320 penningen

## 121.2 Units of Length

Traditional system

							Metric
<b>uren</b>							809.550 m
5	<b>myl</b>						161.909 98 m
$17^{665/13}$	$3^{533/13}$	<b>roede</b>					3.679 77 m
$354\frac{7}{5}$	$288\frac{7}{5}$	$5\frac{7}{5}$	<b>elle</b>				697.813 mm
886	572	13	$2\frac{1}{2}$	<b>voet</b>			283.059 4 mm
9746	6292	143	$27\frac{1}{2}$	11	<b>duim</b>		25.732 7 mm
116,952	75,504	1716	330	132	12	<b>lyne</b>	2.144 4 mm

During the mid-nineteenth century, based on [DOUR]

			Metric
<b>roede</b>			3.680 358 m
13	<b>voet</b>		283.104 mm
143	11	<b>duim</b>	25.737 mm

In Amsterdam

							Metric
<b>roede</b>							3.680 729 m
13	<b>voet</b>						283.133 mm
$47\frac{7}{5}$	$3\frac{7}{5}$	<b>palm</b>					77.218 mm
143	11	3	<b>duim</b>				25.739 mm
572	44	12	4	<b>kwart</b>			6.435 mm
1144	88	24	8	2	<b>achtste</b>		3.217 mm
1573	121	33	11	$2\frac{3}{4}$	$1\frac{3}{8}$	<b>streepe</b>	2.340 mm

The Rhineland units of measurement were predominantly used for surveying and scientific purposes. The mathematician Willebrord Snel van Rooyen of Leiden used this system in 1615 and 1621 to measure the circumference of the earth.

In Rhineland (Rijnlandse) two scales (in 1808, legally defined conversion of Snellius roede; as reported during the twentieth century)

			Metric	Metric
<b>Leyden roede<sup>a</sup>, Rijnlandse roede, Rhyland roede, or Snellius roede</b>			3.766 242 m	3.770 m
12	<b>voet</b>		313.853 mm	314.167 mm
144	12	<b>duim</b>	26.154 mm	26.18 mm

<sup>a</sup>Commonly accepted in the eighteenth century as the length of an iron bar in the wall of the courthouse in Leiden. It was supposed to be a copy of the rood used by Willebrord Snel van Rooyen in 1615. (See also Gore, J. Howard. *Elements of Geodesy*. 3rd ed. New York: John Wiley & Sons, 1893.) A copy of this iron staff can now be seen in Leiden's Boerhaave Museum

Other measures reported during the eighteenth to nineteenth centuries:

1 **vadem** = 2 yd = 1.829 m.

Metric-linked system after 1817

							Metric
<b>mijl</b>							1 km
100	<b>roede</b>						10 m
1000	10	<b>el</b>					1 m
3000	30	3	<b>voet</b>				0.333 m
10,000	100	10	$3\frac{1}{3}$	<b>palm</b>			100 mm
100,000	1000	100	$33\frac{1}{3}$	10	<b>duim</b>		10 mm
1,000,000	10,000	1000	$333\frac{1}{3}$	100	10	<b>streep</b>	1 mm

### 121.3 Units of Area

In Rhineland (Rijnlandse)

				Metric
<b>morgen</b>				8527.8 m <sup>2</sup>
2	<b>(Rhineland) acre</b>			4263.9 m <sup>2</sup>
6	3	<b>hout</b>		1421.3 m <sup>2</sup>
600	300	100	<b>vierkante roede</b>	14.213 m <sup>2</sup>

Metric-linked scale after 1817

						Metric
<b>vierkante bunder, mud, or mudde</b>						100 m <sup>2</sup>
10	<b>vierkante roede</b>					10 m <sup>2</sup>
100	10	<b>vierkante el</b>				1 m <sup>2</sup>
1000	100	10	<b>vierkante palm</b>			1 dm <sup>2</sup>
10,000	1000	100	10	<b>vierkante duim</b>		1 cm <sup>2</sup>
100,000	10,000	1000	100	10	<b>vierkante streep</b>	1 mm <sup>2</sup>

### 121.4 Units of Volume

Metric-linked scale after 1817

				Metric
<b>wisse or kubieke el</b>				1 m <sup>3</sup>
10	<b>kubieke palm</b>			1 dm <sup>3</sup>
100	10	<b>kubieke duim</b>		1 cm <sup>3</sup>
1000	100	10	<b>kubieke streep</b>	1 mm <sup>3</sup>

Other reported measures:

1 **standaard** = 165 cu ft = 4.67 m<sup>3</sup>;  
 1 **register ton** = 100 cu ft = 2.83 m<sup>3</sup>.

### 121.5 Units of Dry Capacity

For commodities in general before 1820

		Metric
<b>zak</b>		278.740 L
10	<b>schepel</b>	27.874 L

For cereal (two alternative scales reported) before 1820

						Metric	Metric
<b>last</b>						2954.88 L	2918.16 L
27	<b>mud</b>					109.44 L	108.08 L
36	1 $\frac{1}{3}$	<b>zak</b>				82.08 L	81.06 L
108	4	3	<b>schepel</b>			27.36 L	27.02 L
432	16	12	4	<b>vierd or vierdevat</b>		6.84 L	6.76 L
3456	128	96	32	8	<b>kop</b>	855.0 mL	844.37 mL

For lime before 1820

			Metric
<b>hoed</b>			911.02 L
2	<b>ton</b>		455.52 L
16	8	<b>kinnetje</b>	56.94 L

Other reported measures:

1 **hondert** (for salt) = 24.811 L.

Metric-linked system after 1820

						Metric
<b>last</b>						3000 L
3	<b>sak or wise</b>					1000 L
30	10	<b>mudde, mud, zac, or zak</b>				100 L
300	100	10	<b>schepel</b>			10 L
3000	1000	100	10	<b>kop</b>		1 L
30,000	10,000	1000	100	10	<b>maatje</b>	0.1 L

## 121.6 Units of Liquid Capacity

Upper scale for wine before 1817 (as in Amsterdam)

						Metric
<b>vat</b>						931.344 L
1 $\frac{3}{5}$	<b>legger or leaguer</b>					582.090 L
		<b>pijp</b>				412.314 L
4	2 $\frac{1}{2}$		<b>okshoofd</b>			232.836 L
6	3 $\frac{3}{4}$		1 $\frac{1}{2}$	<b>aam</b>		155.224 L
24	15	10 $\frac{5}{8}$	6	4	<b>anker</b>	38.806 L

Lower scale for wine before 1817 (as in Amsterdam)

							Metric
<b>anker</b>							38.806 L
2	<b>steekkan</b>						19.403 L
5¼	2⅞	<b>firtel</b>					7.391 619 L
16	8	3½ <sub>21</sub>	<b>stoopt</b>				2.425 375 L
32	16	6⅞ <sub>21</sub>	2	<b>mengel<sup>a</sup></b>			1.212 687 L
64	32	12⅞ <sub>21</sub>	4	2	<b>pintje</b>		606.344 mL
256	128	48⅞ <sub>21</sub>	16	8	4	<b>mutsje or maatje</b>	151.586 mL

<sup>a</sup>One mengel varied between 1.200 and 1.237 L

For liquor in Amsterdam before 1817

						Metric
<b>okshoofd</b>						225 L
12	<b>steekkan</b>					18.75 L
30	2½	<b>firtel</b>				7.5 L
180	15	6	<b>mengel</b>			1.25 L
360	30	12	2	<b>pintje</b>		625 mL
1440	120	48	8	4	<b>mutsje</b>	156.25 mL

For beer in Amsterdam before 1817

						Metric
<b>kuip</b>						1257.984 L
8	<b>ton</b>					157.248 L
64	8	<b>steekkan</b>				19.656 L
512	64	8	<b>stooop</b>			2.457 L
1024	128	16	2	<b>mengel</b>		1.228 5 L
2048	256	32	4	2	<b>pintje</b>	614.25 mL

For oil in Amsterdam before 1817

						Metric
<b>vat</b>						869.496 579 L
–	<b>kwarteel</b>					232.836 L
5 <sup>117/20</sup>	1⅔	<b>aam</b>				145.522 5 L
–	2	1¼	<b>schmaltonne</b>			116.418 L
–	12	7½	6	<b>steekkan</b>		19.403 L
717	192	120	96	16	<b>mengel</b>	1.212 687 L

For arrak in Amsterdam before 1817

			Metric
<b>legger<sup>a</sup></b>			275 L
15	<b>ancre</b>		18.33 L
240	16	<b>stooop</b>	1.146 L

<sup>a</sup>Reported as varying between about 270 and about 280 L

Metric-linked system after 1817

								Metric
<b>last</b>								3000 L
3	<b>wisse or wise</b>							1000 L
30	10	<b>vaat, mud, vaatje, vat or zak</b>						100 L
300	100	10	<b>schepel</b>					10 L
2000	200	20	2	<b>spint</b>				5 L
3000	1000	100	10	5	<b>kan</b>			1 L
30,000	10,000	1000	100	50	10	<b>maatje or dekalier</b>		100 mL
300,000	100,000	10,000	1000	500	100	10	<b>vingerhoed</b>	10 mL

Other measures reported after 1817:

- 1 **fuder** (for Rhine wine) = 1000 L;
- 1 **halbstück** (for Rhine wine) = 600 L;
- 1 **pijp** (for port-wine) = 540 L;
- 1 **boot** (for sherry) = 530 L;
- 1 **barrel** = 220 L;
- 1 **stoop** (for Pils beer) = 6 L.

121.7 Units of Weight

Traditional system for general use

				Metric
<b>anker</b>				49.216 772 kg
100	<b>pond</b>			492.167 72 g
200	2	<b>mark</b>		246.083 86 g
1600	16	8	<b>ons</b>	30.760 482 5 g

During the early nineteenth century, based on [BROS]

						Metric
<b>schippond<sup>a</sup></b>						157.469 12 kg
1⅓	<b>schippond<sup>b</sup></b>					137.785 48 kg
20	17½	<b>lijspond<sup>a</sup></b>				7.873 456 kg
22⅔	20	1⅓	<b>lijspond<sup>b</sup></b>			6.889 274 kg
320	280	16	14	<b>pond</b>		492.091 g

<sup>a</sup>For trucks

<sup>b</sup>For goods

During the early nineteenth century, based on [BROS]

									Metric
<b>scheepslast</b>									1968.364 kg
2	<b>ton</b>								984.182 kg
400	200	<b>steen</b>							4.920 91 kg
4000	2000	10	<b>pond</b>						492.091 g
8000	4000	20	2	<b>mark</b>					246.045 5 g
64,000	32,000	160	16	8	<b>ons</b>				30.755 7 g
128,000	64,000	320	32	16	2	<b>lood</b>			15.377 8 g
1,280,000	640,000	3200	320	160	20	10	<b>enquel</b>		1.537 8 g
40,960,000	20,480,000	102,400	10,240	5120	640	320	32	<b>as</b>	48.0 mg

In Amsterdam, based on [MART3]

										Metric
<b>scheepslast</b>										1976.361 600 kg
13⅓	<b>schippond</b>									148.227 120 kg
40	3	<b>centenaar</b>								49.409 040 kg
266⅔	20	6⅔	<b>lijspond</b>							7.411 356 kg
500	37½	12½	1⅛	<b>steen</b>						3.952 723 kg
666⅔	50	16⅔	2½	1⅓	<b>steen</b>					2.964 542 kg
4000	300	100	15	8	6	<b>pond</b>				494.090 g
8000	600	200	30	16	12	2	<b>mark</b>			247.045 g
64,000	48,000	16,000	240	128	96	16	8	<b>ons</b>		30.881 g
128,000	96,000	32,000	480	256	192	32	16	2	<b>lood</b>	15.440 g
512,000	384,000	128,000	1920	1024	768	128	64	8	4	<b>drachma</b> 3.860 g

## Upper scale for gold, silver, and money

						Metric
<b>pond Trooisch</b>						492.167 72 g
1½	<b>pond<sup>a</sup></b>					369.125 79 g
2	1⅓	<b>mark Trooisch</b>				246.083 79 g
16	10⅔	8	<b>ons Trooisch</b>			30.760 47 g
32	21⅓	16	2	<b>lood</b>		15.380 24 g
128	85⅓	64	8	4	<b>skrupel<sup>a</sup></b>	3.845 059 g

<sup>a</sup>Only for medical use

## Lower scale for gold, silver, and money

						Metric
<b>ons Trooisch</b>						30.760 g
20	<b>engel or esterling</b>					1.538 g
80	4	<b>vierling</b>				384.504 mg
160	8	2	<b>troisken</b>			192.252 mg
320	16	4	2	<b>deusken</b>		96.126 mg
600	30	7½	3¾	1⅞	<b>grein or korrel</b>	51.267 mg
640	32	8	4	2	1⅓ <sub>15</sub>	<b>as</b> 48.063 mg

## For medical use before 1817

					Metric
<b>medicinal pond</b>					369.126 g
12	<b>ons</b>				30.760 5 g
96	8	<b>drachma</b>			3.845 1 g
288	24	3	<b>skrupel</b>		1.281 7 g
5760	480	60	20	<b>grein</b>	64.1 mg

## For medical use after 1817

					Metric
<b>medicinal pond</b>					375 g
12	<b>ons</b>				31.25 g
24	2	<b>lood</b>			15.624 g
96	8	4	<b>drachma</b>		3.906 25 g
288	24	12	3	<b>skrupel</b>	1.302 083 g
5760	480	240	60	20	<b>grein</b> 65.1 mg

## For diamonds and jewels

		Metric
<b>Karaat</b>		206 g
4	<b>grein</b>	51.5 g

Metric-linked system after 1820

								Metric
<b>last</b>								2000 kg
40	<b>anker</b>							50 kg
200	5	<b>lood</b>						10 kg
2000	50	10	<b>pond<sup>a</sup></b>					1 kg
20,000	500	100	10	<b>ons</b>				100 g
200,000	5000	1000	100	10	<b>korrel</b>			10 g
2,000,000	50,000	10,000	1000	100	10	<b>wigtje or esterlin</b>		1 g
20,000,000	500,000	100,000	10,000	1000	100	10	<b>grein</b>	100 mg

<sup>a</sup>In practice, often said to equal 500 g

Other measures reported after 1820:

1 **unit-ton** (for maize and wheat) = 1015 kg;

1 **unit-ton** (for rye) = 1006 kg;

1 **unit-ton** (for oats) = 725 kg.

121.8 Breda

Breda was a barony until the French Revolution in 1795.

121.8.1 Units of Length

						Metric
<b>roede</b>						5.68 m
3	<b>vadem</b>					1.893 m
8 <sup>17</sup> / <sub>81</sub>	2 <sup>58</sup> / <sub>81</sub>	<b>el</b>				697 mm
20	6 <sup>2</sup> / <sub>3</sub>	2 <sup>5</sup> / <sub>11</sub>	<b>voet<sup>a</sup></b>			284 mm
220	73 <sup>1</sup> / <sub>3</sub>	27	11	<b>duim</b>		25.8 mm
1760	586 <sup>2</sup> / <sub>3</sub>	216	88	8	<b>lijn</b>	3.2 mm

<sup>a</sup>1 **houtvoet** (for timber, but also used by glass makers since the late sixteenth century) = 294 mm

121.8.2 Units of Area

Traditional system

				Metric
<b>bunder</b>				12,904.96 m <sup>2</sup>
4	<b>hond</b>			3226.24 m <sup>2</sup>
8	2	<b>lopense</b>		1613.12 m <sup>2</sup>
400	100	50	<b>vierkante roede</b>	32.262 4 m <sup>2</sup>

		Metric
<b>morgen</b>		0.86 ha
2	<b>gemet</b>	0.43 ha

During the eighteenth century

				Metric
<b>bunder<sup>a</sup></b>				10,422 m <sup>2</sup>
1½	<b>morgen</b>			6948 m <sup>2</sup>
9	6	<b>hond</b>		1158 m <sup>2</sup>
900	600	100	<b>vierkante roede</b>	11.58 m <sup>2</sup>

<sup>a</sup>In Roosendaal

121.8.3 Units of Volume

Wood blocks were sold, after 1516, by units of 28.4 dm<sup>3</sup>;

1 **vadem** (for firewood) = 1.65 m<sup>3</sup>;

121.8.4 Units of Dry Capacity

For cabbage after 1587

		Metric
<b>hoed</b>		1209 L
62	<b>maat</b>	19.5 L

For cereal

					Metric
<b>Sester</b>					346 L
2	<b>halster</b>				173 L
4	2	<b>zak or viertel</b>			86.5 L
16	8	4	<b>lopen</b>		21.6 L
64	32	16	4	<b>kwartier</b>	5.41 L

For malt during the sixteenth and seventeenth centuries

				Metric
<b>zak</b>				167.2 L
2	<b>vat</b>			83.6 L
8	4	<b>lopen</b>		20.9 L
32	16	4	<b>kwartier</b>	5.225 L
128	64	16	4	<b>maatje</b> <sup>a</sup> 1.306 L

<sup>a</sup>Reported after 1780

For malt after 1812

		Metric
<b>zak or ton</b>		183.9 L
4	<b>schepel</b>	45.9 L

For lime

				Metric
<b>hoed</b>				911 L
8	<b>tonne</b>			113.87 L
64	8	<b>kinnethje</b>		14.23 L
960	120	15	<b>kop</b>	949 mL

For coal

			Metric
<b>hoed</b>			1173 L
38	<b>maat</b>		30.87 L
57	1½	<b>steek</b>	20.58 L

Some other reported measures:

- 1 **ton** (for peat during the eighteenth century) = 214.1 L;
- 1 **ton** (for peat during the sixteenth century) = 164.2 L;
- 1 **ton** (for bark, off the ground) = 159.4 L;
- 1 (**kraan**)**ton** (export scale, for bark during the sixteenth century) = 136 L;
- 1 (**mul**)**ton** (for bark, on the ground) = 127 L;
- 1 **ton** (for herring, potatoes and onions) = 120.7 L;
- 1 **ton** (for charcoal during the seventeenth century) = 120.7–161 L;
- 1 **haverviertel** (for oats during the seventeenth century) = 99.9–103.8 L;
- 1 **haverviertel watermaat** (for oats during the sixteenth century) = 99.4 L;
- 1 **haverviertel** (for oats during the sixteenth century) = 98.14 L;

1 **haverviertel zoldermaat** (for oats during the sixteenth century) = 98 L;

1 **ton** (for mussels) = 72.5 L;

1 **ton** (for trass during the mid-sixteenth century) = about 62 L;

1 **lopen** (for lime after 1650) = 35.5 L;

1 **lopen** (for lime after 1623) = 32.4 L;

1 **lopen** (for lime after 1587) = 31.3 L;

1 **lopen** (for lime after 1777) = 31.3 L.

## 121.8.5 Units of Liquid Capacity

				Metric
<b>(pot)kan</b>				1.61 L
2	<b>pint</b>			0.8 L
4	2	<b>beduit</b>		0.4 L
16	8	4	<b>maatje</b>	0.1 L

For vinegar after 1580

			Metric
<b>ton</b>			161 L
4	<b>kinnetje</b>		40.25 L
100	25	<b>pot</b>	1.61 L

Other reported measures:

1 **ton** (for beer 1733–1778) = 177 L;

1 **ton** (for beer 1561–1733) = 161 L;

1 **ton** (for beer after 1778) = 161 L;

1 **medeton** (for honey after 1587) = 161 L;

1 **ton** (for beer before 1561) = 148.2 L;

1 **aam** (for wine after 1587) = 148.1 L;

1 **aam** (for oil after 1587) = 144.9 L;

1 **honington** (for honey after 1587) = 120.7 L;

1 **zeemton** (for honey after 1587) = 110.2 L.

## 121.8.6 Units of Weight

For butter after 1587

		Metric
<b>boterton</b>		140 kg
100	<b>pot</b>	1.4 kg

Other reported measures:

- 1 **'maat'** (for butter) = 586 g;  
 1 **Troois pond** (after 1812) = 492.1 g;  
 1 **'Brabantse maat'** (for butter) = 489 g;  
 1 **handelspond** (for merchant use after 1812) = 468.9 g.

## 121.9 Drenthe

### 121.9.1 Units of Length

British Imperial-linked system at Drenthe, Eelde, Gasselte, Gasselternijveeën, Gieten and Hijkersmilde

			Metric
<b>roede</b>			4.12 m
14	<b>voet</b>		294 mm
168	12	<b>duim</b>	24.5 mm

Peat measure at Drenthe, Eelde, Gasselte and Gieten

				Metric
<b>dagwerk</b>				105.84 m
22½	<b>roede</b>			4.704 m
40	1%	<b>veen stok</b>		2.646 m
360	16	9	<b>voet<sup>a</sup></b>	294 mm

<sup>a</sup>From 1625 to 1750, varied between 294.0 and 294.3 mm, and from about 1800 = 294.5 mm

At Anloo, Assen, Bielen, Diever, Gasselternijveeën, Hijkersmilde, Peize, Vledder, Westerbork and Zweeklo

		Metric
<b>roede</b>		4.116 m
14	<b>voet</b>	294 mm

At Anloo, Assen, Gasselternijveeën, Nijveeën, Peize, Vledder, Westerbork and Zweeklo (after c. 1800); at Coevorden

		Metric	Metric
<b>roede</b>		3.528 m	3.767 m
12	<b>voet</b>	294 mm	313.9 mm

At Dieven, Dwingelo, Havelte, Hoogeveen, Meppel, Ruinen, Ruinenwold, Wapserveeën and Zuidwolde

		Metric
<b>el</b>		680 mm
28	<b>duim</b>	24.3 mm

Other reported measures:

- 1 **acker** (field measure at Koekange) = 6.6–7.3 m;  
 1 **veen roede** (at Dieven, Dwingelo, Havelte, Koekange, Meppel and Vledder) = 4.68 m;  
 1 **roede** (at Zuidwolde) = 4.35 m;  
 1 **el** (at Ruinen and Wapserveeën) = 680 mm;  
 1 **el** (at Gasselternijveeën) = 676 mm;  
 1 **el** (at Oosterhesselen) = 669 mm.

### 121.9.2 Units of Area

British Imperial-linked system, Groningen scale and as peat measure at Drenthe, Eelde and Gasselte

						Metric	Metric	Metric
<b>morgen</b>						10,164.9 m <sup>2</sup>	10,182 m <sup>2</sup>	–
1½	<b>dagwerk or dag mat</b>					6776.6 m <sup>2</sup>	6788 m <sup>2</sup>	–
3¾	2½	<b>mud</b>				2710.6 m <sup>2</sup>	2715.2 m <sup>2</sup>	3534.4 m <sup>2</sup>
15	10	4	<b>schepel</b>			677.7 m <sup>2</sup>	678.8 m <sup>2</sup>	883.6 m <sup>2</sup>
60	40	16	4	<b>spint</b>		169.4 m <sup>2</sup>	169.7 m <sup>2</sup>	220.9 m <sup>2</sup>
600	400	160	40	10	<b>vierkante roede</b>	16.94 m <sup>2</sup>	16.97 m <sup>2</sup>	22.09 m <sup>2</sup>

At Anloo, Assen, Gasselternijveeën, Peize, Vledder, Westerbork and Zweeklo; at Gieten; at Coevorden

			Metric	Metric	Metric
<b>morgen</b>			10,164.9 m <sup>2</sup>	10,182 m <sup>2</sup>	8514.17 m <sup>2</sup>
1½	<b>dagmad or dagwerk</b>		6776.6 m <sup>2</sup>	6788 m <sup>2</sup>	5676.12 m <sup>2</sup>
600	400	<b>vierkante roede</b>	16.94 m <sup>2</sup>	16.97 m <sup>2</sup>	14.19 m <sup>2</sup>

At Bielen and Hijkersmilde; at Dwingelo

				Metric	Metric
<b>mud</b>				2710 m <sup>2</sup>	3614 m <sup>2</sup>
4	<b>schepel</b>			677.5 m <sup>2</sup>	903.5 m <sup>2</sup>
16	4	<b>spint</b>		169.4 m <sup>2</sup>	225.9 m <sup>2</sup>
160	40	10	<b>vierkante roede</b>	16.94 m <sup>2</sup>	22.59 m <sup>2</sup>

At Hijkersmilde

			Metric
<b>dagverk</b>			6776.582 m <sup>2</sup>
2½	<b>mud</b>		2710.633 m <sup>2</sup>
400	160	<b>vierkante roede</b>	16.941 m <sup>2</sup>

At Zuidwolde

		Metric
<b>gras</b>		4541.4 m <sup>2</sup>
240	<b>vierkante roede</b>	18.92 m <sup>2</sup>

Other reported measures:

- 1 **morgen** (Steenwijker scale at Drenthe) = 8100 m<sup>2</sup>;  
 1 **mud gezaaid** (at Dieven) = 3600 m<sup>2</sup>;  
 1 **acker** (at Nijeveen between 1605 and 1615) = 542–506 m<sup>2</sup>.

### 121.9.3 Units of Dry Capacity

For grain at Bielen

		Metric
<b>mud</b>		91.2 L
4	<b>schepel</b>	22.8 L

At Coevorden, Diever, Dwingelo, Havelte, Hijkersmilde, Meppel, Ruinen, Ruinenwold and Wapserveen

			Metric
<b>mud</b>			120.4 L
4	<b>schepel</b>		30.1 L
16	4	<b>spint</b>	7.525 L

For grain at Coevorden, Havelte, Hijkersmilde and Meppel

		Metric
<b>last</b>		3 010 L
25	<b>mud</b>	120.4 L

For grain at Ruinen, Ruinenwold, Smilde, Vledder and Wapserveen

					Metric
<b>mud</b>					125.4 L
4	<b>schepel</b>				31.35 L
16	4	<b>spint</b>			7.84 L
64	16	4	<b>vierendel</b>		1.96 L
256	64	16	4	<b>kop or maatje</b>	489.8 mL

At Oosterhesselen

		Metric
<b>mud</b>		79.8 L
14	<b>spint</b>	5.7 L

### 121.9.4 Units of Liquid Capacity

At Coevorden

			Metric
<b>aam</b>			154.88 L
88	<b>kan</b>		1.76 L
176	2	<b>mengel</b>	880 mL

At Dwingelo, Havelte, Meppel, Ruinen, Ruinenwold, Vledder, and Wapserveen

				Metric
(Steenwijker)				1.76 L
<b>kan</b>				
2	<b>mengel</b>			880 mL
4	2	<b>oord</b>		440 mL
16	8	4	<b>maatje</b>	110 mL

Other measures:

- 1 **anker** (at Havelte, Meppel, Ruinen, Ruinenwold, and Wapserveen) = 38.8 L;  
 1 **kroes** (at Bielen) = 1.4 L.

### 121.9.5 Units of Weight

At Beilen, Coevorden, and Dieve before 1701

		Metric
<b>Keuls pond</b>		468 g
32	<b>lood</b>	14.6 g

Other reported measures:

1 **troois pond** (at Beilen and Dieven after 1701) = 492 g.

## 121.10 Flevoland

### 121.10.1 Units of Length

At Urk

		Metric
<b>(Drechterlandse) roede</b>		3.91 m
12	<b>voet</b>	325.8 mm

### 121.10.2 Units of Area

At Urk

		Metric
<b>morgen</b>		9172.86 m <sup>2</sup>
600	<b>vierkante roede</b>	15.288 m <sup>2</sup>

### 121.10.3 Units of Dry Capacity

For grain at Urk

			Metric
<b>mud</b>			136.8 L
2	<b>zak</b>		68.4 L
4	2	<b>schepel</b>	34.2 L

### 121.10.4 Units of Liquid Capacity

Some reported measures:

1 **mengel** (for milk) = 1.58 L:

1 **pint** (for milk) = 0.96 L.

At Beetsterzwaag, Gorredijk<sup>a</sup>, Hoolum, Kollum, Langweer, Lippenhuizen, Rinsumageest and Terschelling; at Bergum and Hardegarijp; at Bolsward, Gorredijk<sup>b</sup>, Heerenveen<sup>b</sup> and Lemmer; at Buitenpost and Het Bildt; at Heeg<sup>c</sup> and De Knipe; at Sloten; at Harlingen and Workum; at Menaldum; at Holwerd

		Metric	Metric	Metric	Metric	Metric	Metric	Metric	Metric	Metric
<b>roede</b> <sup>d</sup>		3.913 m	3.87 m	3.85 m	3.89 m	3.767 m	3.707 m	3.90 m	3.897 m	3.39 m
12	<b>voet</b>	326 mm	323 mm	321 mm	324 mm	314 mm	309 mm	325 mm	324.75 mm	282.5 mm

<sup>a</sup>For peat

<sup>b</sup>For bung peat

<sup>c</sup>According to [NIPP, p. 75], 1 roede = 13 voet and 1 voet = 296 mm

<sup>d</sup>At Buitenpost, as **land roede**, and at Sloten, as **veen roede**

## 121.10.5 Units of Weight

1 **pond** (for merchants at Urk) = 469 g.

## 121.11 Friesland

### 121.11.1 Units of Length

For timber buyers and carpenters

		Metric
<b>(Friese) hout voet</b>		296 mm
12	<b>duim</b>	24.67 mm

For shipbuilding

		Metric
<b>(Amsterdamse) sheeps voet</b>		283 mm
12	<b>duim</b>	23.58 mm

For surveying (Leeuwarden standard) after 1564

			Metric
<b>konings roede</b>			3.91 m
12	<b>konings voet</b>		325.83 mm
144	12	<b>duim</b>	27.15 mm

At Schiermonnikoog; at Balk, Gaasterland, Heerenveer<sup>a</sup>, Lemmer and Wolvega<sup>a</sup>; at Holwerd

		Metric	Metric	Metric
<b>roede</b>		4.736 m	4.73 m	4.51 m
16	<b>voet</b>	296 mm	295.6 mm	282 mm

<sup>a</sup>For peat

At Betterwird, Blija, Damwoude, Ee, Ferwerd, Franeker, Holwerd, Marssum, Minnertsga, Raard and Rauwerd

		Metric
<b>roede</b>		4.144 m
14	<b>(hout) voet</b>	296 mm

At Workum<sup>a</sup>; at Oostermeer

		Metric	Metric
<b>roede</b>		3.897 m	3.875 m
12	<b>voet</b>	324.75 mm	322.5 mm

<sup>a</sup>According to [HOLT3, p. 98]

At Heerenveen

			Metric
<b>konings roede</b>			3.95 m
10	<b>voet</b>		395 mm
~160%	~16	<b>duim</b>	24.6 mm

At Sint Johannesga; at Indijk and Vlieland; at Nijehaske and Oudehaske<sup>a</sup>

		Metric	Metric	Metric
<b>roede<sup>b</sup></b>		4.08 m	3.68 m	3.848 m
13	<b>voet</b>	314 mm	283 mm	296 mm

<sup>a</sup>According to [NIPP, p. 97]<sup>b</sup>At Sint Johannesga, as **veen roede**

Other reported measures:

- 1 **roede** (for peat at Langweer) = 4.73 m;  
 1 **roede** (for locks at Bornwird) = 3.84 m;  
 1 **roede** (for peat at Surhuizum) = 3.767 m;  
 1 **veen roede** (at Oenkerk) = 3.6 m;  
 1 **roede** (at Oenkerk) = 3.14 m;  
 1 **el** (after 1504) = 709 mm;  
 1 **el** (after 1774) = 688 mm.

## 121.11.2 Units of Area

At Augustinusga

		Metric
<b>mad</b>		5472 m <sup>2</sup>
360	<b>vierkante konings roede</b>	15.2 m <sup>2</sup>

At Hallum<sup>a</sup>; at Lemmer; at Heeg; at Workum

		Metric	Metric	Metric	Metric
<b>pondermaat</b>		4121 m <sup>2</sup>	3561 m <sup>2</sup>	3406 m <sup>2</sup>	3648 m <sup>2</sup>
240	<b>vierkante roede</b>	17.17 m <sup>2</sup>	14.84 m <sup>2</sup>	14.19 m <sup>2</sup>	15.2 m <sup>2</sup>

<sup>a</sup>According to [HOLT3, p. 96]

At Balk and Gaasterland; at Ferwerd

		Metric	Metric
<b>pondermaat</b>		4474 m <sup>2</sup>	3428 m <sup>2</sup>
200	<b>vierkante roede</b>	22.37 m <sup>2</sup>	17.14 m <sup>2</sup>

At Beetsterzwaag, Langweer, Lippenhuizen and Ureterp

			Metric
<b>mad<sup>a</sup></b>			5512.2 m <sup>2</sup>
1½	<b>lopental</b>		3674.8 m <sup>2</sup>
360	240	<b>vierkante roede</b>	15.31 m <sup>2</sup>

<sup>a</sup>At Beetsterzwaag and Lippenhuizen, according to [HOLT3, p. 95], = 380 vierkante roede = 5818.4 m<sup>2</sup>

At Bergum

			Metric
<b>mad or lopental</b>			5391.7 m <sup>2</sup>
1½	<b>pondermaat</b>		2995.4 m <sup>2</sup>
360	200	<b>vierkante roede</b>	14.98 m <sup>2</sup>

At Damwoude

		Metric
<b>lopental<sup>a</sup></b>		5503.7 m <sup>2</sup>
360	<b>vierkante (konings) roede</b>	15.29 m <sup>2</sup>

<sup>a</sup>According to [HOLT3, p. 96], = 5 511 m<sup>2</sup>

At Gorredijk; at Oudehaske and Nijehaske

		Metric	Metric
<b>morten</b>		9185 m <sup>2</sup>	8810 m <sup>2</sup>
600	<b>vierkante roede</b>	15.31 m <sup>2</sup>	14.68 m <sup>2</sup>

At Hardegarijp<sup>a</sup> and Oostermeer

		Metric
<b>mad</b> or <b>lopental</b>		5406 m <sup>2</sup>
360	<b>vierkante roede</b>	15.02 m <sup>2</sup>

<sup>a</sup>According to [HOLT3, p. 96]

At Leeuwarden after 1812

						Metric
<b>koegang</b>						7334.4 m <sup>2</sup>
1 $\frac{3}{5}$	<b>mad</b> or <b>mud</b>					4 584 m <sup>2</sup>
2	1 $\frac{1}{4}$	<b>pondemaat</b>				3 667.2 m <sup>2</sup>
4	2 $\frac{1}{2}$	2	<b>haid</b>			1 833.6 m <sup>2</sup>
24	15	12	6	<b>eins</b>		305.6 m <sup>2</sup>
480	300	240	120	20	<b>penning, jeerde</b> or <b>vierkante konings roede</b>	15.28 m <sup>2</sup>

At Schiermonnikoog

		Metric
<b>mad</b>		5495.27 m <sup>2</sup>
245	<b>vierkante roede</b>	22.43 m <sup>2</sup>

At Wolvega (using 1 roede = 3.12 m)

		Metric
<b>lopenstal</b>		2336.26 m <sup>2</sup>
240	<b>vierkante roede</b>	9.73 m <sup>2</sup>

At Stavorena after 1504

			Metric
<b>hoofd</b>			2751.86 m <sup>2</sup>
3	<b>veestal</b>		917.29 m <sup>2</sup>
180	60	<b>vierkante (konings) roede</b>	15.29 m <sup>2</sup>

At Wolvega (using 1 Rijnlandse roede = 3.767 m)

		Metric
<b>mad</b>		5676 m <sup>2</sup>
400	<b>vierkante roede</b>	14.19 m <sup>2</sup>

### 121.11.3 Units of Volume

		Metric
<b>schuit</b> or <b>schip turf</b>		9.8 m <sup>3</sup>
70	<b>turf</b>	14 dm <sup>3</sup>

### 121.11.4 Units of Dry Capacity

Upper scale for cereal

					Metric
<b>loop</b> or <b>lopen</b>					83.6 L
2	<b>halflopen</b>				41.6 L
4	2	<b>vandel</b> or <b>vierendeel</b>			20.9 L
8	4	2	<b>halfvandel</b> or <b>half vierendeel</b>		10.45 L
16	8	4	2	<b>viermaat, spint</b> or <b>twemaal</b> <sup>a</sup>	5.225 L

<sup>a</sup>At Het Bildt named **loopjen**, and at Oosterwierum **lepsen**

Lower scale for cereal

					Metric
<b>viermaat</b>					5.225 L
4	<b>stedemaat</b> or <b>maat</b>				1.306 L
8	2	<b>halfstedemaat</b> or <b>kopmaat</b>			653 mL
16	4	2	<b>botjesmaat</b> or <b>halfkopmaat</b>		327 mL
32	8	4	2	<b>oortjesmaat</b>	163 mL

At Worum

		Metric
<b>Zak</b>		124.02 L
3	<b>achtendeel</b>	41.34 L

Other reported measures:

- 1 **last** = 3009 L ([NIPP, p. 57]) or 3004 L ([HOLT3, p. 175]);  
 1 **ton** (for cereal) = 167.2 L;  
 1 **turfkorf** (for peat after 1770) = 97 L;  
 1 **halve ton** (for coal and shells) = 97 L;  
 1 **mud** (for cereal during the seventeenth century) = 91.2 L;  
 1 **halve ton** (for lime) = 77.6 L;  
 1 **halve zak** or **bag** (for salt) = 52.2 L;  
 1 **vierendeel korf** (for fruit at Leewarden) = 48.1 L;  
 1 **halve ton** (for spray lime) = 46.6 L;  
 1 **halve ton** (for cement) = 38.8 L;

1 **achel** (at Workum during the sixteenth century) = 35.6 L;

1 **haverachel** (for oats at Workum during the sixteenth century) = 32.9 L;

1 **achtste korf** (for fruit at Leewarden) = 24.8 L.

### 121.11.5 Units of Liquid Capacity

At Bolsward and Het Bildt

		Metric
<b>kan</b>		3.95 L
4	<b>mengel</b>	987.5 mL

Upper scale for general use at Leeuwarden

			Metric
<b>vat</b>			924 L
4	<b>oxhoofd</b>		231 L
24	6	<b>anker</b>	38.5 L

Lower scale for general use at Leeuwarden

				Metric
<b>mengel</b>				980 mL
2	<b>halfvandeltje</b>			490 mL
4	2	<b>stuiverskantje</b>		245 mL
8	4	2	<b>halfstuiverskantje</b>	122.5 mL

For beer at Leeuwarden

		Metric
<b>ton</b>		154.8 L
8	<b>rinkelmandje</b>	19.35 L

For wine at Leeuwarden

				Metric
<b>aam</b>				154.8 L
4	<b>anker</b>			38.7 L
80	20	<b>kann or ommekan</b>		1.935 L
160	40	2	<b>mengel</b>	967.5 mL

At Weststellingwerf

				Metric
<b>kan</b>				1.72 L
2	<b>mengel</b>			860 mL
8	4	<b>vandeltje or vaandeltje</b>		215 mL

### 121.11.6 Units of Weight

Some reported measures:

1 **(Amsterdam) pond** (after the eighteenth century) = 494 g.

1 **Troois pond** (after 1529) = 492 g;

1 **pond** (at Vlieland) = 469 g.

## 121.12 Gelderland

### 121.12.1 Units of Quantity

1 **voer** = 1011 pieces = 202 worp (rolls) of five wood pieces and one extra, (the length of the circumference of 10 stuks = 705 mm);

1 **voer** = 104 bos (the length of the circumference = 705 mm).

### 121.12.2 Units of Length

During the seventeenth century

				Metric
<b>roede</b>				3.62 m
14	<b>voet</b>			258 mm
140	10	<b>duim</b>		25.8 mm

Rijnlandse scales

		Metric	Metric
<b>roede</b>		3.76 m	3.78 m
12	<b>voet</b>	313 mm	315 mm

Alternative Rijnlandse scale

		Metric
<b>roede</b>		5.02 m
16	<b>voet</b>	313.9 mm

During the nineteenth century

			Metric
<b>roede</b>			3.8 m
14	<b>voet</b>		271 mm
140	10	<b>duim</b>	27.1 mm

At Apeldoorn, Doetinchem and Nijmegen

			Metric
<b>roede</b>			3.39 m
12	<b>Amsterdam (hout) voet</b>		282.5 mm

At Apeldoorn, Doetinchem

			Metric
<b>roede</b>			4.52 m
16	<b>Amsterdam voet</b>		282.5 mm

At Buren

			Metric
<b>roede</b>			3.76 m
14	<b>voet</b>		268.6 mm

At Doornspijk

			Metric
<b>roede</b>			4.381 m
14	<b>voet</b>		312.9 mm

At Groenlo, Wageningen and Zevenaar

			Metric
<b>roede</b>			3.77 m
12	<b>voet</b>		314.2 mm

At Harderwijk

			Metric
<b>roede</b>			3.96 m
14	<b>voet</b>		283 mm

## At Nijmegen after 1743

			Metric
<b>roede</b>			3.794 m
14	<b>voet</b>		271 mm
140	10	<b>duim</b>	27.1 mm

## Other reported measures:

- 1 **el** (at Buren) = 695 mm;  
 1 **el** (at Silvolde, Terborg and Over Veluwe) = 694 mm (Brabant scale);  
 1 **el** (at Harderwijk (as Lands el)) = 693 mm;  
 1 **el** (at Aalten, Achterhoek, Apeldoorn, Barneveld, Beekbergen, Borculo, Bredevoort, Elst, Gendringen, Ruurlo, Veluwezoom, Voorthuizen, Wageningen and Winterswijk) = 690 mm;  
 1 **el** (at Doesburg, Veluwe and Zutphen) = 688 mm;  
 1 **el** (at Culemborg and Hagestein, ) = 685 mm;  
 1 **el** (at Brakel, Bruchem, Brummen, Delwijnen, Doesburg, Driel, Ede, Eibergen, Geldermalsen, Harderwijk, Velp, Vorden and Zaltbommel) = 684 mm;  
 1 **el** (at Zevenaar) = 680 mm;  
 1 **el** (at Nijmegen) = 678 mm;  
 1 (kleine) **el** (at Silvolde) = 575 mm (Keul scale).

**121.12.3 Units of Area**

There were three different systems from the sixteenth until the nineteenth century.

## Scales used at Arnhem

			Metric	Metric	Metric
<b>morgen</b>			6894 m <sup>2</sup>	8478 m <sup>2</sup>	12,366 m <sup>2</sup>
1½	<b>malder</b>		4596 m <sup>2</sup>	5652 m <sup>2</sup>	8244 m <sup>2</sup>
600	400	<b>vierkante roede</b>	11.49 m <sup>2</sup>	14.13 m <sup>2</sup>	20.61 m <sup>2</sup>

## During the seventeenth century

		Metric
<b>morgen</b>		7862.64 m <sup>2</sup>
600	<b>vierkante roede</b>	13.10 m <sup>2</sup>

## At Harderwijk

				Metric
<b>morgen</b>				9414 m <sup>2</sup>
6	<b>schepel</b>			1569 m <sup>2</sup>
24	4	<b>spint</b>		392.25 m <sup>2</sup>
600	100	25	<b>vierkante roede</b>	15.69 m <sup>2</sup>

## Rijnlandse scale used for sandy soil

				Metric
<b>morgen</b>				8514.17 m <sup>2</sup>
1½	<b>mud or molder</b>			5676.11 m <sup>2</sup>
6	4	<b>schepel</b>		1419.03 m <sup>2</sup>
600	400	100	<b>vierkante roede</b>	14.19 m <sup>2</sup>

## During the nineteenth century

		Metric
<b>morgen</b>		8664 m <sup>2</sup>
600	<b>vierkante roede</b>	14.44 m <sup>2</sup>

## At Doetinchem

			Metric
<b>morgen</b>			6895.3 m <sup>2</sup>
6	<b>schepel</b>		1149 m <sup>2</sup>
600	100	<b>vierkante roede</b>	11.49 m <sup>2</sup>

For arable land at Doornspijk

		Metric
<b>mud gezaaid</b>		7599 m <sup>2</sup>
396	<b>vierkante roede</b>	19.19 m <sup>2</sup>

For grassland at Doornspijk

		Metric
<b>morgen</b>		11,514 m <sup>2</sup>
600	<b>vierkante roede</b>	19.19 m <sup>2</sup>

At Groenlo

		Metric
<b>morgen</b>		8527.74 m <sup>2</sup>
600	<b>vierkante roede</b>	14.21 m <sup>2</sup>

## 121.12.4 Units of Dry Capacity

At Arnhem during the sixteenth century

			Metric
<b>hoed</b>			~1176 L
8 <sup>2</sup> / <sub>3</sub>	<b>mouwer</b>		~140 L
33 <sup>2</sup> / <sub>3</sub>	4	<b>schepel</b>	~35 L

At Arnhem and Apeldoorn during the eighteenth and nineteenth centuries

			Metric
<b>mud or mouwer</b>			136.8 L
4	<b>schepel</b>		34.2 L
16	4	<b>spint</b>	8.55 L

At Asperen

		Metric
<b>zak</b>		114.9 L
3	<b>achtendeel</b>	38.30 L

At Culemborg during the seventeenth century

		Metric
<b>mouwer</b>		140 L
4	<b>achel</b>	35 L

For cereal in Culemborg during the nineteenth century

				Metric
<b>mud</b>				143.3 L
1 <sup>1</sup> / <sub>3</sub>	<b>zak</b>			107.5 L
4	3	<b>schepel</b>		35.83 L
16	12	4	<b>spint</b>	8.96 L

For coal at Culemborg

		Metric
<b>hoed</b>		1002.4 L
28	<b>schepel</b>	35.8 L

For fruit in Culemborg

		Metric
<b>ton</b>		243.5 L
2	<b>zak</b>	121.75 L

For potatoes in Culemborg

		Metric
<b>ton</b>		125.7 L
11	<b>spint</b>	11.4 L

At Doesburg

<b>aam</b>	
88	<b>kan</b>

At Etten

<b>aam</b>	
112	<b>kan</b>

For cereal and salt at Harderwijk

			Metric
<b>mud<sup>a</sup></b>			133.8 L
4	<b>schepel</b>		33.45 L
16	4	<b>spint</b>	8.35 L

<sup>a</sup>During the sixteenth and seventeenth centuries, reported as 106 L

Two reported scales at Nijmegen during the sixteenth century

		Metric	Metric
<b>mouwer</b>		138.4 L	170.3 L
4	<b>schepel</b>	34.6 L	42.6 L

Two reported scales at Nijmegen during the seventeenth century

		Metric	Metric
<b>malder or mouwer</b>		138.4 L	167.2 L
4	<b>schepel</b>	34.6 L	41.8 L

At Nijmegen during the nineteenth century

								Metric
<b>last</b> <sup>a</sup>								3009.6 L
18	<b>malder</b>							167.2 L
72	4	<b>schepel</b>						41.8 L
144	8	2	<b>vat</b>					20.9 L
288	16	4	2	<b>spint</b>				10.45 L
2304	128	32	16	8	<b>kan</b> <sup>b</sup>			1.306 L
4608	256	64	32	16	2	<b>mengel</b>		653 mL
9216	512	128	64	32	4	2	<b>halfje</b>	326 mL

<sup>a</sup>Generally reported as 3006 L ([NIPP, p. 147])

<sup>b</sup>Also reported as 1.328 05 L

For soap at Nijmegen

		Metric
<b>ton</b>		118.5 L
4	<b>kinnetje</b>	29.6 L

For cereal at Zutphen

					Metric
<b>zak</b>					166.8 L
1½	<b>mud</b>				111.2 L
6	4	<b>schepel</b>			27.8 L
24	16	4	<b>spint</b>		6.95 L
48	32	8	2	<b>maatje</b>	3.48 L

Other reported measures:

- 1 **hoed** (at Zaltbommel during the sixteenth century) = 1349 L;
- 1 **haver hoed** (for oats at Asperen) = 1161 L;
- 1 **ton** (at Nijmegen) = 199 L;
- 1 **turf ton** (for peat at Arnhem) = 138.8 L;
- 1 **ton** (for peat at Zutphen) = 113 L;
- 1 **kuip** (for lime at Nijmegen) = 107 L;
- 1 **kalk kuip** (for lime at Arnhem) = 102.6 L;
- 1 **waag** (for coal at Culemborg) = 67.5 kg;
- 1 **schepel** (for coal at Zutphen) = 48.6 L;
- 1 **schepel** (at Barneveld) = 47.0 L;
- 1 **kruis schepel** (for salt at Nijmegen) = 43.4 L;
- 1 **schepel** (for salt at Nijmegen) = 42.1 L;
- 1 **schepel** (at Delwijnen, Driel and Zaltbommel) = 41.9 L;
- 1 **achel** (at Culemborg during the sixteenth century) = 41 L;
- 1 **schepel** (at Gendringen) = 37.6 L;

1 **achel** (at Asperen) = 39.5 L (during the sixteenth century) and 41.5 L (during the seventeenth century);

1 **schepel** (at Buren) = 35.8 L;

1 **schepel** (at Groenlo) = 33.4 L;

1 **schepel** (at Neder Veluwe) = 34.2 or 47 L;

1 **schepel** (at Over Veluwe) = 29 L (Deventer scale) or 34.2 L (Arnhem scale);

1 **korenvat** (for grain at Alem in 1572) = 16.2 L.

## 121.12.5 Units of Liquid Capacity

At Arnhem

				Metric
<b>aam</b>				150 L
100	<b>kan</b>			1.5 L
200	2	<b>mengel</b>		750 mL
800	8	4	<b>pint</b>	187.5 mL

At Culemborg

				Metric
<b>okshoofd</b>				232.5 L
1½	<b>aam</b>			155 L
6	4	<b>anker</b>		38.75 L
31½	21	5¼	<b>viertel</b>	7.38 L

At Didam

		Metric
<b>aam</b>		150 L
112	<b>kan</b>	1.34 L

At Nijmegen

								Metric
<b>vat</b>								900 L
4	<b>okshoofd</b>							225 L
6	1½	<b>aam</b>						150 L
24	6	4	<b>anker</b>					37.5 L
120	30	20	5	<b>vierendeel</b>				7.5 L
672	168	112	28	5⅓	<b>kan</b>			1.34 L
1344	336	224	56	11⅓	2	<b>mengel</b>		670 mL
2688	672	448	112	22⅓	4	2	<b>halfje</b>	335 mL

Lower scale in Nijmegen, based on [NIPP, p. 148]

			Metric
<b>kan</b>			1.39 L
2	<b>mengel</b>		695 mL
4	2	<b>halfje</b>	347.5 mL

At Zutphen

			Metric
<b>steekan</b>			19.36 L
11	<b>kan</b>		1.76 L
22	2	<b>mengel</b>	880 mL

Other repored measures:

1 **kan** (at Wageningen) = 1.73 L;1 **kan** (at Delwijnen and Zaltbommel) = 1.333 533 L.

## 121.12.6 Units of Weight

For rapeseed oil at Barneveld

		Metric
<b>aam</b>		207.6 kg
240	<b>pond</b>	865 g

Other reported measures:

1 **mud** (for dry commodities at Apeldoorn) = 68 kg (minced) or 66.5 kg;1 **pond** (for tree oil at Barneveld) = 494 g;1 **pond** (at Borculo, Burenand Doesburg,) = 494 = g;1 **pond** (at Nijmegen) = 492.2 g;1 **pond** (at Harderwijk) = 492.1 g;1 **pond** (at Nijmegen) = 476 g;1 **pond** (in Buren, Culemborg, Doesburg (for retailers), Driel, Hagstein and Zaltbommel) = 469 g;1 **pond** (at Arnhem and Apeldoorn) = 468.77 g.

## 121.13 Groningen

### 121.13.1 Units of Length

					Metric
<b>torenmaat</b>					5.47 m
1¼	<b>veenroede</b>				4.38 m
1⅞ <sub>56</sub>	1⅞ <sub>14</sub>	<b>roede</b>			4.088 m
18¾	15	14	<b>voet</b>		292 mm
225	180	168	12	<b>duim</b>	24.3 mm

Other reported measures:

- 1 **roede** (at Zuidhorn) = 4.58 m;  
 1 **roede** (at Adorp) = 4.55 m;  
 1 **roede** (at Bedum and Baflo) = 4.38 m;  
 1 **roede** (at Marum) = 4.237 m;  
 1 **roede** (at Zuidhorn) = 4.09 m;  
 1 **roede** (at Woltersum) = 3.50 m;  
 1 **treed** (at Marum) = 1.467 m;  
 1 **el** (at Appingedam) = 699 mm;  
 1 **el** (at Groningen) = 669 mm.

### 121.13.2 Units of Area

			Metric
<b>deimt</b>			5016 m <sup>2</sup>
1¼	<b>gras</b>		4013 m <sup>2</sup>
300	240	<b>vierkante roede</b>	16.72 m <sup>2</sup>

At Adorp; at Aduard

		Metric	Metric
<b>gras</b>		4968 m <sup>2</sup>	5167.2 m <sup>2</sup>
240	<b>vierkante roede</b>	20.7 m <sup>2</sup>	21.53 m <sup>2</sup>

At Baflo

			Metric
<b>juk</b>			
10	<b>voerling</b>		
300	30	<b>vierkante roede</b>	19.18 m <sup>2</sup>

At Zuidhorn (two reported scales)

		Metric	Metric
<b>gras</b>		4014.7 m <sup>2</sup>	5034.3 m <sup>2</sup>
240	<b>vierkante roede</b>	16.73 m <sup>2</sup>	20.98 m <sup>2</sup>

At Woltersum

		Metric
<b>gras</b>		4410 m <sup>2</sup>
360	<b>vierkante roede</b>	12.25 m <sup>2</sup>

Other reported measures:

- 1 **vierkante roede** (at Bedum) = 19.18 m<sup>2</sup>;  
 1 **vierkante roede** (at Marum) = 17.95 m<sup>2</sup>.

### 121.13.3 Units of Dry Capacity

			Metric
<b>mud</b>			91.028 L
4	<b>schepel</b>		22.757 L
16	4	<b>spint</b>	5.689 L

Other reported measures:

- 1 **korf** (for peas at Aduard) = 68 L;  
 1 **zak** = 83.6 L.

### 121.13.4 Units of Volume

Some reported measures:

- 1 **voer** = 2.04 m<sup>3</sup>.

### 121.13.5 Units of Liquid Capacity

At Appingedam

				Metric
<b>aam</b>				155 L
3	<b>sester</b>			51.7 L
105	35	<b>kroes</b>		1.48 L
120	40	1½	<b>mengel</b>	1.29 L

For beer at Groninge

		Metric
<b>ton</b>		169.2 L
120	<b>kroes</b>	1.41 L

Other reported measures:

- 1 **kwaat** (for buttermilk) = 1 L;  
 1 **kroes** = 1.4 L.

### 121.13.6 Units of Weight

		Metric
<b>scheepsvracht</b>		17,700 kg
10	<b>last</b>	1770 kg

Other reported measures:

- 1 **bundel** = 3.2 kg;  
 1 **spekpond** = 543.4 g;  
 1 **pond** (at Appingedam) = 531 g;  
 1 (Trois) **pond** = 492.3 g;  
 1 ('Keuls') **pond** = 468.1 g;  
 1 **medicinaal pond** = 357.6 g.

## 121.14 Limburg

From 1815 until 1839, Limburg was one of the provinces of the United Kingdom of the Netherlands. In 1839, the area was split into a Belgian and a Dutch part.

### 121.14.1 Units of Length

Upper scale at Maasbracht

				Metric
<b>Roede</b>				4.48 m
$6\frac{7}{10}$	<b>el</b>			668.8 mm
16	$2\frac{26}{67}$	<b>voet</b>		280 mm
$107\frac{7}{5}$	16	$6\frac{7}{10}$	<b>talie</b>	41.8 mm

Lower scale at Hoorn

		Metric
(stads) <b>voet</b>		277 mm
10	<b>duim</b>	27.7 mm

Other reported measures:

- 1 **el** (at Hoorn) = 708 mm;  
 1 **el** (at Maastricht) = 683.5 mm;  
 1 **voet** (at St. Hubert) = 294 mm;  
 1 **voet** (at St. Lambert) = 291 mm;  
 1 **voet** (at Maastricht) = 280.6 mm.

### 121.14.2 Units of Area

		Metric
<b>morgen</b>		3174 m <sup>2</sup>
150	<b>roede</b> <sup>2</sup>	21.16 m <sup>2</sup>

### 121.14.3 Units of Volume

- 1 **koord** = 2.77 m<sup>3</sup>.

### 121.14.4 Units of Dry Capacity

For cereal at Hoorn

					Metric
<b>mud</b>					136.8 L
2	<b>zak</b>				68.4 L
4	2	<b>schepel</b>			34.2 L
16	8	4	<b>taak or takel</b>		8.55 L
128	64	32	8	<b>kop</b>	1.069 L

For coal at Hoorn

		Metric
<b>hoed</b>		1463 L
36	<b>bekken</b>	38.5 L

For fruit at Hoorn

					Metric
<b>ton</b>					243.48 L
2	<b>mand</b>				121.74 L
6	3	<b>kinnetje</b>			40.58 L
$28\frac{1}{2}$	$14\frac{1}{4}$	$4\frac{3}{4}$	<b>taak or takel</b> <sup>a</sup>		8.55 L
228	114	38	8	<b>kop</b> <sup>a</sup>	1.069 L

<sup>a</sup>Also used for cement, potatoes, lime, stone and shell sand

For lime at Hoorn

		Metric
<b>hoed</b>		1270 L
10	<b>ton</b>	127 L

For salt at Hoorn

			Metric
<b>honderd</b>			18,278.4 L
204	<b>zak</b>		89.6 L
408	2	<b>schepel</b>	44.8 L

Other reported measures:

- 1 **havermud** (for oats at Maashticht during the seventeenth century) = 633.7 L;  
 1 **mud** (for cereal at Maashticht during the sixteenth century) = 558.1 L;  
 1 **mud** (for cereal at Maashticht during the seventeenth century) = 430 L;  
 1 **ton** (for peat at Hoorn) = 226.5 L;  
 1 **ton** (for charcoal at Hoorn) = 180 L;  
 1 **ton** (for potatoes at Hoorn) = 124.5 L;  
 1 **achtel** (during the seventeenth century) = 34.5–35.8 L;  
 1 **achtel** (during the sixteenth century) = 31.7 L;  
 1 **vat** (for cereal at Maashticht during the early nineteenth century) = 23.34 L;  
 1 **schepel** (at Maashticht) = 22.673 L;  
 1 **measure** (for prawns) = from about 170 mL.

### 121.14.5 Units of Liquid Capacity

For milk, mustard and tar

		Metric
<b>mengel</b>		3 L
2	<b>pint</b>	1.5 L

Other reported measures:

- 1 **ton** (for beer at Hoorn) = 164 L;  
 1 **anker** (for wine at Hoorn) = 38.5 L;  
 1 **halve kan** (for oil at Hoorn) = about 3.5 L;  
 1 **kann** (for beer at Maashticht) = 1.56 L;  
 1 **kann** (for milk and wine at Maashticht) = 1.45 L;  
 1 **pint** (for wine at Hoorn) = 0.7 L;  
 1 **pond** (for olive oil and seed oil at Hoorn) = 0.5 L.

### 121.14.6 Units of Weight

		Metric
(Trois) <b>pond</b>		492 g
2	<b>mark</b>	246 g

Other reported measures:

- 1 **ton** (for soap at Hoorn) = 118.5 kg;  
 1 **pond** (for butter at Maashticht) = 496.9 g;  
 1 **kop** (for butter at Hoorn) = 494 g;  
 1 **pond** (retail weight) = 467.6 g.

## 121.15 North Brabant

### 121.15.1 Units of Length

At Eindhoven and Zevenbergen

			Metric	Metric
<b>roede</b>			5.84 m	5.78 m
20	<b>voet</b>		292 mm	289 mm
200	10	<b>duim</b>	29.2 mm	28.9 mm

Other reported measures:

- 1 **el** (at Woudrichem) = 687 mm.

### 121.15.2 Units of Area

At Eindhoven

			Metric
<b>morgen</b>			10,231.7 m <sup>2</sup>
6	<b>lopen</b>		1795.3 m <sup>2</sup>
300	50	<b>roede<sup>2</sup></b>	35.106 m <sup>2</sup>

At Zevenbergen

		Metric
<b>bunder</b>		13,364 m <sup>2</sup>
400	<b>roede<sup>2</sup></b>	33.41 m <sup>2</sup>

### 121.15.3 Units of Dry Capacity

For cereal at Eindhoven

			Metric
<b>mud</b>			301 L
2	<b>zak</b>		150.5 L
14	7	<b>vat</b>	21.5 L

## Alternative scale at Eindhoven

		Metric
<b>mud</b>		258 L
12	<b>vat</b>	21.5 L

## At Woudrichem

		Metric
<b>zak</b>		87.2 L
2	<b>schepel</b>	43.6 L

## Other reported measures:

- 1 **achtel** (at Zevenbergen after 1572) = 44.1 L;  
 1 **achel** (at Woudrichem after 1572) = 43.7 L;  
 1 **achel** (at Woudrichem during the seventeenth century) = 35.8–42.5 L;  
 1 **achel** (at Woudrichem during early sixteenth century) = 35.6–41 L;  
 1 **vat** (at Eindhoven during the sixteenth century) = 16.9 L.

**121.15.4 Units of Weight**

- 1 **pond** (at Woudrichem) = 457.5 g.

**121.16 North Holland****121.16.1 Units of Length**

## In Amsterdam

			Metric
<b>roede<sup>a</sup></b>			3.677 m
13	<b>voet</b>		282.8 mm
143	11	<b>duim</b>	25.7 mm

<sup>a</sup>There was also (during the early nineteenth century) a roede = 16 voet = 4.53 m and a roede = 12 voet = 3.39 m

## At Enkhuizen

		Metric
<b>(Drechterlandse) roede<sup>a</sup></b>		3.91 m
12	<b>voet</b>	325.8 mm

<sup>a</sup>There was also a carpenters' foot = **timmermans voet** = 283 mm

## At Haarlem after 1629

		Metric
<b>roede</b>		3.91 m
14	<b>voet</b>	279.3 mm

## At Huisduinen before 1629

		Metric
<b>roede</b>		5.32 m
18	<b>voet</b>	295.5 mm

## At Huisduinen after 1629

		Metric
<b>roede</b>		3.42 m
12	<b>voet</b>	285 mm

## At Huisduinen during the nineteenth century

		Metric
<b>roede</b>		4.8 m
16	<b>voet</b>	300 mm

## At Zijpe

		Metric
<b>roede</b>		3.82 m
12	<b>voet</b>	318 mm

## Other reported measures:

- 1 **brugse el** (for unmarked sheets) = 700 mm;  
 1 **brabantse el** (at public auctions) = 694 mm;  
 1 **roede** (at Haarlem before 1629) = 276–278 mm;

**121.16.2 Units of Area**

## In Amsterdam and at Enkhuizen

		Metric	Metric
<b>morgen</b>		8112.20 m <sup>2</sup>	9172.86 m <sup>2</sup>
600	<b>vierkante roede</b>	13.52 m <sup>2</sup>	15.288 m <sup>2</sup>

### 121.16.3 Units of Volume

In Amsterdam

			Metric
<b>voet<sup>3</sup></b>			22.665 dm <sup>3</sup>
~121	<b>riemduim</b> (voet × duim <sup>2</sup> )		186.92 cm <sup>3</sup>
1331	~11	<b>duim<sup>3</sup></b>	16.975 cm <sup>3</sup>

Other reported measures:

1 **vadem** (for firewood) = 2.9 m<sup>3</sup>.

### 121.16.4 Units of Dry Capacity

For cement in Amsterdam

		Metric
<b>(Dordrechtse) ton</b>		60.38 L
45	<b>mengel</b>	1.34 L

Alternative scales for cereal in Amsterdam during the sixteenth century

			Metric	Metric
<b>mud</b>			116.53 L	110.4 L
1⅓	<b>zak</b>		87.4 L	82.8 L
4	3	<b>schepel</b> or <b>vat</b>	29.1 L	27.6 L

For cereals in Amsterdam during the nineteenth century

				Metric
<b>last</b>				3010 L
27	<b>mud</b>			111.48 L
36	1⅓	<b>zak<sup>a</sup></b>		83.6 L
108	4	3	<b>schepel</b> or <b>vat</b>	27.87 L

<sup>a</sup>During the mid-nineteenth century also reported as 79.53 L

For cereal (for retailers) in Amsterdam

			Metric
<b>Schepel</b>			27.76 L
4	<b>vierdevat</b>		6.94 L
32	8	<b>kop</b>	867.5 mL

For grain at Enkhuizen

			Metric
<b>mud</b>			136.8 L
2	<b>zak</b>		68.4 L
4	2	<b>schepel<sup>a</sup></b>	34.2 L

<sup>a</sup>Also reported as 34.05 L

For cereal at Haarlem

		Metric
<b>zak</b>		79.2 L
2	<b>schepel</b>	39.6 L

For charcoal in Amsterdam

		Metric
<b>ton</b>		172 L
8	<b>steekan</b>	21.5 L

For coal in Amsterdam

			Metric
<b>hoed</b>			1172.4 L
38	<b>maat</b>		30.85 L
57	1½	<b>steekan</b>	20.57 L

For fruit in Amsterdam

		Metric
<b>ton</b>		243.5 L
34	<b>vierdevat</b>	7.16 L

For lime in Amsterdam

				Metric
<b>hoed</b>				981.7 L
8	<b>ton</b>			122.7 L
64	8	<b>kinnetje</b>		15.34 L
960	120	15	<b>kop</b>	1.023 L

Alternative scale for lime in Amsterdam

		Metric
<b>ton</b>		120.7 L
90	<b>mengel</b>	1.34 L

For potatoes in Amsterdam

		Metric
<b>ton</b>		220 L
8	<b>mand</b>	27.5 L

For potatoes in Haarlem

		Metric
<b>schel</b>		60 L
32	<b>merretje</b>	1.88 L

For salt in Amsterdam

		Metric
<b>vat</b>		184 L
4	<b>schepel</b> or <b>schel</b>	46 L

For soap in Amsterdam

		Metric
<b>ton</b>		111.6 L
93	<b>mengel</b>	1.2 L

## 121.16.5 Units of Liquid Capacity

For beer, mustard, prawns and yeast in Amsterdam

					Metric
<b>ton</b>					155.4 L
4	<b>anker</b>				38.85 L
8	2	<b>steekan</b>			19.425 L
128	32	16	<b>mengel</b>		1.214 L
256	64	32	2	<b>pint</b>	607 mL

For beer at Haarlem

			Metric
<b>anker</b>			36 L
22	<b>flapkan</b>		1.63 L
44	2	<b>mengel</b>	818.18 mL

For brandy in Amsterdam

			Metric
<b>(Mentzer) steekan</b>			18.75 L
2½	<b>viertel</b>		7.5 L
15	6	<b>mengel</b>	1.25 L

For milk in Amsterdam

			Metric
<b>vat</b>			29 L
16	<b>mengel</b>		1.81 L
32	2	<b>pint</b>	906.25 mL

For olive oil and seed oil in Amsterdam

			Metric
<b>aam</b>			145.5 L
3	<b>sester</b>		48.5 L
120	40	<b>mengel</b>	1.21 L

For olive oil and seed oil in Amsterdam

				Metric
<b>vat</b> <sup>a</sup>				869.4 L
5 <sup>117/120</sup>	<b>aam</b>			145.5 L
17 <sup>37/40</sup>	3	<b>sester</b>		48.5 L
717	120	40	<b>mengel</b>	1.21 L

<sup>a</sup>Only for olive oil

Alternative scale for seed oil in Amsterdam

			Metric
<b>aam</b>			145.5 L
60	<b>stoop</b>		2.4 L
120	2	<b>mengel</b>	1.2 L

For train oil in Amsterdam

				Metric
<b>vat</b>				232.8 L
2	<b>smalton</b>			116.4 L
12	6	<b>steekan</b>		19.4 L
96	48	8	<b>stoop</b>	2.425 L
192	96	16	2	<b>mengel</b> 1.21 L

For water in Amsterdam

			Metric
<b>gang</b>			29.4 L
2	<b>emmer</b>		14.7 L
24	12	<b>mengel</b>	1.225 L

For wine, gin and vinegar in Amsterdam

									Metric
<b>vat or voeder</b>									921.6 L
4	<b>okshoofd<sup>a</sup></b>								230.4 L
6	1½	<b>aam</b>							153.6 L
24	6	4	<b>anker</b>						38.4 L
48	12	8	2	<b>steekkan</b>					19.2 L
384	96	64	16	8	<b>stoop</b>				2.4 L
768	192	128	32	16	2	<b>mengel or kruik</b>			1.2 L
1536	384	256	64	32	4	2	<b>pint</b>		600 mL
6144	1536	1024	256	128	16	8	4	<b>mutsjje</b>	150 mL

<sup>a</sup>According to [DOUR], = 228.51 L, and [KELL], = 232.80 L

For Rhine wine in Amsterdam

		Metric
<b>aam</b>		155.4 L
21	<b>viertel</b>	7.4 L

For wine in general at Haarlem

		Metric
<b>anker</b>		38.8 L
32	<b>kan</b>	1.21 L

Other reported measures:

- 1 **ton** (for water in waterworks) = 185.5 L;
- 1 **ton** (for water) = 110.5 L;
- 1 **mengel** (for milk at Enkhuizen) = 1.58 L;
- 1 **biermengel** (before 1770) = 1.36 L;
- 1 **pint** (for milk at Haarlem) = 1.15 L;
- 1 **pint** (for milk at Enkhuizen) = 960 mL;
- 1 **fles** (for wine) = 880 mL;
- 1 **pond** (for rapeseed oil at Haarlem) = 780 L;
- 1 **pond** (for tree oil at Haarlem) = 580 mL;
- 1 **pond** (olive oil at Haarlem) = 550 mL.

## 121.16.6 Units of Weight

For general use at Amsterdam during the late nineteenth century

				Metric
<b>anker</b>				49.409 032 kg
100	<b>pond</b>			494.090 32 g
200	2	<b>mark</b>		247.045 16 g
1600	16	8	<b>ons or unze</b>	30.880 645 g

For general use at Amsterdam during the late nineteenth century

								Metric
<b>ons or unze</b>								30.880 645 g
2	<b>lood</b>							15.440 322 5 g
8	4	<b>dragma</b>						3.860 080 625 g
24	12	3	<b>skrupel</b>					1.286 693 542 g
51¼	25%	6 <sup>13</sup> / <sub>32</sub>	2 <sup>13</sup> / <sub>96</sub>	<b>engel</b>				602.549 171 mg
80	40	10	3½	1 <sup>23</sup> / <sub>41</sub>	<b>vierling</b>			386.008 062 mg
480	240	60	20	9 <sup>15</sup> / <sub>41</sub>	6	<b>grein</b>		64.334 678 mg
642½	321¼	80 <sup>9</sup> / <sub>16</sub>	26 <sup>37</sup> / <sub>48</sub>	12 <sup>22</sup> / <sub>41</sub>	8 <sup>1</sup> / <sub>32</sub>	1 <sup>69</sup> / <sub>192</sub>	<b>aas</b>	48.063 26 mg

Other reported measures:

- 1 **pond** (for gold and silver) = 492.16 g;  
 1 **pond** (for mercury, cochineal, silk trade and yarn) = 469.09 g;  
 1 **pond** (for merchants at Enkhuizen) = 469 g;  
 1 **pond** (for nails) = 467.09 g;  
 1 **pond** (for medical use) = 369.12 g.

## 121.17 Overijssel

### 121.17.1 Units of Length

At Almelo

		Metric
<b>tred</b>		850 mm
3	<b>voet</b>	283.3 mm

At Devener; at Steenwijk; at Zwolle and Zwollerkerspel

		Metric	Metric	Metric
<b>roede</b>		4.736 m	4.704 m	4.53 m
16	<b>voet</b>	296 mm	294 mm	283 mm

At Mastenbroek during the early sixteenth century

		Metric
<b>roede</b>		5.38 m
19	<b>voet</b>	283 mm

At Mastenbroek

		Metric
<b>roede</b>		4.53 m
12	<b>voet</b>	377.5 mm

At Oldebroek

		Metric
<b>roede</b>		3.96 m
14	<b>voet</b>	283 mm

At Bathmen, Ommen and Salland

			Metric
<b>roede</b>			4.53 m
16	<b>voet</b>		283 mm
176	11	<b>duim</b>	25.7 mm

For peat at Steenwijkskarspelen and Steenwijkerwold

		Metric
<b>turf roede</b>		3.82 m
12	<b>voet</b>	318 mm

Other reported measures:

- 1 **roede** (at Steenwijkskarspelen) = 3.767 m;  
 1 **el** (at Ommen) = 688 mm;  
 1 **el** (at Almelo) = 685 mm;  
 1 **grote el** (at Twente and Steenwijk) = 682 mm;  
 1 **kleine el** (at Twente) = 586 mm;  
 1 **(hout) voet** (at Deventer and Enschede) = 296 mm.

### 121.17.2 Units of Area

At Almelo

		Metric
<b>lands spint</b>		104.04 m <sup>2</sup>
144	<b>vierkante tred</b>	72.25 dm <sup>2</sup>

At Devener and Zwolle

			Metric	Metric
<b>morgen</b>			13,457.82 m <sup>3</sup>	12,312.5 m <sup>3</sup>
6	<b>hond</b>		2242.97 m <sup>3</sup>	–
600	100	<b>roede<sup>2</sup></b>	22.430 m <sup>3</sup>	20.521 m <sup>3</sup>

At Elburg

				Metric
<b>morgen</b>				8400 m <sup>2</sup>
1½	<b>mud</b>			5600 m <sup>2</sup>
3	2	<b>gres</b>		2800 m <sup>2</sup>
6	4	2	<b>gaarde or voeder</b>	1400 m <sup>2</sup>

At Oldebroek

			Metric
<b>morgen</b>			9408.96 m <sup>2</sup>
1½	<b>mud</b>		6272.64 m <sup>2</sup>
600	400	<b>vierkante roede</b>	15.68 m <sup>2</sup>

## At Ommen

		Metric
<b>mud</b>		3078.13 m <sup>2</sup>
150	<b>vierkante roede</b>	20.52 m <sup>2</sup>

## At Bathmen and Salland

			Metric
<b>morgen</b>			12,312.54 m <sup>2</sup>
6	<b>hond</b>		2052.09 m <sup>2</sup>
600	100	<b>vierkante roede</b>	20.59 m <sup>2</sup>

## At Steenwijk

				Metric
<b>morgen</b>				8127 m <sup>2</sup>
2¼	<b>mud</b>			3612 m <sup>2</sup>
9	4	<b>schepel</b>		903 m <sup>2</sup>
36	16	4	<b>spint</b>	225.75 m <sup>2</sup>

## For pasture at Steenwijkspeelen

			Metric
<b>morgen</b>			11,673.92 m <sup>2</sup>
2	<b>dag mad</b>		5836.96 m <sup>2</sup>
800	400	<b>vierkante turf roede</b>	14.59 m <sup>2</sup>

## For arable land at Steenwijkspeelen

			Metric
<b>dag mad</b>			7200 m <sup>2</sup>
2	<b>mud</b>		3600 m <sup>2</sup>
8	4	<b>schepel</b>	900 m <sup>2</sup>

## At Almelo; at Delden, Goor, Herike and Markelo; at Haaksbergen; at Oldenzaal

			Metric	Metric	Metric	Metric
<b>mud</b>			132 L	133.76 L	136.8 L	125.5 L
4	<b>schepel</b> <sup>a</sup>		33 L	33.44 L	34.2 L	31.3 L
16	4	<b>spint</b>	8.25 L	8.36 L	8.55 L	–

<sup>a</sup>During the eighteenth century, varied between 32.46 L and 33.02 L

## At Twente and at Zwolle

		Metric	Metric
<b>morgen</b>		13,310.46 m <sup>2</sup>	12,312.54 m <sup>2</sup>
600	<b>vierkante roede</b>	22.18 m <sup>2</sup>	20.52 m <sup>2</sup>

## At Zwollerkarspel

					Metric
<b>morgen</b>					12,312.5 m <sup>2</sup>
3	<b>mud</b>				4104.2 m <sup>2</sup>
12	4	<b>schepel</b>			1026 m <sup>2</sup>
48	16	4	<b>spint</b>		256.51 m <sup>2</sup>
600	200	50	12½	<b>vierkante roede</b>	20.521 m <sup>2</sup>

## Other reported measures:

- 1 **dagwerk** (for hayland at Hardenberg) = 4400–4900 m<sup>2</sup>;
- 1 **mud** (for sowing land at Hardenberg) = 2500–2800 m<sup>2</sup>.

## 121.17.3 Units of Volume

- 1 **vaam** (for firewood at Steenwijk) = 2.9 m<sup>3</sup>.

## 121.17.4 Units of Dry Capacity

## At Deventer in 1447

				Metric
<b>take</b>				3.6 L
2	<b>quart</b>			1.8 L
4	2	<b>mengel</b>		900 mL
8	4	2	<b>pint</b>	450 mL

At Deventer during the sixteenth century

		Metric
<b>mud</b> <sup>a</sup>		110.7 L
4	<b>schepel</b>	27.7 L

<sup>a</sup>1 **havermud** (for oats) = 102.3 L (at Deventer) and 113.7 L (at Zwolle)

For cereal at Deventer, Enschede and Zwolle

				Metric	Metric	Metric
<b>mud</b>				115.70 L	140.1 L	120.4 L
4	<b>schepel</b> <sup>a</sup>			28.925 L	35.03 L	30.1 L
16	4	<b>spint</b> <sup>a</sup>		7.231 L	8.8 L	7.5 L
128	32	8	<b>kop</b>	903.9 mL	–	–

<sup>a</sup>Also reported as 29.04 L

<sup>b</sup>1 **spint** (for salt, at Enschede after 1792) = 13.5 L

At Elburg

		Metric
<b>mud</b>		125.4 L
4	<b>schepel</b> <sup>a</sup>	31.35 L

<sup>a</sup>For lime = 62.6 L

For cereal at Steenwijk

						Metric
<b>last</b>						3009.6 L
24	<b>mud</b>					125.4 L
96	4	<b>schepel</b>				31.35 L
384	16	4	<b>spint</b>			7.84 L
1536	64	16	4	<b>vierendeel</b>		1.96 L
6144	256	64	16	4	<b>kop</b>	490 mL

For lime at Steenwijk

		Metric
<b>Ton</b>		109.76 L
3½	<b>schepel</b>	31.36 L

For cereal at Vollenhove

		Metric
<b>mud</b>		136.5 L
4	<b>schepel</b> <sup>a</sup>	34.1 L

<sup>a</sup>Also reported as 33.8 L

Other reported measures:

1 **mud** (at Enschede) = 140.1 L;

1 **mud** (for cereals at Zwartsluis) = 136.8 L;

1 **mud** (at Kampen) = 123 L (during the sixteenth and seventeenth centuries) and 120.4 L (during the seventeenth century);

1 **mud** (for grain at Zwolle) = 120.4 L;

1 **mud** (at Colmschate) = 115.7 L;

1 **haver mud** (for oats at Zwolle) = 113.7 L;

1 **haver mud** (for oats at Kampen during the sixteenth century) = 110.7 L;

1 **zak** (at Kampen) = 83.6 L;

1 **zak** (for lime and cereal at Elburg) = 62.6 L;

1 **schepel** (for cereal at Enschede) = 35.27 L;

1 **schepel** (at Enschede) = 34.03 L;

1 **schepel** (at Borne) = 33.4 L;

1 **schepel** (at Oldenzaal) = 32.34 L;

1 **schepel** (at Steenwijk) = 30.95 L;

1 **spint** (at Enschede) = 8.84 L, in 1792 = 13.5 L.

## 121.17.5 Units of Liquid Capacity

For beer, olive oil, train oil and vinegar at Deventer

						Metric	Metric
<b>steekan</b>						10.6 L	–
6	<b>kan</b>					1.76 L	1.61 L
12	2	<b>mengel</b>				880 mL	805 mL
24	4	2	<b>oort</b>			440 mL	402 mL
96	16	8	4	<b>potje or maatje</b>		110 mL	101 mL
192	32	16	8	2	<b>halfje</b>	55 mL	50.3 mL

At Elburg

<b>Ton</b>		
16	<b>fruit</b>	
80	5	<b>kan</b>

At Oldenzaal

		Metric
<b>Aam</b>		145 L
84	<b>kan</b>	1.73 L

For normal and for distilled at Steenwijk

				Metric	Metric
<b>kan</b>				1.75 L	1.64 L
2	<b>mengel</b>			875 mL	820 mL
4	2	<b>oort</b>		437.5 mL	410 mL
16	8	4	<b>maatje</b>	109.4 mL	102.5 mL

Other reported measures:

1 **kan** (for milk and tar at Zwolle) = 2.225 8 L;

1 **pond** (for oil at Steenwijk) = 580 mL.

## 121.17.6 Units of Weight

Some reported measures:

1 **mud** (for granulated bark at Steenwijk) = 64 kg;

1 **mud** (for ground bark at Steenwijk) = 59 kg;

1 **pond** (at Zwolle) = 503.6 g;

1 **pond** (at Hasselt and Vollenhove) = 494 g;

1 **pond** (in Twente except at Enschede) = 493.5 g;

1 **pond** (at Deventer, Enschede, Ommen and Steenwijk) = 492 g;

1 **pond** (at Ommen) = 480 g;

1 **pond** (light weight, at Zwolle) = 479.8 g;

1 **pond** (at Oldenzaal) = 470 g.

For oil, vinegar, beer and wine at Zwolle during the early seventeenth century and from the late seventeenth century

						Metric	Metric
<b>anker</b>						–	36.705 6 L
2	<b>steekan</b>					–	18.352 8 L
24	12	<b>kan</b>				1.689 2 L	1.529 4 L
48	24	2	<b>mengel</b>			844.6 mL	764.7 mL
96	48	4	2	<b>oord</b>		422.3 mL	382.3 mL
384	192	16	8	4	<b>maatje or potje</b>	105.6 mL	95.6 mL

## 121.18 South Holland

### 121.18.1 Units of Length

Traditional system

			Metric
<b>roede</b>			3.960 m
12	<b>voet</b>		330 mm
144	12	<b>duim</b>	27.5 mm

At Abbenbroek

		Metric
<b>roede</b>		4.092 m
12	<b>voet</b>	341 mm

At Strijen

		Metric
<b>roede</b>		4.08 m
12	<b>voet</b>	340 mm

At Putten

			Metric
<b>roede<sup>a</sup></b>			4.07 m
12	<b>voet</b>		339 mm
156	13	<b>duim</b>	26.1 mm

<sup>a</sup>There was also a (Putse-Overmase) **roede** = 4.05 m

At Heenvliet

		Metric
<b>roede</b>		3.97 m
12	<b>voet</b>	331 mm

At Ameid

		Metric
<b>roede</b>		3.924 m
12	<b>voet</b>	327 mm

At Den Briel

		Metric
<b>land roede</b>		3.888 m
12	<b>voet</b>	324 mm

At Maasluis

		Metric
<b>roede</b>		3.796 m
12	<b>voet</b>	316 mm

At Delfland, Heerjakobswoude, Kethel, Langeraar, Mathenesse, Rijnland and Sluipwijk

					Metric
<b>roede</b>					3.767 m
12	<b>voet</b>				313.917 mm
144	12	<b>duim</b>			26.160 mm
1728	144	12	<b>lijn</b>		2.180 mm
20,736	1728	144	12	<b>punt</b>	0.18 mm

At Leiden, Veur, Warmond, Wassenar and Zwammerdam

		Metric
<b>roede</b>		3.762 m
12	<b>voet</b>	313.5 mm

At Den Bommel, Den Briel, Nieuwegote, Nieuwenhoorn, Nieuwhelvoet, Nieuwveen and Rockanje

		Metric
<b>stads roede</b>		3.744 m
12	<b>voet</b>	312 mm

At Rotterdam

		Metric
<b>roede</b>		3.744 m
12	<b>voet</b>	312 mm

At Ablasserdam, Bleskensgraaf, Dordrecht, Hofwegen, Leerambacht, De Mijl and Wijngaarden in 1672

		Metric
<b>roede</b>		3.727 m
12	<b>voet</b>	310 mm

At Achterland and Ammers

		Metric
<b>roede</b>		3.696 m
12	<b>voet</b>	308 mm

At Gorinchem during the nineteenth century and in 1629

		Metric	Metric
<b>roede</b>		3.6 m	3.72 m
12	<b>voet</b>	300 mm	310 mm

Other reported measures:

- 1 **el** (at Klaaswaal and Strijen) = 727 mm;  
 1 **el** (at Heenvliet) = 700 mm;  
 1 **el** (at Maassluis and Noordwijk) = 689 mm;  
 1 **el** (at Kool, Rhoon and Rotterdam) = 686 mm;  
 1 **el** (at Ablasterdam, Bleskensgraaf, Dordrecht, Hazerswoude, Hofwegen, Leerambacht, Leiden, De Mijl, Schoonhoven, Veur, Vianen, Warmond, Wassenar, Wijngaarden and Zwammerdam) = 685 mm;  
 1 old **el** (at Leiden, Veur, Warmond, Wassenar and Zwammerdam) = 683.10 mm;  
 1 **el** (at Abtsrecht, Berkel, Delft, Hogeveen, Honselersdijk, De Lier, Maasdam, Maasland, Mijnsheerland, Naaldwijk, Nieuwveen, Nootdorp, Rijswijk, Wateringen and Zandambacht) = 683 mm;  
 1 **el** (at Brandwijk) = 680 mm;  
 1 **el** (at Rhoon) = 678 mm.

## 121.18.2 Units of Area

Traditional system

			Metric
<b>hoeve</b>			150,528 m <sup>2</sup>
16	<b>morgen</b>		9408.96 m <sup>2</sup>
9600	600	<b>vierkante roede</b>	15.68 m <sup>2</sup>

At Den Briel

				Metric
<b>morgen</b>				9084 m <sup>2</sup>
2	<b>gemet</b>			4542 m <sup>2</sup>
6	3	<b>lijn or hond</b>		1514 m <sup>2</sup>
600	300	100	<b>vierkante roede</b>	15.14 m <sup>2</sup>

At Ablasterdam, Bleskensgraaf, Dordrecht, Hofwegen, Leerambacht, De Mijl and Wijngaarden in 1672

		Metric
<b>morgen</b>		8334 m <sup>2</sup>
600	<b>vierkante roede</b>	13.89 m <sup>2</sup>

At Gorinchem during the nineteenth century and in 1629

			Metric	Metric
<b>morgen</b>			7776 m <sup>2</sup>	8298 m <sup>2</sup>
2	<b>gemet</b>		3888 m <sup>2</sup>	4149 m <sup>2</sup>
600	300	<b>vierkante roede</b>	12.96 m <sup>2</sup>	13.83 m <sup>2</sup>

At Moordrecht in 1514

<b>hoeve</b>		
30	<b>morgen</b>	
18,000	600	<b>vierkante roede</b>

At Nieuw Lekkerland in 1514

<b>morgen</b>	
5	<b>hond</b>

At Putten

			Metric
<b>morgen</b>			9936 m <sup>2</sup>
2	<b>gemet</b>		4968 m <sup>2</sup>
600	300	<b>vierkante roede</b>	16.56 m <sup>2</sup>

At Delfland, Heerjakobswoude, Kethel, Langeraar, Mathenesse, Rijnland and Sluipwijk

						Metric
<b>hoeve</b>						136,224 m <sup>2</sup>
4	<b>viertel</b>					34,056 m <sup>2</sup>
16	4	<b>morgen</b>				8514 m <sup>2</sup>
32	8	2	<b>gemet</b>			4257 m <sup>2</sup>
96	24	6	3	<b>hond</b>		1418 m <sup>2</sup>
9600	2400	600	300	100	<b>vierkante roede</b>	14.19 m <sup>2</sup>

### 121.18.3 Units of Volume

1 **kubieke duim** (at Rijnland) = 17.9 cm<sup>3</sup>.

### 121.18.4 Units of Dry Capacity

At Abtsrecht, Berkel, Delft, Hogeveen, Honselersdijk, De Lier, Maasdam, Maasland, Mijnsheerenland, Naaldwijik, Nieuwveen, Nootdorp, Rijswijk, Wateringen and Zandambacht

					Metric
<b>hoed</b>					1107.2 L
10 <sup>2</sup> / <sub>3</sub>	<b>zak</b>				103.8 L
32	3	<b>achel</b> or <b>achepelel</b> <sup>a</sup>			34.6 L
128	12	4	<b>spint</b>		8.65 L
512	48	16	4	<b>maat</b>	2.162 L

<sup>a</sup>According to [DOUR], also, as **aschtendeel**, = 33.51 L

For lime at Delft

		Metric
<b>hoed</b>		1120 L
32	<b>achel</b>	35 L

For potatoes at Delft

<b>kinnetje</b>	
8	<b>maat</b>

At Den Bommel, Den Briel, Nieuwegote, Nieuwenhoorn, Nieuwhelvoet, Nieuwveen and Rockanje

		Metric
<b>land zak</b>		77.85 L
2	<b>land achel</b> <sup>a</sup>	38.925 L

<sup>a</sup>During the sixteenth century, reported as 36.7–36.9 L

At Den Bommel, Den Briel, Nieuwegote, Nieuwenhoorn, Nieuwhelvoet, Nieuwveen and Rockanje

		Metric
<b>stads zak</b>		77.293 L
2	<b>stads achel</b>	38.146 L

For oats at Ablasserdam, Bleskensgraaf, Dordrecht, Hofwegen, Leerambacht, De Mijl and Wijngaarden during the sixteenth century

		Metric
<b>haver hoed</b>		925.3 L
32	<b>achtel</b>	28.9 L

For lime and trass at Ablasserdam, Bleskensgraaf, Dordrecht, Hofwegen, Leerambacht, De Mijl and Wijngaarden

		Metric
<b>hoed</b>		971.2 L
8	<b>ton</b>	121.4 L

For salt at Ablasserdam, Bleskensgraaf, Dordrecht, Hofwegen, Leerambacht, De Mijl and Wijngaarden<sup>a</sup>

			Metric
<b>vat</b>			183.2 L
2	<b>zak</b>		91.6 L
4	2	<b>achtel</b> or <b>schepel</b>	45.8 L

<sup>a</sup>In 1797, these units of capacity were stated as the official units for salt in the Netherlands

At Ablasserdam, Bleskensgraaf, Dordrecht, Hofwegen, Leerambacht, De Mijl and Wijngaarden

							Metric
<b>hoed</b> <sup>a</sup>							1003.2 L
8	<b>zak</b> <sup>a</sup> or <b>vat</b>						125.4 L
10 <sup>2</sup> / <sub>3</sub>	1 <sup>1</sup> / <sub>3</sub>	<b>smal zak</b>					94.05 L
32	4	3	<b>achtel</b> <sup>b</sup> or <b>schepel</b>				31.35 L
128	16	12	4	<b>spint</b>			7.837 L
512	64	48	16	4	<b>maatje</b>		1.959 L
2048	256	192	64	16	4	<b>kwartier</b>	0.490 L

<sup>a</sup>For barley and oats. Generally used in retail selling

<sup>b</sup>During the fifteenth century, reported as about 31.9 L

At Achterbroek, Berkenwoude, Boskoop, Broekhuil, Broekhuizen, Gouda and Krimpen aan de Lek

					Metric
<b>grote last</b>					3010.0 L
1½	<b>last</b>				2006.7 L
28	18⅔	<b>grote zak</b>			107.5 L
42	28	1½	<b>(kleine) zak</b>		71.6 L
84	56	3	2	<b>schepel<sup>a</sup></b>	35.83 L

<sup>a</sup>In 1572, as **achtel**, reported as 37.5 L, during the sixteenth century, as 35.6 L, and during seventeenth century, as 35–35.8 L. For barley, it was reported as 43.2 L (during the sixteenth century) and 40.6 L (during the seventeenth century)

At Gorinchem, Kedichem, Leerbroek and Rietveld

		Metric
<b>zak</b>		87.2 L
2	<b>schepel<sup>a</sup></b>	43.6 L

<sup>a</sup>During the sixteenth century, reported as 43.2 L, in 1572, as 43.7 L, and during the seventeenth century, as 41.8–43.6 L. For oats, = 55.7 L

At Heenvliet

		Metric
<b>zak</b>		83.6 L
2	<b>achtel<sup>a</sup></b>	41.8 L

<sup>a</sup>During the sixteenth century, reported as 42.2 L. For oats, = 55.7 L (during the seventeenth century)

For cereal at Rotterdam and Schiedam, based on [DOUR], [KELL] and [MART3]

						Metric	Metric	Metric
<b>last</b>						–	–	3003.912 000 L
2 <sup>23</sup> / <sub>32</sub>	<b>hoed</b>					–	–	1104.887 172 L
29	10⅔	<b>zak</b>				100.53 L	103.44 L	103.583 172 L
87	32	3	<b>achtendeel</b>			33.51 L	34.48 L	34.527 724 L
348	128	12	4	<b>vierling</b>		8.378 L	8.62 L	8.631 931 L
1392	512	48	16	4	<b>maat</b>	2.094 L	2.155 L	2.157 983 L

At Heinenoord and Oudbeierland

				Metric
<b>zak</b>				77.8 L
2	<b>schepel</b>			38.9 L
8	4	<b>spint</b>		9.725 L
32	16	4	<b>maatje</b>	2.431 L

For cereal at Leiden, Veur, Warmond, Wassenar and Zwammerdam

			Metric
<b>zak<sup>a</sup></b>			68.4 L
2	<b>achtel<sup>b</sup></b>		34.2 L
32	16	<b>maat</b>	2.137 5 L

<sup>a</sup>[MART3] reported it as 68.271 L

<sup>b</sup>During the sixteenth century, varying between 33.5 and 35.1 L

For cereal at Putten

				Metric
<b>hoed</b>				1248 L
16	<b>zak<sup>a</sup>, vat or viertel</b>			78 L
32	2	<b>achtel<sup>b</sup></b>		39 L
128	8	4	<b>spint</b>	9.75 L

<sup>a</sup>For light grains, usually said to equal 117 L

<sup>b</sup>During the seventeenth century, also reported as 38.9 or 39.2 L

For coal at Kool and Rotterdam

			Metric
<b>hoed</b>			1170.000 000 L
38	<b>maat</b>		30.789 474 L
57	1½	<b>steek</b>	20.526 291 L

For salt at Kool and Rotterdam

		Metric
<b>hondert</b>		24,809.640 000 L
404	<b>maat</b>	61.410 000 L

For potatoes at Achterland, Ammers, Ammerstol, Bergambacht, Bonrepas, Langerak, Lekkerkerk, Schoonhoven, Willige-Langerak and Zevender

		Metric
<b>ton</b>		113.5 L
4	<b>schepel</b>	28.375 L

At Vianen

			Metric
<b>mud</b>			150.5 L
4	<b>schepel</b> or <b>achtel</b> <sup>a</sup>		37.625 L
16	4	<b>spint</b>	9.406 L

<sup>a</sup>In 1572, reported as 38.3 L, during the sixteenth century, also reported as 34.6 or 36.7 L, and during the seventeenth century, as 36.7 L

Other reported measures:

- 1 **hoed** (for hops at Schoonhoven) = 1038 L;
- 1 **ton** (for lime and trass at Ablasterdam, Bleskensgraaf, Dordrecht, Hofwegen, Leerambacht, De Mijl and Wijngaarden in 1805) = 469 L;
- 1 **ton** (for peat at Ablasterdam, Bleskensgraaf, Dordrecht, Hofwegen, Leerambacht, De Mijl and Wijngaarden) = 229 L;
- 1 **ton** (for peat at Leiden, Veur, Warmond, Wassenar and Zwammerdam) = 227 L;
- 1 **bus** (for chestnuts at Ablasterdam, Bleskensgraaf, Dordrecht, Hofwegen, Leerambacht, De Mijl and Wijngaarden in 1805) = 211 L;
- 1 **ton** (for potatoes at Den Bommel, Den Briel, Nieuwegote, Nieuwenhoorn, Nieuwhelvoet, Nieuwveen and Rockanje) = 123 L;
- 1 **tras ton** (for trass at Ablasterdam, Bleskensgraaf, Dordrecht, Hofwegen, Leerambacht, De Mijl and Wijngaarden in 1836) = 118.27 L;

- 1 **maat** (for fine trass at Ablasterdam, Bleskensgraaf, Dordrecht, Hofwegen, Leerambacht, De Mijl and Wijngaarden in 1805) = 82.1 L;
- 1 **zak** (at Noordwijk) = 71.6 L;
- 1 **ton** (for cement at Ablasterdam, Bleskensgraaf, Dordrecht, Hofwegen, Leerambacht, De Mijl and Wijngaarden) = 60.38 L;
- 1 **kinnetjes mand** (for fruit in Den Bommel, Den Briel, Nieuwegote, Nieuwenhoorn, Nieuwhelvoet, Nieuwveen and Rockanje) = 49.5 L;
- 1 **achtel** (for salt at Gorinchem, Kedichem, Leerbroek and Rietveld) = 48.1 L;
- 1 **achtel** (at Leidschendam) = 45.5 L;
- 1 **achtel** (at Abbenbroek) = 44.3 L;
- 1 **achtel** (at Charlois in 1572) = 41.2 L;
- 1 **achtel** (at Langebakkersoord and Poortugaal in 1572) = 37.3 L;
- 1 **achtel** (at Schoonhoven in 1572) = 36.4 L (also reported as 33.5 and 34 L);
- 1 **achtel** (at Barendrecht during the seventeenth century and at Rijnsburg) = 35 L;
- 1 **achtel** (for lime at Gorinchem, Kedichem, Leerbroek and Rietveld) = 33.2 L;
- 1 **achtel** (at Westmaas in 1572) = 32.3 L;
- 1 **haverachel** (for oats at Delft during the sixteenth century) = 32 L;
- 1 **achtel** (for trass at Gorinchem, Kedichem, Leerbroek and Rietveld) = 29.6 L;
- 1 **kinnetje** (for potatoes at Delft) = 8 maten = 17.3 L;
- 1 **maat** (for lime at Ablasterdam, Bleskensgraaf, Dordrecht, Hofwegen, Leerambacht, De Mijl and Wijngaarden in 1805) = 8.8 L;
- 1 **korfje** (for fruit at Den Bommel, Den Briel, Nieuwegote, Nieuwenhoorn, Nieuwhelvoet, Nieuwveen and Rockanje) = 4 L;
- 1 **pint** (at Den Bommel, Den Briel, Nieuwegote, Nieuwenhoorn, Nieuwhelvoet, Nieuwveen and Rockanje) = about 800 mL;
- 1 **kop** (for butter at Delft) = 520 mL.

### 121.18.5 Units of Liquid Capacity

For vinegar at Den Bommel, Den Briel, Nieuwegote, Nieuwenhoorn, Nieuwhelvoet, Nieuwveen and Rockanje

			Metric
<b>stoop</b>			2.56 L
2	<b>kan</b>		1.28 L
4	2	<b>pint</b>	640 mL

At Ablasterdam, Bleskensgraaf, Dordrecht, Hofwegen, Leerambacht, De Mijl and Wijngaarden

			Metric
<b>steekan or kit</b>			19.4 L
8		<b>stoop</b>	2.04 L

At Dordrecht in 1805

			Metric
<b>stoop</b>			2.4 L
2	<b>mengel</b>		1.2 L
4	2	<b>pint</b>	0.6 L

For wholesale at Ablasterdam, Bleskensgraaf, Dordrecht, Hofwegen, Leerambacht, De Mijl and Wijngaarden

				Metric
<b>roede</b>				2000 L
10	<b>aam</b>			200 L
100	10	<b>schreef</b>		20 L
1000	100	10	<b>stoop</b>	2 L

For wine in Rotterdam

						Metric
<b>aam</b>						153.540 000 L
4	<b>anker</b>					38.385 000 L
60	15	<b>stoop</b>				2.559 000 L
120	30	2	<b>kan</b>			1.279 500 L
240	60	4	2	<b>pint</b>		639.750 mL
960	240	16	8	4	<b>mutsje</b>	159.937 mL

For beer at Achterland, Ammers, Ammerstol, Bergambacht, Bonrepas, Langerak, Lekkerkerk, Schoonhoven, Willige-Langerak and Zevender

			Metric
<b>Kan</b>			1.1 L
2		<b>pint</b>	0.55 L

For gin at Achterland, Ammers, Ammerstol, Bergambacht, Bonrepas, Langerak, Lekkerkerk, Schoonhoven, Willige-Langerak and Zevender

		Metric
<b>Stuk</b>		
96	<b>stoop</b>	

For oil at Achterland, Ammers, Ammerstol, Bergambacht, Bonrepas, Langerak, Lekkerkerk, Schoonhoven, Willige-Langerak and Zevender

		Metric
<b>Aam</b>		118.4 L
16	<b>kan</b>	7.4 L

For oil at Achterland, Ammers, Ammerstol, Bergambacht, Bonrepas, Langerak, Lekkerkerk, Schoonhoven, Willige-Langerak and Zevender

		Metric
<b>viertel</b>		3.05 L
4	<b>fles</b>	763 mL

For wine at Achterland, Ammers, Ammerstol, Bergambacht, Bonrepas, Langerak, Lekkerkerk, Schoonhoven, Willige-Langerak and Zevender

			Metric
<b>anker</b>			37.08 L
16	<b>stoop</b>		2.32 L
24	1½	<b>kan</b>	1.545 L

Other reported measures:

- 1 **vat** or **ton** (for olive oil and train oil in Rotterdam) = 340 stoopen = 870.060 L;
- 1 **ton** (for beer in Rotterdam) = 160 kan = 204.8 L;
- 1 **pint** (for beer and milk at Den Briel) = 895 mL;
- 1 **kop** (for milk at Achterland, Ammers, Ammerstol, Bergambacht, Bonrepas, Langerak, Lekkerkerk, Schoonhoven, Willige-Langerak and Zevender) = 650 mL;
- 1 **kop** (for milk in Rotterdam) = 520 mL.

121.18.6 Units of Weight

For butter in Delft

		Metric
<b>kinnetje</b>		37.44 kg
4	<b>buitelaartje</b>	9.36 kg

For butter and weight with barrel in Leiden

			Metric	Metric
<b>vierden</b>			39.50 kg	48.1 kg
2	<b>achtse</b>		19.75 kg	24 kg
4	2	<b>zestiende</b>	9.88 kg	12 kg

Gross weight (licht gewicht) in Rotterdam

										Metric
<b>scheepslast</b>										1976.361 600 kg
13⅓	<b>schippood</b>									148.227 120 kg
40	3	<b>centenaar</b>								49.409 040 kg
266⅔	20	6⅔	<b>lijspood</b>							7.411 356 kg
500	37½	12½	1⅞	<b>steen</b>						3.952 723 kg
4000	300	100	15	8	<b>pood</b>					494.090 g
8000	600	200	30	16	2	<b>mark</b>				247.045 g
64,000	4800	1600	240	128	16	8	<b>ons</b>			30.881 g
128,000	9600	3200	480	256	32	16	2	<b>lood</b>		15.440 g
512,000	38,400	12,800	1920	1024	128	64	8	4	<b>drachma</b>	3.860 g

Net weight (zwaar gewicht) in Rotterdam

				Metric
<b>pood</b>				470.156 g
16	<b>ons</b>			29.385 g
32	2	<b>lood</b>		14.692 g
256	16	8	<b>main</b>	1.837 g

Other reported measures:

- 1 **ton** (for coal in Rotterdam) = 170.000 kg.
- 1 **steen** (in Rotterdam) = 2.3 kg;
- 1 **pint** (for lime and rapeseed oil at Den Bommel, Den Briel, Nieuwegote, Nieuwenhoorn, Nieuwhelvoet, Nieuwveen and Rockanje) = 848 g;
- 1 **pint** (for olive oil at Den Briel) = 593 g;
- 1 **pood** (at Gorinchem in 1810) = 494 g;
- 1 **pood** (for merchant use at Leiden, Veur, Warmond, Wassenar and Zwammerdam) = 481.7 g;

- 1 **pood** (for use at home at Leiden, Schoonhoven, Veur, Warmond, Wassenar and Zwammerdam) = 469.4 g;
- 1 **pood** (for at Den Briel) = 469 g;
- 1 **pood** (in Delft and Nieuwpoort in 1810) = 468 g;
- 1 **pood** (at Gouda, according to [NIPP, p. 302]) = 466 g;
- 1 **pood** (at Dordrecht and Gouda) = 463 g.

121.19 Utrecht

121.19.1 Units of Length

Before 1629

		Metric
<b>roede</b>		3.716 m
14	<b>voet</b>	265 mm

After 1629

				Metric
<b>roede</b>				3.76 m
10	<b>(land)voet</b>			376 mm
14	1⅔	<b>(stads)voet</b>		268.6 mm
140	14	10	<b>duim</b>	26.86 mm

Other reported measures:

1 **roede** (at Het Zand) = 3.50 m;

1 **el** = 685 mm.

### 121.19.2 Units of Area

Before 1629

			Metric
<b>hoeve</b>			165,704 m <sup>2</sup>
20	<b>morgen</b>		8285 m <sup>2</sup>
12,000	600	<b>roede</b> <sup>2</sup>	13.81 m <sup>2</sup>

After 1629

				Metric
<b>hoeve</b>				169,651 m <sup>2</sup>
20	<b>morgen</b>			8482.56 m <sup>2</sup>
120	6	<b>hond</b>		1413.76 m <sup>2</sup>
12,000	600	100	<b>roede</b> <sup>2</sup>	14.137 6 m <sup>2</sup>

At Het Zand

			Metric
<b>gras</b>			4410 m <sup>2</sup>
360		<b>roede</b> <sup>2</sup>	12.25 m <sup>2</sup>

### 121.19.3 Units of Volume

timber was sold by a measure of 13.94 m<sup>3</sup>;  
Indonesian wood was sold by 1 voet<sup>3</sup> = 19.2 dm<sup>3</sup>;  
firewood was, in general, sold by the hundreds.

### 121.19.4 Units of Dry Capacity

Traditional system for cereal

					Metric
<b>mud</b>					120.4 L
1½	<b>zak</b>				90.3 L
4	3	<b>schepel</b>			30.1 L
16	12	4	<b>spint</b>		7.525 L
64	48	16	4	<b>maatje</b>	1.881 L

At IJsselstein during the eighteenth century

			Metric
<b>hoed</b>			1158.4 L
16	<b>zak</b>		72.4 L
32	2	<b>achel</b> <sup>a</sup>	36.2 L

<sup>a</sup>During the sixteenth century, varying between 38.4–39.2 L, and during the seventeenth century, between 36.2–37.8 L

For cereal in Oudewater

		Metric
<b>zak</b>		92.6 L
2	<b>spint</b> <sup>a</sup>	46.3 L

<sup>a</sup>Also reported as 45.2 L

Other reported measures:

- 1 **haverhoed** (for oats at IJsselstein) = 1122 L;
- 1 **ijzervarken** (for grape stones) = 272 L;
- 1 **mouwer** (for cereal during the seventeenth century) = ??
- 1 **mud** (for cereal during the seventeenth century) = 105.4–120 L;
- 1 **havermud** (for oats during the sixteenth century) = 116.5–117 L;
- 1 **mud** (for wheat and rye, during sixteenth century) = 105.4 L;
- 1 **ton** (for cement) = about 54 L;
- 1 **achtel** (in Oudenwater during the seventeenth century) = 41.8–43.2 L.

### 121.19.5 Units of Liquid Capacity

1 **pint** (in Oudenwater) = 850 mL.

### 121.19.6 Units of Weight

For butter

		Metric
<b>vat</b>		160 kg
4	<b>verrel</b> or <b>kinnetje</b>	40 kg

Other reported measures:

- 1 **stoop** (for butter during the fifteenth and sixteenth centuries) = about 16.5 kg;  
 1 **pond** (heavyweight) = 497.8 g;  
 1 **pond** (lightweight) = 468.7 g.

Other reported measures:

- 1 **el** (in stores at Middelburg) = 695 mm;  
 1 **el** (at Schouwen-Duiveland) = 697 mm;  
 1 **el** (at linen markets and in general at Middelburg) = 703 mm and 687.825 mm;  
 1 **voet** (in Middelburg) = 300 mm.

## 121.20 Zeeland

### 121.20.1 Units of Length

		Metric
<b>roede</b>		3.60 m
12	<b>voet</b>	300 mm

### 121.20.2 Units of Dry Capacity

For cereal

				Metric
(Zeeuwse) <b>zak</b>				77.8 L
4	<b>maat</b>			19.45 L
8	2	<b>achel</b>		9.725 L
16	4	2	<b>spint</b>	4.862 5 L

For cereal at Middelburg

							Metric
<b>zak</b>							72.5 L
2	<b>halve zak</b> <sup>a</sup>						36.25 L
4	2	<b>maat</b> <sup>a</sup>					18.125 L
8	4	2	<b>spint</b>				9.06 L
32	16	8	4	<b>stoop</b>			2.26 L
64	32	16	8	2	<b>kan</b>		1.13 L
128	64	32	16	4	2	<b>pint</b>	566.4 mL

<sup>a</sup>Both halve zak and maat were sometimes also called **achtendeel**. According to [DOUR], the lave zak, as **achtendeel**, was 35.13 L

For cereal at Schouwen-Duiveland

						Metric
<b>last</b>						3197.6 L
40	<b>zak</b>					79.94 L
160	4	<b>achel</b>				19.98 L
640	16	4	<b>spint</b>			4.996 L
2560	64	16	4	<b>kannemaat</b>		1.249 L
5120	128	32	8	2	<b>pint</b>	624 mL

For cereal at Zuidbeveland

				Metric
<b>zak</b>				77.8 L
2	<b>schepel</b>			38.9 L
8	4	<b>spint</b>		9.725 L
32	16	4	<b>maatje</b>	2.431 L

Other reported measures:

- 1 **zak** (for salt at Hulst) = 155 L;
- 1 **zeve** (for salt at Middelburg) = 134 L;
- 1 **zak** (for cereal at Holst during the seventeenth century) = 107.5–111.5 L;
- 1 **zak** (at Vlissingen) = 86.349 L;
- 1 **maat** (for salt at Holst) = 77.5 L;
- 1 **zak** (in Middelburg) = 72.387 L;
- 1 **achtel** (during the sixteenth century) = 33.5 L;
- 1 **achtel** (during the nineteenth century) = 35.4 L;
- 1 **viertel** (for cereal at Holst during the sixteenth century) = 23.7 L.

121.20.3 Units of Weight

- 1 **pond** (at Middelburg) = 467.7 g or 469.968 g.

122 Netherlands Antilles [Formerly: Curacao and Dependencies]

See also *Aruba*, *Caribbean Netherlands*, *Country of Curaçao*, and *Sint Maarten*.

Curacao was discovered by the Spanish navigator Alonso de Ojeda in 1499, settled by the Spanish in 1527, and administered by the Dutch West India Company from 1634 to 1787, when the island was handed over to the United Netherlands. Aruba, Bonaire, Curaçao (Leeward Islands), Saba, Sint Eustatius, the Dutch half of Sint Maarten (the Windward Islands) and Dutch Guiana were united to form the Dutch West Indies in 1828. These islands (except Dutch Guiana) were united as the Netherlands Antilles in 1848. In 1954, the Netherlands Antilles gained the status of an overseas territory of the Netherlands. In 1986, Aruba was granted *status aparte*. In 2010, the Netherlands Antilles was dissolved, and the County of Curaçao and Sint Maarten got autonomy within the Kingdom of the Netherlands. Bonaire, Sint Eustatius and Saba, also known as the Caribbean Netherlands, remained as an overseas territory.

During the colonial period, the old Amsterdam scales were in general use. Some English

measures were also reported in use. The metric system became official on July 1, 1876.

*Main sources:* [BAUE], [DOUR], [KELL], [MART3], and [RICA]

122.1 Currency

- 2012–: 1 Caribbean guilder (at Curaçao and the Dutch part of Sint Maarten)
- 2011–: 1 US dollar = 100 cents (at the islands of Bonaire, Sint Eustatius and Saba)
- 1986–: 1 Aruban florin = 100 cents (at Aruba)
- 1952–2010: 1 Netherlands Antillean guilder or florin = 100 cents
- 1828–1951: 1 Curaçao guilder or florin = 100 cents
- 1828–1899: 1 Curaçao guilder or gulden = 20 stuivers
- 1822–1827: 1 dollar = 5 francs = 50 stuivers
- 1818–1822: 1 peso = 15 reales
- 1799–1828: 1 Dutch guilder = 3⅓ real = 20 stuivers

122.2 Units of Length

- 1 **vara** = 847.7 mm;
- 1 **el** = 686.6 mm.

122.3 Units of Area

- 1 **acker** = 4293.36 m<sup>2</sup> or 4293.38 m<sup>2</sup>.

122.4 Units of Liquid Capacity

		Metric
<b>gallon</b>		3.785 310 L
6	<b>pintje</b>	630.885 mL

122.5 Units of Weight

		Metric
cana		750 g
2	pintje	375 g

Other reported measures:

- 1 **pond** (at Curaçao) = 531.279 8 g;
- 1 **livre** (at Sint Maarten) = 489.5 g;
- 1 **pond** (at Sint Maarten) = 373.241 7 g.

123 Netherlands East Indies

See *Indonesia*.

124 Netherlands Guiana

See *Surinam*.

125 New Caledonia

The islands of New Caledonia were discovered by Captain James Cook in 1774. They became a French colony in 1853 and a French overseas territory in 1946. Their status changed to that of a French Associated State in 1998.

The metric system has been official since 1862.

125.1 Currency

- 1945–: 1 New Caledonian franc (as part of CFP franc) = 100 centimes
- 1874–1945: 1 New Caledonian franc = 100 centimes
- 1853–1873: 1 French franc = 100 centimes

126 New Hebrides

See *Vanuatu*.

127 New Zealand

The Dutch navigator Abel Tasman discovered these islands in 1642. Captain James Cook claimed the islands for Britain during his visits of 1769 and 1777. New Zealand became a part of the colony of New South Wales in 1840, a separate British Crown colony in 1841 under the Waitangi Treaty between the native Māori and British settlers, and the Dominion of New Zealand in 1907. In 1947, the country adopted the Statute of Westminster, making New Zealand a Commonwealth realm.

The metric system has been official since 1925 and was legally adopted in 1969. In December 1976, the Parliament passed the Weights and Measures Amendment Act, which established two deadlines: On March 31, 1977, to cease verification of new non-metric weighing or measuring appliance used in trading and to require metric exclusively, and on September 30, 1977, to require metric-only retail pricing in retail establishments where the weighing or measuring appliances are metric, or where prepackaged goods show the contents in metric measure.

*Main sources:* [AUBE], [REGI], and [TAYL5]

127.1 Currency

- 1967–: 1 New Zealand dollar = 100 cents
- 1840–1967: 1 New Zealand pound = 20 shillings = 240 pence

127.2 Units of Length

British Imperial-linked system during the early nineteenth century

					Metric
maero					1609.342 240 m
880	maro				1.828 798 m
1760	2	iari			914.399 mm
5280	6	3	putu		304.800 mm
63,360	72	36	12	inihi	25.400 mm

127.3 Units of Area

1 eka (British Imperial-linked system during the eighteenth century) = about 4050 m<sup>2</sup>.

127.4 Units of Capacity

British Imperial-linked system during the early nineteenth century

								Metric
ipu								227.187 L
1 <sup>7</sup> / <sub>18</sub>	kaho							163.575 L
5%	4	pēke						40.894 L
6 <sup>1</sup> / <sub>4</sub>	4 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>8</sub>	puhera					36.350 L
50	36	9	8	karone				4.544 L
200	144	36	32	4	kusta			1.136 L
400	288	72	64	8	2	paina		568.0 mL
800	576	144	128	16	4	2	hawhe paina	284.0 mL

127.5 Units of Weight

British Imperial-linked system during the early nineteenth century

					Metric
tana					1016.046 837 kg
20	hauawareti or rau				50.802 342 kg
2240	112	pauna			453.592 338 g
4480	224	2	hawe pauna		226.796 169 g
71,680	3584	32	16	aunihi	14.174 761 g

Traditional measures used by the Māori people

127.6 Units of Length

- 1 kumi = 10 tika = 60 feet;
- 1 maro = the extent of both arms stretched out, a yard or a span;
- 1 tika = the extent of the two arms stretched out = 6 feet;
- 1 wahanga = the length from the tip of the middle finger to the middle of the breast = ½ tika;
- 1 teke teke = the length of one arm, the width of the breast and half of the other arm;
- 1 tikarere = the length of an outstretched arm and a little more;
- 1 te keke = the length of an arm;

- 1 pokoiwi = the length from the tip of the middle finger to the shoulder.
- 1 watianga = the length from the end of the middle finger to the elbow;
- 1 kotahiwanga = a span;

- 1 **waroro** or **warona** = a pace;
- 1 **putu** = a foot.

There were also some expressions for distances: *tawiti* = far off, *mamao* = distant, and *tata* = near.

127.7 Units of Dry Capacity

- 1 **paetahi** = as much as can be grasped with both arms;
- 1 **pae rua hamama te toru** = two and a half girths;
- 1 **paihere** = a bundle of flax or raupo;
- 1 **aohanga** or **aowanga** = a handful.

127.8 Units of Weight

No particular measures for weight were in use, only such words as *tai maha* (= heavy), and *mama* (= light).

128 Nicaragua

Christopher Columbus sighted the coast of present-day Nicaragua in 1502, but the area was colonized by conquistadors from Panama in 1522. The provinces of Leon and Granada, settled by Francisco Hernandez de Cordoba in 1524, were part of the Vice-Royalty of New Spain. In

1822, Nicaragua united with the Mexican Empire of Augustin de Iturbide, only to join the federation of the Central American Republic in 1823. In 1825, the two provinces were merged to create Nicaragua. Nicaragua remained a constituent state of the Central American Republic until 1838, when it declared its independence. The eastern coast of Nicaragua was a British protectorate called the Mosquito Coast, but in 1894, this area was ceded to Nicaragua.

After colonization, the old Spanish systems for weights and measures were gradually adopted. The metric system has been official since January 7, 1893, optional since 1910 and compulsory since 1912.

Main sources: [CARD], [MINI4], [UN55], and [UN66]

128.1 Currency

- 1990–: 1 Nicaraguan córdoba oro = 100 centavos
- 1988–1990: 1 new Nicaraguan córdoba = 100 centavos
- 1912–1988: 1 Nicaraguan córdoba = 100 centavos
- 1878–1912: 1 Nicaraguan peso = 100 centavos
- 1824–1878: 1 Central American escudo = 2 pesos = 16 reales
- 1824: 1 Spanish colonial escudo = 2 pesos = 16 reales

128.2 Units of Length

						Metric
milla						1848 m
91⅓	mecate					20.16 m
2200	24	vara				840 mm
6600	72	3	tercia			280 mm
8800	96	4	1⅓	cuarta		210 mm
79,200	864	36	12	9	pulgada	23.3 mm

128.3    Units of Area

Traditional system and rounded value scale

			Metric	Metric
<b>caballería</b>			45.158 ha	44.8 ha
64	<b>manzana</b>		70.56 a	70 a
640,000	10,000	<b>vara<sup>2</sup></b>	0.705 6 m <sup>2</sup>	0.70 m <sup>2</sup>

128.4    Units of Volume

1 **vara** (for mahogany) = 1 vara ×  $\frac{1}{9}$  vara ×  $\frac{1}{2}$  vara = 32.45 dm<sup>3</sup>.

128.5    Units of Capacity

Scale based on [MINI4]

				Metric
<b>cahiz</b>				606.7 L
36 $\frac{2}{3}$	<b>cajuela<sup>a</sup></b>			16.67 L
910	25	<b>botella</b>		666.7 mL
3640	100	4	<b>cuarta</b>	166.7 mL

<sup>a</sup>[UN66] reported it as equal to 17.0 L, when used for beans

128.6    Units of Weight

							Metric
<b>tonelada</b>							920 kg
5 $\frac{1}{2}$	<b>fanega</b>						161 kg
10	1 $\frac{3}{4}$	<b>carga</b>					92 kg
20	3 $\frac{1}{2}$	2	<b>quintal<sup>a</sup></b>				46 kg
80	14	8	4	<b>arroba</b>			11.5 kg
2000	350	200	100	25	<b>libra</b>		460 g
32,000	5600	3200	1600	400	16	<b>onza</b>	28.75 g

<sup>a</sup>For sugar

Other reported measures during the twentieth century:

1 **caja** = 16 kg;  
1 **saco** (of coffee) = 150 libras = 69 kg.

129    Nicobar Islands [Formerly: New Denmark, Frederikshøerne, Theresia Islands, and Sawaraj Islands]

See also *Andaman Islands*.

These archipelagic islands became part of the Danish East India Company in 1754, and a Danish colony, named New Denmark, on January 1, 1756. In late 1756, the islands were renamed Frederikshøerne. Due to outbreaks of malaria in 1759, the islands were largely abandoned until 1768. In 1778, the islands were occupied by Austria, and renamed the Theresia Islands. In 1807, the islands were once again renamed, this time as the Nicobar Islands, and came under the

nominal possession of Britian. A new Danish settlement, called Fredrikshøi, was established, and Denmark reclaimed the islands in early 1846. In 1868, the rights to the islands were sold to Britain, and they became part of British India in 1869. Between 1942 and 1945, the islands were occupied by Japan and renamed the Sawaraj Islands. In 1947, together with the Andaman Islands, they became a union territory of India.

*Main sources:* [IORG] and [MEER]

129.1 Units of Length

				Metric
kaichoodi				~45.6 m
50	chittú			~912 mm
100	2	musham		~456 mm
1200	24	12	viral	~38 mm

129.2 Units of Dry Capacity

For cereal

				Metric
chakku				96.74 L
2	mooda			48.37 L
100	50	wallam		967 mL
600	300	6	laku	161 mL

130 Niger

See also *Hausaland*.

For almost one thousand years, this country was part of Sudan’s ancient cultural area. During the early fifteenth century, an Islamic sultanate (Tuareg) emerged around Agadez, while the Hausa people invaded from the south from the area’s original native Nigeria. The tension between the Muslims and the natives from Nigeria led to constant conflict. A Hausa-kingdom, Gobir, could withstand the Tuaregs in the 1700s, but in the early 1800s, it was incorporated after a war with the sultanate of Sokoto. Niger was incorporated into French West Africa in 1896, and became a French colony in 1922. After the establishment of the Fifth French Republic in 1958, Niger became an autonomous state within the French Community. In 1960, Niger withdrew from the Community and proclaimed its independence.

The metric system has been official since 1884 and compulsory since 1907.

Main source: [BING]

130.1 Currency

- 1945–: 1 West African CFA franc = 100 centimes
- 1922–1945: 1 French West African franc = 100 centimes
- 1922: igbi or manilla (horseshoe-shaped payment made of iron, copper, or bronze) and cowrie shells (here called kulu, petoh, or tiehdeh)

131 Nigeria

See also *Akwa Akpa*, *Biafra*, *Kingdom of Bonny*, *British West Africa*, *Hausaland*, *Sahelian Kingdom*, *Songhay Empire*, and *Yorùbáland*.

Nigeria is a combination of four different colonies. Lagos was established as a colony by the British in 1861, subordinated to Sierra Leone from 1866 to 1874, and to the Gold Coast from 1874 to 1886. Southern Nigeria was established as the Oil Rivers Protectorate in 1891. Lagos became part of Southern Nigeria in 1906. Northern Nigeria was established in 1900 as the Protectorate of Northern Nigeria, belonging to the Royal Niger Company. Southern Nigeria and Northern Nigeria were united as Nigeria in 1914, and remained a British colony until gaining independence in 1960. British Cameroon was joined with Nigeria in 1961. Biafra was established as a separate state in 1967 out of three eastern provinces, leading to civil war. Biafra surrendered to the federal government in 1970, and was reincorporated into Nigeria.

Before metrification, the absence of standardized units and the great diversity of weights and measures resulted in many problems in domestic trade. Transactions were usually made in *oloruka*, *mudu*, cigarette tins, bundles, and heaps throughout most of the country. Below, this divergence is exemplified for provinces. The metric system has been official since 1971 and compulsory since January 1, 1973, but, in general, complete from 1977.

*Main sources:* [BAUE2], [FAGG], [HILL3], [KORM], [NETT], and [NORM]

### 131.1 Currency

1973–: 1 Nigerian naira = 100 kobo  
 1958–1973: 1 Nigerian pound = 20 shillings = 240 pence  
 1913–1958: 1 British West African pound = 20 shillings = 240 pence  
 1907–1913: 1 pound sterling = 20 shillings = 240 pence  
 –nineteenth century: 1 akpa = 20 ukwa = 200 ekpete = 1200 cowries (*monetaria annulus*)

### 131.2 Units of Quantity

1 **bly** (for nuts) = 3000–10,000 nuts.

### 131.3 Units of Length

1 **jacktan**, **jactam** or **jaktan** = 1622 lignes en Paris = 3.659 m.

### 131.4 Units of Dry Capacity

Usually, all dry commodities were measured by weight.

- 1 **bag** (for shelled groundnuts in Northern Nigeria, according to [NORM]) = 40.0–46.13-kg, average = 43.77 kg;
- 1 **mudu** (for shelled groundnuts in Northern Nigeria, according to [NORM]) = 1.0–1.7 kg, but traditionally equal to a cup of 4 handfuls of grain (according to [HILL, p. 299]);
- 1 **mudu** (for beans and gari at Jos, according to [BAUE2, p. 386]) = 1.276 kg;
- 1 **mudu** (for beans and gari at Minna, according to [BAUE2, p. 386]) = 822.14 g.

For cowpeas, guinea corn, rice and other commodities

			Imperial	Metric
<b>bokiti</b> <sup>a</sup>			45 lb	20.43 kg
9	<b>tiya</b> <sup>b</sup>		5 lb	2.27 kg
18	2	<b>mudu</b> <sup>b</sup>	2½ lb	1.13 kg

<sup>a</sup>For shelled groundnuts, according to [HILL]

<sup>b</sup>= heaped measures used in Northern Nigerian markets, values varying according to region

According to [KORM]:

- 1 (large) **offa** or **owo** (for cassava tubers) = 2441.67 kg (in Kwara), 2141.25 kg (in Ondo), 2005.60 kg (in Ogun), 1886.48 kg (in Oyo) and 1670.0 kg (in Ekiti);
- 1 (large) **offa** or **owo** (for yarn rubber) = 681.60 kg (in Ogun), 599.90 kg (in Ondo), 484.32 kg (in Osun), 305.73 kg (in Oyo) and 300.77 kg (in Kwara);
- 1 **wheel barrow** (in Ekiti) = 268.03 kg (for cassava tubers);
- 1 **wheel barrow** (in Kwara) = 160.87 kg (for cassava tubers);
- 1 **wheel barrow** (in Ogun) = 99.77 kg (for cassava tubers);
- 1 **wheel barrow** (in Ondo) = 348.60 kg (for cassava tubers) and 132.60 kg (for sweetpotatoes);
- 1 **wheel barrow** (in Oyo) = 234.06 kg (for cassava tubers);
- 1 (medium) **offa** or **owo** (for yarn rubber) = 325.90 kg (in Ogun), 299.23 kg (in Ondo), 297.97 kg (in Osun), 194.20 kg (in Kwara) and 194.00 kg (in Oyo);
- 1 (small) **offa** or **owo** (for yarn rubber) = 160.40 kg (in Ondo), 154.79 kg (in Ogun), 132.83 kg (in Osun) and 108.13 kg (in Kwara);
- 1 **large bag** (in Abuja) = 139.40 kg (for rice), 116.20 kg (for millet grain), 101.50 kg (for Guinea corn) and 91.27 kg (for maize grain);
- 1 **large bag** (in Benin) = 105.60 kg (for Guinea corn), 103.20 kg (for maize corn), 98.93 kg (for millet grain), 91.47 kg (for cowpeas), 91.10 kg (for soybeans), 91.01 kg (for shelled egusi), 91.00 kg (for shelled groundnuts), 55.87 kg (for unshelled egusi) and 49.37 kg (for unshelled groundnuts);

- 1 **large bag** (in Eikiti) = 105.09 kg (for Guinea corn), 101.19 kg (for millet grain), 100.64 kg (for maize grain), 98.93 kg (for soybeans), 96.97 kg (for cowpeas), 84.76 kg (for shelled groundnuts), 71.52 kg (for shelled egusi), 54.27 kg (for unshelled groundnuts) and 45.77 kg (for unshelled egusi);
- 1 **large bag** (in Enugu) = 108.80 kg (for cowpeas), 108.30 kg (for Bambara nuts), 104.80 kg (for soybeans), 104.10 kg (for Guinea corn), 100.93 kg (for millet grain), 98.93 kg (for maize grain), 94.33 kg (for shelled groundnuts), 83.77 kg (for shelled egusi) and 61.33 kg (for unshelled egusi);
- 1 **large bag** (in Jalingo) = 100.40 kg (for rice), 97.93 kg (for Guinea corn), 95.93 kg (for maize grain) and 95.43 kg (for millet grain);
- 1 **large bag** (in Kaduna) = 135.66 kg (for rice), 103.18 kg (for Guinea corn), 101.65 kg (for millet grain) and 101.25 kg (for maize grain);
- 1 **large bag** (in Kano) = 115.00 kg (for rice), 104.15 kg (for millet grain), 101.88 kg (for Guinea corn) and 98.28 kg (for maize grain);
- 1 **large bag** (in Kufai) = 99.40 kg (for Guinea corn), 96.27 kg (for millet grain) and 94.33 kg (for maize grain);
- 1 **large bag** (in Kwara) = 112.95 kg (for millet grain), 112.65 kg (for local rice), 111.30 kg (for Guinea corn), 109.95 kg (for maize grain), 106.05 kg (for cowpeas), 104.55 kg (for soybeans), 73.82 shelled egusi, 53.49 kg (for unshelled groundshells) and 44.03 kg (for unshelled egusi);
- 1 **large bag** (in Ogun) = 113.98 kg (for maize grain), 107.22 kg (for Guinea corn), 104.10 kg (for cowpeas), 103.78 kg (for soybeans), 96.88 kg (for millet grain), 93.29 kg (for shelled groundnuts), 77.07 kg (for shelled egusi), 52.65 kg (for unshelled egusi) and 52.08 kg (for unshelled groundnuts);
- 1 **large bag** (in Ondo) = 115.30 kg (for local rice), 106.71 kg (for cowpeas), 102.65 kg (for soybeans), 101.49 kg (for millet grain), 101.31 kg (for shelled groundnuts), 99.80 kg (for maize grain), 99.45 kg (for Guinea corn), 80.37 kg (for shelled egusi), 67.87 kg (for unshelled groundnuts) and 46.30 kg (for unshelled egusi);
- 1 **large bag** (in Osun) = 113.55 kg (for Guinea corn), 107.84 kg (for local rice), 104.18 kg (for millet grain), 104.10 kg (for cowpeas), 104.01 kg (for maize grain), 103.78 kg (for soybeans), 93.29 kg (for shelled groundnuts), 77.07 kg (for shelled egusi), 52.65 kg (for unshelled egusi) and 52.08 kg (for unshelled groundnuts);
- 1 **large bag** (in Oyo) = 118.17 kg (for Guinea corn), 109.43 kg (for maize grain), 107.57 kg (for millet grain), 101.35 kg (for cowpeas), 100.67 kg (for soybeans), 96.90 kg (for local rice), 95.51 kg (for shelled groundnuts), 73.71 kg (for shelled egusi), 57.42 kg (for unshelled groundnuts) and 44.60 kg (for unshelled egusi);
- 1 **large bag** (in Wukari) = 104.97 kg (for rice), 102.53 kg (for Guinea corn), 95.37 kg (for millet grain) and 94.87 kg (for maize grain);
- 1 **bag** (in Kwara) = 61.57 kg (for cassava tubers);
- 1 **bag** (in Osun) = 31.23 kg (for cassava tubers);
- 1 **bag** (in Oyo) = 56.83 kg (for sweetpotatoes) and 51.15 kg (for cassava tubers);
- 1 (medium) **bag** (in Abuja) = 50.00 kg (for imported rice), 49.23 kg (for local rice), 44.03 kg (for maize grain), 43.50 kg (for Guinea corn) and 10.00 kg (for Semovita);
- 1 (medium) **bag** (in Benin) = 50.27 kg (for imported rice), 49.73 kg (for local rice) and 9.90 kg (for Semovita);
- 1 (medium) **bag** (in Eikiti) = 59.47 kg (for Guinea corn), 57.63 kg (for miller grain), 53.30 kg (for soybeans), 54.05 kg (for maize grain), 49.88 kg (for imported rice), 40.53 kg (for shelled egusi) and 9.75 kg (for Semovita);
- 1 (medium) **bag** (in Enugu) = 50.10 kg (for local rice), 49.10 kg (for imported rice), 38.50 kg (for unshelled groundnuts) and 9.80 kg (for Semovita);
- 1 (medium) **bag** (in Jalingo) = 49.23 kg (for imported rice) and 9.87 kg (for Semovita);
- 1 (medium) **bag** (in Kaduna) = 50.00 kg (for imported rice), 49.23 kg (for local rice), 46.63 kg (for maize grain), 44.85 kg (for Guinea corn) and 10.00 kg (for Semovita);

- 1 (medium) **bag** (in Kano) = 50.40 kg (for Guinea corn), 50.15 kg (for local rice), 50.10 kg (for imported rice), 47.82 kg (for maize grain) and 10.00 kg (for Semovita);
- 1 (medium) **bag** (in Kufai) = 49.9 kg (for imported rice);
- 1 (medium) **bag** (in Kwara) = 56.50 kg (for millet grain), 55.68 kg (for Guinea corn), 53.10 kg (for maize grain), 53.02 kg (for cowpeas), 51.93 kg (for soybeans), 49.23 kg (for imported rice), 36.92 kg (for shelled egusi) and 9.60 kg (for Semovita);
- 1 (medium) **bag** (in Ogun) = 60.61 kg (for maize grain), 51.97 kg (for cowpeas), 48.58 kg (for imported rice), 22.99 kg (for unshelled egusi) and 9.87 kg (for Semovita);
- 1 (medium) **bag** (in Ondo) = 54.67 kg (for cowpeas), 53.38 kg (for shelled groundnuts), 48.70 kg (for imported rice), 44.02 kg (for maize grain), 40.72 kg (for local rice), 39.67 kg (for unshelled groundnuts), 36.77 kg (for unshelled egusi) and 9.89 kg (for Semovita);
- 1 (medium) **bag** (in Osun) = 53.67 kg (for millet grain), 53.32 kg (for maize grain), 52.90 kg (for Guinea corn), 48.98 kg (for imported rice), 49.38 kg (for soybeans), 48.02 kg (for cowpeas), 45.53 kg (for shelled groundnuts), 37.33 kg (for shelled egusi) and 9.85 kg (for Semovita);
- 1 (medium) **bag** (in Oyo) = 57.00 kg (for Guinea corn), 56.67 kg (for millet grain), 55.23 kg (for maize grain), 49.27 kg (for imported rice), 48.37 kg (for shelled groundnuts), 47.73 kg (for soybeans), 43.54 kg (for cowpeas) and 9.75 kg (for Semovita);
- 1 (medium) **bag** (in Wukari) = 49.17 kg (for imported rice);
- 1 **basin** (in Ondo) = 42.37 kg (for cowpeas), 41.75 kg (for Guinea corn), 41.10 kg (for maize grain), 39.61 kg (for soybeans), 37.64 kg (for miller grain), 35.90 kg (for unshelled groundnuts), 28.15 kg (for shelled groundnuts), 27.00 kg (for shelled egusi) and 22.27 kg (for unshelled egusi);
- 1 **basket** (in Ogun) = 21.33 kg (for unshelled maize grain) = 21.33 kg;
- 1 **basket** (in Osun) = 28.78 kg (for cassava tubers);
- 1 **bakset** (in Oyo) = 16.43 kg (for cassava tubers);
- 1 (large) **basket** (in Osun) = 15.67 kg (for sweetpotatoes);
- 1 (large) **basket** (in Oyo) = 25.17 kg (for cocoyarn) and 11.67 kg (for sweetpotatoes);
- 1 **omolokun** (big plastic bowl, in Oyo) = 20.57 kg (for miller grain) and 20.50 kg (for Guinea corn and maize grain);
- 1 (large) **heap** (in Abuja) = 16.95 kg (for yarn tubers);
- 1 (large) **heap** (in Ekiti) = 24.30 kg (5 or 6 tubers; for yarn tubers);
- 1 (large) **heap** (in Jalingo) = 15.40 kg (for yarn tubers);
- 1 (large) **heap** (in Kaduna) = 14.28 kg (for yarn tubers);
- 1 (large) **heap** (in Kano) = 23.35 kg (for yarn tubers);
- 1 (large) **heap** (in Kufai) = 16.09 kg (for yarn tubers);
- 1 (large) **heap** (in Kwara) = 14.28 kg (5 or 6 tubers; for yarn tubers);
- 1 (large) **heap** (in Ogun) = 69.32 kg (10 or 12 tubers; for yarn tubers);
- 1 (large) **heap** (in Ondo) = 15.87 kg (5 or 6 tubers; for yarn tubers) and 59.43 kg (10 or 12 tubers; for yarn tubers);
- 1 (large) **heap** (in Osun) = 22.10 kg (5 or 6 tubers; for yarn tubers) and 13.8 kg (3 tubers; for yarn tubers);
- 1 (large) **heap** (in Oyo) = 14.53 kg (5 or 6 tubers; for yarn tubers) and 8.92 kg (3 tubers; for yarn tubers);
- 1 (large) **heap** (in Wukari) = 16.43 kg (for yarn tubers);
- 1 **groundnut tin** (in Eikiti) = 30.60 kg (for local rice), 15.81 kg (for Guinea corn), 15.02 kg (for maize grain), 14.70 kg (for soybeans), 14.50 kg (for cowpeas), 14.41 kg (for millet grain), 13.40 kg (for shelled groundnuts), 10.46 kg (for shelled egusi), 9.30 kg (for unshelled groundnuts) and 7.87 kg (for unshelled egusi);

- 1 **groundnut tin** (in Enugu) = 14.52 kg (for Guinea corn), 14.13 kg (for maize grain), 13.77 kg (for millet grain), 13.73 kg (for cowpeas), 13.54 kg (for Bambara nuts), 13.10 kg (for soybeans), 12.49 kg (for local rice), 11.79 kg (for shelled groundnuts), 10.47 kg (for shelled egusi), 7.67 kg (for unshelled egusi) and 4.43 kg (for unshelled groundnuts);
- 1 **groundnut tin** (in Ogun) = 15.54 kg (for Guinea corn), 14.42 kg (for soybeans), 14.13 kg (for cowpeas), 13.21 kg (for shelled groundnuts), 10.24 kg (for shelled egusi), 7.63 kg (for unshelled groundshells) and 7.02 kg (for unshelled egusi);
- 1 **groundnut tin** (in Ondo) = 16.10 kg (for local rice), 14.34 kg (for Guinea corn), 13.94 kg (for maize grain and shelled groundnuts), 13.92 kg (for cowpeas), 13.91 kg (for soybeans), 13.79 kg (for millet grain), 12.27 kg (for shelled egusi), 7.33 kg (for unshelled egusi) and 7.10 kg (for unshelled groundnuts);
- 1 **groundnut tin** (in Osun) = 14.30 kg (for Guinea corn), 14.05 kg (for soybeans), 13.77 kg (for millet grain), 13.60 kg (for cowpeas), 12.97 kg (for shelled egusi and shelled groundnuts), 8.34 kg (for unshelled groundnuts) and 6.25 kg (for unshelled egusi);
- 1 **groundnut tin** (in Oyo) = 14.19 kg (for cowpeas) and 12.28 kg (for shelled groundnuts);
- 1 **omolokun** (big plastic bowl, in Oyo) = 12.17 kg (for unshelled groundnuts) and 9.50 kg (for unshelled egusi);
- 1 **large basket** (in Abuja) = 13.46 kg (for Irish potatoes) and 8.42 kg (for sweet potatoes);
- 1 **large basket** (in Kaduna) = 17.62 kg (for sweet potatoes), 13.35 kg (for Irish potatoes) and 11.97 kg (for coco yarn tubers);
- 1 **large basket** (in Kano) = 13.61 kg (for Irish potatoes) and 13.17 kg (for sweet potatoes);
- 1 (medium) **heap** (in Abuja) = 9.31 kg (for yarn tubers);
- 1 (medium) **heap** (in Ekiti) = 13.07 kg (5 or 6 tubers; for yarn tubers);
- 1 (medium) **heap** (in Jalingo) = 9.35 kg (for yarn tubers);
- 1 (medium) **heap** (in Kaduna) = 8.37 kg (for yarn tubers);
- 1 (medium) **heap** (in Kano) = 13.17 kg (for yarn tubers);
- 1 (medium) **heap** (in Kwara) = 9.10 kg (5 or 6 tubers; for yarn tubers);
- 1 (medium) **heap** (in Ogun) = 11.77 kg (5 or 6 tubers; for yarn tubers) and 33.92 kg (10 or 12 tubers; for yarn tubers);
- 1 (medium) **heap** (in Ondo) = 22.10 kg (for yarn tubers) and 30.97 kg (10 or 12 tubers; for yarn tubers);
- 1 (medium) **heap** (in Osun) = 15.87 kg (5 or 6 tubers; for yarn tubers) and 10.17 kg (3 tubers; for yarn tubers);
- 1 (medium) **heap** (in Oyo) = 10.80 kg (5 or 6 tubers; for yarn tubers) and 6.48 kg (3 tubers; for yarn tubers);
- 1 (medium) **heap** (in Wukari) = 9.33 kg (for yarn tubers);
- 1 (small) **heap** (in Abuja) = 5.46 kg (for yarn tubers);
- 1 (small) **heap** (in Ekiti) = 7.63 kg (5 or 6 tubers; for yarn tubers);
- 1 (small) **heap** (in Jalingo) = 6.72 kg (for yarn tubers);
- 1 (small) **heap** (in Kaduna) = 5.88 kg (for yarn tubers);
- 1 (small) **heap** (in Kano) = 11.10 kg (for yarn tubers);
- 1 (small) **heap** (in Kufai) = 8.56 kg (for yarn tubers);
- 1 (small) **heap** (in Kwara) = 5.18 kg (5 or 6 tubers; for yarn tubers);
- 1 (small) **heap** (in Ogun) = 11.77 kg (5 or 6 tubers; for yarn tubers) and 15.67 kg (10 or 12 tubers; for yarn tubers);
- 1 (small) **heap** (in Ondo) = 8.45 kg (5 or 6 tubers; for yarn tubers) and 16.1 kg (10 or 12 tubers; for yarn tubers);
- 1 (small) **heap** (in Osun) = 11.77 kg (5 or 6 tubers; for yarn tubers) and 3.87 kg (3 tubers; for yarn tubers);
- 1 (small) **heap** (in Oyo) = 10.80 kg (5 or 6 tubers; for yarn tubers) and 3.84 kg (3 tubers; for yarn tubers);

- 1 **uzokpo** or **basin** (in Benin) = 8.03 kg (for local rice), 7.50 kg (for cowpeas), 7.43 kg (for millet grain), 7.41 kg (for maize grain), 7.15 kg (for shelled groundnuts), 6.90 kg (for Guinea corn), 6.43 kg (for soybeans), 5.52 kg (for unshelled groundnuts), 4.88 kg (for shelled egusi) and 4.41 kg (for unshelled egusi);
- 1 (medium) **basket** (in Abuja) = 6.39 kg (for Irish potatoes) and 6.07 kg (for sweet potatoes);
- 1 (medium) **basket** (in Kaduna) = 12.84 kg (for sweet potatoes), 6.67 kg (for Irish potatoes) and 5.32 kg (for coco yarn tubers);
- 1 (medium) **basket** (in Kano) = 7.92 kg (for Irish potatoes) and 7.04 kg (for sweet potatoes);
- 1 (small) **basket** or **basin** (in Ondo) = 5.33 kg (for sweet potatoes);
- 1 (medium) **basket** (in Osun) = 9.37 kg (for sweet potatoes);
- 1 (medium) **basket** or **basin** (in Oyo) = 14.77 kg (for cocoyarn) and 8.68 kg (for sweet potatoes);
- 1 (small) **basket** or **basin** (in Oyo) = 9.00 kg (for cocoyarn) and 5.83 kg (for sweet potatoes);
- 1 **heap** (in Abuja) = 19.2 kg (for cassava tubers), 6.21 kg (for sweet potatoes) and 1.44 kg (for coco yarn tubers);
- 1 **heap** (in Benin) = 49.2 kg (for cassava tubers), 2.20 kg (for sweet potatoes) and 1.03 kg (for cocoyarn tubers);
- 1 **heap** (in Jalingo) = 3.10 kg (for cassava tubers);
- 1 **heap** (in Kaduna) = 19.20 kg (for cassava tubers), 3.28 kg (for coco yarn tubers) and 2.52 kg (for sweet potatoes);
- 1 **heap** (in Kano) = 19.22 kg (for cassava tubers), 1.96 kg (for sweet potatoes) and 1.40 kg (for coco yarn tubers);
- 1 **heap** (in Kufai) = 3.07 kg (for cassava tubers), 1.82 kg (for sweet potatoes) and 1.43 kg (for coco yarn tubers);
- 1 **heap** (in Wukari) = 6.03 kg (for cassava tubers), 1.73 kg (for coco yarn tubers) and 1.53 kg (for sweet potatoes);
- 1 **small basket** (in Abuja) = 4.62 kg (for sweet potatoes), 3.60 kg (for coco yarn tubers) and 2.80 kg (for Irish potatoes);
- 1 **small basket** (in Benin) = 12.65 kg (for cocoyarn tubers);
- 1 **small basket** (in Jalingo) = 2.73 kg (for Irish potatoes);
- 1 **small basket** (in Kaduna) = 5.48 kg (for sweet potatoes), 3.82 kg (for Irish potatoes) and 3.60 kg (for coco yarn tubers);
- 1 **small basket** (in Kano) = 5.41 kg (for sweet potatoes), 4.41 kg (for Irish potatoes) and 3.65 kg (for coco yarn tubers);
- 1 **small basket** (in Wukari) = 1.87 kg (for Irish potatoes);
- 1 **painter** (plastic bowl, in Enugu) = 4.21 kg (for imported rice), 4.15 kg (for Guinea corn), 4.03 kg (for maize grain), 3.99 kg (for millet grain), 3.87 kg (for Bambara nuts), 3.83 kg (for cowpeas), 3.75 kg (for soybean grain), 3.57 kg (for local rice), 3.37 kg (for shelled groundnuts), 3.23 kg (for Guinea corn flour), 3.15 kg (for soybean flour), 3.05 kg (for maize flour), 3.00 kg (for shelled egusi), 2.18 kg (for unshelled egusi) and 1.21 kg (for unshelled groundnuts);
- 1 (big) **tuber** (in Jalingo) = 3.08 kg (for yarn tubers);
- 1 (big) **tuber** (in Kano) = 4.76 kg (for yarn tubers);
- 1 (big) **tuber** (in Kufai) = 2.99 kg (for yarn tubers);
- 1 (big) **tuber** (in Wukari) = 3.48 kg (for yarn tubers);
- 1 **paint container** (in Kwara) = 3.53 kg (for cowpeas);
- 1 **rubber** (in Benin) = 2.82 kg (for imported rice), 2.75 kg (for local rice), 2.66 kg (for Guinea corn), 2.60 kg (for Bambara nuts), 2.58 kg (for maize grain), 2.51 kg (for cowpeas), 2.49 kg (for soybean grain), 2.47 kg (for millet grain), 2.38 kg (for shelled groundnuts), 1.62 kg (for shelled egusi), 1.47 kg (for unshelled egusi) and 920 kgg (for unshelled groundnuts);
- 1 **kongo** (of metal) (in Oyo) = 2.70 kg (for Guinea corn), 2.61 kg (for millet grain) and 2.56 kg (for maize grain);
- 1 (medium) **tuber** (in Jalingo) = 2.02 kg (for yarn tubers);

- 1 (medium) **tuber** (in Kano) = 2.83 kg (for yarn tubers);
- 1 (medium) **tuber** (in Kufai) = 1.92 kg (for yarn tubers);
- 1 (medium) **tuber** (in Wukari) = 2.28 kg (for yarn tubers);
- 1 (small) **tuber** (for yarn tubers) = 2.83 kg (in Kano), 2.28 kg (in Wukari), 2.02 kg (in Jalingo) and 1.92 kg (in Kufai);
- 1 (small) **bag** (in Abuja, Kaduna and Kano) = 2.00 kg (for Semovita);
- 1 (small) **bag** (in Jalingo, Ogun and Oyo) = 1.99 kg (for Semovita);
- 1 (small) **bag** (in Benin) = 1.97 kg (for Semovita);
- 1 (small) **bag** (in Ondo and Osun) = 1.96 kg (for Semovita);
- 1 (small) **bag** (in Kwara and Wukari) = 1.95 kg (for Semovita);
- 1 (small) **bag** (in Eikiti) = 1.94 kg (for Semovita);
- 1 (small) **bag** (in Enugu) = 1.92 kg (for Semovita);
- 1 **mudu** (in Abuja) = 1.50 kg (for rice), 1.39 kg (for Bambara nuts), 1.38 kg (for maize grain), 1.37 kg (for Guinea corn), 1.36 kg (for millet grain), 1.33 kg (for maize flour), 1.32 kg (for cowpeas), 1.31 kg (for soybeans), 1.21 kg (for Guinea corn flour), 1.18 kg (for Semovita), 1.16 kg (for shelled groundnuts), 1.13 kg (for millet flour), 930 g (for shelled egusi), 820 g (for soybean flour), 790 g (for unshelled egusi) and 600 g (for unshelled groundnuts);
- 1 **mudu** (in Jalingo) = 2.20 kg (for local rice), 2.10 kg (for imported rice), 2.08 kg (for Guinea corn and Semovita), 2.03 kg (for maize grain), 2.02 kg (for millet grain and Bambara nuts), 1.92 kg (for cowpeas), 1.90 kg (for soybean grain), 1.80 kg (for shelled groundnuts), 1.39 kg (for shelled egusi), 1.38 kg (for maize flour), 1.17 kg (for unshelled egusi) and 1.07 kg (for unshelled groundnuts);
- 1 **mudu** (in Kaduna) = 1.54 kg (for rice), 1.46 kg (for bambara nuts), 1.42 kg (for maize grain and Guinea corn), 1.39 kg (for millet grain), 1.37 kg (for maize grain), 1.36 kg (for cowpeas), 1.32 kg (for soybean grain), 1.19 kg (for Semovita), 1.17 kg (for shelled groundnuts), 1.12 kg (for shelled egusi), 1.09 kg (for millet flour), 1.02 kg (for Guinea corn flour), 830 g (for unshelled egusi) and 820 g (for soybean flour);
- 1 **mudu** (in Kano) = 2.99 kg (for rice), 2.90 kg (for Bambara nuts), 2.73 kg (for maize flour), 2.67 kg (for millet flour), 2.63 kg (for Guinea corn and millet grain), 2.59 kg (for soybean grain), 2.53 kg (for Guinea corn flour and cowpeas), 2.44 kg (for maize grain), 2.01 kg (for shelled groundnuts), 1.80 kg (for shelled egusi), 1.65 kg (for Semovita), 1.48 kg (for soybean flour), 1.46 kg (for unshelled egusi) and 1.27 kg (for unshelled groundnuts);
- 1 **mudu** (in Kufai) = 2.10 kg (for local rice), 2.07 kg (for imported rice), 2.05 kg (for Guinea corn), 2.02 kg (for millet grain), 1.97 kg (for maize grain), 1.92 kg (for cowpeas), 1.90 kg (for Bambara nuts), 1.79 kg (for soybean grain), 1.78 kg (for shelled groundnuts), 1.42 kg (for shelled egusi), 1.39 kg (for maize flour), 1.19 kg (for unshelled egusi) and 1.08 kg (for unshelled groundnuts);
- 1 **mudu** (in Wukari) = 1.63 kg (for local rice), 1.61 kg (for imported rice), 1.56 kg (for Guinea corn), 1.48 kg (for millet grain), 1.45 kg (for maize grain), 1.38 kg (for Semovita) and 1.10 kg (for maize flour);
- 1 **kongo** (in Eikiti) = 1.64 kg (for imported rice), 1.63 kg (for local rice), 1.54 kg (for maize grain), 1.49 kg (for Guinea corn) and 1.46 kg (for millet grain);
- 1 **kongo** (plastic, in Eikiti) = 1.51 kg (for soybean grain), 1.41 kg (for cowpeas), 1.28 kg (for shelled groundnuts), 1.10 kg (for soybean flour), 1.03 kg (for shelled egusi), 830 g (for unshelled groundshells) and 750 g (for unshelled egusi);
- 1 **kongo** (in Kwara) = 1.75 kg (for maize grain), 1.74 kg (for local rice), 1.71 kg (for imported rice), 1.61 kg (for Guinea corn) and 1.57 kg (for millet grain);
- 1 **kongo** (plastic, in Kwara) = 1.58 kg (for cowpeas), 1.42 kg (for soybean grain),

- 1.08 kg (shelled egusi), 1.04 kg (for unshelled groundnuts) and 670 g (for unshelled egusi)
- 1 **kongo** (in Ogun) = 1.62 kg (for imported rice), 1.61 kg (for local rice), 1.56 kg (for maize grain), 1.52 kg (for Guinea corn) and 1.38 kg (for millet grain);
- 1 **kongo** (plastic, in Ogun) = 1.48 kg (for Bambara nuts), 1.47 kg (for soybean grain), 1.45 kg (for cowpeas), 1.31 kg (for shelled groundnuts), 1.06 kg (for soybean flour), 1.05 kg (for shelled egusi), 930 g (for egusi flour), 750 g (for unshelled groundnuts) and 700 g (for unshelled egusi);
- 1 **kongo** (in Ondo) = 1.61 kg (for imported rice), 1.50 kg (for local rice), 1.45 kg (for Guinea corn), 1.42 kg (for maize grain) and 1.36 kg (for millet grain);
- 1 **kongo** (plastic, in Ondo) = 1.46 kg (for cowpeas), 1.41 kg (for soybean grain), 1.35 kg (for shelled groundnuts), 1.10 kg (for shelled egusi), 1.02 kg (for soybean flour and egusi flour), 890 g (for unshelled groundnuts) and 770 g (for unshelled egusi);
- 1 **kongo** (in Osun) = 1.60 kg (for imported rice), 1.53 kg (for local rice), 1.42 kg (for maize grain and Guinea corn) and 1.36 kg (for millet grain);
- 1 **kongo** (plastic, in Osun) = 1.37 kg (for cowpeas), 1.36 kg (for soybean grain), 1.30 kg (for shelled groundnuts), 1.03 kg (for shelled egusi), 900 g (for soybean flour), 740 g (for unshelled groundnuts) and 630 g (for unshelled egusi);
- 1 **kongo** (in Oyo) = 1.65 kg (for imported rice), 1.58 kg (for local rice), 1.49 kg (for Guinea corn), 1.48 kg (for millet grain), 1.18 kg (for Semovita) and 1.13 kg (for maize flour);
- 1 **kongo** (plastic, in Oyo) = 1.45 kg (for soybean grain), 1.42 kg (for cowpeas), 1.23 kg (for shelled groundnuts), 1.13 kg (for soybean flour), 1.11 kg (for egusi flour and shelled egusi), 890 g (for unshelled groundnuts) and 680 g (for unshelled egusi);
- 1 **kongo** (metal, in Oyo) = 2.07 kg (for shelled groundnuts), 1.95 kg (for shelled egusi), 1.58 kg (for unshelled groundnuts) and 1.10 kg (for unshelled egusi);
- 1 **kobiowu** (plastic, in Kwara) = 1.34 kg (for imported rice), 1.26 kg (for millet grain), 1.25 kg (for local rice), 1.24 kg (for Guinea corn), 1.22 kg (for maize grain), 1.18 kg (for cowpeas), 1.16 kg (for soybeans), 1.14 kg (for Bambara nuts), 1.05 kg (for shelled groundnuts), 830 g (for unshelled groundnuts), 820 g (for shelled egusi), 700 g (for egusi flour) and 580 g (for unshelled egusi);
- 1 **heap** (in Ekiti) = 89.37 kg (for cassava tubers), 1.48 kg (for sweet potatoes) and 1.01 kg (for cocoyarn);
- 1 **heap** (in Kwara) = 61.60 kg (for cassava tubers);
- 1 **heap** (in Ogun) = 100.88 kg (for cassava tubers);
- 1 **heap** (in Ondo) = 174.30 kg (for cassava tubers);
- 1 (large) **heap** (in Benin) = 10.62 kg (3 tubers; for yarn tubers);
- 1 (large) **heap** (in Enugu) = 16 kg (5 tubers; for yarn tubers);
- 1 (large) **heap** (in Ondo) = 7.53 kg (for sweet potatoes);
- 1 (large) **heap** (in Oyo) = 3.00 kg (for sweet potatoes) and 2.27 kg (for cocoyarn);
- 1 (medium) **heap** (in Benin) = 5.80 kg (3 tubers; for yarn tubers);
- 1 (medium) **heap** (in Enugu) = 9.90 kg (5 tubers; for yarn tubers);
- 1 (medium) **heap** (in Ondo) = 6.04 kg (for sweet potatoes);
- 1 (medium) **heap** (in Oyo) = 2.45 kg (for sweet potatoes) and 1.77 kg (for cocoyarn);
- 1 (small) **heap** (in Benin) = 3.66 kg (3 tubers; for yarn tubers);
- 1 (small) **heap** (in Enugu) = 6.37 kg (5 tubers; for yarn tubers);
- 1 (small) **heap** (in Ondo) = 2.98 kg (for sweet potatoes);
- 1 (small) **heap** (in Oyo) = 1.57 kg (for sweet potatoes) and 90 g (for cocoyarn);
- 1 **peregi** (in Kwara) = 1.13 kg (for shelled groundnuts);
- 1 **derica cup** (in Eikiti) = 820 g (for local rice), 810 g (for imported rice), 720 g (for Guinea corn and millet grain), 730 g (for soybeans),

- 640 g (for cowpeas and shelled groundnuts) and 530 g (for shelled egusi);
- 1 **derica cup** (in Ondo) = 760 g (for imported rice), 680 g (for millet grain), 670 g (for maize grain and shelled groundnuts), 660 g (for soybeans), 650 g (for cowpeas) and 580 g (for shelled egusi);
  - 1 **piece** (in Abuja) = 330 g (for coco yarn tubers and sweet potatoes), 200 g (for cassava tubers) and 150 g (for Irish potatoes);
  - 1 **piece** (in Benin) = 410 g (for sweet potatoes) and 180 g (for cocoyarn tubers);
  - 1 **piece** (in Ekiti) = 1.80 kg (for cassava tubers), 330 g (for sweet potatoes) and 240 g (for cocoyarn);
  - 1 **piece** (in Enugu) = 340 g (for sweet potatoes);
  - 1 **piece** (in Jalingo) = 370 g (for sweet potatoes);
  - 1 **piece** (in Kaduna) = 270 g (for sweet potatoes), 220 g (for coco yarn tubers), 200 g (for cassava tubers) and 160 g (for Irish potatoes);
  - 1 **piece** (in Kano) = 280 g (for sweet potatoes), 200 g (for cassava tubers), 180 g (for Irish potatoes) and 100 g (for coco yarn tubers);
  - 1 **piece** (in Kufai) = 270 g (for sweet potatoes);
  - 1 **piece** (in Kwara) = 900 g (for cassava tubers);
  - 1 **piece** (in Ogun) = 900 g (for cassava tubers);
  - 1 **piece** (in Ondo) = 1.29 kg (for cassava tubers) and 390 g (for sweet potatoes);
  - 1 **piece** (in Osun) = 1.14 kg (for cassava tubers), 980 g (for sweet potatoes) and 140 g (for cocoyarn);
  - 1 **piece** (in Oyo) = 1.19 kg (for cassava tubers), 390 g (for sweet potatoes) and 230 g (for cocoyarn);
  - 1 **piece** (in Wukari) = 370 g (for sweet potatoes);
  - 1 **cigratette cup** (in Benin) = 260 g (for imported rice), 240 g (for local rice and maize grain), 220 g (for Guinea corn and bambara nuts), 210 g (for soybeans), 200 g (for millet grain, shelled groundnuts and soybean flour), 160 g (for shelled egusi) and 120 g (for unshelled egusi);
  - 1 **cigarette cup** (in Enugu) = 280 g (for local rice), 260 g (for bambara nuts), 240 g (for maize grain and soybeans), 230 g (for imported rice and Guinea corn), 220 g (for millet grain and cowpeas), 210 g (for Semovita and soybean flour), 200 g (for maize grain and shelled groundnuts), 190 g (for shelled egusi) and 120 g (for unshelled egusi);
  - 1 **milk tin** (in Abuja) = 170 g (for rice) and 120 g (for millet flour);
  - 1 **small milk tin** (in Abuja) = 160 g (for Bambara nuts);
  - 1 **milk tin** (in Benin) = 180 g (for imported rice), 170 g (for local rice) and 160 g (for maize grain, millet grain and Guinea corn);
  - 1 **small milk tin** (in Benin) = 170 g (for Bambara nuts), 160 g (for soybeans), 150 g (for cowpeas and soybean flour), 140 g (for shelled groundnuts) and 110 g (for shelled egusi);
  - 1 **milk tin** (in Ekiti) = 250 g (for maize grain), 160 g (for rice), 150 g (for Guinea corn, millet grain and soybeans), 140 g (for cowpeas), 130 g (for shelled groundnuts), 110 g (for shelled egusi and soybean flour) and 80 g (for unshelled egusi);
  - 1 **milk tin** (in Jalingo) = 160 g (for rice), 150 g (for maize grain and Guinea corn) and 140 g (for millet grain);
  - 1 **milk tin** (in Kaduna) = 170 g (for rice) and 120 g (for millet grain and millet flour);
  - 1 **milk tin** (in Kano) = 320 g (for rice and millet flour);
  - 1 **milk tin** (in Kufai) = 160 g (for rice) and 150 g (for maize grain, Guinea corn, millet grain and millet flour);
  - 1 **milk tin** (in Kwara) = 180 g (for local rice), 170 g (for imported rice and Guinea corn), 160 g (for maize grain and millet grain), 150 g (for Bambara nuts), 140 g (for cowpeas, soybeans and shelled groundnuts), 110 g (for shelled egusi) and 90 g (for egusi flour);
  - 1 **milk tin** (in Ogun) = 220 g (for egusi flour), 160 g (for rice), 150 g (for Guinea corn and maize grain), 140 g (for soybeans), 140 g (for millet grain and cowpeas), 130 g (for shelled groundnuts), 110 g (for soybean flour), 100 g (for shelled egusi) and 70 g (for unshelled groundnuts and unshelled egusi);
  - 1 **milk tin** (in Ondo) = 160 g (for rice), 150 g (for Guinea corn, maize grain and cowpeas), 140 g (for soybeans and shelled groundnuts), 130 g (for millet grain), 120 g (for shelled egusi) and

110 g (for unshelled groundshells, soybean flour and egusi flour);

1 **milk tin** (in Osun) = 160 g (for imported rice), 150 g (for local rice), 140 g (for Guinea corn, maize grain, cowpeas and soybeans), 130 g (for millet grain and shelled groundnuts), 110 g (shelled egusi and soybean flour) and 60 g (for unshelled egusi);

1 **milk tin** (in Oyo) = 160 g (for rice), 150 g (for Guinea corn), 140 g (for maize grain, millet grain, cowpeas and soybeans), 120 g (for shelled groundnuts), 110 g (for maize flour, shelled egusi, soybean flour and egusi flour) and 70 g (for unshelled egusi);

1 **milk tin** (in Wukari) = 160 g (for rice), 150 g (for Guinea corn and millet grain) and 140 g (for maize grain).

### 131.5 Units of Weight

For gold

				Metric
<b>benda</b>				64.12 g
2	<b>benda-off</b>			32.06 g
4	2	<b>egebba</b> or <b>eggebba</b>		16.03 g
8	4	2	<b>piso</b> or <b>eusanno</b>	8.015 g

Some other measures reported during the nineteenth century:

1 **bly** (for nuts) = 1½–3 Cwt = about 76.20–152.41 kg;

1 **bale** (for cotton) = 185 kg;

1 **load** (for cocoa) = 60 lb = about 27.2 kg.

## 132 Niue [Formerly: Savage Island]

In 1774, Captain James Cook sighted the island, which he called “Savage Island.” The next time that Niue was visited was by the London Missionary Society in 1846. Niue soon after became a

British protectorate, but in 1901, the island was annexed to New Zealand as part of the Cook Islands administration. It was administrated separately by New Zealand between 1922 and 1974, when the island got autonomy.

*Main source:* [SPER]

### 132.1 Currency

1967–: 1 New Zealand dollar = 100 cents

–1967: 1 New Zealand pound = 20 shillings = 240 pence

### 132.2 Units of Length

1 **hegatike** = the distance from the tip of the thumb to the tip of the index finger.

### 132.3 Units of Area

1 **matamomo** = a small patch or area.

### 132.4 Units of Weight

1 **matapauna** or **pauna** = 1 Imperial pound;

1 **mina** = 1 pound of money, by weight;

1 **kuleme** = 1 g.

## 133 North Yemen [Formerly: Mutawakkilite Kingdom of Yemen (1926–1962) and Yemen Arab Republic (1962–1990)]

See also *Aden*, *Ottoman Empire*, *South Yemen*, and *Yemen*.

The Qasimi state was founded in 1597, and annexed by the Ottoman Empire in 1876. In 1918, the area gained independence from the Ottoman Empire, and became the Mutawakkilite Kingdom of Yemen in 1926. In 1962, it became a Republic,

renamed the Yemen Arab Republic. The Yemen Arab Republic and South Yemen were united as the Republic of Yemen in 1990.

The metric system has been in general use since 1975.

*Main sources:* [DONA4], [MART3], [UN55], [UN66], [WAGN], and [WATE]

### 133.1 Currency

1978–1990: 1 Yemeni riyal or rial = 100 fils  
 1918–1978: 1 North Yemeni riyal or rial = 40 buqshas or bogaches = 80 halala = 160 zalat

In Mocha:  
 mid-eighteenth century–mid-nineteenth century: 1 qirsh dhahab or Mocha piaster = 80 cavears  
 100 qirsh hajar or Spanish riyal = 121½ qirsh dhahabs

### 133.2 Units of Length

Traditional system in Mocha

		Metric
<b>guz</b> or <b>goss</b>		634.590 mm
8	<b>robi</b>	79.320 mm

For surveying and for iron, etc., in Mocha

		Metric	Metric
<b>cobido</b> or <b>covid</b> <sup>a</sup>		481.58 m	685.8 mm
8	<b>gheria</b>	60.20 mm	85.72 mm

<sup>a</sup>Also reported, by [MART3], as 482.600 mm

Other measures reported during the nineteenth century:

1 **covid** (at Bayt al-Faqīh) or **pik** (at Al-Luhayyah) = 685.790 55 mm;  
 1 **dra** (for fabric) = 670 mm;  
 1 **guz** or **goss** (at Bayt al-Faqīh) = 634.912 5 mm;  
 1 **covid** (small) (at Bayt al-Faqīh) = 457.193 7 mm; [MART3] also reported as 457.00 mm;

### 133.3 Units of Capacity

Metric-linked system

			Metric
<b>thoum</b>			50 L
1¼	<b>kada</b>		40 L
80	64	<b>nafer</b>	625 mL

### 133.4 Units of Dry Capacity

For rice at Bayt al-Faqīh

		Metric	Metric
<b>tomand,</b> <b>tomaun,</b> or <b>teman</b>		84.898 928 2 L	76.186 000 kg
40	<b>chellah, kella,</b> or <b>mekmeda</b>	2.122 473 2 L	1.904 650 kg

For rice in Mocha

		Metric	Metric
<b>tomand,</b> <b>tomaun,</b> or <b>teman</b>		94.300 000 L	84.898 900 kg
40	<b>chellah, kella,</b> or <b>mekmeda</b>	2.357 500 L	2.122 472 kg

On the northern and central plateaux

<b>qadah</b>			
4	<b>rubāʿī</b>		
8	2	<b>thumnah</b> or <b>thumānī</b>	
64	16	8	<b>nafar</b>

At Dhī al-Sufāl

<b>qadah</b>			
2	<b>kaylah</b>		
8	4	<b>thumnah</b>	
64	32	8	<b>nafar</b>

At al-ʿUdayn

<b>qadah</b>					
4	<b>kaylah</b>				
8	2	<b>thumnah</b>			
32	8	4	<b>rubayʿ</b>		
64	16	8	2	<b>thumayn</b>	
128	32	16	4	2	<b>nafar</b>

In the Dhū Jiblah valley

				Metric
<b>qadah</b>				41.36 L
4	<b>kaylah</b>			10.34 L
8	2	<b>thumnah</b>		5.17 L
64	16	8	<b>nafar</b>	646.25 mL

In lower Wadi Mawr

<b>qadah</b> or <b>ḥakam</b>				
2	<b>qawbah</b>			
8	4	<b>kaylah</b> or <b>thumniyyah</b>		
64	32	8	<b>nafar</b>	

Southeast of Hodeida

<b>qadah</b>				
2	<b>ḥakam</b>			
4	2	<b>qawbah</b>		
48	24	12		<b>rubʿī</b>

Around al-Ḥusayniyyah and Bayt al-Faqīh

				Metric
<b>qadah</b>				~45 L
4½	<b>qawbah</b>			~10 L
72 or 81	16 or 18	<b>rubʿī</b>		~0.6 or ~0.5 L

At al-Suwayq

				Metric
<b>thumnah</b>				254 L
40	<b>kaylah</b>			6.35 L
160	4	<b>rubʿ</b>		1.59 L
640	16	4	<b>rubʿī</b>	0.40 L

At Mishrāfah

<b>qadah</b>				
32	<b>kaylah</b>			
128	4		<b>nafar</b>	

133.5 Units of Liquid Capacity

At Bayt al-Faqīh and in Mocha

				Metric
<b>gudda, cuda, or kōddy</b>				7.570 000 L
8	<b>nusfiah</b> or <b>noosfia</b>			946.250 mL
128	16	<b>wakia, wakeia, or vakia</b>		59.141 mL

British Imperial-linked system for general use in Mocha (by weight)

			Imperial	Metric
<b>cuda</b> or <b>gudda</b>			16 lb av	255.75 kg
8	<b>nusfiah</b>		2 lb av	31.97 kg
160	20	<b>vacia</b>	1/10 lb av	1.598 kg

For oil in Mocha

				Metric
<b>gudda, cuda</b> or <b>kōddy</b>				7.84 L
8	<b>nusfiah</b>			979.5 mL
160	20	<b>vacia</b>		48.97 mL

133.6 Units of Weight

Traditional system

<b>Thoum</b>			
1¼	<b>nafer</b>		
8	6⅞		<b>kada</b>

For general use in Al Hudaydah

				Metric
<b>Bahar</b>				368.77 kg
40	<b>frazil</b>			9.22 kg
400	10	<b>maon</b>		921.9 g
12,000	300	30	<b>vakia</b>	30.7 g

For coffee in Al Hudaydah, based on [MART3]

				Metric
<b>bahar</b>				374.213 936 kg
40	<b>frazil</b>			9.355 348kg
300	7½	<b>oca</b>		1.247 380 kg

For general use at Al-Luhayyah

						Metric
<b>kantar</b>						46.137 12 kg
5	<b>faranzala</b>					9.227 424 kg
100	20	<b>rotol</b>				461.371 2 g
114 $\frac{2}{3}$	22 $\frac{2}{3}$	1 $\frac{1}{2}$	<b>rotol</b> (small)			403.699 8 g
1600	320	16	14	<b>wakia</b>		28.835 7 g
16,000	3200	160	140	10	<b>derhem</b>	2.883 57 g

Two reported scales for general use at Bayt al-Faqīh

					Metric	Metric
<b>bahar</b>					369.961 14 kg	369.908 kg
40	<b>frazil</b>				9.249 028 kg	9.247 7 kg
400	10	<b>maund</b>			924.902 85 g	924.770 g
800	20	2	<b>rotol</b>		462.451 42 g	462.385 g
12,000	300	30	15	<b>wakia or wakeia</b>	30.830 10 g	30.825 7 g

Two reported scales for coffee at Bayt al-Faqīh

					Metric	Metric
<b>ballen</b>					129.486 4 kg	125.152 342 kg
14	<b>frazil or frehsil</b>				9.249 028 kg	8.939 453 kg
140	10	<b>maund</b>			924.902 85 g	893.945 3 g
280	20	2	<b>rotol</b>		462.451 42 g	446.972 65 g
4060	290	29	14 $\frac{1}{2}$	<b>wakia</b> <sup>a</sup>	31.893 20 g	30.825 7 g

<sup>a</sup>With dates, 20 rotoli = 320 wakieh

In Mocha during the early nineteenth century, based on [WATE]

			Imperial	Metric
<b>bahar</b>			450 lbs	204.116 kg
15	<b>frazil</b>		30 lbs	13.608 kg
150	10	<b>maund</b>	3 lbs	1.361 kg

In Mocha during the early nineteenth century, based on [WATE]

				Metric
<b>wakia</b>				31.693 g
6 $\frac{2}{3}$	<b>miscal</b>			4.754 g
10	1 $\frac{1}{2}$	<b>coffola</b>		3.169 g
160	24	16	<b>carat</b>	198.1 mg

For general use in Mocha

		Metric
<b>bahar</b>		223.422 kg
460	<b>ratl</b>	485.700 g

For black pepper and iron in Mocha

						Metric
<b>bahar</b>						199.327 918 5 kg
15	<b>frazil</b>					13.288 528 kg
150	10	<b>maund</b>				1.328 853 kg
300	20	2	<b>ratl</b>			664.426 5 g
460	30 $\frac{2}{3}$	3 $\frac{1}{15}$	1 $\frac{1}{15}$	<b>pfund</b>		433.321 56 g
6000	400	40	20	13 $\frac{2}{23}$	<b>wakia</b>	33.221 32 g

For coffee, at bazaars, in Mocha

					Metric
<b>balle<sup>a</sup></b>					186.46 kg
13 <sup>7</sup> / <sub>10</sub>	<b>frazil</b>				13.61 kg
137	10	<b>maund</b>			1.361 kg
274	20	2	<b>rotol</b>		680.5 g
3973	290	29	14 <sup>1</sup> / <sub>2</sub>	<b>wakia, wakeia, or vakia</b>	46.93 g

<sup>a</sup>For export

For coffee, for export, in Mocha

				Metric
<b>balle<sup>a</sup></b>				133.081 800 kg
–	<b>maund</b>			963.418 kg
–	2	<b>rotol</b>		481.709 g
–	29	14 <sup>1</sup> / <sub>2</sub>	<b>wakia, wakeia, or vakia</b>	33.221 g

<sup>a</sup>Also see above

For rubber in Mocha

		Metric
<b>balle</b>		132.885 287 kg
10	<b>frazil</b>	13.288 529 kg

British Imperial-linked system for general use in Mocha

					Imperial	Metric
<b>bahar</b>					450 lb av	205.35 kg
15	<b>frazil</b>				30 lb av	13.69 kg
150	10	<b>maund</b>			3 lb av	1.369 kg
300	20	2	<b>rottol or rotol</b>		1 <sup>1</sup> / <sub>2</sub> lb av	684.5 g
4500	300	30	15	<b>wakia, wakeia, or vakia</b>	1/10 lb av	45.6 g

British Imperial-linked system for copra in Mocha

				Imperial	Metric
<b>maund</b>				2 <sup>1</sup> / <sub>4</sub> lb av	1.020 6 kg
22 <sup>1</sup> / <sub>2</sub>	<b>wakia, wakeia, or vakia</b>			1/10 lb av	45.359 g
2250	100		<b>miscal</b>	1/1000 lb av	454 mg

For gold and silver in Mocha

					Metric	Metric
<b>bihk</b>					46.522 kg	46.545 000 kg
1 <sup>1</sup> / <sub>2</sub>	<b>wakia, wakeia, or vakia</b>				31.015 g	31.030 000 kg
15	10	<b>koffala</b>			3.101 5 g	4.654 500 kg
150	100	10	<b>miscal</b>		310.150 g	3.103 000 kg
240	160	16	1 <sup>3</sup> / <sub>5</sub>	<b>carat</b>	193.844 mg	193.938 g

Other measures reported during the eighteenth to nineteenth centuries:

- 1 **kada** (for beans) = 33.2 kg;
- 1 **kada** (for wheat, fenugreek and green beans) = 32.2 kg;
- 1 **kada** (for yellow sorghum) = 31.0 kg;
- 1 **kada** (for maize, lentils and broad beans) = 29.2 kg;
- 1 **kada** (for foreign-produced barley) = 27.0 kg;
- 1 **kada** (for red sorghum) = 26.9 kg;
- 1 **kada** (for locally-produced barley) = 23.3 kg;
- 1 (large) **maund** = 17.355 kg;
- 1 **frasla** = 11.22 kg;
- 1 **okka** = 850 g;
- 1 **rotle** (for milk, oil, etc.) = 778 g;
- 1 **rotle** (for meat, vegetables and fruit) = 672 g;
- 1 **rotle** (for sugar, tea and coffee) = 560 g;
- 1 **carat** = 194.4 mg.

**134 Norfolk Island (Territory of Norfolk Island)**

See also *Australia*.  
This island was sighted by Captain James Cook in 1774. Britain founded a colony on the island in 1788, but this ended in 1814 when it was discovered that it would not be possible to make it self-sufficient. A new attempt to populate the island was made in 1825. The second colony was abandoned in 1855. After the creation of the Commonwealth of Australia in 1901, Norfolk Island was placed under the authority of the new Commonwealth government to be administered as an external territory.

**134.1 Currency**

1901–: 1 Australian dollar = 100 cents

**135 North Korea [Formerly: Republic of Korea]**

See also *Korea* and *South Korea*.  
Japan replaced China as the predominant foreign influence in Korea in 1895 and annexed the peninsular country in 1910. During World War II, U.S. troops entered Korea from the south and Soviet forces entered from the north. The Potsdam conference in 1945 set the 38th parallel as the line dividing the occupation forces of the U.S. and Russia. In 1948, North Korea proclaimed the establishment of the Democratic People’s Republic of Korea.  
The metric system has been compulsory since 1947.

**135.1 Currency**

2009–: 1 North Korean won = 100 chon  
1980–2009: 1 new North Korean won = 100 chon  
1959–1980: 1 North Korean won = 100 chon  
1947–1959: 1 people’s won = 100 chon

**135.2 Units of Length**

리			리 or 촌	Metric
ri				3927.27 m
36	jeong or chung			109.090 8 m
2160	60	gan or kan		1.818 181 m
12,960	360	6	chock, chok, or ja	303.03 mm

135.3 Units of Area

Traditional and metric-linked system

정보				Metric	Metric
jeongbo or jungbo				9917.355 m <sup>2</sup>	10,000 m <sup>2</sup>
10	danbo			991.735 5 m <sup>2</sup>	1000 m <sup>2</sup>
3000	300	pyung		3.305 785 m <sup>2</sup>	—
108,000	10,800	36	pyungbangja	918.274 cm <sup>2</sup>	—

135.4 Units of Liquid Capacity

Traditional system

석	말	도	홑	Metric
sök				180.391 4 L
10	mal			18.039 140 L
100	10	doi		1.803 914 L
1000	100	10	hob or hop	180.391 4 mL

135.5 Units of Weight

Metric-linked system

			Metric
gwan or kwan			3.75 kg
6¼	geun		600 g
1000	160	don	3.75 g

During the twentieth century:

1 neok = 155 kg (for brown rice), 144 kg (for milled rice), and 100 kg (for rough rice);  
100 L (for milled rice) = 79.826 4 kg.

136 Northern Mariana Islands  
(Commonwealth  
of the United States)  
[Formerly: Mariana Islands  
District]

137 Northern Rhodesia

See *Zambia*.

138 Norway

See also *Bouvet Island*, *Jan Mayen*, and *Sweden*.

A united Norwegian kingdom was established in the ninth century. The kingdom was united briefly with Sweden, had a nominally personal union with Denmark from 1380 to 1814, and a personal union with Sweden from 1814 to 1905, when Norway gained its independence. Norway is divided into five regions: Østlandet, Sørlandet, Vestlandet, Midt-Norge and Nord-Norge. The nationwide systems are listed first in the compilation below, and then some local measures for each region.

During the Viking Age, there was trade with the Roman Empire, which, among other things, resulted in the Norwegians embracing parts of the Roman system of measurement. Due to the land laws introduced by King Magnus Hakonssøn in 1274–1276, Norway had fewer local units of measurement during the late Middle Ages than the other Nordic countries. These laws defined not only the units that would be used, but also foreshadowed a countrywide control system, which included normals and a civil service, to supervise law enforcement. The Norwegian system was replaced by a Danish-Norwegian system according to Christian V’s regulation in 1683. The Danish system was abolished by an Act in 1824. These laws remained in force until the introduction of the metric system in 1875, even if some Swedish weights and measures also came into use during the mid-nineteenth century. The metric system has been official since April 22, 1875, legally optional since 1879 and compulsory since July 1, 1882.

*Main sources:* [AASE], [BERN], [BLEK], [BORG], [BRØG], [DONA3], [ESPE], [FAUE2], [FLØT], [HOLM2], [HOLM3], [IMSE], [KOLS], [MART3], [RUDE], [SIME2], [STEI3], [STOR], [UN55], [UN66], [VIDS], and [VIGE]

### 138.1 Currency

1875–:	1 Norwegian krone or krona = 100 øre
1873–1875:	1 Norwegian speciedaler gull = 4 kroner = 120 skilling
1816–1873:	1 Norwegian speciedaler = 5 ort = 120 skilling
1813–1816:	1 Norwegian riksbankdaler = 6 mark = 96 skilling
c.1665–1680:	1 Norwegian dukat
1546–1813:	1 Norwegian riksdaler-species = 4 ort = 96 skilling
1523–1767:	1 Norwegian riksdaler = 6 mark = 96 skilling
1510–1522:	1 blaffert = 2 penninger
1483–1875:	1 mark = 16 skilling = 192 penninger
1483–1578:	1 skilling = 3 hvid = 12 penninger
c.1110–1522:	1 penning = 4 brakteater
c.300–c.900:	1 ertog = $3\frac{1}{3}$ eyrir = 10 penninger

Some other reported measures:

- 1 **lest** (for herring) = 12 barrels = 14,400;
- 1 **flak** (for timber rafts) = 100 tylfter = 1200 logs;
- 1 **fat** (for osmond iron during the sixteenth century) = 5 storhundre = 600 (= 1 stockholmsk skippund = about 137.32 kg), but in practice, it was not possible to accommodate that many osmond irons in a barrel; normally, only 480–540 were possible.
- 1 **storgross** = 12 gross = 1728;
- 1 **stamp** (for fish hooks) = 3 bøyeler = 600, but during the nineteenth century, only 400;
- 1 **stykke** or **stykkeverd** (for lumber during the sixteenth and seventeenth centuries) = varied according to the type of timber:  
for plank made by half splitting = 20 tylfter = 240;  
for beams = 5 tylfter = 60; and for sailing masts = 3 tylfter = 36;
- 1 **meis** (for fish and small furs) = 240;
- 1 **jernkiste** or **blikkiste** (for iron plates or tin plates) = 225;
- 1 **sekk** (for leather and fur from small animals, e.g., squirrel) = 5 timber = 2 tirøtt hundre = 200;
- 1 **kiste** or **kurv** (for window panes during the sixteenth and seventeenth centuries) = 30–60 skov (=6 or 12 window panes) = 180–360 or 360–720;
- 1 **lest** (for hides and skins) = 144;

### 138.2 Units of Quantity

For general use

								Items
<b>stort tusen</b>								1200
3	<b>kvartal</b>							300
10	$3\frac{1}{3}$	<b>stort hundre</b>						120
12	4	$1\frac{1}{3}$	<b>smalt hundre, spigarhudre or centum</b>					100
75	25	$7\frac{1}{2}$	$6\frac{1}{4}$	<b>øll or ol</b>				80
100	$33\frac{1}{3}$	10	$8\frac{1}{3}$	$1\frac{1}{3}$	<b>skokk or skoek</b>			60
300	100	30	25	4	3	<b>snes or stieg</b>		20
3000	1000	300	250	40	30	10	<b>par</b>	2

- 1 **beslagent hundre** or **rikshundre** (used in the lumber trade and at saw mills) =  $10\frac{1}{2}$  lyft = 126;
- 1 **bøyel** (for fish hooks) = 120 (during the nineteenth century), but later also 200;
- 1 **voll** or **oll** (for fish and eggs) = 80;
- 1 **botn** (for flatbread) = 80;
- 1 **kippe** (for dried halibut) = 20 kast = 60 or 80;
- 1 **kokfisk** (for fish) = the quantity of fish that the fisherman brought home from Lofoten, usually sold in liquor, tobacco and gifts for wives or lovers = 60;
- 1 **pakke** (for wadmal) = 50 alen;
- 1 **vinkiste** (for wine) = 48 bottles of wine;
- 1 **vedd** (for dried fish) = 30;
- 1 **pakke** (for woven fabrics or clothing items) = 16–25;
- 1 **treve** (for grain sheaves) = 24 (in general) or 26 (in Sørlandet);
- 1 **mantel** (for furs from ermine or otter) = 15;
- 1 **bakerdusin** = 13;
- 1 **pakke** (for cloth and canvas) = varied by type of commodity, 12–90;
- 1 **knippe** = 12 saw tables tied together with willow;
- 1 **treve** (for stacked hay) = 12;
- 1 **lest** (for wool) = 12 sekker (= sacks);
- 1 **duzin** =  $1/12$  gross = 12;
- 1 **tylft**, **tylvt**, or **tylt** = 12;
- 1 **balle** (for canvas) = 10 pieces;
- 1 **vorde** or **varða** (for fish) = 10;
- 1 **knippe** (for fish) = 10;
- 1 **deger** or **deker** (for hides from livestock) = 10;
- 1 **ring** (for plank) = 10;
- 1 **skov** (for window panes during the sixteenth and seventeenth centuries) = 6 or 12;
- 1 **tall** (for cod) = varied by the size of the cod fish, sometimes just one, but for smaller fishes 6–8;
- 1 **læg** (for pigs) = 6;
- 1 **kyrlag** (a normal term for the value of a flawless, 3–8-year-old cow that had at least one calf) = 6 sheep or goats (this was a fairly fixed market price during the sixteenth

century), but in Romsdal (c. 1550) = 5 sheep and in southwestern Norway (in the 1500s) = 6 sheep or 4 goats;

- 1 **gang** (for wagon wheels) = 2 pairs;
- 1 **gang** (for horseshoes) = 4;
- 1 **kast** (for fish or dried halibut) = 3 or 4;
- 1 **bordflåte** = several (3 or more) knippe (of saw tables);
- 1 **kyrlag** (a normal term for the value of a flawless, 3–8-year-old cow that had at least one calf) = 3 hides (in the province of Vestlandet during the fifteenth century) and 4 hides (in østafjell and nordafjell);
- 1 **skrukke** (for flatbread) = 2, seldom 1 or 4;
- 1 **kobbel** = 2;
- 1 **sperre** (for cod) = 2;
- 1 **åttling** (for chewing tobacco at Oppdal) =  $1/8$  roll of tobacco;
- 1 **mællag** = a quantity of goods or work performance that normally represented a value of one mæle of grain;
- 1 **ertuglag** = a quantity of goods or work performance that normally represented a value of one ertug.

For pencils

		Items
<b>gros</b>		144
12	<b>duzin</b>	12

For typing paper

			Sheets
<b>balle</b>			5000
10	<b>ris</b>		500
200	20	<b>bok</b>	25

For writing paper

			Sheets
<b>balle</b>			4800
10	<b>ris</b>		480
200	20	<b>bok</b>	24

### 138.3 Units of Length

Proposed system used during trade with the Roman Empire

<i>milliarium</i>	<i>actus</i>	<i>pertica</i>	<i>passus</i>	<i>gradus</i>	<i>pes</i>	<i>palm</i>	<i>uncia</i>	<i>digitus</i>	<i>linum</i>	Metric
<b>mile</b>										~1480 m
41⅓	<b>akt</b>									~35.5 m
500	12	<b>stong</b>								~2.96 m
1000	24	2	<b>pass<sup>a</sup></b>							~1.48 m
2000	48	4	2	<b>stig<sup>b</sup></b>						~0.74 m
5000	120	10	5	2½	<b>fótr</b>					~296 mm
20,000	480	40	20	10	4	<b>høndbreiða<sup>c</sup></b>				~74 mm
60,000	1440	120	60	30	12	3	<b>Þumal<sup>d</sup></b>			~24.7 mm
80,000	1920	160	80	40	16	4	1⅓	<b>fingrbreiða<sup>e</sup></b>		~18.5 mm
720,000	17,280	1440	720	360	144	36	12	9	<b>linje</b>	~2.05 mm

<sup>a</sup>One step with each leg

<sup>b</sup>One step

<sup>c</sup>The width of a hand, measured across the hand midway between the base of the thumb and the index finger

<sup>d</sup>The width of a thumb

<sup>e</sup>The width of the middle finger

Old system from c.800 until the late ninth century

										Metric
<b>dagsreise<sup>a</sup></b>										~36,403.2 m
4	<b>rast or vei<sup>b</sup></b>									~9100.8 m
16	4	<b>fjerdings<sup>c</sup></b>								~2275.2 m
160	40	10	<b>pilskudd<sup>d</sup></b>							~227.52 m
640	160	40	4	<b>steinkast<sup>e</sup></b>						~56.88 m
21,942⅔	5485⅔	1371⅔	137⅔		<b>mannshøyde</b>					~1.66 m
51,200	12,800	3200	320	80	2⅓	<b>armlengde<sup>f</sup></b>				~711 mm
76,800	19,200	4800	480	120	3½	1½	<b>alen</b>			~474 mm
128,000	32,000	8000	800	200	5%	2½	1⅓	<b>fot</b>		~284.4 mm
1,536,000	384,000	96,000	9600	2400	70	30	20	12	<b>tomme</b>	~23.7 mm

<sup>a</sup>The distance one was able to travel during a day (by foot or on horseback)

<sup>b</sup>A suitable distance between rests when walking

<sup>c</sup>Also called **fjerdingsvei**

<sup>d</sup>The distance a grown man was able to shoot an arrow with a standard bow

<sup>e</sup>The distance a grown man was able to throw a stone as big as a fist. Some sources have estimated it as about 35–65 m

<sup>f</sup>The distance from the shoulder of an outstretched arm of a full-grown man to the tip of the middle finger

Old system during the twelfth century

										Metric
<b>dagsreise</b>										~36,403.2 m
4	<b>rast or vei</b>									~9100.8 m
16	4	<b>fjerdingsvei</b>								~2275.2 m
160	40	10	<b>pilskudd</b>							~227.52 m
21,942⅔	5 485⅔	1 371⅔	137⅔		<b>mannshøyde</b>					~1.66 m
42,666⅔	10,666⅔	2 666⅔	266⅔	1⅞	<b>armlengde</b>					~853.2 mm
76,800	19,200	4792½	479¼	3½	1⅝	<b>alen</b>				~474.0 mm
153,600	38,340	9585	958½	7	3⅝	2	<b>fot</b>			~237.0 mm
1,536,000	383,400	95,850	9585	70	36	20	10	<b>tomme</b>		~23.7 mm

System with *kort alen*, defined in a law of 1274 by Magnus VI of Norway

						Metric
<b>favn</b>						1.422 m
3	<b>tommelalen or kort alen</b>					474.00 mm
12	4	<b>kvalt</b>				118.50 mm
54	18	4½	<b>tomme</b>			26.33 mm
648	216	54	12	<b>linje or strå</b>		2.194 mm
7776	2592	648	144	12	<b>skruppel</b>	183 µm

System with *lang alen*, defined in a law of 1274 by Magnus VI of Norway

										Metric
<b>rast or mil</b>										10,617.60 m
4	<b>fjerdings</b>									2654.40 m
26⅔	6⅔	<b>pilskudd<sup>a</sup></b>								398.16 m
6400	1600	240	<b>favn<sup>b</sup></b>							1.66 m
19,200	4800	720	3	<b>stikke<sup>c</sup></b>						553.00 mm
32,000	8000	1200	5	1⅓	<b>fot</b>					331.80 mm
76,800	19,200	2880	12	4	2⅔	<b>kvalt</b>				138.25 mm
403,200	100,800	15,120	63	21	12⅔	5¼	<b>tomme<sup>d</sup></b>			26.33 mm
4,838,400	1,209,600	181,440	756	252	151⅓	63	12	<b>linje<sup>e</sup></b>		2.194 mm
58,060,800	14,515,200	2,177,280	9072	3024	1 814⅔	756	144	12	<b>skruppel</b>	183 µm

<sup>a</sup>The distance a grown man could shoot an arrow with a crossbow

<sup>b</sup>Also called **mannshøyde**

<sup>c</sup>Also called **båtalén** or **lang alén**

<sup>d</sup>Also called **stolpe** or **støl**

<sup>e</sup>Also called **strå**

*Sjællandsk system* adopted by a regulation by Christian III of March 31, 1541

												Metric
mil												11,133.76 m
–	rast											10,121.60 m
–	–	grenzmil										8916.66 m
	4	3 <sup>3⁄40</sup>	fjerdings									2530.40 m
5866⅔	5 333⅓	4700	1333⅓	favn								1.897 8 m
17,600	16,000	14,100	4000	3	alen <sup>a</sup>							632.60 mm
35,200	32,000	28,200	8000	6	2	fot						316.30 mm
70,400	64,000	56,400	16,000	12	4	2	kvart					158.15 mm
422,400	384,000	338,400	96,000	72	24	12	6	tomme				26.36 mm
506,880	460,800	406,080	115,200	86⅔	28⅔	14⅔	7⅔	1⅓	finger			21.96 mm
5,068,800	4,608,000	4,060,800	1,152,000	864	288	144	72	12	10	linje <sup>b</sup>		2.197 mm
60,825,600	55,296,000	48,729,600	13,824,000	10,368	3456	1728	864	144	120	12	skruppel	183 μm

<sup>a</sup>There was also a unit called an **armlengde** in some use, equal to 2½ fot = about 790.75 mm

<sup>b</sup>Also called **strå**

System used in mining during the sixteenth to seventeenth centuries

				Metric
<b>gruve-lakter</b>				2.108 7 m
1⅓	<b>favn</b>			1.897 8 m
3⅓	3	<b>alén</b>		632.60 mm
6⅔	6	2	<b>fot</b>	316.30 mm

System based on the *Ole Rømers system*, defined in a decree of May 1, 1683,<sup>a</sup> and legally used until 1887

										Metric
<b>mil</b>										11,329.2 m
1 $\frac{1}{5}$	<b>grenzmil</b>									9.441 m
3600	3000	<b>stang</b>								3.147 m
6000	5000	1 $\frac{1}{5}$	<b>favn</b>							1.888 2 m
18,000	15,000	5	3	<b>alen</b>						629.40 mm
36,000	30,000	10	6	2	<b>fot</b>					314.70 mm
72,000	60,000	20	12	4	2	<b>kvart</b>				157.35 mm
432,000	360,000	120	72	24	12	6	<b>tomme</b>			26.225 mm
5,184,000	4,320,000	1440	864	288	144	72	12	<b>linje or strå</b>		2.185 mm
62,208,000	51,840,000	17,280	10,368	3456	1728	864	144	12	<b>skruppel</b>	182 $\mu$ m

<sup>a</sup>The system was further specified in decrees of November 11, 1687, August 4, 1688, and January 10, 1698

<sup>b</sup>Sometimes, there was also a unit of distance called a **tylft**, equal to 12 mil = 135,950.4 m, in use. This name was also used for a latitude (**breddegrad**) = about 111,133 m

System based on the law of July 28, 1824

										Metric
<b>mil</b>										11,295.477 m
400	<b>lås</b>									28.238 692 m
3600	9	<b>rode</b>								3.137 632 m
6000	15	1 $\frac{1}{5}$	<b>favn</b>							1.882 579 m
18,000	45	5	3	<b>alen</b>						627.526 mm
36,000	90	10	6	2	<b>fot</b>					313.763 mm
72,000	1080	20	12	4	2	<b>kvart</b>				156.882 mm
432,000	6480	120	72	24	12	6	<b>tomme</b>			26.146 9 mm
5,184,000	77,760	1440	864	288	144	72	12	<b>linje</b>		2.178 9 mm
62,208,000	933,120	17,280	10,368	3456	1728	864	144	12	<b>skruppel</b>	181.6 $\mu$ m

System adopted in 1859

										Metric
<b>favn</b>										1.828 8 m
3	<b>alen</b>									609.60 mm
6	2	<b>fot</b>								304.80 mm
12	4	2	<b>kvart</b>							152.40 mm
72	24	12	6	<b>tomme</b>						25.4 mm
864	288	144	72	12	<b>linje</b>					2.117 mm
10,368	3456	1728	864	144	12	<b>skruppel</b>				176.4 $\mu$ m

System adopted in 1875

										Metric
<b>landmil</b>										11,293.2 m
400	<b>lås</b>									28,233 m
3600	9	<b>rode</b>								3.137 m
6000	15	1 $\frac{2}{3}$	<b>favn</b>							1.882 2 m
18,000	45	5	3	<b>alen</b>						627.40 mm
36,000	90	10	6	2	<b>fot</b>					313.70 mm
72,000	1080	20	12	4	2	<b>kvart</b>				156.685 mm
432,000	6480	120	72	24	12	6	<b>tomme</b>			26.141 7 mm
5,184,000	77,760	1440	864	288	144	72	12	<b>linje</b>		2.178 5 mm
62,208,000	933,120	17,280	10,368	3456	1728	864	144	12	<b>skruppel</b>	181.5 $\mu$ m

Other measures reported during the seven-teenth to nineteenth centuries:

- 1 **kyndelmil** = the distance one was able to walk with a burning torch = about 16 km;
- 1 **neverskomil** = the distance one was able to walk in a pair of birch bark shoes = about 16 km;
- 1 **skogsmil** = the distance one was able to walk without a rest = about 9–11 km;
- 1 **balle** (for canvas) = about 108 m;
- 1 **bolk** (for cords) = 60–70 favner (during the seventeenth to eighteenth centuries) = about 114–133 m, = 25–30 favner (during the nineteenth century) = about 47.5–57 m, and 48–50 favner (during the twentieth century) = about 91.2–95 m;
- 1 **bolk** (for hemp rope) = 48 favner = about 90 m;
- 1 **børseskudd** = distance equal to the approximate range of a rifle bullet = about 100 alen = about 60 m;
- 1 **steinkast** (usually used by the military) = 50 skritt = about 35 m;
- 1 **bolt** (for canvas) = about 22 sjællandske alen = about 13.9 m;
- 1 **normalbord** (for planks, battens and other building materials during the eighteenth century in Christiania, present-day Oslo) = 11 fot = 3.479 3 m;
- 1 **lakter** (for firewood) = 2.23 m;

- 1 **halve bord** (for half planks, battens and other building materials during the eighteenth century in Christiania, present-day Oslo) = 7 fot = 2.214 1 m;
- 1 **lachter** (used in the mines) = 1.983 338 m, but often said to equal 2 m;
- 1 **skritt** (usually used by the military) = 28 tommer = about 700 mm;
- 1 **knokemål** = the length of the middle finger = about 1/3 fot = about 100 mm;
- 1 **tverhand** = the breadth of a palm = 3–4 tommer = about 75–100 mm;
- 1 **palme** (used for timber and ship masts) = 88.6 mm in circumference;
- 1 **spann** or **langspann** = the distance from the tip of the thumb to the tip of the middle finger;
- 1 **stutts Spann** = the distance from the tip of the thumb to the tip of the index finger.

Maritime units of measurement:

Some measures used at sea since before the thirteenth century:

- 1 **dagsreise** (with sailing ship) = 24 hours sailing at 6 knots = 24 vike sjøer = about 267 km.
- 1 **dagsreise** (by rowboat) = 12 hours of rowing at 3 knots = 6 vike sjøer = about 67 km;
- 1 **vika sjóvar**, **vike sjø** or **ukesjø** (by rowboat) = 2 hours of rowing at 3 knots = about 11 km;
- 1 **roskift** (on rivers and lakes in Telemark) = about 2.5 km.

Measures used at sea until the early seventeenth century, based on [FLØT]

				Metric
<b>døger sigling<sup>a</sup></b>				266.64 km
2	<b>halv døger sigling<sup>b</sup></b>			133.32 km
4	2	<b>dags roing<sup>c</sup></b>		66.66 km
24	12	6	<b>vike sjø<sup>d</sup></b>	11.11 km

<sup>a</sup>The distance that could be travelled during a day's sailing

<sup>b</sup>The distance that could be travelled during half a day's sailing

<sup>c</sup>The distance that could be travelled during a day's rowing

<sup>d</sup>The distance that could be travelled without changing the one who is rowing

Measures used at sea until the mid-nineteenth century

						Metric
<b>meridiangrad</b>						~111,120 m
–	<b>sjømil</b>					7530.36 m
–	4	<b>kvarmil<sup>a</sup></b>				1882.59 m
–	40	10	<b>kabellengde</b>			188.259 m
59, 025 <sup>1</sup> / <sub>15</sub>	4000	1000	100	<b>favn</b>		1.882 59 m
177, 075 <sup>1</sup> / <sub>5</sub>	12,000	3000	300	3	<b>alen</b>	627.53 mm

<sup>a</sup>On June 29, 1923, stated as 1852 m. (According to *Norsk Fiskeritidende* **44–45**, 1925, p. 89)

Other maritime measures reported until the nineteenth century:

1 **sjøs vei** = the distance one could usually sail or row while the sea is flooding and falling (approximately 12 hours), or while the sea is either flooding or falling (approximately 6 hours);

1 **landmil** (after 1889) = 10,000 m;

1 **segelsyn** (in Nord-Norge) = the distance at which one can see the sails on a sailboat on the horizon = about 9000 m;

1 **geografisk mil** = 1/15 equatorial degree or 4 minutes of arc = about 7421 m;

1 **kabellengde** = until the late eighteenth century, reported as the length of a mooring = 100–120 favner = 188.25–225.9 m, but later defined as 1/10 international nautical mile = 185.2 m.

## 138.4 Units of Area

Since the Middle Ages, the *bol* was used to describe the size of an area of land in relation to rents.

Land area relations, based on [STEI]

<b>markebol</b>			
8	<b>øresbol</b>		
24	3	<b>ørtogbol</b>	
480	60	20	<b>penningbol</b>

Before 1274, based on *tommelalen*

		Metric
<b>kvadratfavn</b>		2.022 084 m <sup>2</sup>
9	<b>kvadratalen</b>	224.676 dm <sup>2</sup>

System based on the law of 1274 by Magnus VI of Norway after 1274, based on *stikke*

		Metric
<b>kvadratfavn</b>		2.752 281 m <sup>2</sup>
9	<b>kvadratalen</b>	305.809 dm <sup>2</sup>

System based on regulation of March 31, 1541 by Christian III

		Metric
<b>kvadratfavn</b>		3.601 645 m <sup>2</sup>
9	<b>kvadratalen</b>	400.183 dm <sup>2</sup>

System based on decree of May 1, 1683

				Metric
<b>kvadratstang</b>				9.903 609 m <sup>2</sup>
4	<b>kvadratfavn</b>			2.475 902 m <sup>2</sup>
36	9	<b>kvadratalen</b>		275.100 dm <sup>2</sup>
144	36	4	<b>kvadratfot</b>	68.775 dm <sup>2</sup>

Upper scale for arable land before 1816

					Metric
<b>slåttmæling<sup>a</sup></b> (16 × 16 stenger)					14,939.488 420 m <sup>2</sup>
2 <sup>14/25</sup>	<b>ertermål</b> (10 × 10 stenger)				5,835.737 664 m <sup>2</sup>
4	1 <sup>9/16</sup>	<b>høymål</b> or <b>rugmål</b> (8 × 8 stenger)			3,734.872 105 m <sup>2</sup>
4 <sup>7/7</sup>	1 <sup>11/14</sup>	1 <sup>1/7</sup>	<b>kornmål<sup>b</sup></b> (7 × 8 stenger)		3,268.013 092 m <sup>2</sup>
1024	400	256	224	<b>einstengel</b> or <b>stangrute</b>	14.589 344 m <sup>2</sup>

<sup>a</sup>[SOMM, p. 96] reported that the mæling could be 9604, 12,544, 13,824 or 15,680 kvadratalen

<sup>b</sup>Sometimes called **mål**, **skurmål**, **skårmål** or **råmål**. Often said to equal (8 × 7) × (7 × 7) alen = 2744 kvadratalen, but varied by location, and could be as small as about 1440 kvadratalen and as large as about 2800 kvadratalen. In Hadeland, it was reported as 8 × 8 stenger = 48 × 48 alen = 2304 kvadratalen. Later, one skurmål was reported as equal to one høymål (see [KOLS, Vol. II, p. 482])

Lower scale for arable land before 1816

					Metric
<b>tolvfemning</b>					2100.865 559 m <sup>2</sup>
4	<b>seksstengel</b>				525.216 390 m <sup>2</sup>
5 <sup>19/25</sup>	1 <sup>11/25</sup>	<b>femstengel</b>			364.733 604 m <sup>2</sup>
9	2 <sup>1/4</sup>	1 <sup>9/16</sup>	<b>firstengel</b>		233.429 506 m <sup>2</sup>
144 (12 × 12)	36 (6 × 6)	25	16 (4 × 4)	<b>einstengel</b> or <b>stangrute</b>	14.589 344 m <sup>2</sup>

For arable land, based on law of June 6, 1816

						Metric
<b>kvadrat mil</b>						128,350.772 640 km <sup>2</sup>
32,400	(Danish) <b>tønneland</b>					3961.443 6 m <sup>2</sup>
129,600	4	<b>mæling</b> or <b>(mål) agerland</b>				990.360 9 m <sup>2</sup>
12,960,000	400	100	<b>kvadratrode</b> or <b>kvadratstang</b>			9.903 609 m <sup>2</sup>
324,000,000	10,000	2500	25	<b>kvadratalen</b>		396.144 36 dm <sup>2</sup>
1,296,000,000	40,000	10,000	100	4	<b>kvadratfod</b>	99.036 09 dm <sup>2</sup>

For smaller areas, based on law of June 6, 1816

				Metric
<b>kvadratalen</b>				396.144 36 dm <sup>2</sup>
4	<b>kvadratfod</b>			99.036 09 dm <sup>2</sup>
576	144	<b>kvadrattomme</b>		687.75 cm <sup>2</sup>
82,944	20,736	144	<b>kvadratlinje</b>	4.8 mm <sup>2</sup>

For arable land, based on law of July 28, 1824

				Metric
(Norwegian) <b>tønneland</b> <sup>a</sup>				3937.893 827 m <sup>2</sup>
4	<b>mål (jord) or mæling</b>			984.473 457 m <sup>2</sup>
400	100	<b>kvadratode</b>		9.844 734 m <sup>2</sup>
40,000	10,000	100	<b>kvadratfod</b>	9.843 906 25 dm <sup>2</sup>

<sup>a</sup>Before 1850, both the Danish and the Norwegian tønneland was in use. After metrification, also used for 1000 m<sup>2</sup>

Other reported measures:

- 1 **geografisk kvadrat mil** = 55.071 km<sup>2</sup>;
- 1 **månedsmatbol** (used in the context of land rent during the Middle Ages) = the area of land that provided food for a man for a month;
- 1 **foll** or **fold** = the gross return of the harvest; if one puts out 100 kg of potatoes and harvests 500 kg, you get 5 fold (i.e., five times the effort).

## 138.5 Units of Volume

After 1683

			Metric
<b>kubikk alen</b>			249.333 260 dm <sup>3</sup>
8	<b>kubikk fot</b>		31.166 657 dm <sup>3</sup>
13,824	1728	<b>kubikk tomme</b>	18.036 cm <sup>3</sup>

Upper scale after 1824

						Metric
<b>kubikk rode</b>						30.889 169 m <sup>3</sup>
–	<b>commercelæst</b> <sup>a</sup>					2.590 829 m <sup>3</sup>
–	–	<b>læst træ</b> <sup>b</sup>				1.992 351 m <sup>3</sup>
20	–	1 <sup>29</sup> / <sub>100</sub>	<b>læst</b> <sup>c</sup>			1.544 458 m <sup>3</sup>
25	2 <sup>31</sup> / <sub>20</sub>	1 <sup>49</sup> / <sub>80</sub>	1¼	<b>tun</b> <sup>c</sup>		1.235 568 m <sup>3</sup>
1000	83 <sup>7</sup> / <sub>8</sub>	64½	50	40	<b>kubikk fot</b>	30.889 169 dm <sup>3</sup>

<sup>a</sup>For timber. Also called **kommerse læst**. In some ports, also reported as 165 kubikk fot = 50.967 129 m<sup>3</sup>. Before 1824, usually reported as 80 kubikk fot = 2.471 134 m<sup>3</sup>

<sup>b</sup>For timber. Usually said to be 75 bræter (instead of 75<sup>3</sup>/<sub>55</sub> bræter) = 1.990 903 m<sup>3</sup>

<sup>c</sup>For timber

Lower scale after 1824

						Metric
<b>kubikk alen</b>						247.113 352 dm <sup>3</sup>
1%	<b>tønne</b>					139.001 260 dm <sup>3</sup>
8	4½	<b>kubikk fot</b>				30.889 169 dm <sup>3</sup>
14%	8	1%	<b>skjeppe</b>			17.375 157 dm <sup>3</sup>
13,824	7776	1728	972	<b>kubikk tomme</b>		17.875 676 cm <sup>3</sup>
23,887,872	13,436,928	2,985,984	1,679,616	1728	<b>kubikk linje</b>	10.345 mm <sup>3</sup>

Other measures reported during the nineteenth century:

1 **storfavn** (for firewood) = 2 småfavner ved = (2 alner × 2 favner × 2 favner) = 11.16 m<sup>3</sup>;

1 **standard** (for sawn wood) = 165 kubikk fot = 5.096 m<sup>3</sup>;

1 **register-ton** = 2.831 608 m<sup>3</sup>;

1 **favn** (for fuelwood) = (6 × 6 × 2 fot) = 72 kubikfot = about 2.12 m<sup>3</sup>, but after metrification = (2 × 2 × 0.6 m) = 2.4 m<sup>3</sup>;

1 **småfavn** (for firewood) = (1 alen × 1 favn × 1 favn) = 2.232 m<sup>2</sup>;

1 **lakter** or **lachter** (for fuelwood and stacked logs with 65% wood pulp) = (2 × 6 × 6 fot) = 2.224 m<sup>3</sup>;

1 **læst kull** = 1.93 m<sup>3</sup>;

1 **bræt** (for timber) = 26.545 380 dm<sup>3</sup>.

## 138.6 Units of Dry Capacity

Estimated system for grain during the thirteenth century, based on decrees by Magnus VI of Norway

						Metric
<b>tønne</b>						145.8 L
1½	<b>helgd</b> or <b>såld</b>					97.2 L
9	6	<b>mæle</b>				16.2 L
12	8	1⅓	<b>setting</b>			12.15 L
13½	9	1 ½	1⅛	<b>eske</b> or <b>ask</b>		10.80 L
48	32	5⅓	4	3%	<b>skrull</b>	3.037 5 L

Estimated system for grain based on law of December 4, 1604 by Christian IV

				Metric
<b>korntønne</b>				139.121 L
6	<b>strøken skjeppe</b>			23.187 L
9	1½	<b>eske</b> or <b>ask</b>		15.458 L
12	2	1⅓	<b>strøken halvsjeppe</b> or <b>setting</b>	11.593 L



System based on law of July 28, 1824

							Metric
<b>korntønna</b>							138.960 000 L
4	<b>fjerdings</b>						34.740 000 L
8	2	<b>skjeppe</b>					17.370 000 L
16	4	2	<b>halvskjeppe</b> or <b>setting</b>				8.685 000 L
24	6	3	1½	<b>notting</b>			5.790 000 L
32	8	4	2	1⅓	<b>fjerdingskar</b>		4.342 500 L
64	16	8	4	2⅔	2	<b>åttingkar</b>	2.171 250 L

Other measures reported during the thirteenth to eighteenth centuries:

- 1 **lest** or **salt-lest** (for coal, French salt and Spanish salt) = 18 korntønner = 2509.2 L;
- 1 **lest** (for ore and lime) = 16 korntønner (144 potter) = 2230.4 L;
- 1 **stig** (for charcoal) = 24 svenske tønner = 1980 L;
- 1 **lest** (for grain, flour, Norwegian salt and charcoal) = 12 korntønner (144 potter) = 1672.8 L;
- 1 **lest** (for butter) = 12 smørtønner (136 potter) = 1578 L;
- 1 **lest** (for beer, herring, fish, tar, and charcoal) = 12 fisketønner (120 potter) = 1389.6 L;
- 1 **salttønne** (for salt, used from 1683 to 1778) = 176 potter = 170.02 L;

- 1 **korntønne** (before 1683) = 138.97 L;
- 1 **skaalpund** = 498.1 mL;
- 1 **løvd** = a handful;
- 1 **matte** = a rough, braided or woven piece of birch-bark, bast, straw, rope, etc.

### 138.7 Units of Capacity for Butter

There was a particular measurement system used for butter. The butter was churned in a special vessel called a **stampekjerne**, which held about 20 L. Once finished churning, the butter was taken up and placed in a trough and kneaded with the bare hands to get the gist milk racket out. Then, the butter was salted and placed in another vessel.

For butter during the eighteenth century

							Metric	Metric
<b>smørtønne</b>							129.6 L	123.45 kg
8	<b>løp</b> or <b>laup</b> <sup>a</sup>						16.2 L	15.43 kg
12	1½	<b>ask, aske</b> or <b>eske</b> <sup>b</sup>					10.8 L	10.29 kg
32	4	2⅔	<b>spann</b>				4.05 L	3.86 kg
48	6	4	1½	<b>bolle</b> <sup>b</sup>			2.70 L	2.57 kg
192	24	16	6	4	<b>juste</b>		675 mL	642.96 g
576	72	48	18	12	3	<b>pel</b> <sup>c</sup> or <b>mark</b>	225 mL	214.32 g

<sup>a</sup>Varied by location, between 3 and 4 spannar. Some reported it as about 17.93 kg  
<sup>b</sup>Also used for herring, peas, and tar  
<sup>c</sup>When referred to as a unit of weight, called one mark

Barter scale:  
 ½ trepundlaup of butter (= about 7.5 kg), was said to be worth: 1 unblemished cowhide, 2 buckskins, 4 goatskins, 8 sheepskins, 12 calfskins, or 20 squirrel skins.

## 138.8 Units of Liquid Capacity

System instated by law in 1274 by King Magnus Hakonssøn

					Metric
<b>ask, aske, askr or eske</b>					~10.80 L
2	<b>halvask</b>				~5.40 L
4	2	<b>bolle</b>			~2.70 L
8	4	2	<b>halvbolle</b>		~1.35 L
16	8	4	2	<b>juste or iust</b>	~675 mL

Estimated commercial scale before May 1, 1683 (practically used until the early eighteenth century)

											Metric
<b>fat or foder</b>											929.28 L
2	<b>båt<sup>a</sup></b>										464.64 L
4	2	<b>oksehode<sup>b</sup></b>									232.32 L
6	3	1½	<b>amme, ame, aam or åm<sup>c</sup></b>								154.88 L
–	3⅞ <sub>17</sub>	1⅓ <sub>17</sub>	1⅓ <sub>17</sub>	<b>øltønne<sup>d</sup></b>							131.65 L
8	4	2	1⅓	–	<b>tønne<sup>e</sup></b>						116.16 L
24	12	6	4	3⅝	3	<b>anker</b>					38.72 L
240	120	60	40	34	30	10	<b>støfken<sup>e</sup></b>				3.872 L
480	240	120	80	68	60	20	2	<b>kanne</b>			1.936 L
960	480	240	160	136	120	40	4	2	<b>pott</b>		968.0 mL
1920	960	480	320	272	240	80	8	4	2	<b>plank<sup>d</sup></b>	484.0 mL
3840	1920	960	640	544	480	160	16	8	4	2	<b>pel</b> 242.0 mL

<sup>a</sup>Varied between about 463 and 484 L

<sup>b</sup>Mainly used in international trade for wine, beer, liquor and various types of oil

<sup>c</sup>Mainly used for wine, beer and liquor

<sup>d</sup>Also used for butter, salted fish, herring, soap and tallow

<sup>e</sup>Mainly used for wine and fish

Theoretical system based on decree of May 1, 1683

											Metric
<b>fat or foder</b>											904.272 L
2	<b>pipe</b>										452.136 L
4	2	<b>oksehode<sup>a</sup></b>									226.068 L
6	3	1½	<b>amme, ame, aam or åm</b>								150.712 L
–	–	–	1⅓ <sub>17</sub>	<b>fisktønne<sup>b</sup></b>							131.390 L
8	4	2	1⅓	–	<b>tønne</b>						113.034 L
24	12	6	4	3⅓ <sub>35</sub>	3	<b>anker</b>					37.678 L
234	117	58½	39	34	29¼	9¾	<b>støfken<sup>c</sup></b>				3.864 L
468	234	117	78	68	58½	19½	2	<b>kanne</b>			1.932 2 L
936	468	234	156	136	117	39	4	2	<b>pott</b>		966.1 mL
1872	936	468	312	272	234	78	8	4	2	<b>plank<sup>c</sup></b>	483.0 mL
3744	1872	936	624	544	468	156	16	8	4	2	<b>pel</b> 241.5 mL

<sup>a</sup>Mainly used in international trade for wine, beer, liquor and various types of oil

<sup>b</sup>For salted fish and herring

<sup>c</sup>Mainly used for wine. Also called **stobiken** and **stob**



Estimated system used after 1698

										Metric
<b>fat or foder</b>										929.28 L
2	<b>pipe</b>									464.64 L
4	2	<b>oksehode</b>								232.32 L
6	3	1½	<b>amme, ame, aam or åm</b>							154.88 L
24	12	6	4	<b>anker</b>						38.72 L
240	120	60	40	10	<b>støfken</b>					3.872 L
480	240	120	80	20	2	<b>kanne</b>				1.936 L
960	480	240	160	40	4	2	<b>pott</b>			968.0 mL
1920	960	480	320	80	8	4	2	<b>plank</b>		484.0 mL
3840	1920	960	640	160	16	8	4	2	<b>pel</b>	242.0 mL

For coal

		Metric
<b>kullmal</b>		482.6 L
3	<b>kulltønne</b>	160.9 L

Other reported measures:

1 **lest** (for honey, as reported in 1643) = 8  
ammer = about 1240 L.

138.9 Units of Weight

During the Viking Age, there was trade with a wide range of cultures in northern Europe and around the Mediterranean. During the Middle Ages, three main systems for weighing were in general use. The *skålvektssystem* was used as the main trade weight system, the *skippundvektssystem* was generally used for weighing iron, grain, flour, salt, and fish, and the *bismervektssystem* was mainly used for butter and other fat commodities. In some provinces, there was another system, here called *kornvektssystem*, for grain.

*Roman money weight system* used from the third to the tenth century

			Metric
<b>ertog</b>			8.50 g
3⅓	<b>eyrir</b>		2.55 g
10	3	<b>penning</b>	850 mg

*Roman money weight system* used from the third to the ninth century

			Metric
<b>unce</b>			26.796 g
7	<b>denar</b>		3.828 g
28	4	<b>scripulum</b>	957 mg

*Skålvektssystem* during the ninth to early twelfth centuries

				Metric
<b>skålpund</b>				428.64 g
2	<b>mark</b>			214.32 g
16	8	<b>øre</b>		26.79 g
48	24	3	<b>ørtog or ertug</b>	8.93 g

*Skålvektssystem* from the early twelfth to early fourteenth centuries

				Metric
<b>skålpund</b>				~392 g
2	<b>mark</b>			~196 g
16	8	<b>øre</b>		~24.5 g

*Skålvektssystem* from the early fourteenth to mid-fifteenth centuries

				Metric
<b>skålpund</b>				~460 g
2	<b>mark</b>			~230 g
16	8	<b>øre</b>		~28.7 g

*Skålvекtsystem* from the mid-fifteenth century until 1683

				Metric
<b>skålpund<sup>a</sup></b>				467.71 g
2	<b>kølnsk mark</b>			233.85 g
16	8	<b>lodd<sup>b</sup></b>		29.23 g
64	32	4	<b>kvintin</b>	7.308 g

<sup>a</sup>To some extent, the *lybsk pund* (Lübeck pound = 487.71 g) may have been used

<sup>b</sup>The lodd was in use from the early fourteenth century

*Skålvекtsystem* based on decrees of May 1, 1693 and January 10, 1698

							Metric
<b>centner</b>							55.972 kg
112	<b>skålpund<sup>a</sup></b>						499.750 g
224	2	<b>mark</b>					249.875 g
1792	16	8	<b>unse</b>				31.234 g
3584	32	16	2	<b>lodd</b>			15.617 g
14,336	128	64	8	4	<b>kvintin</b>		3.904 g
57,344	512	256	32	16	4	<b>ort</b>	976 mg

<sup>a</sup>Defined as the weight of 1/62 kubikfot of fresh water [RASM, p. 54]. 12 skålpund = 1 bismerpund = 5.997 kg and 16 skålpund = 1 lispund = 7.996 kg

*Skålvекtsystem* based on law of July 28, 1824

								Metric
<b>centner</b>								49.811 2 kg
100	<b>handelspund<sup>a</sup></b>							498.112 g
200	2	<b>mark</b>						249.056 g
1600	16	8	<b>unse</b>					31.132 g
3200	32	16	2	<b>lodd</b>				15.566 g
12,800	128	64	8	4	<b>kvintin</b>			3.891 g
51,200	512	256	32	16	4	<b>ort</b>		972.875 mg
819,200	8192	4096	512	256	64	16	<b>es or aes</b>	60.805 mg
13,107,200	131,072	65,536	8192	4096	1024	256	16	<b>gran</b> 3.800 mg

<sup>a</sup>12 handelspund = 1 bismerpund =  $\frac{3}{4}$  lispund = 5.977 344 kg

Metric-linked system used after 1875

				Metric
<b>centner</b>				50 kg
100	<b>handelspund</b>			500 g
200	2	<b>mark</b>		250 g
1600	16	8	<b>unse</b>	31.25 g

*Bismervektsystem* from the tenth until the late thirteenth century

					Metric
<b>smørtønne</b>					92.586 kg
6	<b>laup</b> <sup>a</sup>				15.431 kg
12	2	<b>spann</b> <sup>b</sup>			7.715 kg
18	3	1½	<b>bismerpund</b>		5.144 kg
432	72	36	24	<b>bismermark</b>	214.32 g

<sup>a</sup>In Hedmark, Land, and Toten, this measure was called a **smørmæle**, and north of Nordmøre it was normally called a **spann**. Some sources indicate that it might have varied by location between 2¼ bismerpund and 3 bismerpund, but [STEI3] reported 3 bismerpund as the usual value

<sup>b</sup>This *spann* was reported in Hedmark, Land, Toten, and most parts of Eidsivatingslag, as well as in several of the areas surrounding Oslo, such as Eiker and Follo. In Gulatingslag and Sörgudbrandsdalen, the laup was divided into 4 spann

*Bismervektsystem* from the late thirteenth century until 1580

			Metric
<b>laup</b>			16.796 16 kg
3	<b>bismerpund</b>		5.598 72 kg
72	24	<b>bismermark</b> or <b>kølnsk mark</b>	233.28 g

*Bismervektsystem* from 1580 to 1683

			Metric
<b>laup</b>			16.837 kg
3	<b>bismerpund</b> <sup>a</sup>		5.612 kg
72	24	<b>bismermark</b> or <b>kølnsk mark</b>	233.85 g

<sup>a</sup>According to [BERN], one bismerpund was about 5.52 kg in Agershuus len, about 7.36 kg (=16 skålpund) in Baahus len, about 5.94 kg in Bergenhuus len and Trondhjem len, and about 5.52 kg in Tønsbjerg len

*Bismervektsystem* based on decrees of May 1, 1683 and January 10, 1698

				Metric
<b>smørspann</b>				17.991 000 kg
3	<b>bismerpund</b>			5.997 000 kg
36	12	<b>pund</b> or <b>skålpund</b>		499.750 g
72	24	2	<b>bismermark</b>	249.875 g

*Bismervektsystem* based on law of July 28, 1824

			Metric
<b>bismerpund</b>			5.977 344 kg
12	<b>pund</b> or <b>skålpund</b>		498.112 g
24	2	<b>bismermark</b>	249.056 g

## Metric-linked system for butter during the late nineteenth century

					Metric
<b>bergensk smørtønne</b>					37.5 kg
1¼	<b>erte tønne</b> or <b>salttønne</b>				30 kg
2½	2	<b>trepundslaup</b> <sup>a</sup>			15 kg
3¾	3	1½	<b>topundslaup</b>		10 kg
7½	6	3	2	<b>laup smør</b>	5 kg

<sup>a</sup>For a trepundslaup of butter, you had to pay 2 lytefri kuhud ugravet or 4 bukkeskinn or 8 geiteskinn or 16 sauerskinn or 24 kalveskinn or 40 gråskinn (ekorn)

*Skippundvektsystem* as instated by law of 1274 by King Magnus VI Lagabøte

					Metric
<b>(landslovs)skippund</b>					151.164 kg
24	<b>uett or vett</b>				6.298 5 kg
346	14 $\frac{1}{2}$	<b>pund</b>			436.89 g
692	28%	2	<b>mark</b>		218.44 g
16,608	692	48	24	<b>ørtug or ertog</b>	9.102 g

*Skippundvektsystem* from the fifteenth century until 1683

					Metric
<b>skippund</b>					177.969 kg
19%	<b>østnorsk lispund</b>				9.258 kg
24	–	<b>uett or vett</b>			7.415 kg
28%	1 $\frac{1}{2}$	–	<b>vestnorsk lispund or trøndersk lispund</b>		6.172 kg
692	36	28%	24	<b>mark or pundarmark</b>	257.18 g

*Skippundvektsystem* as instated by decree pf May 1, 1683, based on [STEI3] and [RASM]

				Metric	Metric
<b>skippund</b>				159.744 kg	159.920 kg
20	<b>lispund</b>			7.987 kg	7.996 kg
320	16	<b>skålpund</b>		499.20 g	499.75 g
640	32	2	<b>mark</b>	249.60 g	249.875 g

*Skippundvektsystem* as instated by law of July 28, 1824

				Metric
<b>skippund</b>				159.396 kg
20	<b>lispund</b>			7.970 kg
320	16	<b>skålpund</b>		498.112 g
640	32	2	<b>mark</b>	249.056 g

Some other reported measures:

- 1 **kommerse-lest** or **commerce-lest** (for fish, food and other commodities, as stated by instructions of January 26, 1769; used by the shipping industry) = 5200 skålpund = 2598.7 kg, but normally varied between 2080 and 2300 kg, depending on the size of the ship
- 1 **lest** (for grain) = 16 skippund = 2560 kg;
- 1 **trelast-lest** (for wood or timber, as stated by instructions of January 26, 1769) = 4000 skålpund = 1999 kg, but on average =  $\frac{2}{3}$  or  $\frac{3}{4}$  kommerse-lest, or the volume of one storhundre (120) standardized cargo volumes (=11' × 9'' × 1 $\frac{1}{4}$ '', Christiania

standard) = about 3 m<sup>3</sup>; during the late twentieth century, also estimated as about 2.08 netto registertonne = about 2080 kg;

1 **lest** (for wool) = 12 skippund = 1920 kg;

1 **foder** (for ore) = 30 centner = 1679.16 kg;

1 **long tonn** (used between 1683 and 1887) = 1016 kg;

1 **lest** (for flax and hemp) = 6 skippund = about 960 kg;

1 **foder** (for lead during the seventeenth century) = 6 københavnske skippund = about 950 kg;

1 **mark** (for money before 1873) = 233.855 500 g;

1 **balje** (for pepper during the seventeenth century) = 300 skålpund = 149.925 kg;

1 **matte** (a sack used in the Pomor trade for packaging of rye flour) = 9 pud = about 147.42 kg;

1 **balje** (for cinnabar during the seventeenth century) = 150 skålpund = 74.962 kg;

1 **balje** (for caraway during the seventeenth century) = 100 skålpund = 49.975 kg;

1 **drømt** or **tremet** (for hops during the sixteenth century) = 3½ danske lispund = about 27.75 kg, or = 16 sjællandske skjepper = about 371 L;

1 **pud** (used for rye flour in the Pomor trade and by Norwegian fishermen for *Pollachius virens* (often called coalfish in Britain)) = 16.38 kg;

1 **sten** (for wool) = 30 skålpund = 14.992 kg;

1 **sten** (for hemp) = 20 or 21 skålpund = 9.995 or 10.495 kg;

1 **sølvkannefisk** = the amount of fish that the Governor of Finnmark in the 1600s got from every man during the first year after he entered the service. For this, he would do two silver pots, one for western Finnmark and one for Eastern Finnmark = ½ våg or a daily catch = about 8.99 kg.

For gold and silver by decrees of 1514 and 1541

					Metric
<b>kølnsk pund</b>					467.70 g
2	<b>mark</b>				233.85 g
32	16	<b>lodd</b>			14.616 g
128	64	4	<b>kvintin</b>		3.654 g
512	256	16	4	<b>ort</b>	913 mg

For gold and silver by decrees of May 1, 1683 and January 10, 1698

					Metric
<b>kølnsk pund<sup>a</sup></b>					470.350 g
2	<b>mark</b>				235.175 g
32	16	<b>lodd</b>			14.698 g
128	64	4	<b>kvintin</b>		3.675 g
512	256	16	4	<b>ort</b>	919 mg

<sup>a</sup>Defined as 16/17 handelspund

*Sølvvektssystem* for silver by law of July 28, 1824

							Metric
sølvvektspund or kølnsk pund							467.988 5 g
2	mark						233.994 2 g
32	16	lodd					14.624 6 g
128	64	4	kvintin				3.656 2 g
512	256	16	4	ort			914.0 mg
8192	4096	256	64	16	es, æs, or as		57.2 mg
131,072	65,536	4096	1024	256	16	gran	3.57 mg

*Gullvektssystem* for gold by law of July 28, 1824

					Metric
<b>gullpund</b> or <b>kølnsk pund</b>					467.988 5 g
2	<b>mark</b>				233.994 2 g
48	24	<b>karat</b>			9.749 8 g
192	96	4	<b>gran</b>		2.437 4 g
576	288	12	3	<b>gren</b>	812.48 mg

*Medisinalvektssystem* for medical use after the mid-sixteenth century (and later stated by law of July 28, 1824)

						Metric
<b>Nürnberg pund</b>						357.846 624 g
12	<b>unse</b>					29.820 552 g
96	8	<b>drachme</b>				3.727 569 g
288	24	3	<b>skruppel</b>			1.242 523 g
5760	480	60	20	<b>Nürnberggran</b>		62.126 mg
92,160	7680	960	320	16	<b>æs</b>	3.881 mg

*Medisinalvektsystem* for medical use by law of May 12, 1866

				Metric
<b>gram</b>				1 g
10	<b>decigram</b>			100 mg
100	10	<b>centigram</b>		10 mg
1000	100	10	<b>milligram</b>	1 mg

Other reported measures:

- 1 **metrisk karat** (for pearls, diamonds and other gemstones after 1875) = 200 mg;  
 1 **karat** (for pearls, diamonds and other gemstones before 1875) = 192 mg.

## 138.10 Østlandet

Østlandet is divided into the counties of Akershus, Oslo, Østfold, Vestfold, Hedmark, Oppland, Buskerud and Telemark.

For arable land in Hallingdal and Telemark

						Metric
<b>vekes-teig<sup>a</sup></b>						~10,952.599 265 to ~12,778.032 476 m <sup>2</sup>
4	<b>orts-teig</b>					~2738.149 816 to ~3194.508 119 m <sup>2</sup>
6	1½	<b>marka-teig<sup>b</sup></b>				~1825.433 211 to ~2433.910 948 m <sup>2</sup>
12–14	3–3½	2–2⅔	<b>mål</b>			~914.716 605 m <sup>2</sup>
48–56	12–14	8–10⅔	4	<b>fjerdingshorn</b>		~228.179 151 m <sup>2</sup>
27,648–32,256	6912–8064	4608–6144	2304	576	<b>kvadratalen</b>	~396.144 36 dm <sup>2</sup>

<sup>a</sup>Also called **dalars-teig**, **lauv slått**, or simply **teig**. It was said to equal the mowing area a full-grown man could mow in a week

<sup>b</sup>Also called **dags-teig**. It was said to equal the mowing area a full-grown man could mow in a day

## 138.10.1 Units of Area

For meadows at Biri, Land, Toten, Valdres and Vardal

			Metric
<b>mæling</b>			~6211.543 565 m <sup>2</sup>
5	<b>mål</b>		~1242.308 713 m <sup>2</sup>
15,680	3 136	<b>kvadratalen</b>	~396.144 36 dm <sup>2</sup>

For meadows at Gudbrandsdalen

			Metric
<b>mæling</b>			~3,804.570 433 m <sup>2</sup>
4	<b>mål</b>		~951.142 608 m <sup>2</sup>
9604	2 401	<b>kvadratalen</b>	~396.144 36 dm <sup>2</sup>

For meadows at Hadeland

			Metric
<b>mæling</b>			~5,476.299 633 m <sup>2</sup>
6	<b>mål</b>		~912.716 605 m <sup>2</sup>
13,824	2304	<b>kvadratalen</b>	~396.144 36 dm <sup>2</sup>

For meadows at Ringebu and some parts of Fron

			Metric
<b>mæling</b>			~4969.234 852 m <sup>2</sup>
4	<b>mål</b>		~1242.308 713 m <sup>2</sup>
12,544	3136	<b>kvadratalen</b>	~396.144 36 dm <sup>2</sup>

For meadows in Ringerike

				Metric
<b>reiemæling<sup>a</sup></b>				~1026.806 181 m <sup>2</sup>
1⅛	<b>mæling</b>			~912.716 605 m <sup>2</sup>
72	64	<b>stangrute</b>		~14.261 197 m <sup>2</sup>
2592	2304	36 (6 × 6)	<b>kvadratalen</b>	~396.144 36 dm <sup>2</sup>

<sup>a</sup>A measure used when crofters were performing compulsory labor during harvest. The difference between the *mæling* and the *reiemæling* was called a **rakstestang**

Other reported measures:

1 **mælestong** (for measuring arable land in Telemark) = about 3.76 m;

1 **måls-teig** or **teig** (in Romerike in 1666) = a hay meadow that was eight stenger (=56 alen) wide.

### 138.10.2 Units of Dry Capacity

Upper scale for barley in Oslo c. 1200–1604

						Metric
<b>tønne</b>						144.408 L
3	<b>såld</b>					48.136 L
5	1 $\frac{2}{3}$	<b>mæle</b>				28.881 6 L
10	3 $\frac{1}{3}$	2	<b>halvmæle</b>			14.440 8 L
12	4	2 $\frac{2}{5}$	1 $\frac{1}{5}$	<b>spandsetting</b>		12.034 L
15	5	3	1 $\frac{1}{2}$	1 $\frac{1}{4}$	<b>setting</b>	9.627 2 L

Lower scale for barley in Oslo c. 1200–1604

						Metric
<b>setting</b>						9.627 2 L
1 $\frac{1}{3}$	<b>bredsetting</b> or <b>ask</b>					7.220 4 L
2	1 $\frac{1}{2}$	<b>notting</b>				4.813 6 L
2 $\frac{2}{3}$	2	1 $\frac{1}{3}$	<b>remål</b>			3.610 2 L
3 $\frac{1}{3}$	2 $\frac{2}{5}$	1 $\frac{1}{5}$	1 $\frac{1}{5}$	<b>skrull</b>		3.008 5 L
4	3	2	1 $\frac{1}{2}$	1 $\frac{1}{4}$	<b>kande</b> or <b>kanne</b>	2.406 8 L

In Christiania, present-day Oslo, during the mid-nineteenth century, based on [MART3]

						Metric
<b>tønne</b>						139.001 260 398 115 968 L
8	<b>skjeppe</b>					17.375 157 549 764 496 L
32	4	<b>fjerdingskar</b>				4.343 789 387 441 124 L
64	8	2	<b>åttingkar</b>			2.171 894 693 720 562 L
144	18	4 $\frac{1}{2}$	2 $\frac{1}{4}$	<b>pott</b>		965.286 530 542 472 mL

For grain in Aker, Asker, Bærum and Follo

		Metric
<b>tønne<sup>a</sup></b> or <b>såld</b>		145.80 L
12	<b>setting</b>	12.15 L

<sup>a</sup>2 tønner = 1 skip pund (185.17 kg)

For grain in Hvaler during the seventeenth century

				Metric
<b>tønne</b> or <b>såld</b>				145.80 L
12	<b>setting</b>			12.15 L
18	1 $\frac{1}{2}$	<b>breddsetting</b>		8.10 L
48	4	2 $\frac{2}{3}$	<b>fjerdingssskål</b>	3.04 L

For grain in Østfold, except Hvaler, during the seven-  
teenth century

				Metric
<b>tønne</b> or <b>såld</b>				145.80 L
12	<b>setting</b>			12.15 L
16	1 $\frac{1}{3}$	<b>breddsetting</b>		9.11 L
48	4	3	<b>skrull</b>	3.04 L

For grain in Eiker, Lier, Modum, Odalen, Ringerike,  
Røyken and Solør before 1600

				Metric
<b>tønne</b>				145.80 L
1 $\frac{1}{3}$	<b>såld</b>			109.35 L
16	12	<b>setting</b>		9.112 L

For grain in Ringerike and Toten before 1600

				Metric
<b>tønne</b>				145.80 L
1 $\frac{1}{3}$	<b>såld</b>			87.48 L
20	12	<b>setting</b>		7.29 L

For grain in Ringerike and Toten in 1599

				Metric
<b>tønne</b>				116.64 L
1 $\frac{1}{3}$	<b>såld</b>			87.48 L
16	12	<b>setting</b>		7.29 L

For grain at Vinje in Telemark

						Metric
<b>tønne</b>						145.80 L
1 $\frac{1}{3}$	<b>såld</b>					109.35 L
4	3	<b>mæle</b>				36.45 L
12	9	3	<b>tredingsteie</b>			12.15 L
16	12	4	1 $\frac{1}{3}$	<b>fjerdingsteie</b>		9.112 L
24	18	6	2	1 $\frac{1}{2}$	<b>notting</b>	6.075 L

For grain in Hadeland during the sixteenth century

				Metric
<b>tønne</b>				145.80 L
1 $\frac{1}{3}$		<b>såld</b>		87.48 L
20		12	<b>setting</b>	7.29 L

For grain in Ringerike and Toten after 1615

				Metric
<b>tønne</b>				131.22 L
1 $\frac{1}{2}$	<b>såld</b>			87.48 L
18	12	<b>setting</b>		7.29 L

For grain in Eggedal, Hallingdal, Hedmark, Krødsherad,  
Sigdal and Sør-Gudbrandsdalen

					Metric
<b>tønne</b>					145.80 L
1 $\frac{1}{2}$	<b>såld</b>				97.20 L
9	6	<b>mæle</b>			16.20 L
18	12	2	<b>setting</b>		8.10 L
72	48	8	4	<b>skrull</b>	2.02 L

For grain in Eiker-Røyken and Modum during the  
seventeenth century

				Metric
<b>tønne</b>				145.80 L
1 $\frac{1}{2}$	<b>såld</b>			97.20 L
18	12	<b>setting</b>		8.10 L

For grain in Modum before 1600

				Metric
<b>tønne</b>				145.80 L
1 $\frac{1}{3}$	<b>såld</b>			109.35 L
16	12	<b>setting</b>		9.112 L

For grain in Hadeland after 1615

				Metric
<b>tønne</b>				139.12 L
1½	<b>såld</b>			92.75 L
18	12	<b>setting</b>		7.73 L
80	48	4	<b>skrull</b>	1.93 L

For grain in Valdres

				Metric
<b>såld</b>				174.96 L
6	<b>mæle</b>			29.16 L
24	4	<b>setting</b>		7.29 L

For grain in Numedal and Vestfold

				Metric
<b>tønne</b>				145.80 L
6	<b>mæle</b>			24.30 L
18	3	<b>setting</b>		8.10 L

For grain in Viken (except at Hvalen), Båhuslen and Borgarsysla

				Metric
<b>tønne</b>				145.76 L
12	<b>setting</b>			12.15 L
18	1½	<b>breddsetting</b>		9.11 L
48	4	3	<b>skrull</b>	3.04 L

For grain at Hvalen

				Metric
<b>såld</b>				97.2 L
12	<b>setting</b>			12.1 L
18	1½	<b>breddsetting</b>		8.1 L
48	4	2⅔	<b>skrull</b>	2.02 L

For grain in Valdres in the 1740s

				Metric
<b>såld</b>				174.96 L
6	<b>mæle</b>			29.16 L
24	4	<b>setting</b>		7.29 L

For grain in Nord-Gudbrandsdalen, except Vågå

					Metric
<b>såld</b>					194.40 L
1⅓	<b>tønne</b>				145.80 L
6	4½	<b>mæle</b>			32.40 L
36	27	6	<b>setting</b>		5.40 L
144	108	24	4	<b>skrull</b>	1.35 L

For grain in Vågå

					Metric
<b>såld</b>					194.40 L
1⅓	<b>tønne</b>				145.80 L
2	1½	<b>mæle</b>			97.20 L
36	27	18	<b>setting</b>		5.40 L
144	108	72	4	<b>skrull</b>	1.35 L

For grain in Nedre Telemark and Bamble

				Metric
<b>tønne<sup>a</sup></b>				145.80 L
6	<b>mæle</b>			24.30 L
18	3	<b>setting</b>		8.10 L

<sup>a</sup>2½ tønne = 1 skippund of grain = 185.7 kg

For grain at Hjartdal, Kviteseid, Lårdal, Nissedal and Seljord, in Øvre Telemark

				Metric
<b>tønne<sup>a</sup></b>				145.80 L
6	<b>mæle</b>			24.30 L
18	3	<b>tredingsteie</b>		8.10 L
24	4	1⅓	<b>fjordingsteie</b>	6.08 L

<sup>a</sup>In the 1660s, reported as 5 mæle. During the seventeenth century, also subdivided into 24 (heaped) nottinger (=6.08 L)

For grain in Fyresdal during the sixteenth century

			Metric
<b>tønne<sup>a</sup></b>			145.80 L
5	<b>mæle</b>		29.16 L

<sup>a</sup>During the seventeenth century, also subdivided into 24 (heaped) nottinger (=6.08 L)

For grain at Mo, Rauland, Tinn and Vinje during the sixteenth century

				Metric
<b>tønne<sup>a</sup></b>				145.80 L
4	<b>mæle</b>			36.45 L
12	3	<b>tredingsteie</b>		12.15 L
16	4	1 $\frac{1}{3}$	<b>fjerdingssteie</b>	9.11 L

<sup>a</sup>During the seventeenth century, also subdivided into 24 (heaped) nottinger (=6.08 L)

For butter in Akershus, Brunla and Tønsberg

				Metric	Metric
<b>smørtønne</b>				108.024 kg	about 113.4 L
7	<b>laup</b>			15.432 kg	about 16.2 L
21	3	<b>bismerpund</b>		5.144 kg	about 5.4 L
504	72	24	<b>mark</b>	214.32 g	about 225 mL

For butter in Hadeland, Ringerike, Romerike, and in the surrounding areas of Oslo, such as Eiker and Follo

				Metric	Metric
<b>hefselde</b>				34.720 kg	about 36.5 L
4 $\frac{1}{2}$	<b>spann</b>			7.715 kg	about 8.1 L
6 $\frac{3}{4}$	1 $\frac{1}{2}$	<b>bismerpund</b>		5.144 kg	about 5.4 L
162	36	24	<b>mark</b>	214.32 g	about 225 mL

For butter in Hadeland and Hedmark

				Metric	Metric
<b>hefselde</b>				30.862 kg	about 32.4 L
4	<b>spann</b>			7.715 kg	about 8.1 L
6	1 $\frac{1}{2}$	<b>bismerpund</b>		5.144 kg	about 5.4 L
144	36	24	<b>mark</b>	214.32 g	about 225 mL

For butter in Toten

				Metric	Metric
<b>hefselde</b>				38.578 kg	about 40.5 L
5	<b>spann</b>			7.715 kg	about 8.1 L
7 $\frac{1}{2}$	1 $\frac{1}{2}$	<b>bismerpund</b>		5.144 kg	about 5.4 L
180	36	24	<b>mark</b>	214.32 g	about 225 mL

For butter in Sør-Gudbrandsdalen

				Metric	Metric
<b>hefselde</b>				23.147 kg	about 24.3 L
1 $\frac{1}{2}$	<b>laup</b>			15.431 kg	about 16.2 L
4 $\frac{1}{2}$	3	<b>bismerpund</b>		5.144 kg	about 5.4 L
108	72	24	<b>mark</b>	214.32 g	about 225 mL

For butter in Østfold

				Metric	Metric
<b>smørtønne</b>				102.880 kg	about 108.0 L
$6\frac{2}{3}$	<b>laup</b>			15.432 kg	about 16.2 L
20	3	<b>bismerpund</b>		5.144 kg	about 5.4 L
480	72	24	<b>mark</b>	214.32 g	about 225 mL

Some other reported measures:

1 **kasse** (for hay in Østfold) = a small load.

### 138.10.3 Units of Liquid Capacity

In the country and in Christiania, present-day Oslo, before the law of July 28, 1824

											Metric	Metric
<b>stykkfat<sup>a</sup></b> or <b>lest</b>											1858.56 L	1862.784 L
2	<b>fat</b>										929.28 L	931.392 L
4	2	<b>pibe</b>									464.64 L	465.696 L
8	4	2	<b>oksehode<sup>b</sup></b>								232.32 L	232.848 L
12	6	3	$1\frac{1}{2}$	<b>amme</b>							154.88 L	155.232 L
16	8	4	2	$1\frac{1}{3}$	<b>tønne</b>						116.16 L	116.424 L
48	24	12	6	4	3	<b>anker</b>					38.72 L	38.808 L
240	120	60	30	20	15	5	<b>viertel</b>				7.74 L	7.762 L
960	480	240	120	80	60	20	4	<b>kanne</b>			1.936 L	1.940 L
1920	960	480	240	160	120	40	8	2	<b>pott</b>		968 mL	970.2 mL
7680	3840	1920	960	640	480	160	32	8	4	<b>pel</b>	242 mL	242.55 mL

<sup>a</sup>Also reported as 11 amme = about 1703.77 L. Usually used for wine

<sup>b</sup>Mainly used for wine, spirits, beer, vinegar and various types of oil, but sometimes also for some dry commodities, such as iron

In Christiania, present-day Oslo, after July 28, 1824, based on [MART3]

											Metric
<b>fat</b>											926.675 069 320 773 120 L
2	<b>pibe</b>										463.337 534 660 386 560 L
4	2	<b>oksehode</b>									231.668 767 330 193 280 L
6	3	$1\frac{1}{2}$	<b>amme</b>								149.619 412 234 083 160 L
8	4	2	$1\frac{1}{3}$	<b>tønne<sup>a</sup></b>							115.834 383 665 096 640 L
128	64	32	$21\frac{1}{3}$	16	<b>viertel</b>						7.239 648 979 068 540 L
480	240	120	$77\frac{1}{2}$	60	$3\frac{3}{4}$	<b>kanne</b>					1.930 573 061 084 944 L
960	480	240	155	120	$7\frac{1}{2}$	2	<b>pott</b>				965.286 530 542 472 mL
3840	1920	960	620	480	30	8	4	<b>pel</b>			241.321 632 635 618 mL

<sup>a</sup>For eggs, salted fish, cod, whale oil, soap, tar, vegetable oil, beer and spirits. Also called **fisketønne**, **tjæretønne** and **tønnekar**

### 138.10.4 Units of Weight

*Skippundvektsystem* from the fifteenth century until 1683

							Metric
<b>østnorsk skippund</b>							185.170 kg
4	<b>fjerding</b>						46.292 kg
20	5	<b>østnorsk lispund<sup>a</sup></b>					9.258 kg
24	6	1½	<b>spann<sup>b</sup></b>				7.715 kg
80	20	4	3⅓	<b>remål<sup>c</sup></b>			2.315 kg
320	80	16	13⅓	4	<b>notting or ringsmun</b>		578.65 g
720	180	36	30	9	2¼	<b>mark</b>	257.18 g

<sup>a</sup>Normally used for grain

<sup>b</sup>This was usually used for flour in Østfold and at Asker

<sup>c</sup>In some areas, reported to equal 4½ skålpund = 2.249 kg

*Skippundvektsystem* from the fifteenth century until 1683, based on [FAUE]

					Metric
<b>østnorsk pund</b>					167.961 6 kg
20	<b>østnorsk lispund</b>				8.398 08 kg
30	1½	<b>bismerpund</b>			5.598 72 kg
720	36	24	<b>bismersmark</b>		233.28 g

In Akershus and Tønsberg after 1604

					Metric
<b>våg</b>					16.56 kg
3	<b>bismerpund</b>				5.52 kg
36	12	<b>skaalpund</b>			460.0 g
72	24	2	<b>mark</b>		230.0 g
108	36	3	1½	<b>pund</b>	153.3 g

Upper scale in Christiania, present-day Oslo, in the mid-nineteenth century, based on [MART3]

									Metric
<b>skipslæst</b>									2590.704 495 kg
2	<b>tønne</b>								1295.352 247 kg
–	–	<b>skipslæst<sup>a</sup></b>							1255.495 255 kg
–	–	–	<b>skippund</b>						159.427 969 kg
52	26	–	–	<b>centner</b>					49.821 240 kg
144⅔	72⅔	70	–	2⅔	<b>våg</b>				17.935 646 kg
325	162½	157½	20	6¼	2¼	<b>lispund</b>			7.971 398 kg
433⅓	216⅔	210	26⅔	8⅓	3	1⅓	<b>bismerpund</b>		5.978 549 kg
5200	2600	2520	320	100	36	16	12	<b>handelspund</b>	498.212 4 g

<sup>a</sup>For cod

Lower scale in Christiania, present-day Oslo, in the mid-nineteenth century, based on [MART3]

								Metric
<b>handelspund</b>								498.212 4 g
2	<b>mark</b>							249.106 2 g
16	8	<b>unse</b>						31.138 3 g
32	16	2	<b>lodd</b>					15.569 1 g
128	64	8	4	<b>kvintin</b>				3.892 3 g
512	256	32	16	4	<b>ort</b>			973.1 mg
8192	4096	512	256	64	16	<b>es, æs, or as</b>		60.8 mg
131,072	65,536	8192	4096	1024	256	16	<b>gran</b>	3.8 mg

Swedish-linked system, in some use between 1814 and 1875

							Metric
<b>oksehode</b>							235.558 854 L
1½	<b>aam</b>						157.039 236 L
6	4	<b>anker</b>					39.259 809 L
90	60	15	<b>kanne</b>				2.617 321 L
180	120	30	2	<b>stopp</b>			1.308 660 L
2880	1920	480	32	16	<b>jomfru</b>		81.791 mL

Some other measures reported by [BERN] as used before 1683:

- 1 **lispund** (in Agershus, Båhus and Tønsberg) = 18 skålpund = about 8.28 kg;  
1 **lispund** (in Bergenhus and Trondhiem) = 16 skålpund = about 7.92 kg.

138.11 Sørlandet

Sørlandet is divided into the counties of Aust-Agder and Vest-Agder.

138.11.1 Units of Area

For arable land at many places in Sørlandet

						Metric
<b>vekes-teig<sup>a</sup></b>						~10,952.599 265 to ~12,778.032 476 m <sup>2</sup>
4	<b>orts-teig</b>					~2738.149 816 to ~3194.508 119 m <sup>2</sup>
6	1½	<b>marka-teig<sup>b</sup></b>				~1825.433 211 to ~2433.910 948 m <sup>2</sup>
12–14	3–3½	2–2⅔	<b>mål</b>			~914.716 605 m <sup>2</sup>
48–56	12–14	8–10⅔	4	<b>fjerdingshorn</b>		~228.179 151 m <sup>2</sup>
27,648–32,256	6912–8064	4608–6144	2304	576	<b>kvadratalen</b>	~396.144 36 dm <sup>2</sup>

<sup>a</sup>Also called **dalars-teig**, **lauv slått**, or simply **teig**. It was said to equal the mowing area a full-grown man could mow in a week  
<sup>b</sup>Also called **dags-teig**. It was said to equal the mowing area a full-grown man could mow in a day

Other reported measures:

- 1 **teig** (for arable land in Lister and Mandal) = the area of land that produced a harvest of 20 trever of grain = 520 nek.

### 138.11.2 Units of Dry Capacity

For grain in Agder during the seventeenth century

			Metric
<b>tønne<sup>a</sup></b>			145.80 L
24	<b>notting</b> (heaped)		6.08 L
36	1½	<b>notting</b> (striken)	4.05 L

<sup>a</sup>In Lista len and Setesdalen, equal to 4 mæler (=36.45 L) = 24 nottinger

For butter in Agder, Rogaland and Trondheim

				Metric	Metric
<b>smørtønne</b>				92.592 kg	about 97.2 L
6	<b>laup</b> or <b>spann</b>			15.432 kg	about 16.2 L
18	3	<b>bismerpund</b>		5.144 kg	about 5.4 L
432	72	24	<b>mark</b>	214.32 g	about 225 mL

### 138.12 Vestlandet

Vestlandet is divided into the counties of Rogaland, Hordaland, Sogn og Fjordane and Møre og Romsdal.

#### 138.12.1 Units of Area

For arable land at Jostedal

			Metric
<b>såldså</b>			~1426.119 696 m <sup>2</sup>
6	<b>mælesland<sup>a</sup></b>		~237.686 616 m <sup>2</sup>
3600	600	<b>kvadratalen</b>	~396.144 36 dm <sup>2</sup>

<sup>a</sup>An area of land that was to be sown with 1 mæle of grain

For arable land at Lærdal

			Metric
<b>såldså</b>			~1140.895 757 m <sup>2</sup>
6	<b>mælesland<sup>a</sup></b>		~190.149 293 m <sup>2</sup>
2880	480	<b>kvadratalen</b>	~396.144 36 dm <sup>2</sup>

<sup>a</sup>An area of land that was to be sown with 1 mæle of grain

For arable land at Sogndal

			Metric
<b>såldså</b>			~1485.541 350 m <sup>2</sup>
6	<b>mælesland<sup>a</sup></b>		~247.590 225 m <sup>2</sup>
3750	625	<b>kvadratalen</b>	~396.144 36 dm <sup>2</sup>

<sup>a</sup>An area of land that was to be sown with 1 mæle of grain

For arable land at Voss and some villages in Sogn

				Metric
<b>såldså</b> or <b>mæling</b>				~1242.308 713 m <sup>2</sup>
6	<b>mælesland</b> <sup>a</sup>			~207.051 452 m <sup>2</sup>
64 (8 × 8)	10 $\frac{2}{3}$	<b>stangaspuns</b> or <b>stangrute</b>		~19.411 074 m <sup>2</sup>
3 136	522 $\frac{2}{3}$	49 (7 × 7)	<b>kvadratalen</b>	~396.144 36 dm <sup>2</sup>

<sup>a</sup>An area of land that was to be sown with 1 mæle of grain

Other reported measures:

- 1 **mælestong** (for measuring arable land in Sogn) = about 3.111 m;  
 1 **tjugvidda** (for arable land at Jæren) = the area of land that produced a harvest of 20 trever of grain.

### 138.12.2 Units of Dry Capacity

For grain at Voss during the sixteenth century

			Metric
<b>tønne</b>			162.00 L
2 $\frac{1}{2}$	<b>såld</b>		64.80 L
10	4	<b>ask, aske</b> or <b>eske</b>	16.20 L

For grain at Voss during the seventeenth century

			Metric
<b>tønne</b>			162.00 L
2	<b>såld</b>		81.00 L
10	5	<b>ask, aske</b> or <b>eske</b>	16.20 L

For grain at Voss during the nineteenth century

			Metric
<b>korntønne</b>			145.80 L
1 $\frac{1}{3}$	<b>såld</b>		81.00 L
9	5	<b>ask, aske</b> or <b>eske</b>	16.20 L

For grain in Hardanger, Sogn, Sunnhordland and Sunnmøre

				Metric
<b>stadstønne</b>				162.0 L
1 $\frac{1}{3}$	<b>tønne</b>			145.8 L
1 $\frac{1}{3}$	1 $\frac{1}{2}$	<b>såld</b>		97.2 L
10	9	6	<b>mæle</b>	16.2 L

For grain in Rogaland during the sixteenth century

		Metric
<b>tønne</b> <sup>a</sup>		145.80 L
24	<b>notting</b> (heaped)	6.08 L

<sup>a</sup>2 $\frac{1}{2}$  tønne of mixed grain and oats or 3 tønne of oats = 1 skippund (=185.17 kg)

For grain in Sunnhordland c. 1600

					Metric
<b>korntønne</b>					194.40 L
1 $\frac{1}{3}$	<b>stadstønne</b>				162.00 L
1 $\frac{1}{3}$	1 $\frac{1}{3}$	<b>smal tønne</b>			145.80 L
8	6 $\frac{2}{3}$	6	<b>mæle</b>		24.30 L
48	40	36	6	<b>kanne</b>	4.05 L

For grain in Hardanger c. 1600

					Metric
<b>korntønne</b> <sup>a</sup>					194.40 L
1 $\frac{1}{3}$	<b>stadstønne</b>				162.00 L
2	1 $\frac{1}{3}$	<b>såld</b>			97.20 L
12	10	6	<b>mæle</b>		16.20 L
48	40	24	4	<b>kanne</b>	4.05 L

<sup>a</sup>In Øystese = 13 mæler = 210.60 L

For grain in Nordhordland c. 1590

			Metric
<b>stadstønne</b>			162.00 L
4	<b>mæle</b>		40.50 L
40	10	<b>kanne</b>	4.05 L

For grain in Nordhordland c. 1597

			Metric
<b>korntønne</b>			194.40 L
4	<b>mæle</b>		48.60 L
48	12	<b>kanne</b>	4.05 L

For grain in Sogn during the seventeenth century

					Metric
<b>stadstønne</b>					162.00 L
1⅓	<b>såld</b>				97.20 L
10	6	<b>mæle</b> <sup>a</sup>			16.20 L
30	18	3	<b>setting</b>		5.40 L
40	24	4	1⅓	<b>kane</b>	4.05 L

<sup>a</sup>1 **mæle** (striken) = 3 settinger, but 1 **mæle** (heaped) was probably = 4 settinger = 21.60 L

For grain in Sunnfjord c. 1603

				Metric
<b>stadstønne</b>				162.00 L
4		<b>mæle</b>		40.50 L
40		10	<b>kane</b>	4.05 L

For grain in Nordfjord c. 1600

				Metric
<b>stadstønne</b>				162.00 L
5		<b>mæle</b>		32.40 L
20	4		<b>fjerdning</b>	8.10 L
40	10	2	<b>kane</b>	4.05 L

For grain in Nordfjord during the seventeenth century

				Metric
<b>stadstønne</b>				162.00 L
4		<b>mæle</b>		40.50 L
16	4		<b>fjerdning</b>	10.125 L
40	10	2½	<b>kane</b>	4.05 L

For grain in Sunnmøre during the seventeenth century

					Metric
<b>stadstønne</b>					162.00 L
1⅓		<b>korntønna</b> <sup>a</sup>			121.50 L
4	3		<b>mæle</b> <sup>b</sup>		40.50 L
16	12	4	<b>fjerdning</b>		10.125 L
40	30	10	2½	<b>kane</b>	4.05 L

<sup>a</sup>During the eighteenth and nineteenth centuries, the fisketønna (usually used for fish) = about 160 L was also used for measuring grain

<sup>b</sup>In 1792, reported as about 44 L

For grain in Nordmøre

				Metric
<b>tønne</b> <sup>a</sup>				194.40 L
1⅓	<b>stadstønne</b>			162.00 L
4⅓	4	<b>skjeppe</b>		40.50 L
48	40	10	<b>kane</b>	4.05 L

<sup>a</sup>Also reported as 6 trøndske skjeppe (=32.4 L)

For butter in Bergenhus and Bratsberg

				Metric	Metric
<b>smørtønne</b>				102.880 kg	about 108.0 L
6⅓	<b>laup</b>			15.432 kg	about 16.2 L
20	3	<b>bismerpund</b>		5.144 kg	about 5.4 L
480	72	24	<b>mark</b>	214.32 g	about 225 mL

For butter in Sogn og Fjordane

			Metric	Metric
<b>skjetting</b>			12.859 kg	about 13.5 L
2½	<b>bismerpund</b>		5.144 kg	about 5.4 L
60	24	<b>mark</b>	214.32 g	about 225 mL

Some other reported measures:

1 **tønne** (for barley in Vestland) = 115.526 4 L;  
 1 **kande** (in Bergen) = 2 pott = 1.932 L;  
 1 **tinte** (in Nordhordland and Orkdal) = ½ pott = 483 mL.

### 138.12.3 Units of Liquid Capacity

Some reported measures:

1 **krug** or **kræge** (in Bergen) = 1/144 toende = about 966 mL.

### 138.12.4 Units of Weight

After 1604

					Metric
<b>skippund</b>					185.172 48 kg
8	<b>våg<sup>a</sup></b>				23.146 56 kg
576	24	<b>bismerpund</b>			964.44 g
1728	72	3	<b>mark</b>		321.48 g
2160	90	3¾	1¼	<b>old mark</b>	257.184 g

<sup>a</sup>Usually for flour

*Skippundvektssystem* from the fifteenth century until 1683, based on [FAUE]

				Metric
<b>vestnorsk pund</b> or <b>pundarepundet</b>				134.369 28 kg
24		<b>bismerpund</b>		5.598 72 kg
576	24		<b>bismersmark</b>	233.28 g

*Skippundvektssystem* from the fifteenth century until 1683, based on [STEI3]

					Metric
<b>vestnorsk skippund</b> or <b>trøndersk skippund</b>					148.136 kg
4	<b>vett<sup>a</sup></b>				37.034 kg
8	2	<b>våg</b>			18.517 kg
24	6	3	<b>vestnorsk lispund</b> or <b>trøndersk lispund<sup>b</sup></b>		6.172 kg
576	144	72	24	<b>mark</b>	257.18 g

<sup>a</sup>The *vett* was usually used for flour, and only used in Rogaland and Sunnhordland. According to [STEI3, p. 97], there was probably (in 1536/37) another *vett* = 5 våg that was only used for weighing flour. In Trøndelag, one vett (for flour) was ¾ skippund = 111.102 kg

<sup>b</sup>The *lispund* was usually called a **spann** in Sørvestlandet

*Skippundvektssystem* in Romsdal from the fifteenth century until 1683

					Metric
<b>vestnorsk skippund</b>					148.136 kg
3	<b>vett</b>				49.379 kg
36	12		<b>tveite</b>		4.115 kg
576	192		16	<b>mark</b>	257.18 g

*Kornvektssystem* for grain in the county of Rogaland during the Middle Ages

					Metric
<b>pundarpund</b>					185.170 kg
4	<b>kornvett</b>				46.292 kg
8	2	<b>kornvåg<sup>a</sup></b>			23.146 kg
24	6	3	<b>spann</b>		7.715 kg
720	180	90	30	<b>mark</b>	257.18 g

<sup>a</sup>Only reported as used in Sunnhordland and Sunnmøre

*Kornvektsystem* for grain at Romsdal c. 1550

				Metric
<b>kornvett</b>				61.723 kg
$3\frac{1}{3}$	<b>våg</b>			18.517 kg
10	3	<b>pund</b>		6.172 kg
240	72	24	<b>mark</b>	257.18 g

*Kornvektsystem* for grain at Romsdal during the seventeenth century

				Metric
<b>kornvett</b>				61.724 kg
12	<b>tveite</b>			5.144 kg
192	16		<b>mark</b>	321.48 g

*Kornvektsystem* for grain at Stavanger during the mid-eighteenth century

				Metric
<b>pundarspund</b>				215.892 kg
12	<b>kornvåg</b>			17.991 kg
24	2	<b>pundarspann</b>		8.995 5 kg
864	72	36	<b>mark</b>	249.875 g

**138.13 Midt-Norge**

Midt-Norge is usually said to include the counties of Nord-Trøndelag and Sør-Trøndelag.

**138.13.1 Units of Area**

For arable land at Trøndelag

							Metric
<b>såldsåd</b>							~2795.194 604 m <sup>2</sup>
2	<b>helgdeland</b>						~1397.597 302 m <sup>2</sup>
$2\frac{46}{49}$	$1\frac{23}{49}$	<b>mæling or fjortenfemning</b>					~951.142 608 m <sup>2</sup>
4	2	$1\frac{13}{36}$	<b>tolvfemning</b>				~698.798 651 m <sup>2</sup>
6	3	$2\frac{1}{24}$	$1\frac{1}{2}$	<b>mælesland</b> <sup>a</sup>			~465.865 767 m <sup>2</sup>
576 (24 × 24)	288	196 (14 × 14)	144	96	<b>favnrote</b>		~4.852 768 m <sup>2</sup>
7056	3528	2401	1764	1176	$12\frac{1}{4}$	<b>kvadratalen</b>	~396.144 36 dm <sup>2</sup>

<sup>a</sup>An area of land that was to be sown with 1 **mæle** (about 32.4 L) of grain

**138.13.2 Units of Dry Capacity**

For grain in Trøndelag

						Metric
<b>såld or korntønne</b>						194.40 L
$1\frac{1}{5}$	<b>bytønne or stadstønne</b>					162.00 L
2	$1\frac{2}{3}$	<b>smal tønne</b>				97.20 L
6	5	3	<b>skjeppe</b>			32.40 L
48	40	24	8	<b>kanne</b>		4.05 L

Other reported measures:

1 **tønne** (for barley in Trondheim) = 86.644 8 L;  
1 **stamp** (for herring at Trøndelag during the  
seventeenth century) = 1/3  
fisketønne = 38.6 L.

138.13.3 Units of Weight

*Skippundvektssystem* in Trøndelag from the fifteenth  
century until 1683, based on [FAUE]

			Metric
<b>trøndsk – nordnorsk pund</b>			100.776 96 kg
18	<b>bismerpund</b>		5.598 72 kg
432	24	<b>bismersmark</b>	233.28 g

*Skippundvektssystem* in Trøndelag from the fifteenth  
century until 1683, based on [STEI3]

				Metric
<b>vestnorsk skippund or trøndersk skippund</b>				148.136 kg
4	<b>vett<sup>a</sup></b>			37.034 kg
8	2	<b>våg</b>		18.517 kg
24	6	3	<b>vestnorsk lispund or trøndersk lispund<sup>b</sup></b>	6.172 kg
576	144	72	24 <b>mark</b>	257.18 g

<sup>a</sup>The *vett* was usually used for flour, and only used in Rogaland and Sunnhordland. According to [STEI3, p. 97], there was probably (in 1536/37) another *vett* = 5 våg that was only used for weighing flour. In Trøndelag, one vett (for flour) was ¾ skippund = 111.102 kg  
<sup>b</sup>The *lispund* was usually called a **spann** in Sørvestlandet

138.14 Nord-Norge

Nord-Norge is divided into Nordland, Troms and Finnmark.

138.14.1 Units of Dry Capacity

Some reported measures:

1 **tinte** (in Nordland) = ½ pott = 483 mL;  
1 **lubbe** (for dried fish in Andenes during the  
sixteenth and seventeenth centuries) = varied  
by the size of the fish; in c. 1600 reported as  
weighing 1/6 våg.

138.14.2 Units of Weight

After 1604

			Metric
<b>våg</b>			17.979 kg
3	<b>bismerpund</b>		5.993 kg
108	36	<b>skaalpund</b>	166.47 g

*Skippundvektssystem* from the fifteenth century until 1683,  
based on [FAUE]

			Metric
<b>trøndsk– nordnorsk pund</b>			100.776 96 kg
18	<b>bismerpund</b>		5.598 72 kg
432	24	<b>bismersmark</b>	233.28 g

139 Nubia

See also *Egypt*, *Ottoman Empire*, and *Sudan*.

A number of small Nubian kingdoms existed  
in this area throughout the Middle Ages. In 1504,  
Nubia was divided between Egypt and the Sennar  
sultanate. Nubia became part of the Ottoman  
Empire in the nineteenth century, and was part  
of Anglo-Egyptian Sudan from 1899 to 1956. In  
1956, the area was divided between Egypt and  
Sudan.

*Main sources:* [BROW], [BURC], and  
[WHIT2]

139.1 Currency

seventeenth to nine- 1 dandy (cotton stuffs,  
teenth centuries: woven in the country,  
about 10 peeks in length)  
They also used cowries,  
glass-beads, broken cop-  
per and paper pieces as  
currencies.

139.2 Units of Length

1 **dhraá** = 676.75 mm.

139.3 Units of Area

1 **feddahn** = 4459.1 m<sup>2</sup>.

139.4 Units of Dry Capacity

			Metric
<b>mörrhi</b>			280.8 L
12	<b>maud</b>		23.4 L
216	18	<b>selga</b> <sup>a</sup>	1.3 L

<sup>a</sup>One selga = as much as can be heaped upon the flat extended hand of a full-grown man

Other reported measures:

- 1 **mhoury** (in Dongòla) = 12 mouds of Cairo = about 291 L;  
1 **ardeb** = 182.1 L.

139.5 Units of Liquid Capacity

Liquids were usually sold by weight.

139.6 Units of Weight

			Metric
<b>rothl</b>			444.73 g
12	<b>uckieh</b>		37.06 g
144	12	<b>derhem</b>	3.088 g

Other reported measures:

- 1 **kantar** = about 230 kg.

140 Nyasaland

See *Malawi*.

141 Oman [Formerly: Muscat and Oman]

See also *Ottoman Empire* and *Zanzibar*.

This area was under control of the Achaemenids from the sixth century BCE until about 250 BCE, when the Parthians extended their territory by establishing garrisons at the Omani peninsula. In the third century CE, the Sassanids succeeded the Parthians. Around 650 CE, Oman converted to Islam and became an Ibadhi state. The area was ruled by the Umayyad Caliphate between 661 and 750, the Abbasid Caliphate between 750 and 750 and 931, the Qarmatians between 931 and 932, the Abbasid Caliphate between 932 and 933, the Qarmatians between 933 and 934, the Abbasid Caliphate between 934 and 967, the Buyid dynasty between 967 and 1053, the Great Seljuq Empire between 1053 and 1154, and the Nabhani dynasty between 1154 and 1470. In 1508, the city of Muscat was occupied by the Portuguese. They held it until 1648, when it became part of the Ottoman Empire. The Ottomans were expelled in 1741, and the country was founded by Ahmed ibn Said of Yemen. In 1784, as Muscat and Oman, the country became a sovereign state. Oman had significant holdings in Baluchistan and Zanzibar. Zanzibar separated from Muscat and Oman in 1861, and the last foothold in Baluchistan was ceded to Pakistan in 1956. Oman became a British protectorate in 1891, which it was until 1970.

The systems of weights and measures used in the area have been those used by the countries with which Oman has conducted trade. Most pre-metric units of measurement have been adopted from Persia, India, and Britain. The metric system has been official since November 15, 1974.

*Main sources:* [BERG], [CLAR], [DONA2], [GALE2], [MART3], [MUSC], [STAT1951], [UN55], and [UN66]

141.1 Currency

1973–: 1 rial Omani = 1,000 baisa or baiza  
1970–1972: 1 rial Saidi = 1,000 baisa or baiza  
1966–1970: 1 Indian rupee = 16 anna = 64 baisa or baiza  
1959–1966: 1 Persian Gulf rupee = 100 naye paisa  
c.1891–1940: 1 Indian rupee = 16 anna = 64 paisa  
1 Maria Theresa Thaler = 230 paisa  
–c.1891: 1 mamoodie = 20 goz = 30 budgerooks

wells and tje heights of trees and buildings) = the span of outstretched arms;  
1 **dhira'** (used for measuring lengths of cloth and the ground plans of buildings) = the distance between the elbow and the tip of the middle finger;  
1 **shibr** = the span of a person's hand;  
1 **fitr** = the distance between the first finger and the thumb;  
1 **rajabah** = the distance between the first joint of the finger to the tip;  
1 **ibhām** = the breadth of a thumb;  
1 **işba'** = the width of a finger.

141.2 Units of Length

Some traditional measures during the nineteenth to twentieth centuries reported by ([MUSC], [DONA2], and [GALE2]):

1 **bā'** or **bâa** (used for measuring the depth of sea and lengths of cloth, rope and fishing nets), or **qāmah** (used for measuring the depths of

Presumed traditional system, with approximate values based on a *farsakh* equal to 20,000 Roman feet

								Metric
<b>farsakh</b>								5924 m
3333⅓	<b>bā'</b> or <b>qāmah</b>							1.777 m
13,333⅓	4	<b>dhira'</b>						444 mm
20,000	6	1½	<b>shibr</b>					296 mm
26,666⅔	8	2	1⅓	<b>fitr</b>				222 mm
160,000	48	12	8	6	<b>rajabah</b>			37 mm
240,000	72	18	12	9	1½	<b>ibhām</b>		25 mm
300,000	90	22½	15	11¼	1⅞	1¼	<b>işba'</b>	20 mm

Other reported measures:

1 **covid** (for cloth) = 994 mm or 964 mm.

British Imperial-linked scale during the late nineteenth century

					Imperial	Metric
<b>bā' or qāmāh</b>					2 yd	1.828 8 m
2	<b>wār</b>				1 yd	914.40 mm
4	2	<b>dhira'</b>			18 in.	457.20 mm
9	4½	2¼	<b>shibr</b>		8 in.	203.20 mm
72	36	18	8	<b>ibhām</b>	1 in.	25.4 mm

System for measuring (knot to knot) the gauge of mesh of a fishing net, based on [DONA2]

	Number of 'ayn/dhirā' (1 dhirā' taken as about 18¼ in. = 464 mm)	Metric
<b>sudāsi</b>	6	77 mm
<b>subā'i</b>	7	66 mm
<b>thumāni</b>	8	58 mm
<b>iḥda'ashari</b>	11	42 mm
<b>ithna'ashari</b>	12	39 mm
<b>thalāt'ashari</b>	13	36 mm
<b>thamānt'ashari</b>	18	26 mm

### 141.3 Units of Area

The only area measure was the **dhira'**  
**murabba'ah** = about 24 dm<sup>2</sup>.

### 141.4 Units of Dry Capacity

Kaylah-system for grain and spices, and the weight of rice, in Oman, based on [DONA2]

		Metric	Metric
<b>maikyāl or šā'</b>		2.6 L	2.53 kg
4	<b>kaylah</b>	650 mL	632.5 g

Suds-system for grain and spices, and the weight of rice, in Oman, based on [DONA2]

					Metric	Metric
<b>maikyāl or šā'</b>					4.10 L	4.05 kg
4	<b>suds</b>				1.03 L	1.012 kg
8	2	<b>niṣf suds</b>			510 mL	506 g
16	4	2	<b>rub' suds</b>		250 mL	253 g
32	8	4	2	<b>thumn suds</b>	120 mL	126 g

Traditional system in Muscat, based on [BERG] and [MART3]

		Metric	Metric
<b>Ferren</b>		31.586 L	24.0 kg
34	<b>sedio</b> or <b>sidio</b>	929.000 mL	706 g

### 141.5 Units of Liquid Capacity

Liquids were generally sold by weight, but sometimes the measures for dry commodities were used.

Traditional system in Muscat, based on [CLAR]

		Metric
<b>ferren</b>		36.030 L
34	<b>sedio</b> or <b>sidio</b>	1.060 L

### 141.6 Units of Weight

There were basically two types of system in use after the late eighteenth century. One type of system (mann-kiyās system) was based on the *qirsh fiddah* (the Maria Theresa Thaler), also known as the *riyāl frans* (European riyal), and the other system (mann-rub' system) was based on the *rūbiyyah* (the Indian rupee).

*Mann-kiyās system* in Muscat and Mutrah

			Maria Theresa Thaler	Metric
<b>mann Masqaṭ</b>			144	4.046 kg
24	<b>kiyās</b>		6	168.583 g
192	8	<b>niṣf rub'</b>	3/4	2.107 g

*Mann-kiyās system* in al-Batinah and rest of Oman

			Maria Theresa Thaler	Metric
<b>mann 'Umān</b> <sup>a</sup> or <b>wazn sittah</b>			36	1.011 5 kg
6	<b>kiyās</b>		6	168.583 g
48	8	<b>niṣf rub'</b>	3/4	2.107 g

<sup>a</sup>Several standards of the *mann 'Umān* were used. 1 **wazn sab'ah** (for salt at al-Khāburah and for dates on the Bātinah coast) = 7 kiyās = 1.180 kg; 1 **wazn thamaniyah** or **mann al-Khaḍrā** (for dates at al-Khadra and al-Suwayq) = 8 kiyās = 1.349 kg; and 1 **wazn tis'ah** (for dates in al-Khāburah) = 9 kiyās = 1.517 kg

*Mann-rub' system* for internal trading in al-Zāhirah

		Indian rupee	Metric
<b>mann al-Zāhirah</b>		70	791 g
4	<b>rub'</b>	17½	197.7 g

Upper scale in Oman after the late seventeenth century

			Metric
<b>bahār</b> or <b>buhār</b>			202.3 kg
20	<b>farāsilah</b> <sup>a</sup>		10.115 kg
200	10	<b>mann 'Uman</b>	1.011 5 kg

<sup>a</sup>The number of mann varied by the commodities being weighed. Bulk staples tended to be weighed by a larger standard than expensive commodities, according to [HINZ]

For rock salt in Oman

			Metric
<b>bahār</b>			404.6 kg
20	<b>farāsilah</b>		20.23 kg
400	20	<b>mann 'Uman</b>	1.011 5 kg

For sihh (dried dates) on the coast of al-Batinah

			Metric
<b>bahār</b>			161.84–242.76 kg
20	<b>farāsilah</b> <sup>a</sup>		8.092–12.138 kg
160–240	8–12	<b>mann 'Uman</b>	1.011 5 kg

<sup>a</sup>The number of mann varied by location

Upper scale in Muscat after the late seventeenth century

			Metric
<b>bahār</b>			807.84 kg
20	<b>farāsilah</b>		40.392 kg
200	10	<b>mann Masqaṭ</b> <sup>a</sup>	4.039 2 kg

<sup>a</sup>Also reported as 3.969 kg and 4.35 kg

Lower scale in Oman during the late nineteenth century, based on [BERG]

			Metric
<b>khandi</b>			4.848 48 kg
60	<b>maund</b>		80.808 g
1440	24	<b>kotscha</b>	3.367 g

British Imperial-linked scale for cereal, except rice, based on [STAT1951]

			Imperial	Metric
<b>khandi</b>			500 lb	226.796 kg
20	<b>ferrah</b>		25 lb	11.340 kg
800	40	<b>pali</b>	3/5 lb	283.495 g

Metric-linked system in Muscat, based on [MART3]

				Metric
<b>bahar</b>				320 kg
1½	<b>khandi</b>			240 kg
80	60	<b>maund</b>		4 kg
1920	1 440	24	<b>cusha</b>	166.667 g

Other reported measures:

- 1 **ṭann** (used for exports of dried limes) = 2240 raṭl = about 1016 kg, or = 1000 kg;
- 1 **raf'** or **raf'ah** (for imports from Bahrain and Dubai) = 5 qinṭār = 5 Cwt = about 254 kg;
- 1 **qalālah** (for qatt and green barley in the north-west of 'Ibri) = 8 mann 'Uman = about 8.09 kg;
- 1 **rub'** or **rub'ah** (for imports from Bahrain and Dubai) = 4 lbs = about 1.81 kg;
- 1 **raṭl** or **riṭl** (for imports from Bahrain and Dubai) = 1 lb av = about 454 g;
- 1 **tōlā** (for precious metals) = since the 1830s, equal to the weight of the old Indian silver rupee = 180 gr. = about 11.6 g;
- 1 **mithqāl** (for precious metals) = the weight of the gold dinar = about 4.25 g (until the early nineteenth century), and the weight of 1/7 Maria Theresa Thaler = about 4.01 g (from the early nineteenth century until metrification).

## 142 Orange Free State [Formerly: Orange River Sovereignty and Part of Former Republic of Potchefstroom]

The Orange Free State was a Boer republic that was officially independent between 1854 and 1902.

### 142.1 Units of Length

Dutch-linked scale

			Metric
<b>rood</b>			3.778 m
12	<b>foot</b>		314.858 mm
144	12	<b>inch</b>	26.238 mm

### 142.2 Units of Area

1 Rhineland Morgen = 3.600 m<sup>2</sup>.

### 142.3 Units of Dry Capacity

Dutch-linked scale

			Metric
<b>load</b>			1080.223 L
10	<b>muid</b>		108.022 L
40	4	<b>schepel</b>	27.006 L

### 142.4 Units of Liquid Capacity

British Imperial scale

			Metric
<b>aum</b>			172.653 L
4	<b>anker</b>		43.163 25 L
38	9½	<b>gallon</b>	4.543 5 L

Dutch-linked scale

					Metric
<b>leaguer</b>					575.372 L
–	<b>pipe</b>				416.388 L
–	–	<b>aum</b>			143.843 L
–	–	4	<b>anker</b>		35.961 L
442 <sup>2</sup> / <sub>11</sub>	320	110 <sup>1</sup> / <sub>2</sub>	27 <sup>8</sup> / <sub>5</sub>	<b>flask</b>	1.301 L

### 142.5 Units of Weight

British Imperial-linked scale

		Metric
<b>ounce</b>		31.103 477 g
20	<b>pennyweight</b>	1.555 174 g

## 143 Orange River Colony

See also *Orange Free State*.

This colony was established in 1902. In 1910, it was united with three other colonies to form the Union of South Africa.

## 144 Orange River Sovereignty

See also *Orange Free State*.

This was a political entity between 1848 and 1854, when it became the Orange Free State.

## 145 Ottoman Empire

See also *Albania, Bulgaria, Egypt, Greece, Hejaz, Hungary, Iraq, Iran, Italy, Libya, Mamluk Sultanate, Morocco, North Yemen, Oman, Russia, Saudi Arabia, Seljuq Empire, Serbia, Syria, Turkey, and Ukraine*.

The Turks entered Asia Minor from the east at the end of the thirteenth century. In 1453, the Ottoman Turks conquered Constantinople and turned it into Istanbul, the capital of their Ottoman Empire. At its height in the late 1500s, the Ottoman Empire included most of the Balkans, a large portion of Hungary in central Europe, and most of the Middle East and North Africa. The defeat of the Turkish navy by the Holy League in 1571, and of the Turkish forces besieging Vienna in 1683, began the steady decline of the Ottoman Empire.

Before the Ottomans, a variety of Byzantine, Ilkhanid and Seljuq systems were in use in Anatolia. The Byzantine *litra*, or *ratl rumi*, was identical to the Ottoman *lidre*. During the eleventh century, the Ottomans brought along systems based on the *arşin* and the *batman* to Anatolia. Central Asian measures, such as the *kulaç* and the *kariş*, were also used by the Ottomans during the eleventh century. From the early fourteenth century, Seljuq measures such as the *okka* (*ukiyya*) and the *dirhem* were also used by the Ottomans. The Ottomans inherited the duodecimal system of the Islamic measuring system. The Ottoman Empire was one of the

17 signatories to the Metre Convention in 1875, but the international and traditional units remained in use until the proclamation of the Turkish Republic.

*Main sources:* [CHIA], [DJUR], [DÖRI2], [DOUR], [DUBO], [FLÜG], [KAHN], [LEMB], [MART3], and [ÖZDU]

### 145.1 Currency

1844–1923: 1 Ottoman lira = 100 kuruş or piastre = 4000 para = 12,000 akçe  
1688–1844: 1 Ottoman kuruş or piastre = 40 para = 120 akçe

### 145.2 Units of Quantity

1 **tay** (= bundle of coarse cotton cloth) = 700 pieces;  
1 **deste** = a bunch of 10 or 12;  
1 **çile** = a bundle, hank or skein;  
1 **dizi** = a string of figs;  
1 **çift** = a pair of shoes, oxen, etc.;  
1 **tâq** (for fabric and turban) = 1 piece.

### 145.3 Units of Length

Traditional units:

1 **merhale** or **mesdfe** = a day's march;  
1 **ağaç** = the distance covered in an hour = about 6 km;  
1 **adım** = the distance covered in one stride = about 0.75 m;  
1 **araş** = the length of the forearm, from the elbow to the tip of the index finger = about 40 cm;  
1 **kariş** = the distance between the tip of the thumb and the tip of the little finger when the hand is stretched out;  
1 **sere** or **serc** = the distance between the tip of the thumb and the forefinger when spread apart = about 17 cm.

During the sixteenth to eighteenth centuries

<b>amme ziraci</b>			
16	<b>giriş</b>		
20	1¼	<b>bogun</b>	
50	3⅞	2½	<b>barmağ</b>

For buildings during the reign of Selim II (1789–1807)

			Metric
<b>mî mār arşını<sup>a</sup></b>			757.74 mm
24	<b>parmah</b> or <b>parmak</b>		31.572 5 mm
240	10	<b>haṭṭ</b>	3.157 25 mm

<sup>a</sup>According to [ÖZDU], around 1520 = 721 mm, during the late sixteenth century = 734 mm, and during the third quarter of the eighteenth century = 764 mm

Before 1869 (four reported scales)

		Metric	Metric	Metric	Metric
<b>ağaç, agatsch</b> or <b>farsang</b>		5000.428 000 m	5010.09 m	5015.94 m	~5334 m
3	<b>berri</b>	1666.809 333 m	1670.07 m	1670.98 m	~1778 m

Upper scale after 1869

								Metric
<b>merhale</b> or <b>mesdfe</b>								45,464.40 m
2	<b>berid</b> or <b>menzil</b>							22,732.20 m
8	4	<b>fersah</b>						5683.05 m
24	12	3	<b>eski mil</b>					1894.35 m
200	100	25	8⅓	<b>berid</b> or <b>menzil</b>				227.322 m
1000	500	125	41⅓	5	<b>girib</b> or <b>djerib</b>			45.464 m
24,000	12,000	3000	1000	120	24	<b>kulaç</b>		1.894 35 m
60,000	30,000	7500	2500	300	60	2½	<b>zirai mimari</b>	757.740 mm

Lower scale after 1869

						Metric
<b>zirai mimari</b> or <b>mî mār arşını<sup>a</sup></b>						757.740 mm
2	<b>ayak</b> or <b>kadem</b>					378.870 mm
24	12	<b>parmak</b>				31.572 mm
288	144	12	<b>hat</b>			2.631 mm
3456	1728	144	12	<b>nokta</b>		219 µm

<sup>a</sup>Used in architecture

## Metric-linked upper scale after 1881

						Metric
<b>Konak</b>						30 km
3	<b>pharoagh<sup>a</sup></b>					10 km
6	2	<b>fersah</b>				5 km
18	6	3	<b>berri mil<sup>b</sup></b>			1 $\frac{1}{3}$ km
30	10	5	1 $\frac{1}{3}$	<b>mil or mill</b>		1 km
300	100	50	16 $\frac{2}{3}$	10	<b>girib</b>	100 m

<sup>a</sup>A two hours' journey<sup>b</sup>According to [KAHN] = 1 476 m

## Metric-linked lower scale after 1881

						Metric
<b>girib</b>						100 m
10	<b>arşın</b>					1 m
100	10	<b>parmak</b>				1 dm
1000	100	10	<b>hat or hatt</b>			1 cm
10,000	1000	100	10	<b>nokta</b>		1 mm

## Ordinary and architect scale

							Metric	Metric
<b>farsah</b>							4875 m	5685 m
75	<b>denk or deng</b>						65 m	75.8 m
150	2	<b>pastav</b>					32.50 m	37.90 m
375	5	2 $\frac{1}{2}$	<b>top</b>				13 m	15.16 mm
1500	20	10	4	<b>çile</b>			3.25 m	3.79 m
7500	100	50	20	5	<b>arşın</b>		650 mm	758 mm
30,000	400	200	80	20	4	<b>çaryek</b>	16.25 mm	18.95 mm

## For textiles before 1830

							Metric
<b>kasaba<sup>a</sup></b>							3.99 m
5	<b>carpenter's arşın</b>						798 mm
6	1 $\frac{1}{3}$	<b>Hashimid arşın</b>					665 mm
6 $\frac{2}{3}$	1 $\frac{1}{3}$	1 $\frac{1}{9}$	<b>fabric arşın</b>				598.5 mm
7 $\frac{1}{7}$	1 $\frac{3}{7}$	1 $\frac{12}{63}$	1 $\frac{1}{14}$	<b>kara arşın</b>			558.6 mm
8	1 $\frac{3}{5}$	1 $\frac{1}{3}$	1 $\frac{1}{5}$	1 $\frac{3}{25}$	<b>hand arşın</b>		498.75 mm
24	4 $\frac{4}{5}$	4	3 $\frac{3}{5}$	3 $\frac{9}{25}$	3	<b>kabda</b>	166.25 mm

<sup>a</sup>After 1830, the kasaba became 22 kabda = 3.55 m

## For fabric before 1869

				Metric
<b>çarşı arşın or pic</b>				680 mm
8	<b>rubu, urup, or ouromb</b>			85 mm
16	2	<b>kirah</b>		42.5 mm

For silk and cotton before 1869

							Metric
<b>top<sup>a</sup></b>							78 m
—	<b>top<sup>b</sup></b>						65 m
—	—	<b>top<sup>c</sup></b>					9.75 m
—	—	—	<b>top<sup>d</sup></b>				8.45 m
120	100	15	13	<b>arşun or endaze</b>			650 mm
960	800	120	104	8	<b>rubu, urup, or ouromb</b>		81.25 mm
1920	1600	240	208	16	2	<b>kirah</b>	40.625 mm

<sup>a</sup>For silk vale

<sup>b</sup>For silk taffeta

<sup>c</sup>For velvet

<sup>d</sup>For cotton cloth

For fabric and silk after 1869

				Metric
<b>nul</b>				1000 m
1562½	<b>arşın<sup>a</sup> or pic</b>			640 mm
12,500	8	<b>rubu, urup, or ouromb</b>		80 mm
25,000	16	2	<b>kirah</b>	40 mm

<sup>a</sup>Varied by location between 64 cm and 76 cm

Scale used at bazaars

			Metric
<b>arson, gaz or gez</b>			685.79 mm
8	<b>rub' or urub'</b>		85.72 mm
16	2	<b>gireh</b>	42.86 mm

Scale used in the Slavic area

			Metric
<b>carsi arşunu</b>			685.58 mm
8	<b>urub'</b>		85.70 mm
16	2	<b>gireh or kerrah</b>	42.85 mm

After 1874

						Metric
<b>fersach-â' chary</b>						10,000 m
10	<b>myli-â' chary</b>					1000 m
10,000	1000	<b>zirâ'i-â' chary</b>				1 m
100,000	10,000	10	<b>euchry-zira'</b>			100 mm
1,000,000	100,000	100	10	<b>a'chary-zira</b>		10 mm
10,000,000	1,000,000	1000	100	10	<b>mi'chary-zira'</b>	1 mm

Other measures reported during the nineteenth century:

- 1 **gaz-i-shābī** = 950 mm;  
 1 **büyük pik** or **halebi** (large pik, for fabric) = 758.55 mm;  
 1 **küçük pik** (small pik, for fabrics) = 687.12 mm;  
 1 **pic halêbi** = 685.794 mm;  
 1 **pik stambuli** (Mekka standard) = 24 kirāt = 685.6 mm;  
 1 **arşın** or **zira** (after 1881) = 680 mm;  
 1 **pic endazeh** (for silk) = 652.8 mm;  
 1 **endaze** (after 1881) = 650 mm;  
 1 **kadem** (after 1881) = 337 mm;  
 1 **urup** (after 1881) = 85 mm;  
 1 **kirah** (after 1881) = 40.625 mm.

## 145.4 Units of Area

Traditional measures:

- 1 **tada** = a piece of land extending as far as the eye reaches;  
 1 **erlik** (for vineyards, ricefields and gardens) = a land for one man's work, defined as a plot of land for cultivation of rice seed of 50 okka or 2½ dönüm of surface;  
 1 **çiftlik** = a farm for one peasant household, varying between 60 and 150 dönüm;  
 1 **mudluk** = a piece of land for one mudd of seed, or 1/6, 1/9 or 1/12 çiftlik (according to the fertility of the soil).

Traditional system

								Metric
<b>büyük dönüm</b>								2721.31 m <sup>2</sup>
1 <sup>71/225</sup>	<b>cerip, girib, or djerib</b>							2068.56 m <sup>2</sup>
2 <sup>24/25</sup>	2¼	<b>eski dönüm</b>						919.30 m <sup>2</sup>
11 <sup>21/25</sup>	9	4	<b>evlek<sup>a</sup></b>					229.82 m <sup>2</sup>
29 <sup>3/5</sup>	22½	10	2½	<b>nishan</b>				91.93 m <sup>2</sup>
296	225	100	25	10	<b>çubuk</b>			9.19 m <sup>2</sup>
1835 <sup>1/5</sup>	1395	620	155	62	6 <sup>1/5</sup>	<b>koltuk</b>		1.48 m <sup>2</sup>
4736	3600	1600	400	160	16	2 <sup>18/31</sup>	<b>bina arşın or arşın murabbâi</b>	57.46 dm <sup>2</sup>

<sup>a</sup>A field of one day's work with oxen

Before 1874 in Istanbul

			Metric
<b>donum</b>			918.671 9 m <sup>2</sup>
1600	<b>murabba-adim</b>		57.416 99 m <sup>2</sup>
6400	4	<b>murabba-cadem</b>	14.354 25 m <sup>2</sup>

After 1874

			Metric
<b>dierib</b>			10,000 m <sup>2</sup>
100	<b>murabba'î-â' chary</b>		100 m <sup>2</sup>
10,000	100	<b>murabba zira'</b>	1 m <sup>2</sup>

145.5 Units of Volume

In Istanbul

		Metric
<b>keyl-i İstanbul</b>		37 dm <sup>3</sup>
4	<b>şinik</b>	9.25 dm <sup>3</sup>

Other measures reported during the nineteenth century:

1 **sira**<sup>3</sup> = 1 **ambar** = 0.435 m<sup>3</sup>.

145.6 Units of Dry Capacity

Traditional measures:

- 1 **çit** = a big basket of fruits;  
1 **sihaf** = a large bowl of cheese.

For oil and butter

		Metric
<b>bardak</b>		8.3 kg
10	<b>men</b>	830 g

For hazelnuts

		Metric
<b>çuval</b>		74 L
2½	<b>kile</b>	29.6 L

After 1874

			Metric
<b>chile i-â' chary</b>			100 L
100	<b>eultscec</b>		1 L
1000	10	<b>zarf</b>	100 mL

Other measures reported during the nineteenth century:

- 1 **Ottoman kilé** = 141.08 L;  
1 **kiló** = 52.899 L;  
1 **alma, almude** or **meter** = 5.24 L;  
1 **rottol** = 1.428 L, but also as about 1.6 L;  
1 **oke** = 727 mL.

For cereal before 1841, after 1841, as reported in 1859 [FLÜG], and in 1862 [DÖRİ2]

				Metric	Metric	Metric	Metric
<b>fortin</b>				132.624 L	141.080 L	140.44 L	141.064 L
4	<b>kilé</b>			33.156 L	35.270 L	35.110 L	35.266 L
8	2	<b>ölçek</b>		16.578 L	17.635 L	17.555 L	17.633 L
16	4	2	<b>şinik</b>	8.289 L	8.817 L	8.777 L	8.816 L

For cereal in Istanbul, based on [MART3]

			Metric
<b>fortin</b>			144.372 000 L
4	<b>kilé</b>		36.093 000 L
32	8	<b>ölçek</b>	4.511 625 L

Metric-linked system after 1869

						Metric
<b>carro</b> <sup>a</sup>						2000 L
5	<b>fortin</b>					400 L
20	4	<b>kilé</b>				100 L
200	40	10	<b>sinik</b>			10 L
2000	400	100	10	<b>okka</b> or <b>sultchek</b>		1 L
20,000	4000	1000	100	10	<b>zarf</b>	100 mL

<sup>a</sup>For wheat

## 145.7 Units of Liquid Capacity

Traditionally, liquids were sold by weight.

For wine

			Metric
<b>baril</b>			205.1 or 230.8 kg
20	<b>medre</b>		10.2 or 11.5 kg
160 or 180	8 or 9	<b>oḳḳa</b>	1.282 g

Other measures reported during the nineteenth century:

- 1 **aime** = 130 L;
- 1 **salma** = 32.714 4 L;
- 1 **alma** or **almud** (for wine) = 5.236 8 L;
- 1 **alma** or **almud** (for cider) = 5.204 8 L;
- 1 **oḳḳa** = 1.281 3 L.

Ottoman standard, middle scale

				Metric
<b>batman</b>				23.093 kg
18	<b>oḳḳa</b>			1.282 945 kg
45	2½	<b>kāse</b>		513.178 g
4500	250	100	<b>habbe</b>	5.132 g

Ottoman standard, lower scale

						Metric
<b>oḳḳa</b>						1.282 945 kg
1 <sup>77</sup> / <sub>143</sub>	<b>männ</b>					833.914 g
2 <sup>3</sup> / <sub>11</sub>	1 <sup>63</sup> / <sub>132</sub>	<b>lodre</b>				564.496 g
3½	2½	1 <sup>7</sup> / <sub>15</sub>	<b>vezne</b>			384.883 g
–	3 <sup>19</sup> / <sub>27</sub>	1 <sup>17</sup> / <sub>27</sub>	–	<b>nügi</b>		346.395 g
4	2⅔	1 <sup>19</sup> / <sub>25</sub>	1½	1 <sup>7</sup> / <sub>25</sub>	<b>lidre or ratl rumī</b>	320.736 g

## 145.8 Units of Weight

Traditional measures:

- 1 camel-load = about 200–300 kg;
- 1 horseload (for silk at Bursa in 1484) = 71⅔ men = 214.200 kg;
- 1 donkeyload = about 60–80 kg;
- 1 **fardello** (for silk at Tanais in 1542) = about 79 kg;
- 1 **batman** (at Bursa during the fifteenth century) = 15–16 okka = 19.245–20.528 kg.

Ottoman standard, upper scale

											Metric
<b>tagār</b>											2001.394 kg
–	<b>mudd</b>										513.178 kg
–	2 <sup>3</sup> / <sub>11</sub>	<b>çeki</b>									225.798 kg
–	4 <sup>9</sup> / <sub>11</sub>	2	<b>çuval</b>								112.899 kg
–	8	3 <sup>13</sup> / <sub>25</sub>	1 <sup>19</sup> / <sub>25</sub>	<b>girār or garār</b>							64.147 kg
–	9 <sup>9</sup> / <sub>11</sub>	4	2	1 <sup>3</sup> / <sub>22</sub>	<b>kantar</b>						56.450 kg
78	20	8⅔	4⅔	2½	2⅔	<b>kile</b>					25.659 kg
312	80	35⅔	17⅔	10	8⅔	4	<b>kadeh</b>				6.415 kg
624	160	70⅔	35⅔	20	17⅔	8	2	<b>kutu</b>			3.207 kg
1248	320	140⅔	70⅔	40	35⅔	16	4	2	<b>kalbur or galbur</b>		1.604 kg
1560	400	176	88	50	44	20	5	2½	1¼	<b>oḳḳa</b>	1.282 945 kg

In Istanbul before 1874, based on [MART3]

												Metric
<b>tonnelata</b>												1045.325 735 kg
–	<b>carico</b>											128.103 644 kg
–	–	<b>cantar</b>										57.646 670 kg
136	–	–	<b>batman<sup>a</sup></b>									7.686 219 kg
–	–	–	–	<b>çeki<sup>b</sup></b>								2.562 073 kg
–	–	–	–	–	<b>teffeh<sup>c</sup></b>							1.953 582 kg
–	100	44	6	2	1 $\frac{5}{8}$	<b>oğka</b>						1.281 036 kg
–	–	–	–	–	–	–	<b>çeki<sup>d</sup></b>					800.648 g
–	–	100	–	–	–	–	–	<b>rotolo</b>				563.656 g
–	–	–	–	–	6 $\frac{1}{10}$	4	2 $\frac{1}{2}$	1 $\frac{19}{25}$	<b>litra</b>			320.259 g
–	–	–	–	–	61	40	25	17 $\frac{1}{5}$	10	<b>metical</b>		4.804 g
–	–	–	–	–	610	400	250	176	100	10	<b>dirhem</b>	3.203 g

<sup>a</sup>For silk from Persia<sup>b</sup>For hair of goats<sup>c</sup>For silk from Bursa<sup>d</sup>For opium. Also reported as 763 g

For finer use

									Metric
<b>oğka or kıyye</b>									1.282 945 kg
–	<b>nügi</b>								346.395 g
4	1 $\frac{7}{25}$	<b>çeki<sup>a</sup>, lidre, or ratl rumī</b>							320.736 g
44 $\frac{4}{5}$	12	11 $\frac{1}{9}$		<b>ünge<sup>b</sup></b>					28.886 g
266 $\frac{2}{3}$	72	66 $\frac{2}{3}$		6	<b>mişqāl</b>				4.811 g
400	108	100		9	1 $\frac{1}{2}$	<b>dirhem</b>			3.207 g
6400	1728	1600		144	24	16	<b>kırat</b>		200.46 mg
25,600	6912	6400		576	96	64	4	<b>dang</b>	50.11 mg

<sup>a</sup>For gold and silver<sup>b</sup>For silver

For grain

		Metric
<b>evlek or evleg</b>		12.829 kg
10	<b>kile</b>	1.283 kg

For rice

		Metric
<b>kabran</b>		128.294 kg
2 $\frac{1}{2}$	<b>çuval</b>	46.184 kg
50	18	<b>kile</b> 2.566 kg

For silk

					Metric
<b>yük</b>					61.574 kg
10	<b>batman</b>				6.157 kg
160	16	<b>lidre</b>			384.84 g
640	64	4	<b>çaryek</b>		96.21 g
19,200	1920	120	30	<b>dirhem</b>	3.207 g

For wood

			Metric
<b>çeki</b>			250 kg
195		<b>okka</b>	1.282 g

For butter and oil

		Metric
<b>bardak</b>		8.3 kg
10	<b>men</b>	830 g

For copper

		Metric
<b>medre</b>		18.442 kg
5750	<b>dirhem</b>	3.207 g

For iron

		Metric
<b>männ</b>		3 kg
4	<b>çaryek</b>	750 g

Other measures reported during the eighteenth to nineteenth centuries:

1 horseload = 600 lidre = 192.42 kg;

1 **collo** = 2½ kantar = 141.122 kg;

1 **tenbelid** = 300 lidre = 96.210 kg;

1 **sanduk** or **sandik** = a wooden container, for figs (=220 okka) and opium (=60 okka);

1 **çeki** (for mohair during the nineteenth century) = 4.564 kg;

1 **taffu** = 1.956 623 8 kg.

1 **teffé** or **taffee** (for silk at Smyrna) = 1.939 kg;

1 **lidre** (for silver in Serbia) = 115 dirhem = 368.805 g.

For medical use, gold and silver

					Metric
<b>çeki</b>					320.259 110 g
100	<b>dirhem</b>				3.202 591 g
400	4	<b>danec</b>			800.648 mg
1600	16	4	<b>tassudsh</b> or <b>chirat</b>		200.162 mg
6400	64	16	4	<b>habbeh</b>	50.040 mg

After 1874

							Metric
<b>tonnellata</b>							1000 kg
10	<b>cantar-â' chary</b>						100 kg
1000	100	<b>vechiei-â' chary</b>					1 kg
1,000,000	100,000	1000	<b>dirhem-â' chary</b>				1 g
10,000,000	1,000,000	10,000	10	<b>euchry-dirhem</b>			100 mg
100,000,000	10,000,000	100,000	100	10	<b>a' chary-dirhem</b>		10 mg
1,000,000,000	100,000,000	1,000,000	1000	100	10	<b>mi' chary-dirhem</b>	1 mg

145.9 Anatolia

145.9.1 Units of Length

1 **accono** (for cloth at Altoluogo, present Aya Solnq, in 1340) = ~0.7 m.

145.9.2 Units of Area

1 **çiftlik** = a plot of land for 2, 3 or 4 mudd of seed.

In Bursa

	دونمك	Metric
<b>feddan</b>		~45,000 m <sup>2</sup>
200	(old) <b>dönüm</b>	~225 m <sup>2</sup>

145.9.3 Units of Dry Capacity

				Metric
<b>kilé<sup>a</sup></b>				101 L
2	<b>ölçek</b>			50.5 L
3	1½	<b>hak</b>		33.7 L
4	2	1½	<b>gödük or ruplağı</b>	25.25 L

<sup>a</sup>Also reported by [KAHN] as 17.635 L before 1841

Old scale at Ankara

			Metric
<b>ölçek</b>			1033.506 m <sup>2</sup>
2	<b>yarım</b>		516.753 m <sup>2</sup>
8	4	<b>şinik</b>	129.188 3 m <sup>2</sup>

In Smyrna, present-day Izmir, after 1851

		Metric
<b>kiló<sup>a</sup></b>		51.30 L
32	<b>oke</b>	1.60 L

<sup>a</sup>Before 1851 = 54.139 2 L

145.9.4 Units of Weight

Traditional system

			Metric
<b>yük</b>			162.144 kg
8	<b>bogça</b>		20.268 kg
32	4	<b>batman</b>	5.067 kg

During the nineteenth century

				Metric
<b>kantar</b>				230.922 kg
180	<b>oğça</b>			1.282 9 kg
720	4	<b>rafl rūmi</b>		320.7 g
7200	400	100	<b>dirhem</b>	3.207 g

At Ahlat and Nisibis (present-day Nusaybin) during the eleventh century

		Metric
<b>rafl</b>		962.1 g
300	<b>dirhem</b>	3.207 g

At Ankara, Karaman and Konya

		Metric
<b>kile</b>		30.790 kg
24	<b>oğka</b>	1.282 9 kg

At Bursa in 1500

				Metric
<b>kile</b>				15.397 kg
1%	<b>çaryek</b>			8.661 kg
12	6¼	<b>oğka</b>		1.283 kg
40	22½	3⅓	<b>lidre</b>	384.93 g

For silk at Bursa during the fifteenth century

		Metric
<b>‘idl</b>		68 kg
176	<b>lidre</b>	386.4 g

For silk at Bursa in 1485

		Metric
<b>hıml</b>		115.860 kg
405	<b>lidre</b>	286.07 g

For silk at Bursa in 1490

		Metric
<b>yük</b>		34.635 kg
90	<b>lidre</b>	384.83 g

For silk at Bursa in 1500

		Metric
<b>tenbelid</b>		96.210 kg
300	<b>lidre</b>	320.70 g

For silk at Bursa in 1526

		Metric
<b>yük</b>		79.000 kg
208	<b>lidre</b>	379.81 g

For silk at Bursa during the sixteenth to seventeenth centuries

		Metric
<b>yük</b>		155.86 kg
405	<b>lidre</b>	384.84 g

For silk at Bursa in 1620 and in 1621

		Metric	Metric
<b>hıml</b>		209.551 kg	176.380 kg
550	<b>lidre</b>	381.00 g	320.69 g

For silk at Bursa in 1775

		Metric
<b>balya</b>		110.000 kg
170	<b>pound</b>	647.06 g

For silk at Erzincan in 1516 and in 1576

				Metric
<b>yük</b>				61.574 kg
10	<b>bağman</b>			6.157 4 kg
120	12	<b>nügi</b>		513.12 g
19,200	1920	160	<b>dirhem</b>	3.207 g

At Harput, present-day Elâzığ

		Metric
<b>männ</b>		5.773 kg
1800	<b>dirhem</b>	3.207 g

At Isparta

		Metric
<b>kile</b>		17.961 kg
14	<b>oğka</b>	1.282 9 kg

At İzmir during the nineteenth century

		Metric
<b>çeki</b>		230.896 kg
180	<b>oğka</b>	1.283 g

At Kilis

		Metric
<b>kile</b>		84.678 kg
66	<b>oğka</b>	1.283 kg

At Malatya in 1528

		Metric
<b>kile</b>		12.829 kg
10	<b>oğka</b>	1.282 9 kg

At Mardin in 1516

			Metric
<b>oğka</b>			1.282 9 kg
2	<b>nügi</b>		641.4 g
400	200	<b>dirhem</b>	3.207 g

For silk at Mardin in 1518

				Metric
<b>yük</b>				162.171 kg
8	<b>boğça</b>			20.271 kg
32	4	<b>bañman</b>		5.068 kg
126 $\frac{7}{5}$	15 $\frac{4}{5}$	3 $\frac{19}{20}$	<b>oğka</b>	1.283 g

At Mardin during the nineteenth century

			Metric
<b>kantar</b>			307.896 kg
15	<b>kile</b>		20.527 kg
240	16	<b>oğka</b>	1.283 g

At Sivas

		Metric
<b>ratl</b>		4.618 kg
1440	<b>dirhem</b>	3.207 g

Other reported measures:

1 **konya kilesi** = 176 kg;

1 **konya çeyreği** = 34 kg;

1 **batman** (at Adana) = 4.848 kg;

1 **karataş** (at Erzerum) = 1.603 kg.

## 145.10 Armenia

*Main source:* [KHAC]

### 145.10.1 Units of Capacity

Both liquids and dry commodities were sold by weight.

For rice during the seventeenth century

						Metric
<b>ghitr akpari</b>						25.509 kg
30	<b>pakaser</b>					850.32 g
40	1 $\frac{1}{2}$	<b>ser</b>				637.74 g
480	16	12	<b>kanua</b>			53.14 g
1200	40	30	2 $\frac{1}{2}$	<b>pesabar</b>		21.258 g
5400	180	135	11 $\frac{1}{4}$	4 $\frac{1}{2}$	<b>miskali ajamstana</b>	4.724 g

Mercantile scale at Smyrna, present-day Izmir

									Metric
<b>kantar</b>									57.646 kg
7 $\frac{1}{2}$	<b>batman</b> or <b>mahnd<sup>a</sup></b>								7.686 kg
29 $\frac{31}{61}$	3 $\frac{57}{61}$	<b>teffeh</b>							218 kg
45	6	1 $\frac{21}{40}$	<b>oğka<sup>b</sup></b>						1.953 kg
100	13 $\frac{1}{3}$	3 $\frac{7}{18}$	2 $\frac{2}{9}$	<b>lodre</b> or <b>rotol</b>					580 kg
180	24	6 $\frac{1}{10}$	4	1 $\frac{1}{5}$	<b>chéki</b>				1.281 kg
12,000	1600	406 $\frac{2}{3}$	266 $\frac{2}{3}$	120	66 $\frac{2}{3}$	<b>metikal</b>			036 4 kg
18,000	2400	610	400	180	100	1 $\frac{1}{2}$	<b>dirhem</b>		576.466 kg
1,152,000	153,600	39,040	25,600	11,520	6400	96	64	<b>grain</b>	38 g
									320.259 kg
									10 g
									48.038 9 g
									32.025 9 g
									500.4 mg

<sup>a</sup>Used for silk. Cotton was sold by British weights

<sup>b</sup>In the areas surrounding of Smyrna, 1 kantar = 44 oğka = 56.365 6 kg. In retail, 1 oğka = 401 $\frac{1}{2}$  dirhem = 1.285 840 3 kg

Other reported measures during the seven-teenth century:

1 **charm** (for indigo) = about 23 kg;

1 **man** or **girt ajamstana** = 5.888 kg.

## 145.10.2 Units of Weight

For precious stones during the seventeenth century

			Metric
<b>tola</b>			17.28 g
12	<b>massa</b>		1.44 g
96	8	<b>erati</b> or <b>tan</b>	0.18 g

For silver during the seventeenth century

					Metric
<b>tuman</b>					373.9 g
25	<b>mahmudi</b>				14.96 g
50	2	<b>abbasi</b>			7.48 g
475	19	9½	<b>dank</b>		787 mg
10,000	400	200	21⅓	<b>dian</b>	37 mg

## 145.11 Balıkesir

### 145.11.1 Units of Weight

Traditional system

		Metric
<b>kile</b>		20.527 kg
16	<b>oğka</b>	1.282 9 kg

In Ayvalık during the nineteenth century

		Metric
<b>çeki</b>		128.29 kg
100	<b>oğka</b>	1.282 9 kg

## 145.12 Baranya

### 145.12.1 Units of Weight

As reported in July 1579

		Metric
<b>kile</b>		38.488 kg
30	<b>oğka</b>	1.282 9 kg

At Mohács, now part of Hungary, during the sixteenth century

		Metric
<b>kile</b>		30.768 kg
24	<b>oğka</b>	1.282 kg

At Peçuy, present-day Pécs in Hungary, during the sixteenth century

		Metric
<b>kile</b>		41.024 kg
32	<b>oğka</b>	1.282 kg

## 145.13 Bessarabia

### 145.13.1 Units of Length

At Akkerman, present-day Bilhorod-Dnistrovskiy in Ukraine, in 1500

		Metric
<b>pastav</b>		13 650 m
21	<b>arşun</b>	650 m

### 145.13.2 Units of Weight

At Akkerman, present-day Bilhorod-Dnistrovskiy in Ukraine, in 1500

				Metric
<b>fuçi</b>				226.596 kg
2	<b>sihaf</b>			113.298 kg
5⅓ or 8	2⅔ or 4	<b>tulum</b>		28.324 or 42.486 kg
8	4	1 or 1½	<b>kantar</b>	28.324 kg

At Akkerman, present-day Bilhorod-Dnistrovskiy in Ukraine, in 1500

		Metric
<b>kile</b>		51.317 kg
40	<b>oḡḡa</b>	1.282 9 kg

For caviar at Akkerman, present-day Bilhorod-Dnistrovskiy in Ukraine, in 1500

		Metric
<b>fuḡi</b>		225.798 kg
52	<b>medre</b>	4.342 kg

For honey and wine at Akkerman, present-day Bilhorod-Dnistrovskiy in Ukraine, in 1500

		Metric
<b>fuḡi</b>		89.810 kg
40	<b>medre</b>	2.245 kg

145.14 Bosnia

145.14.1 Units of Area

1 **dulum** (дулум) or **dunum** (дунум) = 1000 m<sup>2</sup>.

145.14.2 Units of Weight

At Saraybosna, present-day Sarajevo, before 1565 and after 1565

		Metric			Metric
<b>kile<sup>a</sup></b>		25.659 kg	<b>kile</b>		28.224 kg
20	<b>oḡḡa</b>	1.283 kg	22	<b>oḡḡa<sup>b</sup></b>	1.283 kg

<sup>a</sup>Also reported, by [DJUR], as 60 oḡḡa (in 1565) = 76.98 kg

<sup>b</sup>Later also reported as 1.282 kg

145.15 Crimea

145.15.1 Units of Weight

During the seventeenth century

			Metric
<b>tagār</b>			192.420 kg
–	<b>kile</b>		109.038–115.452 kg
150	85–90	<b>oḡḡa</b>	1.282 8 kg

During the eighteenth century

		Metric
<b>ḡeki</b>		480 g
150	<b>dirhem</b>	3.20 g

For salt and clarified butter

		Metric
<b>sapo or sapi</b>		410.416 kg
16	<b>keylḡe</b>	25.651 kg

145.16 Diyarbakır

145.16.1 Units of Weight

In 1518

		Metric
<b>kile</b>		12.828 kg
10	<b>oḡḡa</b>	1.282 8 kg

During the sixteenth century

		Metric
<b>männ</b>		1.860 kg
580	<b>dirhem</b>	3.20 g

At Arghni, present-day Ergani, in 1516

		Metric
<b>nügi</b>		641.4 g
200	<b>dirhem</b>	3.207 g

145.17 Egypt

145.17.1 Units of Dry Capacity

At Massawa, now part of present-day Eritrea

		Metric	Metric
<b>ardeb</b>		10.569 600 L	10.673 520 kg
24	<b>madega</b>	440.400 mL	444.730 g

## 145.17.2 Units of Weight

			Metric
<b>raṭl kebir</b>			500 g
1%	<b>raṭl folfoli<sup>a</sup></b>		450 g
160	144	<b>dirhem</b>	3.125 g

<sup>a</sup>For spices

At Caliphate of Cairo

		Metric
<b>ūḳiya</b>		346.392 g
72	<b>miskāl</b>	4.811 g

Presumed system for fine use

					Metric
<b>männ</b>					812.5 g
–	<b>garama</b>				3.51 g
–	1½	<b>bākila</b>			2.34 g
–	2	1⅓	large <b>sāmūna</b>		1.75 g
1388%	6	4	3	small <b>sāmūna</b>	585 mg
4166⅔	18	12	9	3	<b>kīrat</b> 195 mg

Other measures reported during the nineteenth century:

1 **oḳḳa** = 1.050 kg;

1 **dirhem** (for copper at Cairo) = 3.089 8 g.

## 145.18 Epirus

### 145.18.1 Units of Dry Capacity

At Ioannina, based on [MART3]

		Metric
<b>tagari</b>		25.620 729 kg
20	<b>oḳḳa</b>	1.281 036 kg

In Preveza, based on [MART3]

		Metric
<b>haj</b>		124.975 800 L
1½	<b>staio</b>	83.317 200 L

## 145.18.2 Units of Liquid Capacity

For wine

		Metric
<b>sikla</b>		64 or 77 kg
50 or 60	<b>oḳḳa</b>	1.283 kg

For oil at Ioannina, based on [MART3]

		Metric
<b>migliaio</b>		476.998 700 kg
1000	<b>libber grosse</b>	476.998 700 g

For oil at Ioannina, based on [MART3]

			Metric
<b>canada</b>			32.025 910 kg
10	<b>litra</b>		3.202 591 kg
25	2½	<b>oḳḳa</b>	1.281 036 kg

Other reported measures:

1 **barile** (in Preveza) = 64.385 900 L;

1 **zuccale** (for oil in Preveza) = 3.244 500 L.

### 145.18.3 Units of Weight

1 **litra** = 427 g.

		Metric
<b>onghion</b>		35.277 g
11	<b>dirhem</b>	3.207 g

For wood

			Metric
<b>brasse</b>			2388.946 kg
93⅓	<b>tagār</b>		25.66 kg
1862	20	<b>oḳḳa</b>	1.283 kg

At Nicopolis

		Metric
<b>kile</b>		128.294 kg
100	<b>oḳḳa</b>	1.282 94 kg

In Preveza

		Metric
<b>cartoutso</b>		481 g
150	<b>dirhem</b>	3.207 g

For oil in Preveza, based on [MART3]

		Metric
<b>migliaio</b>		476.998 700 kg
1000	<b>libber grosse</b>	476.998 700 g

145.19 Euboea

145.19.1 Units of Liquid Capacity

For wine

			Metric
<b>medre</b>			70.561 kg
40	<b>kuze</b>		1.764 kg
55	1⅔	<b>oğça</b>	1.283 kg

For oil during the fifteenth century, according to [CHIA]

			Metric
<b>mirro</b>			536.4 kg
90	<b>sestiere</b>		5.96 kg
720	8	<b>palluzza</b>	745 g

145.20 Genoa

145.20.1 Units of Weight

1 **libbra grossa** = 348.450 g;  
1 **libbra sottile** = 316.750 g.

		Metric
<b>kantar</b>		47.600 kg
100	<b>rottolo</b>	476 g

For silk

		Metric
<b>fardello</b>		79.821 kg
252	<b>libbra</b>	316.75 g

For silk

		Metric
<b>balla or balya</b>		90 kg
300	<b>libbra</b>	300 g

For wine

		Metric
<b>metrāta</b>		156 kg
2	<b>baril</b>	78 kg

At Caffa, present-day Feodosiya in Ukraine, in 1490

		Metric
<b>ton</b>		32.50–35.75 m
50–55	<b>arşun</b>	650 mm

145.21 Iraq

145.21.1 Units of Dry Capacity

			Metric
<b>kara or kâra</b>			~120 L
2	<b>kafız</b>		~60 L
16	8	<b>mekkuk</b>	~7.5 L

145.21.2 Units of Weight

Some measures reported during the seventeenth to nineteenth centuries:

1 **kara** or **kâra** (for rice) = 300 rıtl = 121.875 kg;  
1 **kara** or **kâra** (for wheat) = 240 rıtl = 97.5 kg;  
1 **kara** or **kâra** (for barley, chickpeas and lentils)  
= 200 rıtl = 81.25 kg.

145.22 Istanbul

145.22.1 Units of Dry Capacity

						Metric
<b>fortin</b>						148 L
4	<b>kilé</b>					37 L
8	2	<b>ölçek</b>				18.5 L
16	4	2	<b>şinik</b>			9.25 L
32	8	4	2	<b>kutu</b>		4.625 L
64	16	8	4	2	<b>zarf</b>	2.312 5 L

## 145.22.2 Units of Weight

1 **kile** (in Istanbul in 1500) = 18 okka and  
350 dirhem = 24.215 kg;

			Metric
<b>hogga</b> or <b>hukka</b>			1.283 kg
4	<b>okiya</b> or <b>oqiya</b>		320.75 g
400	100	<b>dirham</b>	3.207 5 g

For silk in 1600

		Metric
<b>ferde</b>		89.796–115.452 kg
70–90	<b>oḳḳa</b>	1.282 8 g

During the sixteenth to seventeenth century

		Metric
<b>barre</b>		153.953 kg
6	<b>kile</b>	25.659 kg

During the late eighteenth century

		Metric
<b>raṭl</b>		2.809 kg
876	<b>dirhem</b>	320.66 g

## 145.23 Ludogorie

### 145.23.1 Units of Weight

At Hezargrad, present-day Razgrad in Bulgaria

		Metric
<b>kile</b>		76.976 kg
60	<b>oḳḳa</b>	1.283 kg

At İzvornik, present-day Kazanlak in Bulgaria

			Metric
<b>ḥiml</b>			169.416 kg
4	<b>kile</b>		40.854 kg
132	33	<b>oḳḳa</b>	1.283 kg

## 145.24 Magreb

### 145.24.1 Units of Weight

During the nineteenth century

		Metric
<b>ūqiya</b>		32 g
10	<b>dirhem</b>	3.2 g

## 145.25 Mesopotamia

### 145.25.1 Units of Weight

1 (heavy) **oḳḳa** = 3.210 kg;

1 **batman** (at Urfa) = 2.309 kg;

1 **raṭl** or **oḳḳa** (during the nineteenth century) =  
1.283 g.

## 145.26 Morea

### 145.26.1 Units of Area

1 **stremma** = 900–1900 m<sup>2</sup> (depending on the  
period and perhaps even the type of land).

### 145.26.2 Units of Weight

1 **ster** = 110.802 kg.

## 145.27 Persia

### 145.27.1 Units of Weight

1 **some** (during the fifteenth century) = 155.625  
kg;

1 **männ** (at Tabriz during the sixteenth century) =  
~3 kg.

		Metric
<b>tagār</b>		83.4 kg
100	<b>männ</b>	834 g

145.28 Rumelia

145.28.1 Units of Dry Capacity

At Salonica, present-day Thessaloniki, during the nineteenth century

		Metric
kiló		144.372 000 L
8	cutle	18.046 500 L

145.28.2 Units of Liquid Capacity

Liquids were, in general, sold by weight.

145.28.3 Units of Weight

For salt at Anchialos, present-day Pomorie in Bulgaria

		Metric
muzur		115.452 kg
90	ok̇ka	1.283 kg

At Salonica, present-day Thessaloniki, during the nineteenth century

				Metric
çeki				173.20–179.62 kg
–	barile			64.150 kg
135–140	50	ok̇ka <sup>a</sup>		1.283 kg
54,000–56,000	20,000	400	dirhem	3.207 g

<sup>a</sup>[MART3] reported it as 1.281 300 kg

For salt at Salonica, present-day Thessaloniki, in 1478

		Metric
muzur		57.726 kg
45	ok̇ka	1.283 kg

For rice at Silistre, present-day Silistra in Bulgaria, during the sixteenth century

			Metric
mazur			192.420 kg
5	kile		38.484 kg
150	30	ok̇ka	1.283 kg

At Sredets, present-day Sofia in Bulgaria

		Metric
kile		64.122 kg
50	ok̇ka	1.283 kg

145.29 Serbia

145.29.1 Units of Area

1 **dulum** (дулум) or **dunum** (дунум) = 1000 m<sup>2</sup>.

145.29.2 Units of Dry Capacity

1 **ok̇ka** (for grain) = 1.330 L.

145.29.3 Units of Liquid Capacity

For wine and other liquids

			Metric
akov			56.61 L
40	ok̇ka		1.415 L
160	4	satlijk	354 mL

145.29.4 Units of Weight

1 **lukna** (for grain) = 4 Edirne kile = 92.372 kg.

During the fourteenth to sixteenth centuries

		ока				Metric
poluknice <sup>a</sup>						15.393 kg
3	medre					5.131 kg
12	4	ok̇ka				1.283 kg
30	10	2½	pinte			513.10 g
533⅓	177%	44%	17%	onki		28.863 g
3200	1066⅔	266⅔	106⅔	6	misqāl	4.810 g

<sup>a</sup>For grain

For grain

			Metric
(large) hiyaşa			1575.936 kg
2	(small) hiyaşa		787.968 kg
24	12	kabal	65.664 kg

For charcoal during the fourteenth to sixteenth centuries

		Metric
<b>şıhta, şihsa, or şihse</b>		1313.280 kg
120	<b>verkče</b>	10.944 kg

For minerals during the fourteenth to sixteenth centuries

		Metric
<b>yük</b>		99.576 kg
4	<b>kabal</b>	24.894 kg

For mining during the fourteenth to sixteenth centuries

		Metric
<b>yük</b>		102.636 kg
4	<b>kile</b>	25.659 kg

For grain at Braničevo

		ока	Metric
<b>lukna</b>			93.360 or 234.132 kg
2 or 6¼	<b>luknića</b>		46.680 kg
72 or 225	36	<b>oḳḳa</b>	1.297 kg

At Īpek, present-day Peć in Kosovo

	ока	Metric
<b>kile</b>		51.267 kg
40	<b>oḳḳa</b>	1.281 7 kg

For grain at Smederovo

лукна		киле	ока	Metric
<b>lukna</b>				186.320 or 191.851 kg
2	<b>luknića</b>			93.160 or 95.925 kg
7	3½	<b>kile</b>		26.617 or 27.407 kg
140 or 144	70 or 72	20 or 20%	<b>oḳḳa</b>	1.332 kg

At Yenibazar, present-day Novi Pazar

	ока	Metric
<b>kile</b>		56.449 kg
44	<b>oḳḳa</b>	1.283 kg

## 145.30 Syria

### 145.30.1 Units of Length

1 **pic** or **draa** (at Aleppo) = 790.0 mm;

1 **pic Hâlebi** (at Aleppo) = 685.8 mm;

1 **pic** (at Acra, part of present-day Israel) = 677.32 mm.

### 145.30.2 Units of Dry Capacity

At Acra, part of present-day Israel

			Metric
<b>grora</b>			1299.708 L
16	<b>scumbol</b>		81.231 75 L
36	2¼	<b>chile</b>	36.103 L

Other reported measures:

1 **mocuc** (at Aleppo) = 756.0 L, or  
~ 250 rotoli = 573.80 kg;

1 **ardep** (for rice) = ~340 L, or  
750 libbre = 254.656 5 kg (see also below).

### 145.30.3 Units of Liquid Capacity

In general, liquids were sold by weight.

### 145.30.4 Units of Weight

Traditional system

			Metric
<b>raṭl</b>			1.875 kg
1¼	<b>raṭl zāhiri</b>		1.500 kg
600	480	<b>dirhem</b>	3.125 g

During the nineteenth century

				Metric
<b>kantar</b>				256.400 kg
80 or 100	<b>raṭl</b>			2.564 or 3.205 kg
200	2 or 2½	<b>oḳḳa</b>		1.282 kg
–	–	–	<b>ūḳiya</b>	213 g
–	–	400¼	66½	<b>dirhem</b> 3.203 g

At Tripoli, now part of Lebanon, and at Aleppo

									Metric
<b>cantaro</b> (large)									401.669 402 kg
1¾	<b>cantaro</b>								229.525 373 kg
5½	3⅓	<b>cola</b>							68.857 612 kg
6⅞	3⅞	1⅞	<b>zurlo</b>						63.119 478 kg
35	20	6	5½	<b>vesno</b>					11.476 269 kg
175	100	30	27½	5	<b>rotolo</b> <sup>a</sup>				2.295 254 kg
315	180	54	49½	9	1⅝	<b>oca</b>			1.275 141 kg
2100	1200	360	330	60	12	6⅔	<b>oncia</b>		191.271 1 g
126,000	72,000	21,600	19,800	3600	720	400	60	<b>derhem</b>	3.187 8 g

<sup>a</sup>Other measures in use were: 1 **rotolo** (for silk from Syria) = 2.231 497 kg, 1 **rotolo** (for silk from Persia) = 2.167 740 kg, and 1 **rotolo** (for groceries from Damascus) = 1.912 711 kg

In West Syria

		Metric
<b>mina</b>		470 g
50	<b>shekel</b>	9.4 g

For silk at Aleppo during the seventeenth century

		Metric
<b>ratl</b>		2.217 kg
700	<b>dirhem</b>	3.167 g

At Acre, part of present-day Israel, according to [DUBO, p. 321] and [MART, p. 17]:

- 1 **ardep** (for rice) = 257.81 kg;
- 1 **rottol** (for weighing silk) = 2.234 kg;
- 1 **rottol** (for raw cotton) = 2.207 kg;
- 1 **rottol** (for cotton yarn) = 2.037 kg.

At Aleppo during the late nineteenth century

			Metric
<b>kantar</b>			320.725 kg
100	<b>ratl</b>		3.207 25 kg
250	2½	<b>okka</b>	1.282 9 kg

For gold, silver, pearls and precious stones at Aleppo

		Metric
<b>metical</b>		4.803 g
1½	<b>derhem</b>	3.202 g

Other units reported during the nineteenth century:

- 1 **shinol** (for wheat) = ~110–120 kg;
- 1 **männ** = 819 g.

## 145.31 Tabriz

### 145.31.1 Units of Weight

- 1 **dirhem** = 3.072 g.

## 145.32 Thrace

### 145.32.1 Units of Length

- 1 **modios** (in Gallipoli) = 583.170 m.

### 145.32.2 Units of Liquid Capacity

For oil in Gallipoli

			Metric
<b>salma</b>			155.00 L
10	<b>stajo</b>		15.50 L
320	32	<b>pignatta</b>	484.4 L

### 145.32.3 Units of Weight

At Edirne

		Metric
<b>lukna</b>		93.372 kg
4	<b>kile</b>	23.343 kg

For rice at Edirne

		Metric
<b>kile</b>		11.546 kg
9	<b>oḱḱa</b>	1.282 9 kg

### 145.33 Yemen

#### 145.33.1 Units of Weight

For precious metals, based on [LEMB]

			Metric
<b>wakeija</b>			31.69 g
10	<b>cafla</b>		3.169 g
160	16	<b>crat</b>	198 mg

### 146 Outer Mongolia

See *Mongolia*.

### 147 Oyo Empire (c. 1400–1905)

See *Yorùbáland*.

The Yoruba empire became one of the largest West African states in pre-colonial Africa.

### 147.1 Currency

Cowrie shells; the smaller the shells, the more valuable they were considered to be.

### 148 Pacific Islands

This represents about 30,000 islands in the Pacific Ocean, which is traditionally grouped into three divisions: Melanesia, Micronesia, and Polynesia.

#### 148.1 Currency

1 US dollar = 100 cents

### 149 Kingdom of Pagan (c. 849–1298)

See also *Myanmar*.

This Kingdom, which was founded in the Irrawaddy valley during the late ninth century, grew gradually over the following two hundred years by absorbing its surrounding regions. In the 1060s, King Anawrahta Minsaw (1014–1077) founded the Pagan Empire, and unified the Irrawaddy valley and its surroundings. The Mongol invasion of the area, starting in 1277, finally ended the kingdom in late 1298.

#### 149.1 Currency

1 silver kyat

## 150 Pakistan [Formerly: West Pakistan]

In 712, the Arab general Muhammad bin Qasim conquered Sindh and Multan in southern Punjab. Northern Pakistan fell under the reign of Mahmud of Ghazna (997–1030). The Ghorids ruled Pakistan from 1150 to 1203, when the Delhi Sultans established their rule over the nation. The Mughals conquered Pakistan in 1526, when Babur defeated the Sultan of Delhi. During the 1750s, Pakistan was seized from the Mughals by the Afghans under Ahmad Shah (1747–1773). The British occupied Bakkhar in 1843, and from then on, Pakistan was under British control. In 1858, the British government took over the rule of India from the British East India Company. Pakistan gained its independence from British India in 1947. The province of East Pakistan broke away from the territory after a civil war in 1971 forming the new state of Bangladesh. From 1947 to 1971, the land was comprised of two parts, West Pakistan and East Pakistan, separated geographically by over 1600 km, with India between the two areas.

The metric system has been official since 1967, and compulsory since 1972.

*Main sources:* [HUGH2], [UN55], [UN66], and [WOLS]

### 150.1 Currency

1961–: 1 Pakistani rupee = 100 paisa  
 1948–1961: 1 Pakistani rupee = 16 anna = 64 pice = 192 pies  
 c.1850–1947: 1 Indian rupee = 16 anna = 64 pice = 192 pies

## 150.2 Units of Length

British Imperial upper scale

				Imperial	Metric
<b>yoyan</b>				7200 yd	6.583 68 km
$3\frac{3}{5}$	<b>coss</b>			2000 yd	1.828 8 km
$327\frac{3}{11}$	$90\frac{3}{11}$	<b>djerib or jareeb</b>		22 yd	20.116 8 m
720	200	$2\frac{1}{5}$	<b>niranja</b>	10 yd	9.144 0 m

British Imperial middle scale

		करम		Imperial	Metric
<b>niranja</b>				10 yd	9.144 0 m
5	<b>danda</b>			2 yd	1.828 8 m
$5\frac{9}{11}$	$1\frac{1}{11}$	<b>karam</b>		$5\frac{1}{2}$ ft	1.676 4 m
10	2	1%	<b>guz or gaz</b>	1 yd	914.4 mm

British Imperial lower scale

					Metric
<b>guz or gaz</b>					914.4 mm
2	<b>hasta, hath or moolum</b>				457.20 mm
12	6	<b>moot</b>			76.20 mm
16	8	$1\frac{1}{3}$	<b>gira or girah</b>		57.15 mm
48	24	4	3	<b>angula, unglie, or unguli</b>	19.05 mm
144	72	12	9	3	<b>jow or jaob</b> 6.35 mm

### 150.3 Units of Area

British Imperial upper scale

		बीघा		कनाल		Imperial	Metric
<b>marabba or moraba</b>						121,000 yd <sup>2</sup>	10.117 ha
25	<b>ghumaon or acre</b>					4840 yd <sup>2</sup>	40.469 a
50	2	<b>bigha</b>				2420 yd <sup>2</sup>	20.234 a
62½	2½	1¼	<b>kaneer</b>			1936 yd <sup>2</sup>	16.187 a
200	8	4	3⅓	<b>kanal</b>		605 yd <sup>2</sup>	505.86 m <sup>2</sup>
250	10	5	4	1¼	<b>djerib<sup>2</sup> or jareeb<sup>2</sup></b>	484 yd <sup>2</sup>	404.69 m <sup>2</sup>

British Imperial lower scale

			माला		वर्ग करम	Imperial	Metric
<b>djerib<sup>2</sup> or jareeb<sup>2</sup></b>						484 yd <sup>2</sup>	404.69 m <sup>2</sup>
4	<b>guntha</b>					121 yd <sup>2</sup>	101.17 m <sup>2</sup>
10	2½	<b>cent</b>				48⅔ yd <sup>2</sup>	40.47 m <sup>2</sup>
16	4	1⅓	<b>marla</b>			30¼ yd <sup>2</sup>	25.29 m <sup>2</sup>
24	6	2⅔	1½	<b>anna</b>		20⅙ yd <sup>2</sup>	16.86 m <sup>2</sup>
144	36	14⅔	9	6	<b>sarsahi or karam<sup>2</sup></b>	3⅓ yd <sup>2</sup>	2.810 m <sup>2</sup>

### 150.4 Units of Weight

1 **chattauck** (as used for the Mogul people at Hyderabad) = 2 oz av = 56.693 g.

Traditional upper scale as instated in 1939<sup>4</sup>

				तोला	Metric
<b>maund</b>					37.324 16 kg
40	<b>seer</b>				933.104 g
160	4	<b>pao</b>			233.276 g
640	16	4	<b>chattack</b>		58.319 g
3200	80	20	5	<b>tola</b>	11.663 8 g

Traditional lower scale as instated in 1939

तोला	माशा				Metric
<b>tola</b>					11.663 8 g
12	<b>masha</b>				971.984 mg
96	8	<b>ruttee</b>			121.498 mg
768	64	8	<b>chawal</b>		15.187 mg
6144	512	64	8	<b>khashkha</b>	1.898 mg

<sup>4</sup> In use until 1980, according to the International Rice Research Institute, Dept. of Agricultural Economics, *World Rice Statistics 1985*, p. 268.

British Imperial-linked system established by the Standards of Weight Act of 1939

					Imperial	Metric
<b>ton</b>					2240 lbs	1016.047 kg
20	<b>hundredweight</b>				112 lbs	50.802 kg
2240	112	<b>pound</b>			1 lb	453.592 g
35,840	1792	16	<b>ounce</b>		1 oz	28.350 g
15,680,000	784,000	7000	437½	<b>grain</b>	1 gn	64.799 mg

Metric-linked system

			Metric
<b>maund</b>			40 kg
40	<b>seer</b>		1 kg
160	4	<b>pao</b>	250 g

## 150.5 Balochistan

### 150.5.1 Units of Quantity

1 **mora** = a bundle of dry lucerne grass (alfala).

### 150.5.2 Units of Length

The **hath** (cubit) was measured from the projecting bone of the customer's elbow around the end of the middle finger, when extended straight, and back to the lower knuckle joint. In every village, there was generally a man whose hath was considered to be the standard of measurement and who was referred to in all cases of dispute. Distances were generally measured by the **kos** = about 3.2 km.

In Sidi

			Metric
<b>hath<sup>a</sup></b>			~548.4 mm
1½	<b>gazi</b>		~383.9 mm
10	7	<b>girah</b>	~54.8 mm

<sup>a</sup>Usually for cloth

Some other reported local measures:

- 1 **gaz** (in the Pishin Valley, based on [WOLS]) = 1 English yard = 914.4 mm;
- 1 **hath** (in Nasirabad) = ~685 mm;
- 1 **hath** (in Kohlu and Shahrigh) = ½ Kalāti or Kandahári yard = ~522 mm.

In the towns and bazaars during the late nineteenth century

		Metric
<b>yard</b>		914.39 mm
16	<b>girah</b>	57.15 mm

### 150.5.3 Units of Area

In Nasirabad

			Metric
<b>gathas</b>			4046.86 m <sup>2</sup>
40	<b>zanjirs</b>		101.17 m <sup>2</sup>
640	16	<b>karis</b>	6.32 m <sup>2</sup>

### 150.5.4 Units of Dry Capacity

Grain and other commodities were sold by weight everywhere, except in Kolwa and Gichk. Here, wooden measures, known as **kail**, were used for transactions in grain. These containers were generally made of tamarisk.

In the highlands, green fodder, such as alfalfa or maize, was usually sold as a standing crop by plots (**kurdas**), the area of which varied.

In the plains, standing crops such as green corn and juár were sold by the **hath hatha** (square cubit).

In Kach and Kawas, bhúsa was sold by the **khurjin** (sack). The khurjin was usually about 3 yards long and 1 yard wide.

### 150.5.5 Units of Weight

Fodder and fuel were generally sold by the donkey-, camel-, or bullockload. It could also be sold by the **pétit** (a load that a man can carry on his back) or by the **trangar** (sackload).

For wheat among the Marri tribes in the Kohlu district

										Metric
<b>kharwár</b>										671.836 kg
3	<b>khai</b> or <b>gawáne</b>									223.945 kg
6	2	<b>tang</b>								111.973 kg
60	20	10	<b>kásagh</b>							11.197 3 kg
120	40	20	2	<b>pai</b>						5.598 6 kg
240	80	40	4	2	<b>topa</b>					2.799 32 kg
480	160	80	8	4	2	<b>mángo</b>				1.399 66 kg
960	320	160	16	8	4	2	<b>pinki</b>			699.829 g
1920	640	320	32	16	8	4	2	<b>ním pinki</b>		349.915 g
4608	1536	768	76¼	38¾	19½	9¾	4¾	2¾	<b>chuthai</b>	145.798 g

For pearl millet (*Pennisetum glaucum*), china (*Smilax china*), múng (*Vigna radiata*), and wheat among the Zarkúns in the Kohlu district

									Metric
<b>ghund</b>									186.621 kg
40	<b>topa</b>								4.665 kg
100	2½	<b>path</b>							1.866 kg
160	4	1¾	<b>paropi</b>						1.166 kg
400	10	4	2½	<b>tsloram</b>					466.553 g
600	15	6	3¾	1½	<b>pán</b>				311.035 g
1200	30	12	7½	3	2	<b>lap</b>			155.518 g

For múng in areas irrigated by a Shāhi Wāh (a canal that serves as a main conduit for irrigation water) in the Nasirabad district

								Metric
<b>kharwár</b>								1007.754 kg
10	<b>toka</b>							100.775 kg
40	4	<b>pai</b>						25.193 8 kg
160	16	4	<b>dari</b>					6.298 5 kg
640	64	16	4	<b>pinki</b>				1.574 6 kg
1280	128	32	8	2	<b>pāti</b>			787.308 g
2560	256	64	16	4	2	<b>toya</b>		393.654 g

For múng in Mamal villages irrigated by a Begāri Wāh (a body of running water moving to a lower level through a channel on land) in the Nasirabad district

				Metric
<b>kharwár</b>				1007.754 kg
10	<b>toka</b>			100.775 kg
160	16	<b>dari</b>		6.298 46 kg
1000	100	6¼	<b>toya</b>	1.007 75 kg

For múng in the areas of Rojhan Mazari and Mohamnapur, exclusive to Nála Sháhalzai, irrigated by a Begāri Wāh (a body of running water moving to a lower level through a channel on land) in the Nasirabad district

					Metric
<b>kharwār</b>					1007.754 kg
10	<b>toka</b>				100.775 kg
60	6	<b>kása</b>			16.796 kg
160	16	2½	<b>dari</b>		6.298 46 kg
1440	144	24	9	<b>toya</b>	699.829 g

For múng in the areas of Nála Sháhalzai and Sirwāh irrigated by a Begāri Wāh (a body of running water moving to a lower level through a channel on land) in the Nasirabad district

						Metric
<b>kharwār<sup>a</sup></b>						1007.754 kg
2	<b>khai</b>					503.877 kg
60	30	<b>kása</b>				16.796 kg
240	120	4	<b>toya</b>			4.199 kg
960	480	16	4	<b>pāti</b>		1.049 7 kg
3840	1920	64	16	4	<b>toyi or chuthai</b>	262.436 g

<sup>a</sup>One kharwār was reported as 10 maunds (for kirang), 20 maunds (for kunjud), 22 maunds (for sarshaf), 25 maunds (for juár), 26 maunds (for wheat), 26½ maunds (for bájri), and 27 maunds (for múng)

In the Pishin Valley, based on [WOLS]

			Metric
<b>kharwar<sup>a</sup></b>			392.357 kg
100	<b>man</b>		3.923 kg
400	4	<b>seer</b>	980.9 g

<sup>a</sup>Assload. ['Donkeyload' might be more appropriate, if applicable, since this has a slang connotation in American English]

For wheat outside Sangan in the Sibi district

							Metric
<b>kharwār or khárar</b>							391.904 kg
2	<b>bori</b>						195.952 kg
60	30	<b>kása</b>					6.532 kg
240	120	4	<b>topa</b>				1.633 kg
960	480	16	4	<b>pinki</b>			408.234 g
1920	960	32	8	2	<b>mánga</b>		204.117 g
3840	1920	64	16	4	2	<b>paropi or thúla</b>	102.058 g

For rice at Sangan in the Sibi district

				Metric
<b>kharwār or khárar</b>				55.986 kg
10	<b>kása<sup>a</sup></b>			5.598 6 kg
40	4	<b>topa or path</b>		1.399 6 kg
160	16	4	<b>paropi or pinki</b>	349.915 g

<sup>a</sup>One kása has been reported as 3 seer (for coriander), 5 seer (for barley and til), 6 seer (for sarshaf), 6–7 seer (for juár), 7 seer (for wheat and pearl millet), 7 or 8 seer (for moth), and 8 seer (for múng)

For wheat and juár at Quat-Mandai in the Sibi district

			Metric	Metric
kása			111.973 kg	93.311 kg
20	dari		5.598 6 kg	4.665 5 kg
160	8	pinkí	699.829 g	583.191 g

For wheat at Kach and Kawas in the Ziarat district

					Metric
kharwár					18,662.112 kg
80	ghúndae				233.276 kg
4000	50	kása			4.665 5 kg
16,000	200	4	path		1.166 4 kg
32,000	400	8	2	mánga	583.191 g

For wheat in other parts of the Ziarat district

						Metric
ghind						186.621 kg
20	shának					9.331 kg
200	10	path				933.106 g
400	20	2	mánga			466.553 g
800	40	4	2	tsloram		233.276 g
1600	80	8	4	2	lap	116.638 g

Troy weights:

1 gaddag = 7 kapoti = 7 ratti

For gold and silver

तोला				Metric
tola				11.660 g
12	másha			971.67 mg
96	8	ratti		121.46 mg
192	16	2	múng	60.73 mg

Alternative scale for gold and silver

				Metric
rupee				11.660 g
2	8 anna			5.830 g
4	2	4 anna		2.915 g
8	4	2	2 anna	1.457 g

150.6 Punjab

The Punjab Weights & Measures Enforcement Act of 1975 introduced the metric system.

150.6.1 Units of Weight

In Montgomery tahsil

máni								
2	kharwár							
4	2	borá						
80	40	20	pai					
320	160	80	4	topa				
1280	640	320	16	4	paropí			
5120	2560	1280	64	16	4	thola		
10,240	5120	2560	128	32	8	2	chhitánk	

In eastern Lodhran tahsil

máni									
4	bora								
6¼	1⅙	toka							
50	12½	8	pál						
100	25	16	2	dari					
200	50	32	4	2	topa				
400	100	64	8	4	2	panki			
800	200	128	16	8	4	2	paropi		
1600	400	256	32	16	8	4	2	toa	
3200	800	512	64	32	16	8	4	2	tholá

150.7 Sindh

150.7.1 Units of Weight

For general use

		तोला	माशा		Metric
maund-pucka					470.363 g
40	seer-pucka				11.759 g
40%	1⅞	tola			11.598 g
486⅔	12%	12	masha		966.5 mg
2920	73	72	6	ruttee	161.1 mg

For diamonds and pearls

		Metric
ruttee		1.036 8 g
8	hubla	129.6 mg

For rice and wheat

					Metric
<b>cossah</b> or <b>copah</b>					8.466 kg
4	<b>towyah</b>				2.116 5 kg
16	4	<b>botwayee</b>			529.125 g
20	5	1¼	<b>seer cutcha</b>		423.300 g
640	160	40	32	<b>pice</b>	13.228 g

150.8 Jaffarabad

This area was founded as a state in the mid-eighteenth century by Sidi Hilol of the Janjira. In 1924, the state came under British control.

150.8.1 Currency

–1924: 1 kori

I have not found any data directly related to this state.

151 Pāla Empire (c.750–1174)

See *India*.

152 Palau [Formerly: Palau District]

Spain sold Palau and most of the rest of the Caroline Islands to Germany in 1899. Palau was part of German New Guinea until 1914, when the Japanese occupied the island. The United States occupied Palau in 1944, and it became part of the Federated States of Micronesia in 1947. Palau gained its independence in 1994.

152.1 Currency

1944– : 1 US dollar = 100 cents  
1914–1944: 1 Japanese yen = 100 sen  
1899–1914: 1 German Mark = 100 Pfennig

153 (Mandatory) Palestine

See also *Gaza*, *Israel*, *Jordania*, and *Transjordan*.

This area was under British administration from 1920 until mid-1948, when Israel declared its independence.

153.1 Units of Area

1 **dönüm** (before 1928) = 919.3 m<sup>2</sup>;  
1 **dönüm** (after 1928) = 1000 m<sup>2</sup>.

154 Palmyra Atoll

See *United States of America*.

One of the United States Minor Outlying Islands. The only human population consists of temporarily stationed scientific and military personnel.

155 Panama

This area was discovered by the Spanish conquistador Rodrigo Galvan de Bastidas in 1501. The first Pacific-coast settlement was founded in 1519. Panama was incorporated into the Vice-Royalty of New Granada in 1717, and remained part of the Vice-Royalty until independence in 1821, when Panama joined the Confederation of Greater Colombia. Greater Colombia dissolved into New Granada, Venezuela and Ecuador in 1831. The name was changed from New Granada to Colombia in 1861. Panama gained its

independence from Colombia in 1903. The United States administered the Canal Zone from 1903 until 1979, when the United States ceded the Canal Zone to Panama.

The metric system has been compulsory since 1916.

*Main sources:* [CATT], [PANA], [UN55], and [UN66]

155.1 Currency

- 1904–:1 Panamanian balboa = 100 centésimos  
1 US dollar = 100 cents
- 1872–1904:1 Colombian peso = 100 centavos
- 1853–1872:1 peso = 10 decimos = 100 centavos
- 1847–1853:1 peso = 10 reales = 100 decimos
- 1819–1847:1 escuso = 2 pesos = 16 reales

155.2 Units of Length

Traditional system, scale used from the late nineteenth century, and metric-linked system

					Metric	Metric	Metric
legua					4239.598 m	4176 m	4000 m
1250	estadal				3.391 678 m	3.340 8 m	3.2 m
5000	4	vara			847.919 6 mm	835.2 mm	800 mm
15,000	12	3	pie		282.639 9 mm	278.4 mm	266.67 mm
180,000	144	36	12	pulgada	23.553 3 mm	23.2 mm	22.22 mm

155.3 Units of Area

Traditional system

					Metric
yugada					331,300.224 m <sup>2</sup>
50	fanega				6626.004 48 m <sup>2</sup>
28,800	576	estadal cuadrada			11.503 48 m <sup>2</sup>
460,800	9216	16	vara cuadrada		71.896 77 dm <sup>2</sup>
4,147,200	82,944	144	9	pie cuadrada	7.988 53 dm <sup>2</sup>

Other measures reported during the nineteenth century:

1 braza (for agricultural land) = 2.79 m<sup>2</sup>.

155.4 Units of Dry Capacity

Castilian scale

								Metric
<b>cahiz</b>								666 L
12	<b>fanega</b>							55.5 L
48	4	<b>cuartilla</b>						13.875 L
144	12	3	<b>celemin</b>					4.625 L
288	24	6	2	<b>medio</b>				2.312 5 L
576	48	12	4	2	<b>cuartillo</b>			1.156 25 L
2304	192	48	16	8	4	<b>ración</b>		289.062 5 mL
9216	768	192	64	32	16	4	<b>ochavillo</b>	72.265 6 mL

Other measures reported during the nineteenth century:

1 **arroba** = 12.56 L.

Metric-linked system for beans, rice, and maize during the early twentieth century

			Metric
<b>fanega</b>			400 L
24	<b>cajuela</b>		16.67 L
96	4	<b>cuartillo</b>	4.17 L

155.5 Units of Liquid Capacity

Traditional system

				Metric
<b>moyo</b>				258.447 36 L
64	<b>cuartilla</b>			4.038 24 L
128	2	<b>azumbre</b>		2.019 12 L
512	8	4	<b>cuartillo</b>	504.78 mL

Other measures reported during the nineteenth century:

1 **cantara** = 12.56 L;

1 **botella** = 757 mL.

155.6 Units of Weight

Traditional system

						Metric
<b>tonelada</b>						460.141 92 kg
4	<b>carga</b>					115.035 48 kg
10	2½	<b>quital</b>				46.014 19 kg
40	10	4	<b>arroba</b>			11.303 54 kg
1000	250	100	25	<b>libra</b>		460.141 92 g
16,000	4000	1600	400	16	<b>onza</b>	28.859 87 g

Other measures reported during the twentieth century ([FAO74]):

1 **lata** = 16.32 kg (for rough rice) and 11.33 kg (for milled rice).

156    **Papal States (Status Pontificius) or Holy See**

See also *Italy*.

This was an historical state of Italy between 752 and 1870.

156.1    **Currency**

–1866:    1    Papal    States    scudo    =  
             100 baiocchi = 500 quattrini;  
             1 grosso = 5 baiocchi; 1 carlino = 7½  
             baiocchi; 1 giulio or paoli = 10  
             baiocchi; 1 testone = 30 baiocchi;  
             1 doppia = 3 scudi

156.2    **Units of Length**

Lower scale for general use

			Metric
<b>oncia</b>			19.4 mm
5	<b>minuta</b>		3.88 mm
10	2	<b>decima</b>	1.94 mm

For mercantile use

			Metric
<b>canna mercantile</b>			1.992 6 m
8	<b>palmo mercantile</b>		249.1 mm
24	3	<b>parti</b>	83.02 mm

For buildings

							Metric
<b>catena</b>							12,833.4 m
5¾	<b>canna architettonica</b>						2,231 9 m
10	–	<b>stajolo</b>					1.283 3 m
57½	10	5¾	<b>palmo</b>				223.19 mm
690	120	69	12	<b>oncia</b>			18.60 mm
3450	600	345	60	5	<b>minuta</b>		3.72 mm
17,250	3000	1725	300	25	5	<b>decima</b>	744 µm

For surveyors

			Metric
<b>miglio</b>			1487.9 m
1000	<b>passo</b>		1.487 9 m
5000	5	<b>piede</b>	297.58 mm

For maritime use

		Metric
<b>grad des aequators</b>		111,114 m
60	<b>miglia di mare</b>	1851.9 m

At Ancona

		Metric
<b>canna</b>		2.234 m
10	<b>palma</b>	223.5 mm

At Ancona

		Metric
<b>pertica</b>		4.096 067 m
10	<b>piede</b>	409.606 7 mm

At Faenza

		Metric
<b>piede</b>		479.771 mm
10	<b>oncia</b>	47.977 1 mm

In Ravenna

					Metric
<b>canna</b>					5.846 077 m
10	<b>piede</b>				584.608 mm
100	10	<b>pollice or oncia</b>			58.461 mm
1000	100	10	<b>punto</b>		5.846 mm
10,000	1000	100	10	<b>atomo</b>	585 µm

In Rimini

		Metric
<b>piede</b>		542.948 mm
10	<b>oncia</b>	54.295 mm

For agricultural use and factory scale at Urbino

			Metric	Metric
<b>canna</b>			3.835 408 m	–
10	<b>piede</b>		383.540 8 mm	353.720 mm
120	12	<b>oncia</b>	31.961 7 mm	29.477 mm

Other reported measures:

- 1 **braccio da tela** (for native cloths at Sinigaglia) = 782 mm;  
 1 **braccio d'ara** = 6 palmo sacre = 750 mm  
 1 **braccio da tela** (for cloth at Faenza) = 719.743 mm;  
 1 **braccio da tela** (for cloth at Urbino) = 701.667 mm;  
 1 **braccio** (at Urbino) = 699 mm;

- 1 **braccio da mercante** (for mercantile use) = 670 mm;  
 1 **passetto romano** (in Urbino) = 670.265 mm;  
 1 **braccio** (at Ancona) = 664 mm;  
 1 **braccio da seta e da panno** (for fabric at Sinigaglia) = 664 mm;  
 1 **braccio da panno** (for fabric at Urbino) = 651.590 mm;  
 1 **braccio da panno** (for fabric at Ravenna) = 643.138 m;  
 1 **braccio da panno** (for fabric at Faenza) = 638.490 mm;  
 1 **braccio per le tele** (for linen) = 635 mm;  
 1 **braccio mercantile** (in Rimini) = 631.432 mm;  
 1 **braccio da seta** (for silk at Urbino) = 595.740 mm;  
 1 **piede** (at Sinigaglia) = 558.5 mm;  
 1 **piede** (at Ancona and Urbino) = 409.6 mm;  
 1 **braccio da legname** (for wood at Ravenna) = 347.563 mm.

### 156.3 Units of Area

							Metric
<b>rubbia or rubbio</b>							18,446.04 m <sup>2</sup>
4	<b>quarta</b>						4611.51 m <sup>2</sup>
7	1 $\frac{3}{4}$	<b>pezzo</b>					2635.15 m <sup>2</sup>
16	4	2 $\frac{3}{7}$	<b>scorzo</b>				1152.88 m <sup>2</sup>
32	8	4 $\frac{7}{7}$	2	<b>quartuccio</b>			576.44 m <sup>2</sup>
112	28	16	7	3 $\frac{1}{2}$	<b>catena quadrata</b>		164.70 m <sup>2</sup>
3703	925 $\frac{3}{4}$	529	–	–	33 $\frac{7}{112}$	<b>canna architetonica quadrata</b>	4.981 m <sup>2</sup>

At Ancona

				Metric
<b>rubbio grande or soma</b>				14,260.63 m <sup>2</sup>
	<b>rubbio medio</b>			11,744.05 m <sup>2</sup>
1 $\frac{7}{25}$	1 $\frac{7}{25}$	<b>rubbio piccolo</b>		10,485.76 m <sup>2</sup>
850	700	625	<b>pertica quadra</b>	16.777 m <sup>2</sup>

At Faenza

			Metric
<b>tornatura</b>			2301.800 2 m <sup>2</sup>
100	<b>tavola</b>		23.018 002 m <sup>2</sup>
10,000	100	<b>piede quadro</b>	23.018 002 dm <sup>2</sup>

At Ravenna

				Metric
<b>tornatura</b>				3417.6 m <sup>2</sup>
100	<b>tavole</b>			34.176 m <sup>2</sup>
10,000	100	<b>piede quadro</b>		34.176 dm <sup>2</sup>
1,000,000	10,000	100	<b>uncia quadra</b>	34.176 cm <sup>2</sup>

At Rimini

				Metric
<b>tornatura</b>				2947.929 3 m <sup>2</sup>
100	<b>tavole</b>			29.479 293 m <sup>2</sup>
10,000	100	<b>piede quadro</b>		29.479 293 dm <sup>2</sup>
1,000,000	10,000	100	<b>uncia quadra</b>	29.479 293 cm <sup>2</sup>

At Urbino

				Metric
<b>coppa</b>				2824.388 069 m <sup>2</sup>
48	<b>tavola</b>			58.841 418 m <sup>2</sup>
192	4	<b>canna cuadra</b>		14.710 354 m <sup>2</sup>
19,200	400	100	<b>piede quadro</b>	14.710 354 dm <sup>2</sup>

156.4 Units of Volume

For timber

		Metric
<b>canna cuba</b>		68.723 m <sup>3</sup>
1000	<b>piede cubo</b>	68.723 dm <sup>3</sup>

For timber at Ravenna

		Metric
<b>piede cubo</b>		199.799 dm <sup>3</sup>
1000	<b>uncia cuba</b>	200 cm <sup>3</sup>

For timber at Rimini

		Metric
<b>piede cubo</b>		160.057 dm <sup>3</sup>
1000	<b>uncia cuba</b>	160 cm <sup>3</sup>

For timber at Urbino

			Metric
<b>passo</b>			2.630 m <sup>3</sup>
–	<b>piede cubo</b>		44.257 dm <sup>3</sup>
102,687½	1728	<b>uncia cuba</b>	2.561 cm <sup>3</sup>

Other reported measures:

1 **piede cubo** (at Faenza) = 110.434 dm<sup>3</sup>.

156.5 Units of Dry Capacity

Traditional system

								Metric
<b>rubbio</b>								294.46 L
2	<b>rubbiatella</b>							147.23 L
4	2	<b>quarta or quartarello</b>						73.61 L
12	6	3	<b>staja</b>					24.54 L
16	8	4	1⅓	<b>starello</b>				18.404 L
22	11	5½	1⅙	1%	<b>scorzo</b>			13.384 L
48	26	–	–	3¼	2⅞ <sub>11</sub>	<b>decina or decima</b>		6.135 L
88	–	–	–	–	–	1%	<b>quartuccio</b>	3.346 L

## Alternative scale

					Metric
<b>rubbiatella</b>					147.12 L
3	<b>quarta</b>				49.04 L
6	2	<b>quartella</b>			24.52 L
12	4	2	<b>starello</b>		12.26 L
24	8	4	2	<b>decima</b>	6.13 L

## For grain at Ancona

				Metric
<b>rubbio</b>				280.648 L
8	<b>coppa or lappa</b>			35.081 L
32	4	<b>provenda</b>		8.770 25 L
256	32	8	<b>scodella</b>	1.096 28 L

## At Faenza

			Metric
<b>corba</b>			72.633 500 L
2	<b>staio</b>		36.316 750 L
8	4	<b>ottava</b>	9.079 187 L

## Old system for grain at Ravenna and Rimini

			Metric	Metric
<b>rubbio</b>			287.545 400 L	278.58 L
5	<b>stajo</b>		57.509 080 L	55.716 L
40	8	<b>ottava</b>	7.188 635 L	6.964 L

## New system for grain at Ravenna, heaped and stricken measures, before 1855

				Metric	Metric
<b>sacco</b>				180.170 000 L	171.171 000 L
3	<b>staio colmo</b>			60.056 667 L	57.057 000 L
12	4	<b>quarteruola</b>		15.014 167 L	14.264 250 L
300	100	25	<b>scodella</b>	600.567 mL	570.570 mL

## New system for grain at Ravenna, heaped and stricken measures, after 1855

				Metric	Metric
<b>sacco</b>				174.135 300 L	172.527 300 L
3	<b>staio colmo</b>			58.045 100 L	57.509 100 L
12	4	<b>quarteruola</b>		14.511 275 L	14.377 275 L
300	100	25	<b>scodella</b>	580.451 mL	575.091 mL

## New system in Rimini

			Metric
<b>sacco</b>			187.633 200 L
4	<b>cassella</b>		46.908 300 L
12	3	<b>bernarda</b>	15.636 100 L

## For grain at Sinigaglia

				Metric
<b>rubbio</b>				286.10 L
8	<b>coppa or lappa</b>			35.762 L
36	4	<b>sacca</b>		8.941 L
108	12	3	<b>stajo</b>	2.980 L

## At Urbino

			Metric
<b>sacco</b>			167.084 600 L
8	<b>quarta</b>		20.885 575 L
32	4	<b>provenda</b>	5.221 394 L

156.6 Units of Liquid Capacity

For wine

					Metric
<b>botta</b>					933.465 6 L
16	<b>barile</b>				58.341 6 L
512	32	<b>boccale</b>			1.823 2 L
2048	128	4	<b>foglietta</b>		455.79 mL
8192	512	16	4	<b>quartuccio</b>	113.95 mL

For oil

							Metric
soma							164.231 L
2	pelle						82.116 L
2⅞	1⅞	barile					57.481 L
20	10	7	cognatelle				8.212 L
80	40	28	4	boccale			2.053 L
320	160	112	16	4	foglietta		513.22 mL
1280	640	446	64	16	4	quartuccio	128.306 mL

For oil in Ancona

				Metric
<b>metro</b>				17.40 L
12	<b>boccale</b>			1.45 L
48	4	<b>foglietta</b>		362.5 mL
192	16	4	<b>misuretta</b>	90.625 mL

For wine in Ancona

				Metric
<b>soma</b>				69.60 L
2	<b>barile</b>			34.80 L
48	24	<b>boccale</b>		1.45 L
192	96	4	<b>foglietta</b>	362.5 mL

For wine at Faenza

		Metric
<b>soma</b>		72.633 500 L
60	<b>boccale</b>	1.210 558 L

For oil at Faenza

				Metric
<b>libbra</b>				395.330 mL
2	<b>metà</b>			197.665 mL
3	$1\frac{1}{2}$	<b>terzi</b>		131.777 mL
4	2	$1\frac{1}{3}$	<b>quarti</b>	98.832 mL

For wine at Ravenna before 1855

			Metric
<b>barile</b>			54.140 000 L
40	<b>boccale</b>		1.353 500 L
160	4	<b>foglietta</b>	338.375 mL

For wine at Ravenna after 1855

		Metric
<b>barile</b>		53.771 300 L
40	<b>boccale</b>	1.344 282 L

For wine at Rimini

			Metric
<b>soma</b>			76.132 000 L
64	<b>boccale</b>		1.189 562 L
192	3	<b>terzetto</b>	396.521 mL

For oil at Rimini

			Metric
<b>soma</b>			75.498 000 L
100	<b>libbra</b>		754.980 L
2400	24	<b>onzia</b>	31.457 mL

For wine at Sinigaglia

		Metric
<b>soma</b>		118 L
50	<b>boccale</b>	2.36 L

Old scale (. . . misura antica) for wine at Urbino

				Metric
<b>soma</b>				85.537 800 L
50	<b>boccale</b>			1.710 756 L
100	2	<b>mezzo</b>		855.378 mL
200	4	2	<b>foglietta</b>	427.689 mL

New scale (. . . misura nuova) for wine at Urbino

					Metric
<b>soma</b>					81.377 200 L
2	<b>barile</b>				40.688 600 L
40	20	<b>boccale</b>			2.034 430 L
80	40	2	<b>mezzo</b>		1.017 215 L
160	80	4	2	<b>foglietta</b>	508.607 5 mL

For oil in Urbino

		Metric
<b>soma</b>		71.126 300 L
3	<b>terzarola</b>	23.708 767 L

156.7 Units of Weight

For mercantile use

							Metric
<b>migliajo</b>							339.072 84 kg
$1\frac{1}{16}$	<b>rubbio</b>						217.006 62 kg
4	$2\frac{1}{25}$	<b>cantaro</b>					84.768 21 kg
$6\frac{1}{4}$	4	$1\frac{1}{16}$	(small) <b>cantaro</b>				54.251 654 kg
10	$6\frac{2}{5}$	$2\frac{1}{2}$	$1\frac{1}{5}$	<b>centinajo</b>			33.907 284 kg
100	64	25	16	10	<b>decina</b>		3.390 728 4 kg
1000	640	250	160	100	10	<b>libbra</b>	339.072 84 g

For gold and silver

				Metric
<b>libbra</b>				339.072 84 g
12	<b>oncia</b>			28.256 07 g
288	24	<b>denaro</b>		1.177 34 g
6912	576	24	<b>grano</b>	49.056 mg

For medical use in most areas

						Metric
<b>libbra</b>						339.072 84 g
12	<b>oncia</b>					28.256 07 g
96	8	<b>dramma</b>				3.532 01 g
288	24	3	<b>scrupolo</b>			1.177 34 g
6912	576	72	24	<b>grano</b>		49.056 mg
165,888	13,824	1728	576	24	<b>parte</b>	2.044 mg

At Ancona

									Metric
<b>tonnellata di mare</b>									988.749 kg
20	<b>cantaro</b>								49.437 45 kg
30	1½	<b>centenaio</b>							32.958 30 kg
120	6	4	<b>rubbio</b>						8.239 576 kg
3000	150	100	25	<b>libbra</b>					329.583 g
36,000	1800	1200	300	12	<b>oncia</b>				27.465 2 g
288,000	14,400	9600	2400	96	8	<b>drama or ottava</b>			3.433 2 g
864,000	43,200	28,800	7200	288	24	3	<b>denaro</b>		114.4 mg
20,736,000	1,036,800	691,200	172,800	6912	576	72	24	<b>grano</b>	4.8 mg

In Ravenna

			Metric
<b>libbra</b>			347.832 g
12	<b>oncia</b>		28.986 g
96	8	<b>ottava</b>	3.623 g

For oil in Ravenna

				Metric
<b>libbra</b>				380.020 g
2	<b>metà</b>			190.010 g
3	1½	<b>terzi</b>		126.673 g
4	2	1⅓	<b>quarti</b>	95.005 g

At Rimini

					Metric
<b>libbra grossa</b>					691.031 g
1⅓	<b>libbra mezzana</b>				518.273 g
2	1½	<b>libbra comune</b>			345.516 g
24	18	12	<b>oncia</b>		28.793 g
192	144	96	8	<b>ottava</b>	3.599 g

At Sinigaglia and Urbino

			Metric	Metric
<b>libbra<sup>a</sup></b>			337.0 g	325.509 g
12	<b>oncia</b>		28.08 g	27.126 g
76	8	<b>ottava</b>	4.43 g	3.391 g

<sup>a</sup>1 **libra** (at Urbino) has also been reported as 323.239 g

For medical use at Urbino

						Metric
<b>libbra</b>						325.509 g
12	<b>oncia</b>					27.125 750 g
96	8	<b>dramma</b>				3.390 719 g
288	24	3	<b>scrupolo</b>			1.130 240 g
6912	576	72	24	<b>grano</b>		47.093 mg
165,888	13,824	1728	576	24	<b>parte</b>	1.962 mg

**157 Papua New Guinea [Formerly: Territory of Papua and New Guinea]**

The Netherlands claimed the western half of the island of Guinea in 1828. In 1884, Germany claimed the northeastern part of the island as German New Guinea. The southeastern part of the island was claimed by Britain in 1898. The British government renamed their territory in 1905 as the Territory of Papua. In 1906, the total responsibility for the British part was transferred to Australia. In 1914, Australian troops occupied German New Guinea, which was mandated to Australia by the League of Nations in 1920, becoming known as the Territory of New Guinea. Most of the territory was occupied by Japan in 1942. Following the Japanese surrender, it came under UN trusteeship in 1946, with Australia as the administering power. The Papua and New Guinea act of 1949 provided for the government of Papua and New Guinea to be one administrative unit. Full independence was achieved in 1975. Papua New Guinea now encompasses the eastern half of the island and its offshore islands, as well as the islands New Britain, New Ireland, the Admiralty Islands, and those of Bougainville and Buka. The country is generally divided into four regions: the Highlands region, the Islands region, the Momase region, and the Papua region.

The islands that constitute Papua New Guinea have been settled for tens of thousands of years by a mixture of peoples who are generally referred to as Melanesians. Chinese, Malaysian, and Macassan traders are thought to have visited Guinea well before the seventeenth century, to trade with various indigenous groups. It is also most likely that domestic trade existed among the indigenous tribes, a designation that includes almost one thousand different ethnic groups living in mountainous regions, large valleys, coastal swamps, and plains. Each ethnic group also represents a distinct language group. Scholars indicate that those ethnic groups used different

methods of measurement. People who live in the town areas often communicate in the lingua franca Tok Pisin.

It is possible to get information on almost any subject, but when it comes to the methods of counting and measuring systems used by these various ethnic groups, still very little is known. We know that they used rudimentary measures like “one man’s load” and “much/little,” and that body part-related measures such as arm span and hand span were used extensively. Commerce was traditionally conducted so that all interested parties were always present at the exchange, and therefore had less need for formal systems of measurement. Much research work remains when it comes to mapping and describing the various measurement systems used among the indigenous people of Papua New Guinea. Below, I have attempted to describe some examples of measures and applications of measurement that emerged from the recent research at the University of Goroka.

Officially, the metric system has been compulsory since 1970, but the measurement systems that colonialists introduced, i.e., Indonesian-Dutch on the western half of the island and German-British on the eastern half, were used well into the twenty-first century.

*Main sources:* [LEAN], [OWEN2], [OWEN3], and [UN66]

**157.1 Currency**

1975–:	1 Papua New Guinean kina = 100 toas
1966–1975:	1 Australian dollar = 100 cents
1945–1966:	1 New Guinea pound = 20 shillings = 240 pence
1942–1945:	1 Oceanian pound = 20 shillings
1915–1942:	1 New Guinea pound = 20 shillings = 240 pence
1873–1914:	1 German gold Mark = 100 Pfennig

157.2 Units of Length

Some examples based on [OWEN2]:

Highland region: Cultural studies indicate that foot-sized steps, paces, and ropes were commonly used for measuring lengths.

Momase region: The depth of holes, as well as the lengths and heights of different things, were often measured with a long cane or stick. Sometimes, marks were made on these canes. Those marks did not necessarily indicate a particular unit. They may, for example, be used to characterize a specific type of canoe and its curvature.

Island region: Length measures were used in canoe-making, weaving, dowry ceremonies and gardening, but also when making fishing nets, bat nets, and graters for sago or coconuts.

Papua region: Among people from the Bamu area, marks were made on long canes to indicate the length of a war canoe, a garden, a house, etc.

System used in the Ambulas language area, based on [OWEN2]

kama nak <sup>a</sup>	
5	ndik nak tamba <sup>b</sup>

<sup>a</sup>The length of a bamboo stick  
<sup>b</sup>The length of a bamboo internode

Metric scale in Tok pisin

				Metric
kilomita				1000 m
1000	mita			1 m
100,000	100	sentimita		10 mm
1,000,000	1000	10	milimita	1 mm

157.3 Units of Area

Garden plots were, according to [OWEN2], usually easy to compare by measuring the length of each plot, as the widths were roughly the same. Sometimes, a long rope, commonly 20 paces or armspans in length, was used to measure each of the lengths.

Another example of area measuring was the habit of using the length of bamboo sticks among the Ambulas to indicate a garden plot area, e.g., a garden plot equal to seven lengths of 5-internode-lengths (ndik nak tamba) was called a **tumbu**.

157.4 Units of Dry Capacity

[OWEN3] presents different ways of expressing volume among certain ethnic groups. The paper also shows the obvious link between lengths, estimated volume and mass, when it comes to comparison of pig sizes. Pigs are often slaughtered in cultural ceremonies, as dowry payment, and then the size of the pigs' usually determined both visually and by measuring the girth of the pigs. Below, I summarize some notes presented in this paper:

In the Angala-speaking areas, a small rope was used to measure the length of the pig and the circumference around it.

In some Kamano-Kafe-speaking areas, one estimates the size of a pig by putting one's arms around the pig to see how far apart the fingers are. A Kamano-Kafe lady mentioned that a piece of a rope was used to measure larger and smaller bilums.

Ropes and bamboo nodes were used by Yupna men to measure the length and size of foodstuffs and pigs.

A Keyagana man mentioned that a long stick and a circular rope were used to measure the volume of a pit for a toilet hole.

157.5 Units of Weight

The commodities exported are cocoa, coffee, coconuts (copra), tea, cardamom, chillies, palm oil, pyrethrum, and rubber.

Metric scale in Tok pisin

			Metric
kilogiram			1 kg
1000	giram		1 g
1,000,000	1000	miligiram	1 mg

Other measures reported during the twentieth century:

1 **cru** (for palm oil) = 20.865 262 kg.

157.6 Units of Time

English	Tok pisin	English	Tok pisin
year	yia	hour	aua
week	wik	minute	minit
day	de	second	sekon

Days of the week in Tok pisin: Mande, Tunde, Trinde, Fonde, Fraide, Sarere, and Sande.

158 Paracel Islands [Population less than 20]

See also *China* and *Vietnam*.  
From 1932 to 1956, part of French Indochina, and after 1956, administrated and controlled by China and Vietnam.

159 Paraguay

This area was first visited by the shipwrecked Spaniard Alejo García in 1524. In 1527 and 1528, the Spanish explorer Sebastian Cabot sailed up the Parana and Paraguay rivers. Paraguay was part of the Vice-Royalty of Rio de la Plata until 1811, when it gained its independence from Spain.

The metric system has been legally optional since 1899, and compulsory since January 1, 1901.

*Main sources:* [CARD], [UN55], and [UN66]

159.1 Currency

- 1944–: 1 Paraguayan guaraní = 100 céntimos
- 1874–1943: 1 Paraguayan peso = 100 centavos
- 1870–1874: 1 Paraguayan peso or peso fuerte = 100 céntimos
- 1856–1870: 1 Paraguayan peso = 8 reales
- 1813–1856: 1 Argentine real = 10 décimos
- 1813: 1 Spanish colonial real

159.2 Units of Length

System used until the mid-nineteenth century

							Metric
lieue or legua							4192.800 m
50	cuadra						83.856 m
60	1½	cuerdas or cordel					69.880 m
1250	25	20%	estodal				3.354 m
5000	100	83⅓	4	vara			838.56 mm
15,000	300	83⅓	12	3	pié, pièze, or piede		279.520 mm
18,000	3600	1000	144	36	12	pouce or pulgada	23.293 mm
216,000	43,200	12,000	288	432	144	12	ligne or linea 1.941 mm

System reported during the late nineteenth century

							Metric
<b>lieue or legua</b>							4330.0 m
50	<b>cuadra</b>						86.60 m
180	3 $\frac{3}{5}$	<b>cuerda or cordel</b>					24.056 m
5000	100	27 $\frac{1}{9}$	<b>vara</b>				866 mm
15,000	300	83 $\frac{1}{3}$	3	<b>pié, pièze, or piede</b>			288.667 mm
18,000	3600	1000	36	12	<b>pouce or pulgada</b>		24.055 mm
216,000	43,200	12,000	432	144	12	<b>ligne or linea</b>	2.005 mm

### 159.3 Units of Area

Old system used until the mid-nineteenth century

					Metric
<b>legua cuadrada</b>					17,579 571.74 m <sup>2</sup>
2500	<b>cuadra cuadrada</b>				7031.828 7 m <sup>2</sup>
3600	36/25	<b>liño</b>			4883.214 4 m <sup>2</sup>
25,000,000	10,000	6944%	<b>vara cuadrada or cordel</b>		70.318 3 dm <sup>2</sup>
225,000,000	90,000	62,500	9	<b>pié cuadrada</b>	781.31 cm <sup>2</sup>

New system reported during the late nineteenth and twentieth centuries

					Metric
<b>legua cuadrada</b>					18,748 900 m <sup>2</sup>
2500	<b>cuadra cuadrada</b>				7499.56 m <sup>2</sup>
250,000	100	<b>line or liño</b>			74.996 m <sup>2</sup>
25,000,000	10,000	100	<b>vara cuadrada or cordel</b>		74.996 dm <sup>2</sup>
225,000,000	90,000	900	9	<b>pié cuadrada</b>	833.28 cm <sup>2</sup>

### 159.4 Units of Dry Capacity

Traditional system, metric-linked system, and scale used after metrification for cereal, salt and lime

						Metric	Metric	Metric
<b>pipe</b>						581.568 L	576 L	500 L
2	<b>fanéga</b>					290.784 L	288 L	250 L
6	3	<b>baril</b>				96.928 L	96 L	–
24	12	4	<b>almúde</b>			24.232 L	24 L	–
192	96	32	8	<b>frasco</b>		3.029 L	3 L	–
768	384	128	32	4	<b>cuarta</b>	757.025 mL	750 mL	–

159.5 Units of Liquid Capacity

Traditional system

						Metric
<b>pipa</b>						581.568 L
4	<b>cuarterola</b> or <b>cuarter</b>					145.392 L
6	1½	<b>baril</b> or <b>barril</b>				96.928 L
192	48	32	<b>frasco</b>			3.029 L
768	192	128	4	<b>cuarta</b>		757.250 mL
1536	384	256	8	2	<b>octava</b>	378.625 mL

Other reported measures:

1 **azumbre** (for liquids) = 32 libras = 14.72 kg;  
1 **arroba** (usually for wine) = 35.55 L.

For medical use

		Metric
<b>libra</b>		345.060 g
16	<b>onza</b>	21.566 g

159.6 Units of Weight

Traditional upper scale until the late eighteenth century

				Metric
<b>tonne</b> or <b>tonelada</b>				920.160 kg
20	<b>quintal</b>			46.008 kg
80	4	<b>arroba</b>		11.502 kg
2000	100	25	<b>libbra</b> or <b>libra</b>	460.080 g

For jewels

		Metric
<b>libra</b>		447.300 g
16	<b>onza</b>	27.956 250 g

For gold and silver also reported

		Metric
<b>onza</b>		28.683 2 g
16	<b>adarme</b>	1.792 7 g

Traditional lower scale until the late eighteenth century

				Metric
<b>libbra</b> or <b>libra</b>				460.080 g
2	<b>marco</b> <sup>a</sup>			230.040 g
16	8	<b>onza</b> <sup>a</sup>		28.755 g
128	64	8	<b>ochava</b> <sup>a</sup>	3.594 375 g

<sup>a</sup>Also used for gold and silver

160 Parma, Piacenza and Guastalla

See also *Italy*.

The Duchy of Parma was created in 1545. In 1556, Piacenza was annexed to Parma. The city of Guastalla became part of the Duchy of Parma,

Portuguese scale and metric-linked system reported during the late nineteenth century

						Metric	Metric
<b>tonne</b> or <b>tonnelada</b>						918.80 kg	918.00 kg
5%	<b>carga</b>					165.384 kg	165.24 kg
20	3⅓	<b>quintal</b>				45.94 kg	45.90 kg
80	14⅔	4	<b>arroba</b>			11.485 kg	11.475 kg
2000	360	100	25	<b>libbra</b> or <b>libra</b>		459.40 g	459.00 g
32,000	5760	1600	400	16	<b>onza</b> or <b>once</b>	28.712 5 g	28.687 5 g

Piacenza and Gustaella, to which it belonged until 1847. In 1859, the Duchy of Parma and Piacenza became part of the United Provinces of Central Italy.

*Main source:* [ZUPK4]

### 160.1 Currency

1815–1859: 1 Parma lira = 20 soldi = 100 centesimi

1802–1815: 1 French franc = 100 centimes

–1802: 1 Parma lira = 20 soldi = 40 sesini  
= 240 denari; 1 ducato = 7 lire

### 160.2 Units of Length

1 **braccio mercantile** (in Guastalla) = 671.025 mm;

1 **pie de da fabrica** or **braccio agrimensorio** (in Guastalla) = 542.604 mm.

### 160.3 Units of Area

In Guastalla

				Metric
<b>biolca</b>				3052.538 1 m <sup>2</sup>
72	<b>tavola</b>			42.396 362 m <sup>2</sup>
864	12	<b>dodicesimo</b>		3.533 030 m <sup>2</sup>
10,368	144	12	<b>pie de quadro</b>	29.441 9 dm <sup>2</sup>

### 160.4 Units of Dry Capacity

In Guastalla

				Metric
<b>sacco</b>				114.600 L
3	<b>staio</b>			38.200 L
12	4	<b>quarta</b>		9.550 L

## 160.5 Units of Weight

In Guastalla

				Metric
<b>libbra</b>				324.524 g
12	<b>uncia</b>			27.044 g
288	24	<b>denaro</b>		1.127 g
6912	576	24	<b>grano</b>	46.951 mg

For medical use in Guastalla

					Metric
<b>libbra</b>					324.524 680 g
12	<b>uncia</b>				27.043 640 g
96	8	<b>dramma</b>			3.380 455 g
288	24	3	<b>scrupolo</b>		1.126 818 g
6912	576	72	24	<b>grano</b>	46.951 mg

For gold in Guastalla

			Metric
<b>libbra</b>			234.997 300 g
12	<b>uncia</b>		19.583 108 g

## 161 Penang Island [Formerly: Prince of Wales Island]

Penang was part of the Malay Sultanate of Kedah until 1786. In 1786, Captain Francis Light of the British East India Company landed, renamed it Prince of Wales Island, and received the island as a portion of his marriage to the daughter of the Sultan. Light eventually ceded it to the Government of India. In 1790, the island was ceded to the East India Company. In 1826, Penang became part of the Straits Settlements, and in 1946, it became part of the Malayan Union.

*Main sources:* [BAUE], [DOUR], and [KELL]

### 161.1 Currency

1 Spanish dollar = 10 copangs = 100 pies

### 161.2 Units of Quantity

1 **corge** = 20.

### 161.3 Units of Length

British Imperial-linked system for land measures at George Town

					Imperial	Metric
<b>orlong</b>					2880 in.	73.152 m
20	<b>jěmba, jumba, or giumba</b>				144 in.	3.657 6 m
40	2	<b>děpa</b>			72 in.	1.828 8 m
160	8	4	<b>hesta, hasta, or astah</b>		18 in.	457.2 mm
240	12	6	1½	<b>kâki</b>	12 in.	304.8 mm

Other measures reported during the nineteenth century:

1 **yard** = 914.39 mm.

### 161.4 Units of Area

British Imperial scale

				Metric
<b>orlong<sup>2</sup></b>				5351.21 m <sup>2</sup>
400	<b>jumba<sup>2</sup></b>			13.378 m <sup>2</sup>
1600	4	<b>děpa<sup>2</sup></b>		3.344 5 m <sup>2</sup>
25,600	64	16	<b>hasta<sup>2</sup></b>	20.903 2 dm <sup>2</sup>

### 161.5 Units of Capacity

Most dry commodities were sold by weight.

For both dry commodities and liquids

					Metric	Metric
<b>coyang, copang, or koyan</b>					3561.12 L	2413.204 kg
40	<b>pécul or sac</b>				89.028 L	60.330 kg
80	2	<b>parra<sup>a</sup></b>			44.514 L	30.165 kg
800	20	10	<b>gantang</b>		4.451 4 L	3.016 5 kg
3200	80	40	4	<b>chopa, chupa, or chupah</b>	1.112 8 L	754.13 g

<sup>a</sup>Also reported as 5, 15, and 20 gantangs

Other measures reported during the nineteenth century:

1 **bag** (for rice) = 2 gantangs = 8.902 8 L.

## 161.6 Units of Weight

Malaysian scale (two reported scales, in practice and theoretical), based on [BAUE]

				Metric	Metric
<b>bhāra or bahr</b>				194.138 kg	193.533 kg
3	Malaysian <b>pécul</b> <sup>a</sup>			64.712 5 kg	64.511 kg
300	100	Malaysian <b>catty</b>		647.125 5 g	645.109 6 g
4800	1600	16	Malaysian <b>tahil</b>	40.445 g	40.319 g

<sup>a</sup>One pécul (for pepper and tin) = 68.59 kg

Bazaar scale and Chinese scale, based on [BAUE]

					Metric	Metric
<b>coyang</b>					2418.920 kg	2419.608 kg
13⅓	<b>bahar or bahr</b>				181.420 kg	181.437 kg
40	3	<b>pécul</b>			60.473 kg	60.479 02 kg
4000	300	100	<b>catty</b> <sup>a</sup>		604.73 g	604.790 2 g
64,000	4800	1600	16	<b>tael or tahil</b>	–	37.799 4 g

Scale based on [KELL]

					Metric
<b>coyang</b>					2413.204 kg
13⅓	<b>bahar or bahr</b>				194.116 kg
40	3	<b>pécul</b>			60.472 kg
4000	300	100	<b>catty</b>		604.72 g
64,000	4800	1600	16	<b>tael or tahil</b>	37.799 4 g

Other measures reported during the nineteenth century:

1 **coyang** (for salt) = 3810.18 kg;

1 **coyang** (for rice) = 2721.56 kg;

1 **ton** (for freight to England) =  
16 Cwt = 812.84 kg;

1 **sack** (for begalian rice, peas, and beans) =  
2 bengalian muns = 74.65 kg or  
164 lbs = 74.39 kg;

1 **sack** (for salt) = 100 lbs = 45.36 kg.

British Imperial-linked system and Spanish scale for gold and silver

				Imperial	Metric	Metric
<b>catty</b>				16,640 gr	1.079 334 kg	1.078 254 kg
20	<b>bongkal or buncal</b>			832 gr	53.966 7 g	53.912 7 g
320	16	<b>mayam, miam, or meham</b>		52 gr	3.372 9 g	3.369 5 g
3840	192	12	<b>saga</b>	4⅓ gr	281.08 mg	280.79 mg

162 Persia

See *Iran*.

163 Peru

See also *Spain*.

In 1533, the Incan Empire of Peru fell to the Spanish conquistador Francisco Pizarro. Lima was founded in 1535, and the Spanish set up the Vice Royalty of Peru in 1542, after discovering that the region was rich in silver. Peru gained its independence in 1821, when Lima was liberated by General Jose San Marin. In 1836, Andrés de Santa Cruz, President of Bolivia, attempted to confederate Peru and Bolivia. The South Peruvian state was proclaimed in 1836, and the North Peruvian State in 1836. The Confederation between Peru and Bolivia ceased in 1839. Peru was reconstituted in 1838. Spain recognized Peru's independence in 1879. Chile occupied Peru from 1881 until 1883.

The Peruvian cultures had no form of writing until 1532. Instead, they used *quipus* or *kipus*, multicolored groups of llama or alpaca hair strings tied together, with a number of knots tied in them, for calculation and for recording metrological units decimally. During the mid-nineteenth century, some British measures also came into use in international trading. The Spanish system of weights and measures was used until the early twentieth century. The metric

system was established by law in 1860, has been official since 1862, and compulsory since 1869.

*Main sources:* [BAUD], [DELA], [ECON], [HORN], [IWAT7], [NORD3], [NORD4], [RIVE], [ROST], [ROST2], [UHLE], [UN55], [UN66], and [WAKE]

163.1 Currency

1991–:	1 Peruvian nuevo sol = 100 céntimos
1985–1991:	1 Peruvian inti = 100 céntimos = 1000 soles
1898–1931:	1 libra or libra peruana de oro = 10 soles
1881–1882:	1 inca = 10 reales de inca = 100 centavos de inca
1880–1882:	1 peseta = 10 reales
1863–1985:	1 Peruvian sol = 10 dinéros = 100 centavos
1826–1863:	1 peso = 8 Peruvian reales
–1826:	1 Spanish colonial real

163.2 Units of Length

Some measures reported during the eighteenth century:

- 1 **cocoda** = the distance one can walk while under the influence of a drug = about 3000 m on level ground and about 2000 m on an uphill slope when carrying a 45 kg load for 35–40 minutes in Pataz county.

Lima scale, Spanish scale and Peruvian scale during the nineteenth to twentieth centuries

								Metric	Metric	Metric
<b>legua</b> <sup>a</sup>								4576.500 m	4514.292 m	4526.28 m
36	<b>cuadra</b> <sup>b</sup>							127.125 m	125.397 m	125.730 m
2700	75	<b>braza</b>						1.695 m	1.672 m	1.676 m
5400	150	2	<b>vara</b>					847.500 mm	835.98 mm	838.2 mm
10,800	300	4	2	<b>codo</b>				433.750 mm	417.99 mm	419.1 mm
16,200	450	6	3	1½	<b>pié</b>			282.500 mm	278.66 mm	279.4 mm
194,400	5400	72	36	18	12	<b>pulgada</b>		23.542 mm	23.222 mm	23.283 mm
2,332,800	64,800	864	432	216	144	12	<b>linea</b>	1.962 mm	1.935 mm	1.940 mm

<sup>a</sup>Varied by location, between 16,000 and 20,000 piés

<sup>b</sup>Varied by location, between 100 and 150 varas

Other measures reported during the nineteenth century:

1 **legua** (maritime) = 5556.031 111 m;

1 **yard** (used in international trading) = 914.4 mm.

### 163.3 Units of Area

Lima scale, Spanish scale and Peruvian scale, and metric-linked system during the nineteenth to twentieth centuries

				Metric	Metric	Metric	Metric
<b>cuadra</b>				7182.562 4 m <sup>2</sup>	6988.625 6 m <sup>2</sup>	7025.792 4 m <sup>2</sup>	10,000 m <sup>2</sup>
2	<b>topo</b>			3591.281 2 m <sup>2</sup>	3494.312 8 m <sup>2</sup>	3512.896 2 m <sup>2</sup>	5000 m <sup>2</sup>
10,000	5000	<b>vara cuadrada</b>		71.825 624 dm <sup>2</sup>	69.886 256 dm <sup>2</sup>	70.257 924 dm <sup>2</sup>	–
90,000	45,000	9	<b>pié cuadrado</b>	7.980 625 dm <sup>2</sup>	7.765 140 dm <sup>2</sup>	7.806 436 dm <sup>2</sup>	–

Other measures reported during the nineteenth century:

1 **fanegada cañete** or **cañete-fanegada** = 31,401 m<sup>2</sup>;

1 **fanegada** (in general) = 6459.6 m<sup>2</sup>, but in northern Peru, = 29,696 m<sup>2</sup>, in central Peru, = 28,978 m<sup>2</sup>, and in southern Peru, = 6440 m<sup>2</sup>;

1 **tupo** or **topo** = 2706 m<sup>2</sup>, in Arequipa, = 3493 m<sup>2</sup>, in Cuzco, = 2720 m<sup>2</sup>, and in Puno, = 4608 m<sup>2</sup>;

1 **collo** = 1207 m<sup>2</sup>.

### 163.4 Units of Dry Capacity

For commercial use, dry goods were generally measured by weight, but sometimes values were identified by Spanish values, as below.

Customary scale

									Metric
<b>cahiz</b>									666.012 000 L
4	<b>carga<sup>a</sup></b>								166.503 000 L
12	3	<b>fanega<sup>b</sup></b>							55.501 000 L
48	12	4	<b>cuartilla</b>						13.875 250 L
144	36	12	3	<b>almud</b> or <b>celemín</b>					4.625 083 L
288	72	24	6	2	<b>medio</b>				2.312 542 L
576	144	48	12	4	2	<b>curtillo</b>			1.156 271 L
2304	576	192	48	16	8	4	<b>ochavo</b> or <b>racion</b>		289.067 7 mL
9216	2304	768	192	64	32	16	4	<b>ochavillo</b>	72.266 9 mL

<sup>a</sup>For rice, = 172.534 875 kg

<sup>b</sup>For corn, = 63.262 427 kg

163.5 Units of Liquid Capacity

During the seventeenth to nineteenth centuries, liquids were generally measured by the Castilian scale.

British Imperial-linked system for general use

		Metric
galón		3.785 L
5	botella	757.08 mL

For wine

		Metric
arroba <sup>a</sup>		16.133 L
4	cuartillo	4.033 25 L

<sup>a</sup>For oil, also reported as 12.563 L

Other measures reported during the nineteenth century:

1 **fanega** = 55.501 L.

163.6 Units of Weight

Scale used for gold during the sixteenth to seventeenth centuries

		Metric
castellano		4.536 g
8	tomine	567 mg

Castilian upper scale and Peruvian upper scale used before 1852

							Metric	Metric
cajón <sup>a</sup>							2760.096 kg	2760.557 4 kg
3	tonelada						920.032 kg	920.185 800 kg
40	13⅓	carga					69.002 4 kg	69.013 935 kg
60	20	1½	quintal				46.001 6 kg	46.009 290 kg
80	26⅔	2	1⅓	bulto corriente			34.501 2 kg	34.506 967 5 kg
240	80	6	4	3	arroba		11.500 4 kg	11.502 322 5 kg
6000	2000	150	100	75	25	libra	460.016 g	460.092 9 g

<sup>a</sup>Used in mineral mines

Castilian lower scale and Peruvian lower scale used before 1852

							Metric	Metric
libra							460.016 g	460.092 9 g
2	marco						230.008 g	230.046 45 g
16	8	onza					28.751 g	28.755 806 25 g
128	64	8	ochava				3.593 9 g	3.594 475 78 g
256	128	16	2	adarme			1.796 9 g	1.797 238 g
768	384	48	6	3	tomine		598.98 mg	599.079 3 mg
9216	4608	576	72	36	12	grano	49.91 mg	49.923 3 mg

Castilian scale used after 1852

								Metric
cajón								2760.54 kg
3	tonelada							920.180 kg
42⅔	14⅔	fanega						64.413 kg
60	20	1⅔	quintal					46.009 kg
240	80	5⅔	4	arroba				11.502 kg
6000	2000	140	100	25	libra			460.09 g
96,000	32,000	2240	1600	400	16	onza		28.756 g
1,536,000	512,000	35,840	25,600	6400	256	16	adarme	1.797 23 g

Other measures reported during the nineteenth century:

- 1 **carga** (for rice) = 15 arrobas = 172.53 kg;
- 1 **saco** (for coffee) = 69 kg;
- 1 **fanega** (for wheat) = 135–140 libras = 62.10–64.40 kg.

Metric-linked system

							Metric
<b>cajón</b>							2760 kg
3	<b>tonelada</b>						920 kg
60	20	<b>quintal</b>					46 kg
240	80	4	<b>arroba</b>				11.5 kg
6000	2000	100	25	<b>libra</b>			460 g
96,000	32,000	1600	400	16	<b>onza</b>		28.75 g
1,536,000	512,000	25,600	6400	256	16	<b>adarme</b>	1.796 875 g

For gold and silver

			Metric
<b>marco</b>			230.046 5 g
2	<b>onza</b>		115.023 2 g
50	25	<b>castellano</b>	4.600 9 g

164 **Philippines [Formerly: Philippines Islands]**

The Spanish navigator Ferdinand Magellan landed in the Philippines in 1521. The Philippines was established as a Spanish colony in 1539. The first permanent settlement was established by Miguel de Legazpi at Cebu in 1565. Britain captured Manila and occupied the Spanish colony in 1762, but returned it to Spain by the treaty of Paris in 1763. Spain ceded the islands to the United States after the U.S. Navy defeated the Spanish navy in the Spanish-American War of 1898, and the islands subsequently became a United States territory. In 1935, the Philippines became a Commonwealth, and formally gained its independence in 1946.

Before metrification, the systems for weights and measures were influenced by the Oriental, the

Spanish and the British systems. The metric system has been officially accepted since 1860. It was authorized by section 9 of act No. 230 of the Philippine Commission, enacted by September 17, 1901, was legally adopted in 1906, and has been compulsory since January 1, 1975.

*Main sources:* [DOUR], [ECON], [KELL], [KLIM], [MART3], [SIMM], [SANG], [UN55], and [UN66]

164.1 **Currency**

- 1962–: 1 Philippine peso or piso = 100 sentimos
- 1946–1962: 1 Philippine peso or piso = 100 centavos or sentimos
- 1903–1946: 1 Philippine peso or piso = 100 centavos or sentimos
- 1899–1903: 1 US dollar = 100 cents
- 1876–1899: 1 peso or piso = 100 centimos
- 1872–1876: 1 peseta = 100 centimos
- 1871–1872: 1 escudo = 100 centimos
- 1852–1871: 1 peso = 100 centimos

**164.2    Units of Quantity**

In Abra, Albay, Ambos Camarines, Antique, Bataán, Batangas, Benguet, Bohol, Bulacán, Cagayán, Cavite, Cebú, Dapitan, Dávao, Ilocos Norte, Ilocos Sur, Iloílo, Isabela, La Leguna, La Unión, Leyte, Manila, Marinduque, Masbate, Mindoro, Negros Occidental, Negros Oriental, Nueva Écija, Pampanga, Pangasinán, Paragus, Rizal, Sámar, Surigao, Tárlac, Tayabas, Zambales, and Zamboanga

				Metric
<b>uyon</b>				600 bundles
10	<b>baar</b>			60 bundles
100	10	<b>manajo</b>		6 bundles
600	60	6	<b>atado</b>	1 bundle

For tobacco leaves in Bataán, Batangas, Bulacán, Cavite, Pampanga, Pangasinán, and Zambales

					Metric
<b>gilo<sup>a</sup></b>					12,500 leaves
50	<b>balut</b>				250 leaves
125	2½	<b>buhat</b>			100 leaves
500	10	4	<b>tanca</b>		25 leaves
12,500	250	100	25	<b>betel</b>	1 leaf

<sup>a</sup>Also reported as equal to 15,000, 17,500 and 25,000 leaves

For buyo leaves in Negros Occidental and Pangasinán

				Metric
<b>lacsá</b>				10,000 buyo leaves
100	<b>sacob</b>			100 buyo leaves
400	4	<b>salonson</b> or <b>tanca</b>		25 buyo leaves

Other reported measures:

1 **troje** (in Albay, Cabú, Iloílo, Negros Occidental, and Tárlac) = 60 manojos = 360 bundles.

**164.3    Units of Length**

Old system in Bulacán and Masbate

				Metric	Metric
<b>anet</b>				23.2 m	16.72 m
10	<b>braza<sup>a</sup></b>			2.32 m	1.672 m
20	2	<b>vara</b>		1.16 m	836 mm
80	8	4	<b>palma<sup>b</sup></b>	290 mm	209 mm

<sup>a</sup>Distance between the extended arms and hands

<sup>b</sup>Distance between the end of the thumb and the little finger, hand extended

Traditional system and Spanish scale

				Metric	Metric
<b>vara</b>				847.5 mm	835.98 mm
3	<b>pié</b>			282.5 mm	278.66 mm
36	12	<b>pulgada</b>		23.54 mm	23.22 mm
432	144	12	<b>linea</b>	1.96 mm	1.93 mm

British Imperial scale

				Imperial	Metric
<b>milya</b>				1 mile	1.609 344 km
1760	<b>yarda</b>			1 yd	0.914 4 m
5280	3	<b>piye</b>		1 ft	30.48 cm
63,360	36	12	<b>pulgada</b>	1 in	2.54 cm

Traditional system in Ambos Camarines and Cavite after 1860

				Metric
<b>dupa</b>				1.679 m
2	<b>vara</b>			839.50 mm
8	4	<b>dangao</b>		209.87 mm
96	48	12	<b>dedo</b>	17.49 mm

Traditional system in Nueva Ecija

		Metric
<b>unatbating</b>		29.256 64 m
4	<b>tigday</b>	7.314 16 m

Other reported measures:

1 **tsci** (in Manilla) = 351.0 mm.

164.4 Units of Area

Traditional system

						Metric
quiñon, quignon, or guinon						27,949.5 m <sup>2</sup>
10	balita or boitas					2794.95 m <sup>2</sup>
100	10	loan or bucan				279.495 m <sup>2</sup>
10,000	1000	100	braza cuadrada			279.495 dm <sup>2</sup>
40,000	4000	400	4	vara cuadrada		69.874 dm <sup>2</sup>
360,000	36,000	3600	36	9	pié cuadrada	7.764 dm <sup>2</sup>

Other reported measures:

1 cuerda = 3930 m<sup>2</sup>.

164.5 Units of Dry Capacity

Traditional system before 1860, based on [NELK]

					Metric	Metric
cabán, kabán, or cavan					99.90 L	98.28 L
2½	bättel <sup>a</sup>				39.96 L	39.31 L
25	10	ganta			3.996 L	3.931 L
200	80	8	chupa, cupa, or cupak		499.5 mL	491.4 mL
800	320	32	4	apatan	124.9 mL	122.8 mL

<sup>a</sup>Also reported as 31.66 L

For cereal, coffee, and cacao in Manilla, based on [MART3]

					Metric
pico <sup>a</sup>					90.078 000 L
1½	caban				75.065 000 L
30	25	ganta			3.002 600 L
240	200	8	chupa		375.325 mL
960	800	32	4	apatan	93.834 mL

<sup>a</sup>For wheat

Other reported measures:

1 fanega (in Batangas and Negros Occidental) =  
55.5 L.

Metric-linked system in Abra, Albay, Antique, Basilan, Bataán, Batangas, Benguet, Bohol, Bulcán, Cagayán, Cavite, Cebú, Cottabato, Dapitan, Dávao, Ilocos Norte, Ilocos Sur, Iloílo, Isabela, Joló, La Unión, Lepanto-Bontoc, Leyte, Manila, Marinduque, Mindoro, Misamis, Negros Occidental, Nueva Écija, Nueva Vizcaya, Pampanga, Pangasinán, Paragus, Paragua Sur, Rizal, Romblón, Sámar, Sorsogón, Surigao, Tárlac, Tayabas, Zambales, and Zamboanga after 1860

				Metric
<b>cabán, kabán, or cavan<sup>a</sup></b>				75 L
25	<b>ganta</b>			3 L
200	8	<b>chupa, cupa, or cupak</b>		375 mL
800	32	4	<b>apatan</b>	93.75 mL

<sup>a</sup>Defined by the Spanish colonial government (Bureau of Insular Affairs, War Department. *Fourth Annual Report of the Philippine Commission*. 1903. Washington (DC): U.S.G.P.O. 1904, p. 898) as a cube with 422 mm on a side

Metric-linked system in Ambos Camarines after 1860

							Metric
<b>cavan de Provincia</b>							112.55 L
1½	<b>cavan de Rey</b>						75.033 L
25	16⅔	<b>ganta</b>					4.502 L
37½	25	1½	<b>anega</b>				3.001 L
150	100	6	4	<b>gain</b>			750.33 mL
300	200	12	8	2	<b>chupa</b>		375.17 mL
1200	800	48	32	8	4	<b>apatan</b>	93.79 mL

Metric-linked system in La Laguna after 1860

				Metric
<b>cavan</b>				81 L
27	<b>ganta</b>			3 L
200	8	<b>chupa</b>		375 mL
800	32	4	<b>apatan</b>	93.75 mL

Metric-linked system in Masbate after 1860

			Metric
<b>cavan</b>			79 L
26⅓	<b>ganta</b>		3 L
213 <sup>19</sup> / <sub>37</sub>	8 <sup>4</sup> / <sub>37</sub>	<b>chupa</b>	370 mL

Metric-linked system in Zambales after 1860

			Metric
<b>cavan</b>			75 L
25	<b>ganta</b>		3 L
200	8	<b>chupa</b>	375 mL

before 1973:

1 **ganta** (for milled rice) = 3 L.

after 1973:

1 **ganta** (for milled rice) = 2.24 L.

Some measures of indefinite magnitude:

- 1 **arca** (in Albay) = a chest;
- 1 **arceas** (in Tárlac) = a chest;
- 1 **bagacay** (in Antique) = threads of hemp;
- 1 **bagong** (in Sámar) = threads of hemp;
- 1 **bugang** or **bugnay** (in Leyte) = threads of hemp;
- 1 **banasta** or **banasto** (in Cebú and Ilocos Sur) = a basket;
- 1 **barilla** (in Leyte) = a barrel;
- 1 **bayones** (in Bulacán, Cebú, Iloílo, La Laguna, Leyte, Negros Occidetal, Negros Oriental, Nueva Ecija, Pampanga, Pangasinán, Romblón, Tárlac, and Zambales) = a grass sack for transporting sugar;
- 1 **betel** (in Pangasinán) = a basket;
- 1 **bocota** (in Ambos Camarines) = a bundle of rice straw;
- 1 **bultitos** (in Cabú) = a small bundle;

- 1 **bulto** (in Albay, Batangas, Cebú, Iloílo, Leyte, Negros Oriental, Pangasinán, Romblón, Sámar, Surigao, and Tayabas) = a bundle;
- 1 **canastillo** (in Albay, Ambos Camarines, Bataán, Batangas, Bulacán, Cavite, Cebú, Ilocos Norte, Ilocos Sur, Iloílo, Nueva Ecija, Pangasinán, and Sámar) = a small basket;
- 1 **canastra** (in Albay, Ambos Camarines, Antique, Bataán, Batangas, Bohol, Bulacán, Cagayán, Cavite, Cebú, Dapitan, Dávao, Ilocos Norte, Ilocos Sur, Iloílo, Isabela, La Laguna, La Unión, Leyte, Maila, Masbate, Negros Occidental, Negros Oriental, Nueva Ecija, Pampanga, Paragua, Rizal, Romblón, Sámar, Surigao, Tárlac, Tayabas, and Zambales) = a large basket;
- 1 **canastritas** (in Cagayán) = a small basket;
- 1 **carga** (in Batangas, Bulacán, Cavite, La Laguna, Rizal, and Tayabas) = a load;
- 1 **carja** (in Ambos Camarines) = a load;
- 1 **carreta** (in Bataán, Cagayán, Isabela, and Tárlac) = a cart;
- 1 **carretado** (in Cagayán) = a cartload;
- 1 **carretones** (in Bataán, Batangas, Ilocos Sur, Isabela, Nueva Ecija, Pampanga, and Pangasinán) = a small cart;
- 1 **carro** (in Antique, Negros Occidental, and Pangasinán) = a cart;
- 1 **castale** (in Iloílo) = a sack or bag;
- 1 **cayance** (in Bulacán) = a grass sack for transporting sugar;
- 1 **cayones** (in Pampanga and Tayabas) = a grass sack for transporting sugar;
- 1 **cestillo** (in Abra, Batangas, Ilocos Norte, and Negros Occidental) = a small basket;
- 1 **cesto** (in Abra, Albay, Ambos Camarines, Antique, Batangas, Benguet, Bulacán, Cagayán, Cabú, Dapitan, Ilocos Norte, Ilocos Sur, Iloílo, Isabela, La Laguna, La Unión, Manila, Masbate, Negros Occidental, Negros Oriental, Nueva Ecija, Pampanga, Pangasinán, Rizal, Romblón, Sámar, Surigao, Tárlac, Tayabas, and Zambales) = a basket;
- 1 **costale** (in Bataán, Batangas, Bulacán, Cavite, Cebú, Marinduque, Pampanga, and Tárlac) = a sack or bag;
- 1 **dama carga** (in Nueva Vizcaya) = a large load;
- 1 **envoltorio** (in La Laguna) = a bundle;
- 1 **manato** (in Leyte and Sámar) = a basket;
- 1 **manazita** (in Pangasinán) = a small basket;
- 1 **manea** (in Cavite) = a basket;
- 1 **manesto** (in Cabú) = a basket;
- 1 **matas** (in Bulacán, Cavite, Cebú, Ilocos Norte, Joló, Pangasinán, and Tárlac) = a bundle;
- 1 **mazo** (in Cavite) = a bundle;
- 1 **padoe** (in Sámar) = a double handful;
- 1 **paqueta** (in Ambos Camarines and La Laguna) = a bundle;
- 1 **paquete** (in Batangas) = a bundle;
- 1 **petates bayones** (in Leyte) = a sack;
- 1 **pompones** (in Isabela, Nueva Ecija, and Tárlac) = a large stack;
- 1 **pumpollos** (in Cebú) = a large stack;
- 1 **racimo** (in Abra, Albay, Ambos Camarines, Antique, Basilau, Bataán, Batangas Benguet, Bohol, Bulacán, Cagayán, Cavite, Cebú, Dapitan, Dávao, Ilocos Norte, Ilocos Sur, Iloílo, Isabela, Joló, La Laguna, La Unión, Lepanto-Bontoe, Leyte, Manila, Marinduque, Masbate, Mindoro, Misamis, Negros Occidental, Negros Oriental, Nueva Ecija, Nueva Vizcaya, Pampanga, Pangasinán, Paragua, Paragua Sur, Rizal, Romblón, Sámar, Sorsogón, Surigao, Tárlac, Tayabas, Zambales, and Zamboanga) = a bunch;
- 1 **retona** (in Pampanga) = a bunch of leaves;
- 1 **retone** (in Bulacán) = a bunch of leaves;
- 1 **ristra** (in Ilocos Sur) = a bunch;
- 1 **rollo** (in Antique, Batangas, Bulacán, Cavite, Cebú, Ilocos Sur, Iloílo, La Laguna, Leyte, Marinduque, Negros Occidental, Negros Oriental, Pangasinán, Romblón, Surigao, Tárlac, and Tayabas) = a roll;
- 1 **saco** (in Albay, Ambos Camarines, Bataán, Batangas, Bohol, Bulacán, Cagayán, Cavite, Cebú, Dapitan, Ilocos Sur, Iloílo, Isabela, La Laguna, Leyte, Manila, Masbate, Mindoro, Misamis, Negros Occidental, Negros Oriental, Nueva Ecija, Pampanga, Pangasinán, Sámar, Sorsogón, Surigao, Tárlac, Tayabas, Zambales, and Zamboanga) = a sack;
- 1 **sareta** or **serita** (in Albay) = a small basket;
- 1 **varilla** (in Bohol) = a basket;
- 1 **volta** (in Leyte and Zambales) = a bundle;
- 1 **volto** (in Cebú) = a basket.

164.6    Units of Liquid Capacity

Traditional systems and metric-linked system

				Metric	Metric
<b>cabán,</b> <b>kabán</b> or <b>cavan</b>				99.90 L	75 L
$1\frac{1}{16}$	<b>tinaja</b> or <b>tinja</b>			63.94 L	48 L
25	16	<b>ganta</b>		4.00 L	3 L
200	128	8	<b>chupa,</b> <b>cupa</b> or <b>cupak</b>	499.50 mL	375 mL

In Manilla, based on [MART3]

				Metric
<b>tinaja</b>				48.041 600 L
16	<b>ganta</b>			3.002 600 L
128	8	<b>chupa</b>		375.325 mL
512	32	4	<b>apatan</b>	93.834 mL

In Mindanao

		Metric
<b>battel</b>		31.660 000 L
10	<b>ganta</b> or <b>gantang</b>	3.166 000 L

Metric-linked system in Ambos Camarines after 1860

				Metric
<b>cavan de Provincia</b>				112.5 L
25	<b>ganta</b>			4.5 L
150	6	<b>gain</b>		750 mL
300	12	2	<b>chupa</b>	375 mL

Metric-linked system in Antique, Bataán, Batangas, Benguet, Bohol, Bulacán, Cagayán, Cavite, Cebú, Ilocos Sur, Isabela, La Laguna, Leyte, Negros Occidental, Nueva Écija, Nueva Vizcaya, Surigao, Surigao, and Zambales after 1860

				Metric
<b>cavan</b>				75 L
25	<b>ganta</b>			3 L
200	8	<b>chupa</b>		375 mL
800	32	4	<b>apatan</b>	93.75 mL

Metric-linked system in Ilocos Norte, Iloílo, Negros Oriental, Pangasinán, Sámar, Sorsogón, and Tayabas after 1860

					Metric
<b>cavan</b>					75 L
$4\frac{1}{16}$	<b>arroba</b>				16 L
25	$5\frac{1}{2}$	<b>ganta</b>			3 L
200	$42\frac{2}{3}$	8	<b>chupa</b>		375 mL
800	$170\frac{2}{3}$	32	4	<b>apatan</b>	93.75 mL

Metric-linked system in Albay, Ambos Camarines and Sámar after 1860

						Metric
<b>cavan</b>						75 L
$4\frac{1}{6}$	<b>tinaja</b>					48 L
$4\frac{1}{16}$	3	<b>danajuan</b>				16 L
25	16	$5\frac{1}{3}$	<b>ganta</b>			3 L
200	128	$42\frac{2}{3}$	8	<b>chupa</b>		375 mL
800	512	$170\frac{2}{3}$	32	4	<b>apatan</b>	93.75 mL

164.7    Units of Weight

Old upper Spanish scale and scale reported during the late nineteenth century

							Metric	Metric
<b>bale</b>							126.687 kg	126.5 kg
2	<b>pikul</b>						63.343 kg	63.25 kg
$2\frac{2}{97}$	100/97	<b>caban</b>					61.443 kg	61.35 kg
200/48	100/48	$2\frac{1}{48}$	<b>lachsa</b>				30.405 kg	30.36 kg
20	10	$9\frac{7}{10}$	$4\frac{4}{5}$	<b>chinanda</b>			6.334 kg	6.325 kg
200	100	97	48	10	<b>kati</b>		633.434 g	632.5 g
3200	1600	1552	768	160	16	<b>tael</b>	39.590 g	39.531 g

Old upper Spanish scale and scale reported during the late nineteenth century

							Metric	Metric
<b>kati</b>							633.434 g	632.5 g
$1\frac{3}{8}$	<b>libra</b>						460.679 g	460 g
—	—	<b>tale<sup>a</sup></b>					287.924 g	—
—	—	—	<b>marc<sup>b</sup></b>				230.336 g	—
3	$2\frac{7}{11}$	—	—	<b>punto<sup>c</sup></b>			211.145 g	211 g
22	16	10	8	$7\frac{1}{3}$	<b>onza</b>		28.792 g	28.8 g
160	$116\frac{4}{11}$	$72\frac{7}{11}$	—	$53\frac{1}{3}$	$7\frac{7}{11}$	<b>chin or mace</b>	3.96 g	3.95 g

<sup>a</sup>For gold. 1 **tale** (for silk) = 11 onza = 316.712 g

<sup>b</sup>For silver

<sup>c</sup>For gold and silver

In Albay, Batangas, Bohol, Cavite, Cebú, Iloilo, Joló, La Unión, Layte, Negros Occidental, Sámar, Surigao, Tárlac, and Tayabas

				Metric
<b>picul</b>				63.262 kg
10	<b>chinanta</b>			6.326 2 kg
100	10	<b>catty</b>		632.262 g
1600	160	16	<b>tael</b>	39.516 g

Spanish scale in Abra, Albay, Ambos Camarines, Antique, Bataán, Batangas, Benguet, Bulcán, Cagayán, Cavite, Cebú, Dapitan, Dávao, Iloilo, Isabela, La Laguna, La Unión, Lepanto-Bontoc, Leyte, Manjla, Marinduque, Mindoro, Misamis, Negros Occidental, Negros Oriental, Nueva Écija, Nueva Vizcaya, Pampanga, Pangasinán, Paragua Sur, Rizal, Romblón, Sorsogón, Surigao, Tárlac, Tayabas, Zambales, and Zamboanga during the late nineteenth century

				Metric
<b>quintal</b>				46.009 kg
4	<b>arroba</b>			11.502 kg
100	25	<b>libra</b>		460.08 g
1600	400	16	<b>onza</b>	28.755 g

Spanish scale in Bohol during the late nineteenth century

					Metric
<b>picul</b>					66 kg
$1\frac{3}{8}$	<b>quintal</b>				48 kg
$5\frac{1}{2}$	4	<b>arroba</b>			12 kg
$137\frac{1}{2}$	100	25	<b>libra</b>		480 g
2200	1600	400	16	<b>onza</b>	30 g

Spanish scale in Masbate, Paragua and Sámar during the late nineteenth century

				Metric	Metric	Metric
<b>quintal</b>				47.008 kg	51.158 8 kg	60 kg
4	<b>arroba</b>			11.752 kg	12.789 7 kg	15 kg
100	25	<b>libra</b>		470.08 g	511.588 g	600 g
1600	400	16	<b>onza</b>	29.38 g	31.974 g	37.5 g

For tobacco in Albay, Ambos Camarines, Antique, Bataán, Batangas, Bohol, Bulcán, Cagayán, Cavite, Cebú, Dapitan, Dávao, Ilocos Norte, Ilocos Sur, Iloílo, Isabela, La Laguna, La Unión, Leyte, Marinduque, Masbate, Mindoro, Misamis, Negros Occidental, Nueva Écija, Pampanga, Pangasinán, Paragus, Paragua, Romblón, Sámar, Sorsogón, Surigao, Tárlac, Tayabas, Zambales, and Zamboanga

				Metric
<b>fardo</b>				14.968 8 kg
40	<b>mano</b>			347.22 g
400	10	<b>manojita</b>		34.722 g
4000	100	10	<b>hoja</b> <sup>a</sup>	3.472 2 g

<sup>a</sup>A leaf of tobacco

Traditional system and British Imperial-linked scale in Manilla, based on [MART3]

					Metric	Metric
<b>tonelada</b>					1012.204 380 m	1016.047 542 m
16	<b>pico</b>				63.262 774 m	63.502 971 m
160	10	<b>chinanta</b>			6.326 277 m	6.350 297 m
1600	100	10	<b>cate</b>		632.628 mm	635.030 mm
25,600	1600	160	16	<b>tael</b>	39.539 mm	39.689 mm

Other reported measures:

- 1 **pico** (in Leyte) = 69.012 kg;
- 1 **pico** (in Albay, Antique, Basilan, Bataán, Batangas, Bulacán, Cagayán, Cavite, Cebú, Cottabato, Dapitan, Ilocos Norte, Joló, La Laguna, La Unión, Manila, Mindoro, Negros Occidental, Negros Oriental, Pangasinán, Paragua, Rizal, Surigao, Tárlac, Tayabas, Zambales, and Zamboanga) = 63.262 kg;
- 1 **picul** (in Ilocos Sur) = 63 kg;
- 1 **picul** (in Iloílo) = 60.262 787 kg;

- 1 **pilones** (a loaf of sugar, used in Bataán, Bulacán, Cavite, Ilocos Sur, La Laguna, Nueva Ecija, Pampanga, Pangasinán, Rizal, Tárlac, Zambales, and Zamboanga) = 57.510–92.016 kg;
- 1 **quintal** (for wax in Manilla) = 110 Castillian libras = 50.610 219 kg;
- 1 **quintal** (for tobacco, gross weight) = 50 kg;
- 1 **quintal** (for coffee, tobacco, indigo and copper in Manilla) = 100 Castillian libras = 46.009 290 kg;
- 1 **quintal** (in Manilla) = 87 Castillian libras = 40.028 082 kg;
- 1 **picul** (in Sorsogón) = 39 kg.

Metric-linked system during the twentieth century

							Metric
<b>pecul</b>							60 kg
100/97	<b>caban</b>						58.2 kg
24/5	97/48	<b>lachsa</b>					28.8 kg
10	97/10	24/5	<b>chinanta</b>				6 kg
100	97	48	10	<b>catty</b>			600 g
300	291	144	30	3	<b>punto</b>		200 g
30,000	29,100	14,400	3000	300	100	<b>kilates</b>	200 mg

before 1973:

- 1 **US standard box** = 3 kaings = 126–139 lbs = 57–63 kg;
- 1 **cavan** (for shelled maize) = 126 lbs = 57 kg;
- 1 **cavan** (for milled rice) = 123 lbs = 56 kg;
- 1 **cavan** (for rough rice) = 97 lbs = 44 kg;
- 1 **cavan** (for cacao at Manilla) = 38 kg.
- 1 **kaing** or **basket** = 42–46 lbs = 19–21 kg.

after 1973:

- 1 **cavan** (for rough rice and milled rice) = 50 kg;
- 1 **ganta** (for milled rice) = 2.24 kg.

For silk in Manilla

		Metric
<b>tola</b>		297.707 g
11	<b>onza</b>	27.064 g

For gold and pearls in Manilla

		Metric
<b>tael</b>		39.539 234 g
1⅓	<b>onza</b>	28.755 806 g

For precious metals in Manilla

					Metric
<b>libra</b>					433.029 g
1⅓	<b>tola</b>				270.643 g
1⅞	1⅞	<b>punto</b>			243.579 g
2	1¼	1⅞	<b>marco</b>		216.514 g
16	10	9	8	<b>onza</b>	27.064 g

165 Piombino

See also *Lucca and Piombino* and *Tuscany*.  
The Principality of Piombino existed as a state from 1399 until 1805, when it became a part of the Principality of Lucca and Piombino.

166 Pitcairn Islands (Pitcairn, Henderson, Ducie, and Oeno Islands)

This island was discovered by a British naval officer in 1767, but was not occupied until 1790,

when Fletcher Christian and nine mutineers from the British ship, the HMS Bounty, along with some Tahitian men and women went ashore, and survived in obscurity until discovered by American whalers in 1808. The Pitcairn Islands became a British colony in 1838, and were placed under the jurisdiction of the Commissioner for the Western Pacific in 1898. In 1970, the territory was renamed Pitcairn and dependencies.

166.1 Currency

- 1968–: 1 New Zealand dollar = 100 cents
- 1967–1968: 1 New Zealand pound = 20 shillings = 240 pence
- 1967: 1 pound sterling = 20 shillings = 240 pence

167 Pleasant Island

See *Nauru*.

168 Poland

Poland was incorporated into Russia in 1795, and became the Duchy of Warsaw under Napoleon in 1807. The Congress of Vienna established the Polish Kingdom, placing it in *de jure* personal union with Russia in 1815. The Polish Kingdom was established in 1917, and it became the Polish Republic in 1918. Germany invaded Poland in 1939, annexing the western part of Poland, and turning the rest of Poland into the General Government of Poland. The Soviet Union instituted a new communist government in 1945. In 1952, the official name of the Polish state became the People’s Republic of Poland, but since 1989, it has been the Republic of Poland. In 1989, democratic rule was re-instated, and a third Polish Republic was established.

Many systems of measurement, such as the systems used in Galicia, Austria, Danzig, Kraków, Prussia, Wrocław and Russia, have been used in Poland during recent centuries. Some units (with the same name) had

considerably different values in different systems, but were still used in the same area and at the same time. In 1818, on the initiative of Stanisław Staszic, a new system of measurement, called “nowopolskim,” was developed. National units were defined by their metric equivalents, but the decimal division was abandoned. The basic units were 1 linia = 2 mm, 1 kwarta = 1 L and 1 granik = 8 mg. In 1836, the Free City of Kraków adopted their own Kraków system, which was replaced by the Austro-Hungarian system in 1857. The Russian system was legalized in 1849, without displacing national measurements. The metric system has been in use since 1872 for most parts of present-day Poland. In areas under Russian rule, the metric system has been in use since 1875. The metric system has been compulsory since 1919.

*Main sources:* [FENN2], [KAHN], [LEWI4], [POWS], [STAM2], and [UN66]  
*e-mail source:* [eTUBI]

168.1 Currency

- 1995–: 1 Polish new złoty = 100 new groszy
- 1950–1995: 1 Polish złoty = 100 groszy
- 1924–1950: 1 Polish złoty = 100 groszy
- 1917–1924: 1 Polish marka = 100 fenigów
- 1917–1919: 1 Austro-Hungarian krone = 100 halerzy
- 1841–1917: 1 Polish ruble = 100 kopeks
- 1496–1858: 1 Polish złoty = 30–100 groszy
- 1495: 1 grzywna = 48 groszy

168.2 Units of Length

After 1565

						Metric
łokieć						586 mm
2	stopa					293 mm
4	2	ćwierć				146.5 mm
24	12	6	cal			24.417 mm
192	96	48	8	ziarno		3.052 mm

Commercial scale after 1764

							Metric
łokieć							595.500 mm
2	stopa						297.750 mm
3	1½	sztych					198.500 mm
4	2	1⅓	ćwierć				148.875 mm
8	4	2⅔	2	dłoń			74.437 5 mm
24	12	8	6	3	cal		24.812 5 mm
192	96	64	48	24	8	ziarno	3.101 6 mm

Agricultural and road measures after 1764

						Metric
?						8.933 034 m
2	pręt					4.466 517 m
4	2	krok geometryczny				2.233 258 m
15	7½	¾	łokieć			595.535 6 mm
30	15	7½	2	stopa		297.767 8 mm

Russian scale<sup>a</sup> after 1795

					Metric
<b>sążeń rosyjski</b>					2.133 6 m
3	<b>arszyny</b>				711.2 mm
7	2⅓	<b>stopa</b>			304.8 mm
48	16	6⅞	<b>werszki</b>		44.45 mm
84	28	12	1¾	<b>cal</b>	25.4 mm

<sup>a</sup>There was also 1 **mila rosyjska** = 7 wiorsty rosyjskie = 7467.465 6 m, and 1 **mila** = 8 wiorsty rosyjskie = 8534.246 4 m

After 1819 (“nowopolskim”)<sup>a</sup>

											Metric
<b>sznur</b>											43.2 m
10	<b>pręt</b>										4.32 m
25	2½	<b>sążeń</b>									1.728 m
75	7½	3	<b>łokieć</b>								576 mm
100	10	4	1⅓	<b>pręcik</b>							432 mm
150	15	6	2	1½	<b>stopa</b>						288 mm
225	22½	9	3	2¼	1½	<b>szytych</b>					192 mm
300	30	12	4	3	2	1⅓	<b>ćwierć</b>				144 mm
1000	100	40	13⅓	10	6⅞	4⅞	3⅓	<b>ławka</b>			43.2 mm
1800	180	72	24	18	12	8	6	1⅞	<b>cal</b>		24 mm
21,600	2160	864	288	216	144	96	72	21⅓	12	<b>lina</b>	2 mm
43,200	4320	1728	576	432	288	192	144	43⅓	24	2	<b>milimetry</b> 1 mm

<sup>a</sup>There was also 1 **mila nowopolska prawna** = 8534.311 2 m and 1 **mila geograficzna** = 7419.905 m

In Warsaw before 1819

			Metric
<b>łokieć</b>			653 mm
2	<b>stopa</b>		326.5 mm
24	12	<b>cal</b>	27.208 mm

Other measures reported during the nineteenth century:

- 1 **aune** = 620 mm;
- 1 **piędź** (in Warsaw) = 297.8 mm.

After 1819 (“nowopolskim”)<sup>a</sup>

					Metric
<b>włoka</b>					167,961.60 m <sup>2</sup>
30	<b>morga</b>				5598.72 m <sup>2</sup>
90	3	<b>sznur</b>			1866.24 m <sup>2</sup>
9000	300	100	<b>pręt kwadratowy</b>		18.662 40 m <sup>2</sup>
56,250	1875	625	6¼	<b>sążeń kwadratowy</b>	2.985 984 m <sup>2</sup>
2,025,000	67,500	22,500	225	36	<b>stopa kwadratowa</b> 8.294 4 dm <sup>2</sup>

<sup>a</sup>There was also 1 **mila kwadratowa polska prawna** = 72,834,844.192 5 m<sup>2</sup>, 1 **mila kwadratowa** = 55,763,027.251 2 m<sup>2</sup>, and 1 **mila kwadratowa geograficzna** = 55,055,007.521 28 m<sup>2</sup>

168.3 Units of Area

During the thirteenth to nineteenth centuries, based on [KULA]:

- 1 **łan** (unit of land area, varying with the district) = ~170,000 m<sup>2</sup> (in Chełmno) and ~226,000–253,000 m<sup>2</sup> (in Franconia).

## In Warsaw after 1819 (podział łokcia)

						Metric
<b>łokieć kwadratowy</b>						33.177 6 dm <sup>2</sup>
4	<b>stopa kwadratowa</b>					8.294 4 dm <sup>2</sup>
16	4	<b>ćwierć kwadratowa</b>				2.073 6 dm <sup>2</sup>
576	144	36	<b>cal kwadratowy</b>			5.76 cm <sup>2</sup>
82,944	20,736	5184	144	<b>linia kwadratowa</b>		4 mm <sup>2</sup>
331,776	82,944	20,736	576	4	<b>milimetr kwadratowy</b>	1 mm <sup>2</sup>

## In Warsaw after 1819 (posział sążnia)

						Metric
<b>sążeń kwadratowy</b>						2.985 984 m <sup>2</sup>
9	<b>łokieć kwadratowy</b>					33.177 6 dm <sup>2</sup>
36	4	<b>stopa kwadratowa</b>				8.294 4 dm <sup>2</sup>
5184	576	144	<b>cal kwadratowy</b>			5.76 cm <sup>2</sup>
746,496	82,944	20,736	144	<b>linia kwadratowa</b>		4 mm <sup>2</sup>
2,985,984	331,776	82,944	576	4	<b>milimetr kwadratowy</b>	1 mm <sup>2</sup>

## In Warsaw after 1819 (podział scnura mierniczgo)

							Metric
<b>sznur kwadratowy</b>							1866.24 m <sup>2</sup>
100	<b>pręt kwadratowy</b>						18.662 4 m <sup>2</sup>
5625	56¼	<b>łokieć kwadratowy</b>					33.177 6 dm <sup>2</sup>
10,000	100	1%	<b>pręcik kwadratowy</b>				18.662 4 dm <sup>2</sup>
1,000,000	10,000	177%	100	<b>ławek kwadratowy</b>			18.662 4 cm <sup>2</sup>
3,240,000	32,400	576	324	3¼	<b>cal kwadratowy</b>		24 mm <sup>2</sup>
466,560,000	4,665,600	82,944	46,656	466¼ <sub>25</sub>	144	<b>linia kwadratowa</b>	2 mm <sup>2</sup>
1,866,240,000	18,662,400	331,776	186,624	1866% <sub>25</sub>	576	4	<b>milimetr kwadratowy</b> 1 mm <sup>2</sup>

168.4 Units of Volume

		Metric
sążen sześcienny		5.159 780 352 m <sup>3</sup>
216	stopa sześcienna	23.887 872 dm <sup>3</sup>

Other reported measures:

1 **Holtztoss** (for firewood at Wrocław) =  $18\frac{1}{3} \times 9\frac{1}{6} \times 3$  Fuss =  $504\frac{1}{5}$  Kubikfuss =  $4\frac{3}{4}$  Klafter of Prussia = 15.586 731 m<sup>3</sup>;

1 **sążen** (for timber) =  $3 \times 6 \times 6$  stóp sześciennych = 2.579 89 m<sup>3</sup>;  
1 **sążen leśny terażniejszy** (for timber) =  $85\frac{3}{4}$  stóp sześciennych = 2.048 385 m<sup>3</sup>.

168.5 Units of Dry Capacity

After 1565

				Metric
beczka				271.350 L
2	półbeczka			135.675 L
72	36	garniec <sup>a</sup>		3.769 L
288	144	4	kwarta	942.2 mL

<sup>a</sup>[KAHN] reported 4.012 L

After 1764

							Metric
laszt							3618.048 L
13 $\frac{1}{3}$	beczka						271.354 L
30	2 $\frac{1}{4}$	korzec					120.602 L
960	72	32	garniec				3.768 8 L
3840	288	128	4	kwarta			942.20 mL
15,360	1152	512	16	4	kwaterka		235.55 mL
30,720	2304	1024	32	8	2	półkwaterka	117.77 mL

After 1766

						Metric
laszt						3529.0 L
13 $\frac{1}{3}$	stangiew					264.675 L
26 $\frac{2}{3}$	2	półbeczka				132.337 L
960	72	36	garniec duży			3.676 L
1250	93 $\frac{3}{4}$	46 $\frac{7}{8}$	1 $\frac{87}{288}$	garniec mały		2.823 2 L

Russian scale after 1795

					Metric
laszt or last					3146.145 60 L
15	kłoda or ćwiertnia				209.743 04 L
30	2	korzec or osmine			104.871 52 L
120	8	4	ćwiertnia or chetverik		26.217 880 L
960	64	32	8	garniec or garnetz	3.277 235 L

Metric-linked system after 1819 (“nowopolski”), and in Kraków, based on [MART3]

										Metric	Metric
laszt										3840 L	3690 L
19½	stangiew									200 L	–
30	1⅙	korzec								128 L	123 L
38⅞	2	1⅞	beczka							100 L	–
60	3⅛	2	1⅙	poł korkow						64 L	–
120	6¼	4	3⅛	2	ćwierć					32 L	30.750 L
960	50	32	25	16	8	garniec				4 L	3.843 750 L
3840	200	128	100	64	32	4	kwarta			1 L	960.937 mL
15,360	800	512	400	256	128	16	4	kwaterka		250 mL	–
30,720	1600	1024	800	512	256	32	8	2	półkwaterka	125 mL	–

168.6 Units of Liquid Capacity

For general use before 1819

						Metric
stangiew						273.08 L
2	beczka					136.54 L
72	36	garniec				3.793 L
288	144	4	kwarta			948.2 mL
1152	576	16	4	kwaterka		237.05 mL
2304	1156	32	8	2	półkwaterka	118.52 mL

Metric-linked system after 1819 (“nowopolski”)

								Metric
stangiew								200 L
1⅔	kibel							140 L
2	1⅔	beczka						100 L
10	7	5	konew					20 L
50	35	25	5	garniec				4 L
200	140	100	20	4	kwarta			1 L
800	560	400	80	16	4	kwaterka		250 mL
1600	1120	800	160	32	8	2	półkwaterka	125 mL

In Chełm after 1714, in Kraków before 1819 and in Warszawa after 1764

		Metric	Metric	Metric
garniec		7.12 L	2.75 L	3.77 L
4	kwarta	1.78 L	687.5 mL	942.5 mL

In Kraków, based on [MART3]

				Metric
beczka				138.375 L
36	garniec			3.843 750 L
144	4	kwarta		960.937 mL
576	16	4	kwaterka	240.234 mL

## 168.7 Units of Weight

Monetary weights during the fourteenth century

						Metric
<b>grzywna</b>						198 g
4	<b>wiardunek</b>					49.50 g
8	2	<b>uncja</b>				24.75 g
16	4	2	<b>łut</b>			12.375 g
24	6	3	1½	<b>skojec</b>		8.250 g
96	24	12	6	4	<b>kwarta</b>	2.062 g

Monetary weights after 1565

						Metric
<b>grzywna</b>						234.0 g
4	<b>wiardunek</b>					58.50 g
8	2	<b>uncja</b>				29.25 g
16	4	2	<b>tutów or łut</b>			14.625 g
24	6	3	1½	<b>skojec</b>		9.750 g
96	24	12	6	4	<b>kwarta</b>	2.437 g

Upper scale after 1819 (“nowopolski”)

						Metric
<b>cetnar polski<sup>a</sup></b>						40.550 400 kg
4	<b>kamień</b>					10.137 600 kg
100	25	<b>funt polski</b>				405.504 g
1600	400	16	<b>uncja</b>			25.344 g
3200	800	32	2	<b>łut</b>		12.672 g
4800	1200	48	3	1½	<b>skoyciec</b>	8.448 g

<sup>a</sup>1 Warszawski cetnar wełny = 128 funtom = 51.904 kg

Lower scale after 1819 (“nowopolski”)

						Metric
<b>skoyciec</b>						8.448 g
2⅔	<b>drachme</b>					3.168 g
8	3	<b>skrupul</b>				1.056 g
192	72	24	<b>gran</b>			44 mg
1056	396	132	5½	<b>granik</b>		8 mg
7680	2880	960	40	8	<b>miligram</b>	1 mg

Other measures reported during the twentieth century:

1 **kwintal** (metric) = 100 kg;

1 **caban** (in Kraków, after metrification) = 2 kg.

169 Ponape

See *Micronesia*.

*Main sources:* [ARAV], [BOTE], [BROW], [CHIA], [CLAR], [DOUR], [ECON], [LOPE], [LOPE2], [MART3], [MINI3], [NELK], [OSAK], [SILV], [UN55], [UN66], and [UZZA]

170 Portugal

See also *Azores* and *Madeira*.

After centuries of domination by Romans, Visigoths and Moors, the County of Portugal was founded in 1093, and became a Kingdom in 1139. Portugal colonized Brazil in South America, Angola and Mozambique in Africa, the territory around the Indian Ocean and Macau in China. During the 1960s and 1970s, Portugal lost its remaining colonies, however, Macau was under Portuguese administration until 1999. The Azores and Madeira Islands are still formally part of Portugal.

The old Portuguese measure was used not only in Portugal, but also in Brazil, the Portuguese colonies in Africa and elsewhere. The metric system has been legally optional since 1852, officially recommended since 1868, and compulsory since 1872. The transition to the metric system was slow, and many of the old measurements persisted alongside the new well into the 1960s.

170.1 Currency

1999–:	1 euro = 100 euro-cent
1911–2002:	1 Portuguese escudo = 100 centavos
c.1495–1910:	1 Portuguese real
1385–1495:	1 Portuguese real branco = 840 dinheiros
1380–1385:	1 Portuguese real = 120 dinheiros
1128–1380:	1 Portuguese dinheiro

170.2 Units of Quantity

1 **caderno** (used in paper trade) = 5 or 6 sheets of paper.

170.3 Units of Length

Traditional upper scale

							Metric
<b>legoa</b>							6175.8 m
3	<b>milha</b>						2058.6 m
24	8	<b>estadio</b>					257.325 m
2820	940	117½	<b>braça</b>				2.190 m
3760	1253⅓	156⅔	1⅓	<b>passo</b>			1.643 m
5640	1880	235	2	1½	<b>vara</b>		1.095 m
9400	3133⅓	392	3⅓	2½	1⅔	<b>côvada</b>	657 mm

Traditional lower scale

							Metric
<b>vara</b>							1.095 m
3⅓	<b>Pé</b>						328.5 mm
5	1½	<b>palmo de craveira</b>					219.0 mm
40	12	8	<b>polegada or pollegada</b>				27.375 mm
240	72	48	6	<b>grao</b>			4.562 5 mm
480	144	96	12	2	<b>linha</b>		2.281 25 mm
5760	1728	1152	96	24	12	<b>ponto</b>	190.104 µm

Upper scale in Lisbon before 1835, based on [MART3]

						Metric
<b>braca</b>						2.185 900 m
$1\frac{1}{3}$	<b>passo geometrico</b>					1.639 425 m
2	$1\frac{1}{2}$	<b>vara</b>				1.092 950 m
$3\frac{1}{3}$	$2\frac{1}{2}$	$1\frac{1}{3}$	<b>covado</b>			676.262 mm
5	$3\frac{3}{4}$	$2\frac{1}{2}$	$1\frac{1}{2}$	<b>pé</b>		655.770 mm
10	$7\frac{1}{2}$	5	3	2	<b>palmo</b>	327.885 mm

Lower scale in Lisbon before 1835, based on [MART3]

								Metric
<b>palmo de Craveiro avantejado</b>								225.421 mm
–	<b>palmo de Craveiro</b>							218.590 mm
–	$1\frac{9}{91}$	<b>palmo da Junta<sup>a</sup></b>						198.917 mm
$8\frac{1}{4}$	8	$7\frac{7}{25}$	<b>pollegada</b>					27.324 mm
$12\frac{7}{8}$	12	$10\frac{23}{25}$	$1\frac{1}{2}$	<b>dedo</b>				18.216 mm
$49\frac{1}{2}$	48	$43\frac{17}{25}$	6	4	<b>grao</b>			4.554 mm
99	96	$87\frac{7}{25}$	12	8	2	<b>linha</b>		2.277 mm
1188	1152	$1048\frac{8}{25}$	144	96	24	12	<b>ponto</b>	189 µm

<sup>a</sup>Adapted in 1756. Then also subdivided into 10 pollegadas

Metric-linked upper scale, used in territories and Portugal

								Metric
<b>legoa</b>								6600 m
3	<b>milha</b>							2200 m
24	8	<b>estadio</b>						275.0 m
3000	1000	125	<b>braça</b>					2.20 m
$3333\frac{1}{3}$	$1111\frac{1}{9}$	$138\frac{2}{3}$	$1\frac{1}{9}$	<b>toesa</b>				1.98 m
4000	$1333\frac{1}{3}$	$166\frac{2}{3}$	$1\frac{1}{3}$	$1\frac{1}{5}$	<b>passo geométrico</b>			1.65 m
6000	2000	250	2	$1\frac{1}{5}$	$1\frac{1}{2}$		<b>vara</b>	1.10 m
10,000	$3333\frac{1}{3}$	$416\frac{2}{3}$	$3\frac{1}{3}$	3	$2\frac{1}{2}$		$1\frac{1}{3}$	<b>côvada</b> 660 mm

Metric-linked lower scale, used in territories and Portugal

								Metric
<b>côvado<sup>a</sup></b>								660 mm
2	<b>pé</b>							330 mm
3	$1\frac{1}{2}$	<b>palmo de craveira</b>						220 mm
24	12	8	<b>pollegada</b>					27.5 mm
36	18	12	$1\frac{1}{2}$	<b>dedo</b>				18.3 mm
144	72	48	6	4	<b>grão</b>			4.58 mm
288	144	96	12	8	2	<b>linha</b>		2.29 mm
3456	1728	1152	144	96	24	12	<b>ponto or punto</b>	0.19 mm

<sup>a</sup>The côvado was used only for cloth

Other measures reported during the nineteenth to twentieth centuries:

- 1 **lan** (at sea) = 5555 varas = 6082.725 m;
- 1 **legoa** (in Oport) = 3900.890 m;
- 1 **lan** (at land) = 5000 varas = 5 475 m;
- 1 **jard** (used in international trading) = 914.4 mm;
- 1 **covado** (in Oporto) = 664.116 mm.

Route units

				Metric
<b>legoa de 18 grados</b>				6172.84 m
1 <sup>1</sup> / <sub>9</sub>	<b>legoa de 20 grados</b> or <b>legoa maritime</b> <sup>a</sup>			5555.56 m
1 <sup>7</sup> / <sub>18</sub>	1 <sup>1</sup> / <sub>4</sub>	<b>legoa de 25 grados</b>		4444.44 m
3 <sup>1</sup> / <sub>3</sub>	3	2 <sup>2</sup> / <sub>5</sub>	<b>milha geográfica</b>	1851.85 m

<sup>a</sup>After metrification, the **legoa metrico** = 5000 m was used after May 2, 1855

Route units, based on [MART3]

					Metric
<b>legoa de 18 grados</b>					6173.367 901 m
1 <sup>1</sup> / <sub>9</sub>	<b>legoa maritime de 20 grados</b>				5556.031 111 m
3	2 <sup>7</sup> / <sub>10</sub>	<b>milha de 54 grados</b>			2057.789 300 m
3 <sup>1</sup> / <sub>3</sub>	3	1 <sup>1</sup> / <sub>9</sub>	<b>milha maritime de 60 grados</b>		1852.010 370 m
24	21 <sup>2</sup> / <sub>5</sub>	8	7 <sup>1</sup> / <sub>5</sub>	<b>estadio de 432 grados</b>	257.223 662 m

Metric scale after 1860

							Metric
<b>miriametro</b>							10,000 m
10	<b>kilometro</b>						1000 m
100	10	<b>hectometro</b>					100 m
1000	100	10	<b>decametro</b>				10 m
10,000	1000	100	10	<b>metro</b>			1 m
100,000	10,000	1000	100	10	<b>decimetro</b>		100 mm
1,000,000	100,000	10,000	1000	100	10	<b>centimetro</b>	10 mm
10,000,000	1,000,000	100,000	10,000	1000	100	10	<b>milimetro</b> 1 mm

## 170.4 Units of Area

Traditional measures:

1 **aradura** = the quantity of land that a yoke of oxen can plough in a year [ELWE], but later also defined as the amount of land that can be conveniently ploughed by a team of oxen in one day.

before 1835

			Metric
<b>geira</b>			5781.573 6 m <sup>2</sup>
1210	<b>braça quadrada</b>		4.778 160 m <sup>2</sup>
4840	4	<b>vara quadrada</b>	1.194 540 m <sup>2</sup>

After 1835

							Metric
<b>geira</b>							5856.4 m <sup>2</sup>
8	<b>ferrado</b>						732.05 m <sup>2</sup>
1210	151¼	<b>braça quadrada</b>					4.84 m <sup>2</sup>
4840	605	4	<b>vara quadrada</b>				1.21 m <sup>2</sup>
121,000	15,125	100	25	<b>palmoqu quadrado</b>			4.84 dm <sup>2</sup>
7,744,000	968,000	6400	1600	64	<b>polegada quadrada</b>		7.562 5 cm <sup>2</sup>
1,115,136,000	139,392,000	921,600	230,400	9216	144	<b>linha quadrada</b>	5.252 mm <sup>2</sup>

Other measures reported during the nineteenth to twentieth centuries:

1 **alqueire** (in rural areas) = varying by location.

In at least one district, reported at only 1420 m<sup>2</sup>.

According to [OSAK, p. 150], 1 **alqueire** = 24,200 m<sup>2</sup>.

Metric scale after 1860

						Metric
<b>hectarea</b>						10,000 m <sup>2</sup>
100	<b>area</b>					100 m <sup>2</sup>
10,000	100	<b>metro quadrado</b>				1 m <sup>2</sup>
1,000,000	10,000	100	<b>decimetro quadrado</b>			1 dm <sup>2</sup>
100,000,000	1,000,000	10,000	100	<b>centimetro quadrado</b>		1 cm <sup>2</sup>
10,000,000,000	100,000,000	1,000,000	10,000	100	<b>milimetro quadrado</b>	1 mm <sup>2</sup>

170.5 Units of Volume

In Lisbon before 1835 and after 1835

			Metric	Metric
pié cubico			35.251 dm <sup>3</sup>	35.937 dm <sup>3</sup>
3⅔	palmo cubico		10.445 dm <sup>3</sup>	10.648 dm <sup>3</sup>
1 728	512	pollegada cubico	20.4 cm <sup>3</sup>	20.8 cm <sup>3</sup>

Metric scale after 1860

				Metric
metro cubico				1 m <sup>3</sup>
1000	decimetro cubico			1 dm <sup>3</sup>
1,000,000	1000	centimetro cubico		1 cm <sup>3</sup>
1,000,000,000	1,000,000	1000	milimetro cubico	1 mm <sup>3</sup>

170.6 Units of Dry Capacity

Scale used during the seventeenth century

								Metric
moio								814 L
10	saio							81.4 L
15	1½	fanega						54.266 L
60	6	4	alqueire					13.567 L
120	12	8	2	meios alqueire				6.78 L
240	24	16	4	2	quarta alqueire			3.39 L
480	48	32	8	4	2	oitava alqueire		1.70 L
960	96	64	16	8	4	2	maquia	848 mL

1 alqueie (at the end of 1709) = 13.8 L (According to *The New Cambridge Modern History*: The rise of Great Britain and Russia, 1688–1715, Vol 6)

Scale used during the nineteenth century<sup>5</sup>

	A	B	C	D
moio	788.46 L	836.88 L	895.74 L	943.02 L
saio	78.85 L	83.69 L	89.57 L	94.30 L
fanega	52.56 L	55.79 L	59.72 L	62.87 L
alqueire	13.141 L	13.948 L	14.929 L	15.717 L
meios	6.57 L	6.97 L	7.465 L	7.86 L
quarta	3.29 L	3.49 L	3.73 L	3.93 L
oitava	1.64 L	1.74 L	1.87 L	1.96 L
maquia or maeis-outava	821 mL	872 mL	933 mL	982 mL

	E	F	G
moio	1022.94 L	1048.50 L	1157.88 L
saio	102.29 L	104.85 L	115.79 L
fanega	68.20 L	69.90 L	77.19 L
alqueire	17.049 L	17.475 L	19.298 L
meios	8.525 L	8.738 L	8.738 L
quarta	4.26 L	4.37 L	4.37 L
oitava	2.13 L	2.18 L	2.41 L
maquia or maeis-outava	1066 mL	1092 mL	1206 mL

<sup>5</sup> According to [LOPE], which includes a statistical study of reported values for the alqueire in the *nineteenth century*, the reported values fell into seven groups (A–G).

At Faro and Figuera

				Metric	Metric
<b>fanega</b>				66.08 L	57.24 L
4	<b>alqueire</b>			16.52 L	14.31 L
8	2	<b>meios</b>		8.26 L	7.15 L
16	4	2	<b>quarta</b>	4.13 L	3.58 L

In Lisbon before 1835, based on [MART3]

							Metric
<b>moio</b>							811.230 000 L
15	<b>fanga</b>						54.082 000 L
60	4	<b>alqueire</b>					13.520 500 L
120	8	2	<b>meio alqueire</b>				6.760 250 L
240	16	4	2	<b>quarta</b>			3.380 125 L
480	32	8	4	2	<b>oitava or outava</b>		1.690 062 L
960	64	16	8	4	2	<b>salamin<sup>a</sup> or meia outava</b>	845.031 mL
1920	128	32	16	8	4	2	<b>maquia</b> 422.516 mL

<sup>a</sup>According to some sources, for example [BOTE, p. 185], one selemin =  $\frac{1}{4}$  maquia, but the selemin was also reported as a synonym for oitava [NELK] or maquia [DOUR]

In Lisbon before 1835, based on [CLAR]

						Metric
<b>moio</b>						811.152 L
15	<b>fanga</b>					54.076 8 L
60	4	<b>alqueire</b>				13.519 2 L
120	8	2	<b>meio alqueire</b>			6.759 6 L
240	16	4	2	<b>quarta</b>		3.379 8 L
480	32	8	4	2	<b>oitava or outava</b>	1.689 9 L

In Lisbon after 1835, based on [MART3], and metric-linked system

							Metric	Metric
<b>moio</b>							830.445 000 L	828 L
15	<b>fanga</b>						55.363 000 L	55.2 L
60	4	<b>alqueire</b>					13.840 750 L	13.8 L
120	8	2	<b>meio alqueire</b>				6.920 375 L	6.9 L
240	16	4	2	<b>quarta</b>			3.460 187 L	3.45 L
480	32	8	4	2	<b>oitava or outava</b>		1.730 094 L	1.725 L
960	64	16	8	4	2	<b>salamin</b>	865.047 mL	862.5 mL

For salt in Lisbon, reported in 1830 by [KRÜG]

			Metric
<b>moio</b>			790.200 L
18	<b>raza</b>		43.900 L
48	$2\frac{2}{3}$	<b>alqueire</b>	16.462 5 L

For lime in Lisbon, before 1835 and after 1835, based on [MART3]

			Metric	Metric
<b>moio</b>			676.025 000 L	692.037 500 L
50	<b>alqueire</b>		13.520 500 L	13.840 750 L
100	2	<b>meios</b>	6.760 250 L	6.920 375 L

At Oporto, based on [MART3] and [NELK], [CLAR], and [BROW]

							Metric	Metric	Metric
<b>moio</b>							1047.900 000 L	933.994 L	1 024.615 L
15	<b>fanega</b>						69.860 000 L	62.266 3 L	68.308 L
60	4	<b>alqueire</b>					17.465 000 L	15.567 L	17.077 L
120	8	2	<b>meios</b>				8.732 500 L	7.783 L	8.538 L
240	16	4	2	<b>quarta</b>			4.366 250 L	3.892 L	4.269 L
480	32	8	4	2	<b>oitava</b>		2.183 125 L	1.946 L	2.135 L
960	64	16	8	4	2	<b>maquia</b>	1.091 562 L	972.9 mL	1.067 L

For salt in Oporto

			Metric
<b>milheiro</b>			14,809.200 000 L
336		<b>raza</b>	44.075 000 L

At Viana do Castelo

				Metric
<b>fanega</b>				68.28 L
4	<b>alqueire</b>			17.07 L
8	2	<b>meios</b>		8.53 L
16	4	2	<b>quarta</b>	4.27 L

For coal in Lisbon before 1835, based on [MART3] and [DOUR]

			Metric	Metric
<b>pipa</b>			4542.888 000 L	430 L
10	<b>balde</b>		454.288 800 L	43 L
70	7	<b>canastra</b>	64.898 400 L	6.1 L

For coal in Lisbon after 1835, based on [MART3]

			Metric
<b>pipa</b>			4650.492 000 L
6	<b>fanega</b>		775.082 000 L
48	8	<b>alqueire</b>	96.885 250 L

Other reported measures:

1 **alma** = 5.205 L;

1 **saco** (for charcoal) = 51.880 L.

## 170.7 Units of Liquid Capacity

Traditional upper scale in Lisbon

				Metric
<b>tonelada</b> or <b>tonnelada</b>				860.267 L
2	<b>bota</b> or <b>pipa</b>			430.134 L
4	2	<b>barrique</b>		215.067 L
52	26	13	<b>almude</b> or <b>almud</b>	16.543 6 L

For salt and other dry commodities, based on [NOBA] and [WAGN2]

								Metric
<b>moyo</b>								830.445 000 L
15	<b>fanga</b>							55.363 000 L
60	4	<b>alqueire</b>						13.840 750 L
120	8	2	<b>meio</b>					6.920 375 L
240	16	4	2	<b>quarta</b>				3.460 187 L
480	32	8	4	2	<b>oitava</b>			1.730 094 L
960	64	16	8	4	2	<b>salamine</b>		865.047 mL
1920	128	32	16	8	4	2	<b>maquia</b>	432.523 mL

Before 1835 in Lisbon, based on [MART3]

								Metric
<b>tonelada</b>								860.132 000 L
2	<b>pipa</b>							430.066 000 L
2%	1%	<b>barril</b>						297.738 000 L
52	26	18	<b>almude</b>					16.541 000 L
104	52	36	2	<b>pote</b> or <b>alqueire</b>				8.270 500 L
624	312	216	12	6	<b>canada</b>			1.378 417 L
2496	1248	864	48	24	4	<b>quartilho</b>		344.604 mL

After 1835 in Lisbon, based on [MART3]

								Metric
<b>tonelada</b>								1004.400 000 L
2	<b>pipa</b>							502.200 000 L
3 $\frac{1}{3}$	1 $\frac{1}{3}$	<b>barril</b>						301.320 000 L
60	30	18	<b>almude</b> or <b>amalde</b>					16.740 000 L
120	60	36	2	<b>pote</b>				8.370 000 L
720	360	216	12	6	<b>canada</b>			1.395 000 L
1440	720	432	24	12	2	<b>meia canada</b>		697.500 mL
2880	1440	864	48	24	4	2	<b>quartilho</b>	348.750 mL
5760	2880	1728	96	48	8	4	2	<b>meio quartilho</b> 174.375 mL

In Lisbon, based on [DOUR]

								Metric
<b>tonnelada</b>								1460.16 L
$1\frac{1}{5}$	<b>moyo</b>							811.20 L
27	15	<b>fanega</b>						54.08 L
108	60	4	<b>alqueire</b>					13.52 L
216	120	8	2	<b>meio</b>				6.76 L
432	240	16	4	2	<b>quarto</b>			3.38 L
864	480	32	8	4	2	<b>outava</b>		1.69 L
1728	960	64	16	8	4	2	<b>meia-outava, selamin, or maquia</b>	845 mL

For shipload in Lisbon, based on [MART3]

				Metric
<b>tonelada</b>				870.480 000 L
$1\frac{1}{12}$		<b>pipa</b>		435.240 000 L
52		48	<b>almude</b>	16.740 000 L

Metric-linked system in Lisbon

								Metric
<b>tonel</b>								840 L
2	<b>pipa</b>							420 L
50	25	<b>almude or cântaro</b>						16.8 L
100	50	2	<b>pote</b>					8.4 L
600	300	12	6	<b>canada</b>				1.4 L
2400	1200	48	24	4	<b>quartilho</b>			350 mL
4800	2400	96	48	8	2	<b>meio-quartilho</b>		175 mL
9600	4800	192	96	16	4	2	<b>quarto de quartilho</b>	87.5 mL

For wine

					Metric
<b>pipa</b>					535.0 L
2	<b>demi-pipa</b>				267.5 L
4	2	<b>quartaut</b>			133.75 L
10	5	$2\frac{1}{2}$	<b>balde</b>		53.50 L
70	35	$17\frac{1}{2}$	7	<b>canastra</b>	7.643 L

Metric-linked system during the late nineteenth century

			Metric
<b>tonelada or tonnelada</b>			1000 L
2	<b>bota or pipa</b>		500 L
4	2	<b>barrique</b>	250 L

In Oporto

						Metric
<b>tonelada</b>						1065.330 000 L
2	<b>pipa</b>					532.665 000 L
42	21	<b>almude</b> or <b>almud</b>				25.365 000 L
84	42	2	<b>alquiere, cantaro, or pote</b>			12.682 500 L
504	252	12	6	<b>canada</b>		2.113 750 L
2016	1008	48	24	4	<b>quartilho</b>	528.437 mL

For wine in Oporto

						Metric
<b>tonelada</b>						1068.000 000 L
2	<b>pipa</b>					534.000 000 L
42	21	<b>almude</b> or <b>amalde</b>				25.428 571 L
84	42	2	<b>alquiere</b>			12.714 285 L
504	252	12	6	<b>canada</b>		2.119 048 L

Metric scale after 1863

						Metric
<b>hectolitro</b>						100 L
10	<b>decalitro</b>					10 L
100	10	<b>litro</b>				1 L
1000	100	10	<b>decilitro</b>			100 mL
10,000	1000	100	10	<b>centilitro</b>		10 mL
100,000	10,000	1000	100	10	<b>mililitro</b>	1 mL

170.8 Units of Weight

During the fifteenth century, based on [UZZA]

						Metric
<b>cantaro di Pisa</b>						50.918 4 kg
4		<b>arroba</b>				12.729 6 kg
64		16	<b>libra</b>			795.6 g
128		32	2	<b>arratel<sup>a</sup></b>		397.8 g

<sup>a</sup>85½ arratel = 100 Florentine libbre, according to [CHIA]

Traditional upper scale and rounded values (1 libra = 459 g)

							Metric	Metric
<b>tonelada or tonelada</b>							793.077 4 kg	793.152 kg
13½	<b>quintal</b>						58.746 5 kg	58.752 kg
27	2	<b>quintalejo</b>					29.373 2 kg	29.376 kg
54	4	2	<b>arroba</b>				14.686 6 kg	14.688 kg
1728	128	64	32	<b>libra<sup>a</sup> or arrátel</b>			458.956 8 g	459 g
3456	384	128	64	2	<b>marco or meio</b>		229.478 4 g	229.5 g
27,648	3072	1024	512	16	8	<b>onça</b>	28.684 8 g	28.687 5 g

<sup>a</sup>1 **libra** (for drugs) = 3/4 libra = 344.25 g

Traditional lower scale and rounded values (1 libra = 459 g)

						Metric	Metric
<b>onça</b>						28.684 8 g	28.687 5 g
8	<b>oitava</b> or <b>outava</b>					3.585 6 g	3.589 g
24	3	<b>escrópulo</b>				1.195 2 g	1.195 3 g
144	18	6	<b>quilate</b>			199.20 mg	199.219 mg
256	32	10%	1%	<b>vintém-de-ouro</b>		112.05 mg	112.061 mg
576	72	24	4	2¼	<b>grão</b>	49.800 mg	49.805 mg

Metric-linked system during the late nineteenth century

				Metric
<b>quintal</b>				60 kg
4	<b>arroba</b>			15 kg
128	32	<b>libra</b> or <b>arratel</b>		468.75 g
2048	512	16	<b>onça</b>	29.297 g

For oil in Lisbon, based on [MART3]

			Metric
<b>pipa</b>			468.180 000 kg
30	<b>almude</b>		15.606 000 kg
1020	34	<b>arrateis</b>	459.000 g

For medical use in Lisbon before 1835 and after 1835, based on [MART3]

					Metric	Metric
<b>arratel</b> or <b>libra</b>					344.190 750 g	344.250 000 g
12	<b>onça</b>				28.682 562 g	28.687 500 g
96	8	<b>outava</b>			3.585 320 g	3.585 937 g
288	24	3	<b>scropulo</b> or <b>escropulo</b>		1.195 107 g	1.195 312 g
6912	576	72	24	<b>grão</b>	49.796 mg	49.805 mg

For gold, silver and money in Lisbon before 1835 and between 1835 and 1855, based on [MART3]

					Metric	Metric
<b>Marco</b>					229.460 500 g	229.500 000 g
8	<b>onça</b>				28.682 562 g	28.687 500 g
64	8	<b>outava</b>			3.585 320 g	3.585 937 g
192	24	3	<b>scropulo</b> or <b>escropulo</b>		1.195 107 g	1.195 312 g
4608	576	72	24	<b>grão</b>	49.796 mg	49.805 mg

For diamonds and jewels

		Metric
<b>quilate</b>		205.830 mg
4	<b>grão</b>	51.457 mg

For gold

			Metric
<b>quilate</b>			41.66 mg
4	<b>grão</b>		10.415 mg
32	8	<b>oitava</b>	1.302 mg

For silver

			Metric
<b>dinheiro</b>			83.33 mg
24	<b>grão do dinheiro</b>		3.472 mg
96	4	<b>quarta</b>	868 µg

Metric scale after 1863

									Metric
<b>tonelada metrica</b>									1000 kg
10	<b>quintal metrico</b>								100 kg
1000	100	<b>kilogramo</b>							1 kg
10,000	1000	10	<b>hectogramo</b>						100 g
100,000	10,000	100	10	<b>decagramo</b>					10 g
1,000,000	100,000	1000	100	10	<b>gramo</b>				1 g
10,000,000	1,000,000	10,000	1000	100	10	<b>decigramo</b>			100 mg
100,000,000	10,000,000	100,000	10,000	1000	100	10	<b>centigramo</b>		10 mg
1,000,000,000	100,000,000	1,000,000	100,000	10,000	1000	100	10	<b>miligramo</b>	1 mg

I have chosen to exemplify the variety of local Portuguese measure through some measures of the districts of Aveiro and Viseu.

170.9 Aveiro

170.9.1 Units of Dry Capacity

At Agueda; at Albergaria-a-Velha

								Metric	Metric
<b>moio</b>								853.02 L	865.8 L
15	<b>fanga</b>							56.868 L	57.72 L
60	4	<b>alqueire</b>						14.217 L	14.43 L
240	16	4	<b>quarta</b>					3.554 25 L	3.607 5 L
480	32	8	2	<b>oitava</b>				1.777 125 L	1.803 75 L
960	64	16	4	2	<b>maquia</b>			888.562 5 mL	901.875 mL
1920	128	32	8	4	2	<b>selamim</b>		444.281 25 mL	450.937 5 mL
3840	256	64	16	8	4	2	<b>meio selamim</b>	222.140 625 mL	225.468 75 mL

At Alvarenga; at Anadia and at Bemposta; at Angeja

								Metric	Metric	Metric
<b>moio</b>								1086.6 L	888 L	892.62 L
15	<b>fanga</b>							72.44 L	59.2 L	59.508 L
60	4	<b>alqueire</b>						18.11 L	14.8 L	14.877 L
240	16	4	<b>quarta</b>					4.527 5 L	3.7 L	3.719 25 L
480	32	8	2	<b>oitava</b>				2.263 75 L	1.85 L	1.859 625 L
960	64	16	4	2	<b>maquia</b>			1.131 875 L	925 mL	929.812 5 mL
1920	128	32	8	4	2	<b>selamim</b>		565.937 5 mL	462.5 mL	464.906 25 mL
3840	256	64	16	8	4	2	<b>meio selamim</b>	282.968 75 mL	231.25 mL	232.453 125 mL

At Arada; at Arouca; at Aveiro

								Metric	Metric	Metric
<b>moio</b>								792 L	976.2 L	794.4 L
15	<b>fanga</b>							52.8 L	65.08 L	52.96 L
60	4	<b>alqueire</b>						13.2 L	16.27 L	13.24 L
240	16	4	<b>quarta</b>					3.3 L	4.067 5 L	3.31 L
480	32	8	2	<b>oitava</b>				1.65 L	2.033 75 L	1.655 L
960	64	16	4	2	<b>maquia</b>			825 mL	1.016 875 L	827.5 mL
1920	128	32	8	4	2	<b>selamim</b>		412.5 mL	508.437 5 mL	413.75 mL
3840	256	64	16	8	4	2	<b>meio selamim</b>	206.25 mL	254.218 75 mL	206.875 mL

At Barró; at Castello de Paiva; at Couto de Esteves

								Metric	Metric	Metric
<b>moio</b>								891.3 L	1062.6 L	1190.04 L
15	<b>fanga</b>							59.42 L	70.84 L	79.336 L
60	4	<b>alqueire</b>						14.855 L	17.71 L	19.834 L
240	16	4	<b>quarta</b>					3.713 75 L	4.427 5 L	4.958 5 L
480	32	8	2	<b>oitava</b>				1.856 875 L	2.213 75 L	2.479 25 L
960	64	16	4	2	<b>maquia</b>			928.437 5 mL	1.106 875 L	1.239 625 L
1920	128	32	8	4	2	<b>selamim</b>		464.218 75 mL	553.437 5 mL	619.812 5 mL
3840	256	64	16	8	4	2	<b>meio selamim</b>	232.109 375 mL	276.718 75 mL	309.906 25 mL

At Eixo; at Esgueira; at Estarreja

								Metric	Metric	Metric
<b>moio</b>								826.2 L	848.4 L	855 L
15	<b>fanga</b>							55.08 L	56.56 L	57 L
60	4	<b>alqueire</b>						13.77 L	14.14 L	14.25 L
240	16	4	<b>quarta</b>					3.442 5 L	3.535 L	3.562 5 L
480	32	8	2	<b>oitava</b>				1.721 25 L	1.767 5 L	1.781 25 L
960	64	16	4	2	<b>maquia</b>			860.625 mL	883.75 mL	890.625 mL
1920	128	32	8	4	2	<b>selamim</b>		430.312 5 mL	441.875 mL	445.312 5 mL
3840	256	64	16	8	4	2	<b>meio selamim</b>	215.156 25 mL	220.937 5 mL	222.656 25 mL

At Feira; at Fervedo; at Ferreiros

								Metric	Metric	Metric
<b>moio</b>								1048.8 L	1086.6 L	933.48 L
15	<b>fanga</b>							69.92 L	72.44 L	62.232 L
60	4	<b>alqueire</b>						17.48 L	18.11 L	15.558 L
240	16	4	<b>quarta</b>					4.37 L	4.527 5 L	3.889 5 L
480	32	8	2	<b>oitava</b>				2.185 L	2.263 75 L	1.944 75 L
960	64	16	4	2	<b>maquia</b>			1.092 5 L	1.131 875 L	972.375 mL
1920	128	32	8	4	2	<b>selamim</b>		546.25 mL	565.937 5 mL	486.187 5 mL
3840	256	64	16	8	4	2	<b>meio selamim</b>	273.125 mL	282.968 75 mL	243.093 75 mL

At Ilhavo; at Maciera de Cambra and Oliveira de Azemeis; at Mealhada

								Metric	Metric	Metric
<b>moio</b>								846 L	1080 L	865.08 L
15	<b>fanga</b>							56.4 L	72 L	57.672 L
60	4	<b>alqueire</b>						14.1 L	18 L	14.418 L
240	16	4	<b>quarta</b>					3.525 L	4.5 L	3.604 5 L
480	32	8	2	<b>oitava</b>				1.762 5 L	2.25 L	1.802 25 L
960	64	16	4	2	<b>maquia</b>			881.25 mL	1.125 L	901.125 mL
1920	128	32	8	4	2	<b>selamim</b>		440.625 mL	565.5 mL	450.562 5 mL
3840	256	64	16	8	4	2	<b>meio selamim</b>	220.312 5 mL	281.25 mL	225.281 25 mL

At Oiaã; at Ois da Ribeira; at Oliveira do Bairro

								Metric	Metric	Metric
<b>moio</b>								829.8 L	835.8 L	865.32 L
15	<b>fanga</b>							55.32 L	55.72 L	57.688 L
60	4	<b>alqueire</b>						13.83 L	13.93 L	14.422 L
240	16	4	<b>quarta</b>					3.457 5 L	3.482 5 L	3.605 5 L
480	32	8	2	<b>oitava</b>				1.728 75 L	1.741 25 L	1.802 75 L
960	64	16	4	2	<b>maquia</b>			864.375 mL	870.625 mL	901.375 mL
1920	128	32	8	4	2	<b>selamim</b>		432.187 5 mL	435.312 5 mL	450.687 5 mL
3840	256	64	16	8	4	2	<b>meio selamim</b>	216.093 75 mL	217.656 25 mL	225.343 75 mL

At Ovar; at Palhaço; at Pereira

								Metric	Metric	Metric
<b>moio</b>								1137.24 L	923.1 L	948 L
15	<b>fanga</b>							75.816 L	61.54 L	63.2 L
60	4	<b>alqueire</b>						18.954 L	15.385 L	15.8 L
240	16	4	<b>quarta</b>					4.738 5 L	3.846 25 L	3.95 L
480	32	8	2	<b>oitava</b>				2.369 25 L	1.923 125 L	1.975 L
960	64	16	4	2	<b>maquia</b>			1.184 625 L	961.562 5 mL	987.5 mL
1920	128	32	8	4	2	<b>selamim</b>		592.312 5 mL	480.781 25 mL	493.75 mL
3840	256	64	16	8	4	2	<b>meio selamim</b>	296.156 25 mL	240.390 625 mL	246.875 mL

170.9.2 Units of Liquid Capacity

At Agueda, at Ois da Riberia, and at Recardães; at Albergaria-a-Velha and at Angeja; at Alvarenga

								Metric	Metric	Metric
<b>tonel</b>								984 L	1212 L	1510.20 L
2	<b>pipa</b>							492 L	606 L	755.10 L
50	25	<b>almude</b>						19.68 L	24.24 L	30.204 L
100	50	2	<b>pote</b>					9.84 L	12.12 L	15.102 L
600	300	12	6	<b>canada</b>				1.64 L	2.02 L	2.517 L
2400	1200	48	24	4	<b>quartilho</b>			410 mL	505 mL	629.25 mL
4800	2400	96	48	8	2	<b>meio quartilho</b>		205 mL	252.5 mL	314.625 mL
9600	4800	192	96	16	4	2	<b>quarto de quartilho</b>	102.5 mL	126.25 mL	157.312 5 mL

For olive oil at Albergaria-a-Velha

								Metric
<b>tonel</b>								852 L
2	<b>pipa</b>							426 L
50	25	<b>almude</b>						17.04 L
100	50	2	<b>pote</b>					8.52 L
600	300	12	6	<b>canada</b>				1.42 L
2400	1200	48	24	4	<b>quartilho</b>			355 mL
4800	2400	96	48	8	2	<b>meio quartilho</b>		177.5 mL
9600	4800	192	96	16	4	2	<b>quarto de quartilho</b>	88.75 mL

At Anadia and at Ferreiros; at Arada, at Eixo, and at Esgueira; at Estarreja, at Feira, and at Fermeso

								Metric	Metric	Metric
<b>tonel</b>								948 L	903.6 L	1272 L
2	<b>pipa</b>							474 L	451.8 L	636 L
50	25	<b>almude</b>						18.96 L	18.072 L	25.44 L
100	50	2	<b>pote</b>					9.48 L	9.036 L	12.72 L
600	300	12	6	<b>canada</b>				1.58 L	1.506 L	2.12 L
2400	1200	48	24	4	<b>quartilho</b>			395 mL	376.5 mL	530 mL
4800	2400	96	48	8	2	<b>meio quartilho</b>		197.5 mL	188.25 mL	265 mL
9600	4800	192	96	16	4	2	<b>quarto de quartilho</b>	98.75 mL	94.125 mL	132.5 mL

At Arouca

								Metric
<b>pipa</b>								510 L
20	<b>almude</b>							25.5 L
40	2	<b>pote</b>						12.75 L
240	12	6	<b>canada</b>					2.125 L
960	48	24	4	<b>quartilho</b>				531.25 mL
1920	96	48	8	2	<b>meio quartilho</b>			265.625 mL
3840	192	96	16	4	2	<b>quarto de quartilho</b>		132.812 5 mL

At Aveiro; at Barró; at Bemposta

								Metric	Metric	Metric
<b>tonel</b>								870 L	917.4 L	1230 L
2	<b>pipa</b>							435 L	458.7 L	615 L
50	25	<b>almude</b>						17.4 L	18.348 L	24.6 L
100	50	2	<b>pote</b>					8.7 L	9.174 L	12.3 L
600	300	12	6	<b>canada</b>				1.45 L	1.529 L	2.05 L
2400	1200	48	24	4	<b>quartilho</b>			362.5 mL	382.25 mL	512.5 mL
4800	2400	96	48	8	2	<b>meio quartilho</b>		181.25 mL	191.125 mL	256.25 mL
9600	4800	192	96	16	4	2	<b>quarto de quartilho</b>	90.625 mL	95.562 5 mL	128.125 mL

At Castello de Paiva; at Couto de Esteves

								Metric	Metric
<b>tonel</b>								1260 L	1368 L
2	<b>pipa</b>							630 L	684 L
50	25	<b>almude</b>						25.2 L	27.36 L
100	50	2	<b>pote</b>					12.6 L	13.68 L
600	300	12	6	<b>canada</b>				2.1 L	2.28 L
2400	1200	48	24	4	<b>quartilho</b>			525 mL	570 mL
4800	2400	96	48	8	2	<b>meio quartilho</b>		262.5 mL	285 mL
9600	4800	192	96	16	4	2	<b>quarto de quartilho</b>	131.25 mL	142.5 mL

At Ilhavo; at Maciera de Cambra; at Mealhada

								Metric	Metric	Metric
<b>tonel</b>								936 L	1440 L	1057.2 L
2	<b>pipa</b>							468 L	720 L	528.6 L
50	25	<b>almude</b>						18.72 L	28.8 L	21.144 L
100	50	2	<b>pote</b>					9.36 L	14.4 L	10.572 L
600	300	12	6	<b>canada</b>				1.56 L	2.4 L	1.762 L
2400	1200	48	24	4	<b>quartilho</b>			390 mL	600 mL	440.5 mL
4800	2400	96	48	8	2	<b>meio quartilho</b>		195 mL	300 mL	220.25 mL
9600	4800	192	96	16	4	2	<b>quarto de quartilho</b>	97.5 mL	150 mL	110.125 mL

At Oiaã, atOliveira do Bairro, and at Palhaço; at Sousa; at Vagos

								Metric	Metric	Metric
<b>tonel</b>								880 L	950 L	1000 L
2	<b>pipa</b>							440 L	475 L	500 L
50	25	<b>almude</b>						17.6 L	19 L	20 L
100	50	2	<b>pote</b>					8.8 L	9.5 L	10 L
500	250	10	5	<b>canada</b>				1.76 L	1.9 L	2 L
2000	1000	40	20	4	<b>quartilho</b>			440 mL	475 mL	500 mL
4000	2000	80	40	8	2	<b>meio quartilho</b>		220 mL	237.5 mL	250 mL
8000	4000	160	80	16	4	2	<b>quarto de quartilho</b>	110 mL	118.75 mL	125 mL

At Oliveira de Azemeis; at Ovár and at Pereira; at Prestimo

								Metric	Metric	Metric
<b>tonel</b>								1230 L	1308 L	1528.2 L
2	<b>pipa</b>							615 L	654 L	764.1 L
50	25	<b>almude</b>						24.60 L	26.16 L	30.564 L
100	50	2	<b>pote</b>					12.30 L	13.08 L	15.282 L
600	300	12	6	<b>canada</b>				2.05 L	2.18 L	2.547 L
2400	1200	48	24	4	<b>quartilho</b>			515.5 mL	545 mL	636.75 mL
4800	2400	96	48	8	2	<b>meio quartilho</b>		256.25 mL	272.5 mL	318.375 mL
9600	4800	192	96	16	4	2	<b>quarto de quartilho</b>	128.125 mL	136.25 mL	159.187 5 mL

At Server do Vouga; at Vouga

								Metric	Metric
<b>tonel</b>								1536 L	1188 L
2	<b>pipa</b>							768 L	594 L
50	25	<b>almude</b>						30.72 L	23.76 L
100	50	2	<b>pote</b>					15.36 L	11.88 L
600	300	12	6	<b>canada</b>				2.56 L	1.98 L
2400	1200	48	24	4	<b>quartilho</b>			640 mL	495 mL
4800	2400	96	48	8	2	<b>meio quartilho</b>		320 mL	247.5 mL
9600	4800	192	96	16	4	2	<b>quarto de quartilho</b>	160 mL	123.75 mL

## 170.10 Viseu

### 170.10.1 Units of Dry Capacity

At Alva and Aregos

								Metric	Metric
<b>moio</b>								855.060 L	1061.220 L
15	<b>fanga</b>							57.004 L	70.748 L
60	4	<b>alqueire</b>						14.251 L	17.687 L
240	16	4	<b>quarta</b>					3.562 75 L	4.421 75 L
480	32	8	2	<b>oitava</b>				1.781 375 L	2.210 875 L
960	64	16	4	2	<b>maquia</b>			890.687 5 mL	1.105 437 5 L
1920	128	32	8	4	2	<b>selamim</b>		445.343 75 mL	552.271 875 mL
3840	256	64	16	8	4	2	<b>meio selamim</b>	222.671 875 mL	276.359 375 mL

Old scale and new scale at Armamar

								Metric	Metric
<b>moio</b>								1026.600 L	917.580 L
15	<b>fanga</b>							68.440 L	61.172 L
60	4	<b>alqueire</b>						17.110 L	15.293 L
240	16	4	<b>quarta</b>					4.277 5 L	3.823 25 L
480	32	8	2	<b>oitava</b>				2.138 75 L	1.911 625 L
960	64	16	4	2	<b>maquia</b>			1.069 375 L	955.812 5 mL
1920	128	32	8	4	2	<b>selamim</b>		534.687 5 mL	477.906 25 mL
3840	256	64	16	8	4	2	<b>meio selamim</b>	267.343 75 mL	238.953 125 mL



## At Ferreira de Aves

								Metric
<b>moio</b>								844.080 L
15	<b>fanaga</b>							56.272 L
60	4	<b>alqueire</b>						14.068 L
240	16	4	<b>quarta</b>					3.517 L
480	32	8	2	<b>oitava</b>				1.758 5 L
960	64	16	4	2	<b>maquia</b>			879.25 mL
1920	128	32	8	4	2	<b>selamim</b>		439.625 mL
3840	256	64	16	8	4	2	<b>meio selamim</b>	219.812 5 mL

## Old and new scale at Ferreiros de Tendaes

								Metric	Metric
<b>moio</b>								920.280 L	1022.100 L
15	<b>fanga</b>							61.352 L	68.140 L
60	4	<b>alqueire</b>						15.338 L	17.035 L
240	16	4	<b>quarta</b>					3.834 5 L	4.258 75 L
480	32	8	2	<b>oitava</b>				1.917 25 L	2.129 375 L
960	64	16	4	2	<b>maquia</b>			958.625 mL	1.064 687 5 L
1920	128	32	8	4	2	<b>selamim</b>		479.312 5 mL	532.343 75 mL
3840	256	64	16	8	4	2	<b>meio selamim</b>	239.656 25 mL	266.171 875 mL

## At Fragoas, Freixedo, and Golfar

								Metric	Metric	Metric
<b>moio</b>								937.920 L	928.320 L	831.480 L
15	<b>fanga</b>							62.528 L	61.888 L	55.432 L
60	4	<b>alqueire</b>						15.632 L	15.472 L	13.858 L
240	16	4	<b>quarta</b>					3.908 L	3.868 L	3.464 5 L
480	32	8	2	<b>oitava</b>				1.954 L	1.934 L	1.732 25 L
960	64	16	4	2	<b>maquia</b>			977.0 mL	967.0 mL	866.125 mL
1920	128	32	8	4	2	<b>selamim</b>		488.5 mL	483.5 mL	433.062 5 mL
3840	256	64	16	8	4	2	<b>meio selamim</b>	244.25 mL	241.75 mL	216.531 25 mL

## At Ladorico

								Metric
<b>moio</b>								992.160 L
15	<b>fanga</b>							66.144 L
60	4	<b>alqueire</b>						16.536 L
240	16	4	<b>quarta</b>					4.134 L
480	32	8	2	<b>oitava</b>				2.067 L
960	64	16	4	2	<b>maquia</b>			1.033 5 L
1920	128	32	8	4	2	<b>selamim</b>		516.75 mL
3840	256	64	16	8	4	2	<b>meio selamim</b>	258.375 mL









At Santa Comba Dão and Foz Dão

								Metric	Metric
<b>moio</b>								943.020 L	1073.28 L
15	<b>fanga</b>							62.868 L	71.552 L
60	4	<b>alqueire</b>						15.717 L	17.888 L
240	16	4	<b>quarta</b>					3.929 25 L	4.472 L
480	32	8	2	<b>oitava</b>				1.964 625 L	2.236 L
960	64	16	4	2	<b>maquia</b>			982.312 5 mL	1.118 L
1920	128	32	8	4	2	<b>selamim</b>		491.156 2 mL	559 mL
3840	256	64	16	8	4	2	<b>meio selamim</b>	245.578 1 mL	279.5 mL

170.10.2 Units of Liquid Capacity

At Alva, Castro Daire, Mões, and Reriz

								Metric
<b>tonel</b>								1392 L
2	<b>pipa</b>							696 L
50	25	<b>almude</b>						27.840 L
100	50	2	<b>pote</b>					13.920 L
600	300	12	6	<b>canada</b>				2.32 L
2400	1200	48	24	4	<b>quartilho</b>			580 mL
4800	2400	96	48	8	2	<b>meio quartilho</b>		290 mL
9600	4800	192	96	16	4	2	<b>quarto de quartilho</b>	145 mL

At Aregos and Armamar

								Metric	Metric
<b>tonel</b>								1287 L	1256.75 L
2	<b>pipa</b>							643.5 L	628.375 L
50	25	<b>almude</b>						25.740 L	25.135 L
100	50	2	<b>pote</b>					12.870 L	12.567 5 L
550	275	11	5½	<b>canada</b>				2.34 L	2.285 L
2200	1100	44	22	4	<b>quartilho</b>			585 mL	571.25 mL
4400	2200	88	44	8	2	<b>meio quartilho</b>		293 mL	285.625 mL
8800	4400	176	88	16	4	2	<b>quarto de quartilho</b>	146 mL	142.812 5 mL

At Canas de Senhorim

								Metric
<b>tonel</b>								1343 L
2	<b>pipa</b>							671.5 L
50	25	<b>almude</b>						26.860 L
100	50	2	<b>pote</b>					13.430 L
600	300	12	6	<b>canada</b>				2.238 3 L
2400	1200	48	24	4	<b>quartilho</b>			559.583 3 mL
4800	2400	96	48	8	2	<b>meio quartilho</b>		279.791 7 mL
9200	4800	192	96	16	4	2	<b>quarto de quartilho</b>	139.898 3 mL

## At Carregal, Currello, and Oliveira do Conde

								Metric
<b>tonel</b>								1276.8 L
2	<b>pipa</b>							638.4 L
50	25	<b>almude</b>						25.536 L
100	50	2	<b>pote</b>					12.768 L
600	300	12	6	<b>canada</b>				2.128 L
2400	1200	48	24	4	<b>quartilho</b>			532 mL
4800	2400	96	48	8	2	<b>meio quartilho</b>		266 mL
9600	4800	192	96	16	4	2	<b>quarto de quartilho</b>	133 mL

## At Couto and Oliveira de Frades

								Metric
<b>tonel</b>								1362 L
2	<b>pipa</b>							681 L
50	25	<b>almude</b>						27.240 L
100	50	2	<b>pote</b>					13.620 L
600	300	12	6	<b>canada</b>				2.270 L
2400	1200	48	24	4	<b>quartilho</b>			567.5 mL
4800	4200	96	48	8	2	<b>meio quartilho</b>		283.75 mL
9600	8400	192	96	16	4	2	<b>quarto de quartilho</b>	141.875 mL

## At Couto de Mosteiro, Freixedo, and Óvoa

								Metric
<b>tonel</b>								1370.4 L
2	<b>pipa</b>							685.2 L
50	25	<b>almude</b>						27.408 L
100	50	2	<b>pote</b>					13.704 L
600	300	12	6	<b>canada</b>				2.284 L
2400	1200	48	24	4	<b>quartilho</b>			571 mL
4800	2400	96	48	8	2	<b>meio quartilho</b>		285.5 mL
9600	4800	192	96	16	4	2	<b>quarto de quartilho</b>	142.75 mL

## For wine at Ferreira de Aves

								Metric
<b>tonel</b>								1530.4 L
2	<b>pipa</b>							765.2 L
50	25	<b>almude</b>						30.608 L
100	50	2	<b>pote</b>					15.304 L
625	312½	12½	6¼	<b>canada</b>				2.448 64 L
2500	1250	50	25	4	<b>quartilho</b>			612.16 mL
5000	2500	100	50	8	2	<b>meio quartilho</b>		306.08 mL
10,000	5000	200	100	16	4	2	<b>quarto de quartilho</b>	153.04 mL

For olive oil at Ferreira de Aves

								Metric
<b>tonel</b>								1469.2 L
2	<b>pipa</b>							734.6 L
50	25	<b>almude</b>						29.384 L
100	50	2	<b>pote</b>					14.692 L
600	300	12	6	<b>canada</b>				2.448 67 L
2400	1200	48	24	4	<b>quartilho</b>			612.167 mL
4800	2400	96	48	8	2	<b>meio quartilho</b>		306.083 mL
9600	4800	192	96	16	4	2	<b>quarto de quartilho</b>	153.042 mL

Old and new scale at Ferreiros de Tendaes

								Metric	Metric
<b>tonel</b>								1130.5 L	1269 L
2	<b>pipa</b>							565.25 L	634.5 L
50	25	<b>almude</b>						22.610 L	25.380 L
100	50	2	<b>pote</b>					11.305 L	12.69 L
600	300	12	6	<b>canada</b>				1.884 17 L	2.115 L
2400	1200	48	24	4	<b>quartilho</b>			471.041 7 mL	528.75 mL
4800	2400	96	48	8	2	<b>meio quartilho</b>		235.520 8 mL	264.375 mL
9600	4800	192	96	16	4	2	<b>quarto de quartilho</b>	117.760 4 mL	132.187 5 mL

At Fragoas

								Metric
<b>tonel</b>								1504.5 L
2	<b>pipa</b>							752.25 L
50	25	<b>almude</b>						30.090 L
100	50	2	<b>pote</b>					15.045 L
550	275	11	5½	<b>canada</b>				2.735 454 L
2200	1100	44	22	4	<b>quartilho</b>			683.863 6 mL
4400	2200	88	44	8	2	<b>meio quartilho</b>		341.931 8 mL
8800	4400	176	88	16	4	2	<b>quarto de quartilho</b>	170.965 9 mL

For wine at Golfar

								Metric
<b>tonel</b>								1700 L
2	<b>pipa</b>							850 L
50	25	<b>almude</b>						34 L
100	50	2	<b>pote</b>					17 L
625	312½	12½	6¼	<b>canada</b>				2.72 L
2500	1250	50	25	4	<b>quartilho</b>			680 mL
5000	2500	100	50	8	2	<b>meio quartilho</b>		340 mL
10,000	5000	200	100	16	4	2	<b>quarto de quartilho</b>	170 mL

For olive oil at Golfar

								Metric
<b>tonel</b>								1632 L
2	<b>pipa</b>							816 L
50	25	<b>almude</b>						32.640 L
100	50	2	<b>pote</b>					16.32 L
600	300	12	6	<b>canada</b>				2.72 L
2400	1200	48	24	4	<b>quartilho</b>			680 mL
4800	2400	96	48	8	2	<b>meio quartilho</b>		340 mL
9600	4800	192	96	16	4	2	<b>quarto de quartilho</b>	170 mL

For wine at Ladorico

								Metric
<b>tonel</b>								1595 L
2	<b>pipa</b>							797.5 L
50	25	<b>almude</b>						31.900 L
100	50	2	<b>pote</b>					15.950 L
625	312½	12½	6¼	<b>canada</b>				2.552 L
2500	1250	50	25	4	<b>quartilho</b>			638 mL
5000	2500	100	50	8	2	<b>meio quartilho</b>		319 mL
10,000	5000	200	100	16	4	2	<b>quarto de quartilho</b>	159.5 mL

For olive oil at Ladorico

								Metric
<b>tonel</b>								1531.2 L
2	<b>pipa</b>							765.6 L
50	25	<b>almude</b>						30.624 L
100	50	2	<b>pote</b>					15.312 L
600	300	12	6	<b>canada</b>				2.552 L
2400	1200	48	24	4	<b>quartilho</b>			638 mL
4800	2400	96	48	8	2	<b>meio quartilho</b>		319 mL
9600	4800	192	96	16	4	2	<b>quarto de quartilho</b>	159.5 mL

Old scale at Lamego

								Metric
<b>tonel</b>								1266.75 L
2	<b>pipa</b>							633.375 L
50	25	<b>almude</b>						25.335 L
100	50	2	<b>pote</b>					12.667 5 L
600	300	12	6	<b>canada</b>				2.111 25 L
2400	1200	48	24	4	<b>quartilho</b>			527.812 5 mL
4800	2400	96	48	8	2	<b>meio quartilho</b>		263.906 2 mL
9600	4800	192	96	16	4	2	<b>quarto de quartilho</b>	131.953 1 mL

## New scale at Lamego

								Metric
<b>tonel</b>								1266.75 L
2	<b>pipa</b>							633.375 L
50	25	<b>almude</b>						25.335 L
100	50	2	<b>pote</b>					12.667 5 L
550	275	11	5½	<b>canada</b>				2.303 182 L
2200	1100	44	22	4	<b>quartilho</b>			575.795 4 mL
4400	2200	88	44	8	2	<b>meio quartilho</b>		287.897 7 mL
8800	4400	176	88	16	4	2	<b>quarto de quartilho</b>	143.948 9 mL

## At Mangualde

								Metric
<b>tonel</b>								1366.1 L
2	<b>pipa</b>							668.05 L
50	25	<b>almude</b>						26.722 L
100	50	2	<b>pote</b>					13.361 L
625	312½	12½	6¼	<b>canada</b>				2.138 L
2500	1250	50	25	4	<b>quartilho</b>			534 mL
5000	2500	100	50	8	2	<b>meio quartilho</b>		267 mL
10,000	5000	200	100	16	4	2	<b>quarto de quartilho</b>	134 mL

## At Moimenta da Beira

								Metric
<b>tonel</b>								1290 L
2	<b>pipa</b>							645 L
50	25	<b>almude</b>						25.800 L
100	50	2	<b>pote</b>					12.900 L
550	275	11	5½	<b>canada</b>				2.345 454 L
2200	1100	44	22	4	<b>quartilho</b>			586.363 6 mL
4400	2200	88	44	8	2	<b>meio quartilho</b>		293.181 8 mL
8800	4400	176	88	16	4	2	<b>quarto de quartilho</b>	146.590 9 mL

## At Mondim and Mortagoa

								Metric	Metric
<b>tonel</b>								1242.8 L	1108.8 L
2	<b>pipa</b>							621.4 L	554.4 L
50	25	<b>almude</b>						24.856 L	22.176 L
100	50	2	<b>pote</b>					12.428 L	11.088 L
550	275	11	5½	<b>canada</b>				2.259 636 L	2.016 L
2200	1100	44	22	4	<b>quartilho</b>			564.909 1 mL	504 mL
4400	2200	88	44	8	2	<b>meio quartilho</b>		282.454 5 mL	252 mL
8800	4400	176	88	16	4	2	<b>quarto de quartilho</b>	141.227 3 mL	126 mL









## At São Pedro do Sul

								Metric
<b>tonel</b>								1206 L
2	<b>pipa</b>							603 L
50	25	<b>almude</b>						24.120 L
100	50	2	<b>pote</b>					12.060 L
600	300	12	6	<b>canada</b>				2.010 L
2400	1200	48	24	4	<b>quartilho</b>			502.5 mL
4800	2400	96	48	8	2	<b>meio quartilho</b>		251.25 mL
9600	4800	192	96	16	4	2	<b>quarto de quartilho</b>	125.625 mL

## For wine at Satam

								Metric
<b>tonel</b>								1670 L
2	<b>pipa</b>							835 L
50	25	<b>almude</b>						33.400 L
100	50	2	<b>pote</b>					16.700 L
625	312½	12½	6¼	<b>canada</b>				2.672 L
2500	1250	50	25	4	<b>quartilho</b>			668 mL
5000	2500	100	50	8	2	<b>meio quartilho</b>		334 mL
10,000	5000	200	100	16	4	2	<b>quarto de quartilho</b>	167 mL

## For olive oil at Satam

								Metric
<b>tonel</b>								1603.2 L
2	<b>pipa</b>							801.6 L
50	25	<b>almude</b>						32.064 L
100	50	2	<b>pote</b>					16.032 L
600	300	12	6	<b>canada</b>				2.672 L
2400	1200	48	24	4	<b>quartilho</b>			668 mL
4800	2400	96	48	8	2	<b>meio quartilho</b>		334 mL
9600	4800	192	96	16	4	2	<b>quarto de quartilho</b>	167 mL

## At Sernancelhe

								Metric
<b>tonel</b>								1282.8 L
2	<b>pipa</b>							641.4 L
50	25	<b>almude</b>						25.656 L
100	50	2	<b>pote</b>					12.828 L
600	300	12	6	<b>canada</b>				2.138 L
2400	1200	48	24	4	<b>quartilho</b>			534.5 mL
4800	2400	96	48	8	2	<b>meio quartilho</b>		267.25 mL
9600	4800	192	96	16	4	2	<b>quarto de quartilho</b>	133.625 mL

For wine at Silvã de Cima

								Metric
<b>tonel</b>								1452.3 L
2	<b>pipa</b>							726.15 L
50	25	<b>almude</b>						29.046 L
100	50	2	<b>pote</b>					14.523 L
625	312½	12½	6¼	<b>canada</b>				2.323 68 L
2500	1250	50	25	4	<b>quartilho</b>			580.92 mL
5000	2500	100	50	8	2	<b>meio quartilho</b>		290.46 mL
10,000	5000	200	100	16	4	2	<b>quarto de quartilho</b>	145.23 mL

For olive oil at Silvã de Cima

								Metric
<b>tonel</b>								1394.2 L
2	<b>pipa</b>							697.1 L
50	25	<b>almude</b>						27.884 L
100	50	2	<b>pote</b>					13.942 L
600	300	12	6	<b>canada</b>				2.323 67 L
2400	1200	48	24	4	<b>quartilho</b>			580.916 7 mL
4800	2400	96	48	8	2	<b>meio quartilho</b>		290.458 3 mL
9600	4800	192	96	16	4	2	<b>quarto de quartilho</b>	145.229 2 mL

At Sinfães and at Sul

								Metric	Metric
<b>tonel</b>								1307.4 L	1313.9 L
2	<b>pipa</b>							653.7 L	656.95 L
50	25	<b>almude</b>						26.148 L	26.278 L
100	50	2	<b>pote</b>					13.074 L	13.139 L
600	300	12	6	<b>canada</b>				2.179 L	2.189 83 L
2400	1200	48	24	4	<b>quartilho</b>			544.75 mL	547.458 3 mL
4800	2400	96	48	8	2	<b>meio quartilho</b>		272.375 mL	272.729 2 mL
9600	4800	192	96	16	4	2	<b>quarto de quartilho</b>	136.187 5 mL	136.864 6 mL

At Tabuaço and Tarouca

								Metric	Metric
<b>tonel</b>								1245.2 L	1262 L
2	<b>Pipa</b>							622.6 L	631 L
50	25	<b>almude</b>						24.904 L	25.240 L
100	50	2	<b>pote</b>					12.452 L	12.620 L
550	275	11	5½	<b>canada</b>				2.264 L	2.294 54 L
2200	1100	44	22	4	<b>quartilho</b>			566 mL	573.636 4 mL
4400	2200	88	44	8	2	<b>meio quartilho</b>		283 mL	286.818 2 mL
8800	4400	176	88	16	4	2	<b>quarto de quartilho</b>	141.5 mL	143.409 1 mL

Old scale and new scale at Tendaes

								Metric	Metric
<b>tonel</b>								1130.5 L	1294.2 L
2	<b>Pipa</b>							565.25 L	647.1 L
50	25	<b>almude</b>						22.610 L	25.884 L
100	50	2	<b>pote</b>					11.305 L	12.942 L
600	300	12	6	<b>canada</b>				1.884 17 L	2.157 L
2400	1200	48	24	4	<b>quartilho</b>			471.041 7 mL	539.25 mL
4800	2400	96	48	8	2	<b>meio quartilho</b>		235.520 8 mL	269.625 mL
9600	4800	192	96	16	4	2	<b>quarto de quartilho</b>	117.760 4 mL	134.812 5 mL

At Tondella and Vouzella

								Metric	Metric
<b>tonel</b>								1344 L	1250.4 L
2	<b>pipa</b>							672 L	625.2 L
50	25	<b>almude</b>						26.880 L	25.008 L
100	50	2	<b>pote</b>					13.440 L	12.504 L
600	300	12	6	<b>canada</b>				2.240 L	2.084 L
2400	1200	48	24	4	<b>quartilho</b>			560 mL	521 mL
4800	2400	96	48	8	2	<b>meio quartilho</b>		280 mL	260.5 mL
9600	4800	192	96	16	4	2	<b>quarto de quartilho</b>	140 mL	130.25 mL

## 171 Portuguese East Africa

See *Mozambique*.

## 172 Portuguese Guinea

See also *Guinea-Bissau*.

### 172.1 Currency

1914–1975: 1 Portuguese Guinea escudo = 100 centavos

1909–1914: 1 Portuguese Guinea real

In 1505, the Portuguese established a Government at Kochi and nominated the first Viceroy. In 1510, a Government was established by Albuquerque in Goa. Diu was settled in 1535, and Damao in 1559. In 1947, Portuguese India included Goa, as well as the coastal enclaves of Daman and Diu, and the enclaves of Dadra and Nagar Haveli. The territories of Portuguese India were sometimes referred to collectively as Goa. Portugal lost Dadra and Nagar Haveli in 1954, and finally Goa, Daman, and Diu in 1961.

Except for the measures of capacity and weight, old Portuguese scales were in use before 1961.

*Main sources:* [AHME] and [MATH]

## 173 Portuguese India

See also *Damao*, *Diu*, and *Goa* under *India*.

### 173.1 Currency

1958–1961: 1 Portuguese Indian escudo = 100 centavos

1871–1958: 1 Indian rupia = 16 tangas =  
960 réis

173.2 Units of Dry Capacity

Traditional upper scale

						Metric
<b>cumbo</b>						9866.673 6 L
20	<b>candil</b>					493.333 68 L
400	20	<b>curo</b>				24.666 684 L
800	40	2	<b>chuoto</b>			12.333 342 L
3200	160	8	4	<b>pori</b>		3.083 335 L
9600	480	24	12	3	<b>medida</b>	1.027 778 33 L

Traditional lower scale

					Metric
<b>pori</b>					3.083 335 L
2	<b>nactis</b>				1.541 667 5 L
4	2	<b>anatis</b>			770.833 75 mL
8	4	2	<b>guernatis</b>		385.416 875 mL
16	8	4	2	<b>salavemes</b>	192.708 437 mL

Scale used during the early twentieth century and metric-linked system

				Metric	Metric
<b>candel or candil</b>				159.7 L	160 L
20	<b>curo</b>			7.986 L	8 L
40	2	<b>puili</b>		3.993 L	4 L
160	8	4	<b>podd</b>	998 mL	1 L

173.3 Units of Liquid Capacity

Traditional system

			Metric
<b>candil</b>			33.484 616 L
2	<b>almude</b>		16.742 308 L
4	2	<b>canada</b>	8.371 154 L

173.4 Units of Weight

At Baçaim, present-day Visai-virar

			Metric
<b>bahār</b>			234.663 75 kg
20	<b>mann</b>		11.733 19 kg
800	40	<b>ser</b>	293.330 g

At Banda

		Metric
<b>bahār</b>		330.152 69 kg
100	<b>catty</b>	3.301 53 kg

At Batticaloa

			Metric
<b>bahār</b>			212.058 00 kg
22	<b>frāsila</b>		9.639 00 kg
2200	100	<b>fen</b>	96.390 g

## At small port of Bengal

		Metric
<b>mann</b>		21.343 50 kg
40	<b>ser</b>	533.587 kg

## At Calcutta

			Metric
<b>bahār</b>			207.468 00 kg
20	<b>frāsila</b>		10.373 39 kg
2000	100	<b>fen</b>	103.734 g

## At Cannanore, present-day Kannur

			Metric
<b>bahār</b>			205.617 65 kg
20	<b>frāsila</b>		10.280 88 kg
2000	100	<b>fen</b>	102.808 8 g

## At Cannanore, present-day Kannur

			Metric
<b>bahār</b>			211.498 59 kg
20	<b>mann</b>		10.574 93 kg
800	40	<b>ser</b>	264.373 g

## At Ceylon, present-day Sri Lanka

			Metric
<b>bahār</b>			176.212 96 kg
20	<b>frāsila</b>		8.810 65 kg
2000	100	<b>fen</b>	881.065 g

## At Ceylon, present-day Sri Lanka

		Metric
<b>calanja</b>		4.380 84 g
20	<b>mangelin</b>	210.4 mg

## At Chaul

			Metric
<b>candy</b>			234.998 43 kg
20	<b>mann</b>		11.749 92 kg
800	40	<b>ser</b>	293.748 g

## At Cochin, present-day Kochi

			Metric
<b>bahār</b>			166.272 75 kg
20	<b>frāsila</b>		8.313 64 kg
2000	100	<b>fen</b>	831.364 g

## At Cosmim

			Metric
<b>bahār</b>			144.585 00 kg
120	<b>bisa</b>		1.204 87 kg
12,000	100	<b>tical</b>	12.049 g

## At Cuama

		Metric
<b>bahār</b>		293.760 00 kg
20	<b>frāsila</b>	14.688 kg

## At Dabul or Dabhol

			Metric
<b>bahār</b>			229.500 00 kg
20	<b>mann</b>		11.475 00 kg
800	40	<b>ser</b>	286.875 g

## At Dala Township

			Metric
<b>bahār</b>			141.831 00 kg
120	<b>bisa</b>		1.181 92 kg
12,000	100	<b>tical</b>	118.192 g

## At Diu among the Moors

			Metric
<b>candy</b>			244.182 42 kg
20	<b>mann</b>		12.209 12 kg
800	40	<b>ser</b>	305.228 g

## At Diu among the Portuguese people

		Metric
<b>bahār</b>		235.008 00 kg
20	<b>mann</b>	11.750 40 kg

## At Goa

		Metric
<b>candy</b>		230.320 00 kg
20	<b>mann</b>	11.016 00 kg

1 **almeno** (during the sixteenth century) = 1.2 kg  
[MATH, p. 236].

Traditional upper scale

						Metric
<b>candil</b>						220.102 560 kg
1¼	<b>bahar</b>					205.429 056 kg
3¾	3½	<b>quintal</b>				58.694 016 kg
20	18⅔	5⅓	<b>mao</b>			11.005 128 kg
80	74⅔	21⅓	4	<b>dora</b>		2.751 282 kg
480	448	128	24	6	<b>arratel</b>	458.547 g

Traditional lower scale

						Metric
<b>arratel</b>						458.547 g
2	<b>marco</b>					229.273 5 g
16	8	<b>onça</b>				28.659 187 5 g
128	64	8	<b>outava</b>			3.582 498 4 g
384	192	24	3	<b>scrupulo</b>		1.194 132 8 g
9216	4608	576	72	24	<b>grao</b>	49.755 5 mg

Scale reported during the twentieth century

						Metric
<b>mao</b>						37.32 kg
–	<b>arroba</b>					14.69 kg
40	–	<b>geira or ceira</b>				933.04 g
–	32	–	<b>arratel</b>			459 g
–	–	–	16	<b>onça</b>		28.69 g
–	–	80	–	–	<b>tola</b>	11.664 g

For gold and silver

		Metric
<b>matal</b>		2.388 265 58 g
48	<b>grao</b>	49.755 5 mg

174 Portuguese Timor

See *East Timor*.

175 Prince of Wales Island

See *Penang Island*.

176 Puerto Rico (Commonwealth of Puerto Rico)

Puerto Rico was discovered by Christopher Columbus in 1493, and was established as a Spanish colony and part of the Spanish West Indies in 1508. It was ceded to the United States under the Treaty of Paris in 1898. Puerto Rico became a U.S. Territory in 1917, and achieved Commonwealth status in 1952.

The metric system has been used since 1849, legally adopted since 1860 and compulsory since 1868.

*Main sources:* [MART3] and [UN55]

176.1 Currency

1917–: 1 US dollar = 100 cents  
–1916: 1 Spanish peso = 8 reales

176.2 Units of Area

Traditional system

					Metric
<b>caballeria</b>					7858.826 m <sup>2</sup>
2	<b>cuerdas<sup>a</sup></b>				3930.395 625 m <sup>2</sup>
5	2½	<b>cuerto</b>			1572.158 250 m <sup>2</sup>
7998	40	16	<b>parcela</b>		98.259 89 m <sup>2</sup>
1,120,719¾	5605	2250	140⅞	<b>vara cuadrada</b>	70.123 02 dm <sup>2</sup>

<sup>a</sup>According to [ROBI3, p. 194], equal to 0.971 2 acres = 3930.307 m<sup>2</sup>

Other reported measures:

1 **cuerta** (metric-linked) = 3000 m<sup>2</sup>.

176.3 Units of Dry Capacity

Dry commodities were usually sold by weight.

1 **barril** (for wheat flour) = 196 lbs = 88.904 160 kg;  
1 **quintal** (for sugar and coffee) = 100 libras di Castilia = 46.009 200 kg.

176.4 Units of Liquid Capacity

Some reported measures:

110 gallons (for rum) = 416.384 100 L.

176.5 Units of Weight

Some reported measures:

1 **libra** = 461 g.

177 Qatar

Qatar was considered to be a dependency of Bahrain until 1868. The area came under Ottoman control from 1872 until the beginning of World War I, when the Ottomans evacuated the Qatar

Peninsula. Qatar was placed under the protection of Britain in 1916. In 1969, it became part of the Federation of Arab Emirates, which was constituted from the Trucial States, Qatar, and Bahrain. Qatar achieved independence in 1971.

177.1 Currency

1973–: 1 Qatari riyal = 100 dirhams  
1966–1973: 1 Dubai and Qatar riyal = 100 dirhams  
1966: 1 Saudi riyal = 100 dirhams  
1959–1966: 1 Persian Gulf rupee = 100 naye paise  
1957–1959: 1 Indian rupee = 100 naye paise  
1916–1957: 1 Indian rupee = 16 anna

178 Qu'aiti State

See also *South Yemen*.

A sultanate in the Hadhramaut region, established in 1902 as the Qu'aiti State of Shihri and Mukulla. In 1955, it was renamed the Qu'aiti State in Hadhramaut. In 1967, it became part of South Yemen.

178.1 Currency

- 1966–1967: 1 South Arabian dinar = 1000 fils  
1951–1966: 1 East African shilling = 100 cents  
1942–1951: 1 Indian rupee = 16 anna = 192 pies  
1902–1942: 1 ryal

179 Republic of Ragusa (1358–1808)

See *Dalmatia, France, and the Kingdom of Illyria*.

This Republic lasted until 1808, when it became part of the autonomous Illyrian Province of France.

180 Rashtrakuta Empire (753–982)

See *India*.

181 Reddy Kingdom (1325–1448)

See *India*.

182 Republic of Korea

See *North Korea*.

183 Réunion [Formerly: Bourbon Island]

Captain Goubert claimed the uninhabited island for France in 1638. The French East India Company settled the island, then known as the Île de Bourbon, in 1642. It was renamed Réunion in 1793. The island was captured by the British in 1810, but returned to be a French colony in 1815. Réunion became a French overseas département in 1946.

The metric system has been official since 1839.

183.1 Currency

- 2002–: 1 euro = 100 euro-cents  
1973–2002: 1 French franc = 100 centimes  
1967–1972: 1 Réunion franc = 100 centimes  
1945–1967: 1 CFA franc = 100 centimes  
1874–1945: 1 Réunion franc = 100 centimes  
–1874: 1 French franc = 100 centimes

183.2 Units of Length

- 1 **aune** = 1.188 446 m;  
1 **perche** = 18 or 20 pieds = 5.847 m or 6.497 m.

Traditional upper scale

			Metric
<b>toise</b>			1.949 0 m
1½	<b>brasse</b>		1.624 2 m
6	5	<b>pied de roi</b>	324.839 4 mm

Traditional lower scale

				Metric
<b>pied de roi</b>				324.839 4 mm
12	<b>pouce</b>			27.069 95 mm
144	12	<b>ligne</b>		2.255 829 mm
1728	144	12	<b>point</b>	188.00 µm

Alternative lower scale

				Metric
<b>pied de roi</b>				324.839 4 mm
12	<b>pouce</b>			27.069 95 mm
120	10	<b>ligne</b>		2.706 995 mm
1200	100	10	<b>point</b>	270.699 µm

For marine use

			Metric
<b>grad des aequators</b>			111,111.06 m
20	<b>lieue marin</b>		5555.553 m
60	3	<b>mille marin</b>	1851.851 m

183.3 Units of Area

			Metric
arpent			3418.868 m <sup>2</sup>
100	perche carrée		34.188 68 m <sup>2</sup>
32,400	324	pied carré	10.552 dm <sup>2</sup>

183.4 Units of Dry Capacity

						Metric
muid						1873.195 2 L
12	setier					156.099 6 L
144		boisseau				13.008 3 L
576	48	4	picotin			3.252 075 L
864	72	6	1½	mesure		2.168 05 L
2304	192	16	4	2⅔	litron	813.02 mL

183.5 Units of Liquid Capacity

							Metric
poignon							268.219 5 L
2	feuillette						134.109 75 L
3	1½	tierçon					89.406 5 L
4	2	1⅓	quartaut				67.054 88 L
36	18	12	9	velte			7.450 54 L
288	144	96	72	8	pinte		931.318 mL
576	288	192	144	16	2	chopin	465.659 mL

183.6 Units of Weight

1 marc (for gold and silver) = ½ livre = 244.752 9 g;  
1 carat (for precious stones) = 4 grains = 205.872 9 mg.

Traditional system

						Metric
livre						489.505 8 g
2	marc					244.752 9 g
16	8	once				30.594 1 g
128	64	8	gros			3.824 3 g
384	192	24	3	denier		1.274 75 g
9216	4608	576	72	24	grain	53.115 mg

For marine use

					Metric
<b>tonneau de mer</b>					979.011 6 kg
2	<b>millier</b>				489.505 8 kg
20	10	<b>quintaux</b>			48.950 58 kg
60	30	3	<b>charge</b>		16.316 86 kg
2000	1000	100	33⅓	<b>livre</b>	489.505 8 g

Rounded traditional upper scale

			Metric
<b>charge</b>			14.685 kg
3	<b>quintal</b>		4.894 kg
300	100	<b>livre</b>	489.500 g

Rounded traditional lower scale

						Metric
<b>livre</b>						489.500 g
2	<b>marc</b>					244.75 g
16	8	<b>once</b>				30.594 g
161	80½	10⅞	<b>gros</b>			3.040 4 g
9790	4895	611⅞	60 <sup>139/161</sup>	<b>grain</b>		50 mg
244,750	122,375	15,296⅞	1520 <sup>39/161</sup>	25	<b>carobe</b>	2 mg

For medical use

					Metric
<b>livre</b>					489.505 8 g
16	<b>once</b>				30.594 1 g
128	8	<b>drachme</b>			3.824 26 g
384	24	3	<b>Scrupule</b>		1.274 75 g
9216	576	72	24	<b>grain</b>	53.115 mg

184

Rhodesia

See *Zimbabwe*.

185

Riau Archipelago

See *Indonesia*.

186

Rif Republic

See *Morocco*.

186.1

Currency

1923–1926: 1 riffan

187

Río Muni

See also *Equatorial Guinea*.

This region was ceded by Portugal to Spain in 1778, but was not colonized until after 1900. Río Muni became a province of Spanish Guinea in 1959.

188
Roman Egypt or Aegyptus (30 BCE–c. 641)

[MAYE], [PTOL], [RATH], [SHEL], [SHEL2], [VANL], and [WARB]

In 30 BCE, after Octavian defeated Mark Anthony, the Ptolemaic kingdom of Egypt fell to the Roman Empire as the Roman province of Egypt. The area remained a Roman province until the Muslim conquest in 641.

Main sources: [ADAM3], [BAGN], [BAGN2], [BOYA], [DUNC], [DUNC2], [DUNC3], [FLEI], [FOWL2], [JAHN], [KRUI],

188.1
Currency

1 talent = 6000 drachmas  
1 denarius = 4 drachmas (or 1 tetradrachma)  
1 tetradrachma = 24 obols (but usually 28 or 29 obols)

188.2
Units of Length

												Metric
<b>Gallic leuga</b>												2217 m
1½	<b>milia passuum</b> <sup>a</sup>											1478 m
750	500	<b>decempeda</b>										2.957 m
1500	1000	2	<b>passus</b>									1.478 m
3000	2000	4	2	<b>gradus</b>								739.2 mm
5000	3333⅓	6⅔	3⅓	1⅔	<b>cubit</b>							443.55 mm
6000	4000	8	4	2	1⅕	<b>palmipes</b>						369.63 mm
7500	5000	10	5	2½	1½	1¼	<b>pes</b>					295.7 mm
30,000	20,000	40	20	10	6	5	4	<b>palm</b>				74 mm
90,000	60,000	120	60	30	18	15	12	3	<b>uncia</b>			24.6 mm
120,000	80,000	160	80	40	24	20	16	4	1½	<b>digitus</b>		18.48 mm

<sup>a</sup>The distance that a soldier would march in a thousand double paces

188.3
Units of Area

											Metric
<b>saltus</b>											~2,012,044 m <sup>2</sup>
4	<b>centuria</b> <sup>a</sup>										~503,011 m <sup>2</sup>
64	16	<b>millena</b>									~31,438.18 m <sup>2</sup>
400	100	6¼	<b>heredium</b> <sup>b</sup>								~5030.11 m <sup>2</sup>
800	200	12½	2	<b>iugerum</b>							~2515.05 m <sup>2</sup>
1600	400	25	4	2	<b>actus</b>						~1257.53 m <sup>2</sup>
2400	600	37½	6	3	1½	<b>triens</b>					~838.35 m <sup>2</sup>
9600	2400	150	24	12	6	4	<b>uncia</b>				~209.59 m <sup>2</sup>

<sup>a</sup>This was the normal size of a century = 20 × 20 actus. Nonstandard centuries were also used, and varied between 50 and 400 iugera

<sup>b</sup>An area of land sufficient for one person. Later reported as 7 iugera. See also [FUSS]

Other measures:

1 **aroura** =  $\sim 2756 \text{ m}^2$ .

## 188.4 Units of Dry Capacity

Scale based on [BAGN2]

						Metric
<b>artaba</b> <sup>a</sup>						38.808 L
$3\frac{1}{3}$	<b>modius castrensis</b> <sup>b</sup> or <b>modius xystos</b>					11.642 4 L
$4\frac{1}{2}$	$1\frac{1}{20}$	<b>modius Italicus</b> <sup>c</sup>				8.624 L
10	3	$2\frac{1}{9}$	<b>mation</b> or <b>metron</b>			3.880 8 L
40	12	$8\frac{1}{9}$	4	<b>choenix</b>		970.2 mL
72	$21\frac{1}{5}$	16	$7\frac{1}{5}$	$1\frac{1}{5}$	<b>sextarius</b>	539 mL

<sup>a</sup>There were different types of artaba, ranging from 24 to 40 choenikes. An artaba of 40 choenikes has also been reported as 38.78 L and about 43 L

<sup>b</sup>There was also a modius castrensis equal to 22 sextarii = 11.858 L

<sup>c</sup>Also reported as 8.618 L

Scale based on [ERMA]

							Metric
<b>artaba</b>							38.384 L
$3\frac{1}{3}$	<b>modius castrensis</b>						11.815 L
$4\frac{1}{2}$	$1\frac{1}{20}$	<b>modius Italicus</b>					8.752 L
12	$3\frac{1}{5}$	$2\frac{1}{9}$	<b>chus</b>				3.282 L
48	$14\frac{2}{5}$	$10\frac{1}{9}$	4	<b>choenix</b>			820.5 mL
72	$21\frac{1}{5}$	16	6	$1\frac{1}{2}$	<b>sextarius</b>		547 mL
144	$43\frac{1}{5}$	32	12	3	2	<b>cotylae</b>	273.5 mL

Other measures that appeared at different times and places for a variety of commodities:

1 **môion** (for chaff) = ?

1 **sarganê** (for chaff) = about 150 lbs

1 **desmê** (for hay) = ?

1 **gomos** (for various goods) = ?

## 188.5 Units of Liquid Capacity

						Metric
<b>gomaria</b>						54.6 L
4	<b>keramion dichôron</b>					13.65 L
$6\frac{2}{3}$	$1\frac{1}{3}$	<b>oxyrhynchition</b>				8.19 L
8	2	$1\frac{1}{5}$	<b>keramion monochôron</b>			6.825 L
20	5	3	$2\frac{1}{2}$	<b>gomor</b>		2.73 L
200	50	30	25	10	<b>kotule</b>	273 mL



## 189 Romania

See also *Bukovina, Dobruja, Hungary, Moldavia, Moldova, Transylvania, Ukraine, and Wallachia*.

Present-day Romania covers the territories of the Principality of Wallachia, the Principality of Moldavia, and the Grand Principality of Transylvania. The Principality of Wallachia was founded in 1324, and the Principality of Moldavia in 1352. The two were merged in 1861 to form the United Romanian Principality. In 1878, full independence was achieved.

The metric system has been used since 1864, legally optional since 1866, and compulsory since 1884 and 1911. Prior to the metric system, many of the Ottoman units and Austrian units (in the western parts) were in use.

*Main sources:* [LAZA], [MART3], and [STOI]

## 189.1 Currency

1868–:	1 Romanian leu = 100 bani or para
1861–1867:	1 Romanian leu or aslan = 40 para or parale = 120 bani or asper
–1861:	1 Turkish piastre or leu = 40 para or parale = 80 lascai = 120 bani or asper

## 189.2 Units of Length

After 1683

				Metric
<b>prăjină</b>				5.943 m
3	<b>stânjen</b>			1.981 m
24	8	<b>picior</b>		247.6 mm
48	16	2	<b>palmă or puhm</b>	123.8 mm

In Iași, based on [MART3]

						Metric
<b>leghe</b>						3962.320 000 m
666⅔	<b>prăjină</b>					5.943 480 m
2000	3	<b>stânjen</b>				1.981 160 m
16,000	24	8	<b>palmă</b>			247.645 mm
160,000	240	80	10	<b>degetu</b>		24.764 mm
1,600,000	2400	800	100	10	<b>linia</b>	2.476 mm

Upper scale

						Metric
<b>poștă<sup>a</sup></b>						15,697.040 m
2	<b>mila</b>					7848.520 m
4	2	<b>leghe</b>				3924.260 m
2666⅔	1333⅓	666⅔	<b>prăjină</b>			5.886 390 m
8000	4000	2000	3	<b>stânjen</b>		1.962 130 m
24,000	12,000	6000	9	3	<b>endesé, endeseh, or endere</b>	654.043 mm

<sup>a</sup>Varied by location between about 8 and 20 km

Lower scale

						Metric
<b>endesé, endeseh, or endere</b>						654.043 mm
2		<b>picior</b>				327.021 mm
3⅓		1⅔	<b>palmă</b>			196.213 mm
33⅓		16⅔	10	<b>degetu</b>		19.621 3 mm
333⅓		166⅔	100	10	<b>linia</b>	1.962 13 mm

For fabrics

				Metric
<b>halibiu, cotu, or halibin<sup>a</sup></b>				701.27 mm
1 <sup>1</sup> / <sub>17</sub>	<b>cot, endesé, endesa, endeseh, or endere<sup>b</sup></b>			662.31 mm
8 <sup>8</sup> / <sub>17</sub>	8	<b>rup</b>		82.79 mm
16 <sup>16</sup> / <sub>17</sub>	16	2	<b>gref</b>	41.39 mm

<sup>a</sup>For silk and clothes, such as **khalibi** = 683.0 mm (in Bucharest) or 686 mm (in Wallachia). For wool, cotton and woven cloth, such as **halibiu** = 671.3 mm (in Bucharest) and 682 mm (in Wallachia)

<sup>b</sup>For wool, cotton and woven cloth, such as **endazèh** = 641.1 mm (in Bucharest). 1 **cotu** or **endesa** (for fabrics of linen and flax in Iași) = 631.400 mm

Other measures reported during the nineteenth century:

1 **stânjen marin** (for maritime use) = 1.83 m;

1 **stânjen pescăresc** (used by fishermen) = ~1.5 m.

### 189.3 Units of Area

Traditional system

				Metric
<b>pogone</b>				4989.540 561 422 m <sup>2</sup>
5 <sup>23</sup> / <sub>125</sub>	<b>decar</b>			962.488 534 225 m <sup>2</sup>
144	27 <sup>7</sup> / <sub>9</sub>	<b>prăjină pătrat</b>		34.649 587 232 m <sup>2</sup>
1296	250	9	<b>stânjen pătrat</b>	3.849 954 137 m <sup>2</sup>

For agricultural use

		Metric
<b>donumu</b>		919.302 m <sup>2</sup>
1600	<b>arsini pătrat</b>	57.456 dm <sup>2</sup>

Bazaar scale for fabrics

			Metric
<b>cot al bazarului pătrat</b>			0.462 4 m <sup>2</sup>
64	<b>rupi pătrat</b>		7 225 mm <sup>2</sup>
256	4	<b>ghirahe pătrat</b>	1 806.25 mm <sup>2</sup>

Traditional system for fabric

			Metric
<b>cot mic pătrat</b>			0.422 5 m <sup>2</sup>
64	<b>rupi or cotului mic pătrat</b>		6 601.56 mm <sup>2</sup>
256	4	<b>ghirahe or cotului pătrat</b>	1 650.39 mm <sup>2</sup>

In Iași, based on [MART3]

		Metric
<b>faltasce</b>		11,303.985 4 m <sup>2</sup>
2880	<b>stânjen pătrat</b>	3.924 995 m <sup>2</sup>

## 189.4 Units of Dry Capacity

For mercantile use

						Metric
<b>kilé</b>						393.60 L
2	<b>mirza</b>					196.80 L
4	2	<b>koböly</b>				98.40 L
8	4	2	<b>baniță or banniza</b>			49.2 L
16	8	4	2	<b>dimerli</b>		24.60 L
256	128	64	32	16	<b>oka</b>	1.537 5 L

Wallachian scale and traditional system

				Metric	Metric
<b>kilé</b>				681.272 L	674.96 L
8	<b>baniță or banniza</b>			85.159 L	84.37 L
400	50	<b>oka</b>		1.703 L	1.697 4 L
160,000	20,000	400	<b>dram</b>	4.26 mL	4.22 mL

At Brăila before 1866, based on [MART3]

			Metric
<b>kilé</b>			672.800 L
20	<b>baniță or banniza</b>		33.640 L
400	20	<b>oka</b>	1.682 L

In Iași, based on [MART3]

			Metric
<b>kilé</b>			435.100 L
2	<b>mirza</b>		217.550 L
20	10	<b>dimerli</b>	21.755 L

## 189.5 Units of Liquid Capacity

Liquids were generally sold by weight.

Traditional system

		Metric
<b>vadră</b>		14.15 L
10	<b>oka</b>	1.415 L

For aquavite and oil in Bucharest and Iași

		Metric
<b>vadră</b>		15.375 600 L
12	<b>oka</b>	447.967 mL

For all other liquids in Bucharest and Iași

				Metric
<b>vadră</b>				12.813 L
10	<b>oka</b>			1.281 3 L
40	4	<b>lită</b>		320.325 mL
4000	400	100	<b>dramuru</b>	3.203 25 mL

## 189.6 Units of Weight

At Bucharest and Iași

					Metric
<b>kilé</b>					652.928 128 kg
11 $\frac{1}{11}$	<b>cântara or cantariu</b>				56.111 011 kg
512	44	<b>oka</b>			1.275 250 kg
2048	176	4	<b>lită</b>		318.812 5 g
204,800	17,600	400	100	<b>dramuru</b>	3.188 125 g

Other reported measures:

1 **kilé** (in Brăila) = 435.33 kg;

1 **oka** (in the Banat area) =  $2\frac{1}{4}$  Wiener  
Pfund = 1.260 141 7 kg.

## 190 Ruanda

See *Rwanda*.

## 191 Russia [Formerly: Russian Empire, Russian Soviet Federative Socialist Republic]

The first Russian dynasty was founded in Novgorod by the Viking Rurik in 862 CE. The subsequent Kievan state became one of the cultural centers of Europe, as well as one of its most prosperous states, before falling to the Mongol-Tatars of the Batu Khan, in 1240. They established the Ulus of Joch, also known as the state of the Golden Horde. The area was under Mongolian control until the fifteenth century, when Ivan III threw off the control of the Golden Horde and consolidated the whole of Central and Northern Russia under Moscow's dominion. The Russian Empire was enlarged and solidified during the reigns of Ivan the Terrible, Peter the Great and Catherine the Great. In 1917, Nicholas II abdicated under pressure and was replaced by a provisional government that rapidly lost ground to the Bolsheviks, who attained power following the Bolshevik Revolution later that year. After the Russian Civil War, the regional governments and national states became federal republics of the Russian Socialist Federal Soviet Republic. In late 1922, a conference of delegations from the Russian SFSR, the Transcaucasian SFSR, the Ukrainian SSR and the Byelorussian SSR approved the Treaty of Creation of the USSR and the Declaration of the Creation of the USSR. In 1924, the Uzbek and Turkmen Soviet Socialist Republics were separated from the Turkestanian Autonomous Soviet Socialist Republic of the RSFSR. The Tajik Autonomous Soviet Socialist Republic was elevated to a union republic in 1929, becoming the Tajik SSR. In 1936, the Transcaucasian SFSR was broken into the Armenian SSR, the Georgian SSR and the Azerbaijani SSR, and the Turkestanian SSR was divided between the new Kazakh SSR and the Kirghiz SSR. In the early 1940s, many new

republics were created, such as the Karelo-Finnish SSR, the Lithuanian SSR, the Latvian SSR, the Estonian SSR, and the Moldovan SSR. In the autumn of 1991, Estonia, Latvia and Lithuania won their independence. Later that year, the 1922 treaty was annulated, an act that effectively abolished the old USSR.

Very little is known about ancient metrology in Russia, due to a lack of written sources dedicated to units of measurement. Those written sources that do exist, such as works by foreigners who travelled to Russia or by those who were interested in the subject because of the development of Russian trade, only contain indirect information on the measures used in ancient Russia. At any rate, as new archaeological excavations are carried out, the number of sources on metrology is gradually increasing. Specific information on the measures can also be obtained from cultural artefacts and coins.

During the age of feudalism and decentralization, from the twelfth to mid-fifteenth centuries, the Russian metrological systems became extremely diverse, due to the collapse of Kievan Rus' and the emergence of a number of independent and semi-independent principalities. The Principality of Chernigov (?–1401), the Principality of Pleskov (862–1230s), the Grand Duchy of Ryazan (1097–1521), the Novgorod Republic (1136–1478), the Principality of Novgorod-Seversk (1139–1237), the Vladimir-Suzdal Principality (1168–1389), the Kingdom of Galicia-Volhynia (1199–1349), and the Grand Duchy of Moscow (1283–1547), all consolidated local units of measurement and local monetary systems. However, trade between local territorial markets and the growth of monetary relations led to the elimination of local measures and the strengthening of a unified all-Russian measurement system.

The metric system has been used since 1899, legally optional since 1900, and compulsory since 1918 and Jan. 1, 1927. In 1900, the fundamental national units were defined as below:

Length: archine = the distance at 17 °C between the axes of two lines drawn on the platinum-iridium prototype marked "H 1894."

Mass: fount = the mass of the platinum-iridium prototype marked “H 1894.”

Liquid capacity: vedro = the volume of 30 founts of pure water at  $16\frac{2}{3}$  °C.

Dry capacity: garnets = the volume of 4/15 vedro.

*Main sources:* [BELI], [DOUR], [ECON], [HELE], [HELL], [HOLM], [KAUF], [KENN3], [KLIU], [KUPF], [MART3], [MART6], [MURR], [PUSK], [ROMA], [RURL], [RYBA], [SHOS], [SMIT7], [TOOK], [UN55], [UN66], [VESE], and [www.iro.yar.ru](http://www.iro.yar.ru)

*Russian sources:*

Греков, Б. Д., Что такое обжа?, (What is obzhe?) “ИАН СССР”, 6 серия, 1926, No 10-11.

Данилова, Л. В., Очерки по истории землевладения и хоз-ва в Новгородской земле в XIV-XV вв. (Essays on the history of land tenure and household islands in the land of Novgorod in the fourteenth to fifteenth centuries), Moscow, 1955.

## 191.1 Currency

1704–: 1 Russian ruble or rouble = 100 kopeks  
 c.1535–: 1 kopek  
 fourteenth–sixteenth centuries: 1 bélka = 2 dengas (in some Novgorod and Perm regions)

### Gold coins

imperial						
2	half-imperial					
$4\frac{7}{23}$	$2\frac{4}{23}$	ducat <sup>a</sup>				
5	$2\frac{1}{2}$	$1\frac{3}{20}$	two-ruble-piece or Andrew-ducat			
10	5	$2\frac{3}{10}$	2	golden ruble		
20	10	$4\frac{3}{5}$	4	2	half ruble	
40	20	$9\frac{3}{5}$	8	4	2	quarter-ruble

<sup>a</sup>Equal to  $1\frac{1}{10}$  rubles

### Silver coins

ruble						
2	half-ruble					
4	2	quarter-ruble				
5	$2\frac{1}{2}$	$1\frac{1}{4}$	twenty-kopeek-piece			
$6\frac{2}{3}$	$3\frac{1}{3}$	$1\frac{2}{3}$	$1\frac{1}{3}$	fifteen-kopeek-piece		
10	5	$2\frac{1}{2}$	2	$1\frac{1}{2}$	grievnik	
20	10	5	4	3	2	five-kopek-piece
$33\frac{1}{3}$	$16\frac{2}{3}$	$8\frac{1}{3}$	$6\frac{2}{3}$	5	$3\frac{1}{3}$	$1\frac{2}{3}$ altine

### Copper coins

						Poods
grievnik or grivna						
2	pataki					
5	$2\frac{1}{2}$	grosch				$1/23$
10	5	2	kopeek			
20	10	4	2	denuschka		
40	20	8	4	2	poluschka	

## 191.2 Units of Quantity

Various measures reported during the sixteenth to nineteenth centuries:

- 1 **last** (for buck skins) = 400;
- 1 **sotnitsa** = 100 large bundles in which cereal plants are bound after reaping;
- 1 **kipa** (for hides) = 45 pairs = 90;
- 1 **last** (for canvas) = 60;
- 1 **last** (for Flemish linen) = 20;
- 1 **diuzhina** = 12;
- 1 **kist** (for cord, silk, and thread) = a bundle or bunch;
- 1 **kerb'**, **puchok**, or **viazanka** (for flax) = a bundle;
- 1 **bunt** (for hides and skins) = a pile of skins;
- 1 **gneздо** = a pair;
- 1 **kochan** = a head of cabbage;
- 1 **plast'** = ½ fish;
- 1 **zveno** = a crossection of a fish;
- 1 **kolodka** (for nails and salted fish) = a unknown number of fish or nails;
- 1 **kattsy** or **kottsy** (for salted fish) = a unknown number of fish;
- 1 **knizhka** (for gold leaves) = a unknown number of leaves;
- 1 **tshan'** (for sauerkraut) = a unknown amount of sauerkraut;
- 1 **plenitsa**, **pletnitsa**, or **polinnitsa** (for onions) = a unknown number of onions.

For writing paper

		Sheets
<b>stopa</b>		480
20	<b>dest'</b>	24

## 191.3 Units of Length

traditional units:

- 1 **agatsch** = the distance one can ride a horse in an hour; usually said to equal about 7 km;
- 1 **kosaya sazhen** = the distance between the tip of a raised arm and the tip of the opposite leg slightly extended = ~2.48 m;

1 **makhovaya sazhen** = the distance between the tips of the arms stretched sideways = ~1.76 m;

1 **arshin** = the length of a man's arm from the shoulder = ~880–950 mm;

1 ?? (локоть) = the distance from the elbow to the end of the extended middle finger;

1 (large) **piad** (большая пядь) = the distance between the outstretched thumb and the middle finger = ~190 mm;

1 **piad** (пядь; known since the twelfth century)<sup>6</sup> = the distance between the outstretched thumb and the index finger = ~180 mm.

The size of the ancient piad is generally reported in the range from 19 to 23 cm.<sup>7</sup>

Presumed scale during the twelfth to fourteenth centuries

сажени	локоть	фут	пядь с кувырком ог пядь с кутыркой	Metric
<b>sazhen</b>				~2.19 m
4	cubit			~547 mm
6	1½	<b>fut</b>		~365 mm
8	2	1⅓	Ivansky elbow	~273 mm

The piad and the “elbow” were used as the official measures of trade and in people's everyday lives. A fragment of a natural measure, called a иванский локоть (the Ivansky elbow), was found in Novgorodduring archaeological excavations in 1955. The rod was about 547 mm, and has been dated to the eleventh to twelfth centuries.

<sup>6</sup> Daniel of Kiev, who was the first travel writer from Kievan Rus', used the piad during his travels in the early twelfth century, but did not provide sufficient data to determine its size ([LILE]). Zosimus the Bearded (d. 1494), Metropolitan of Russia from 1490, also mentioned the piad.

<sup>7</sup> The Russian historian Boris Alexandrovich Rybakov (1908–2001) found the small piad to be equal to 190 mm, and the large piad about 220–230 mm. He also reported on another unit of length, called the “пядь с кувырком” or “пядь с кутыркой,” equal to the small piad plus two or three breadths of index or middle fingers. The length of this unit has been estimated at 270 or 310 mm.

### The Novgorod- and Pleskov-system

сажени	локтя	пядям	Metric
fathom			1.76–1.84 m
4	cubit		440–460 mm
8	2	elbow	220–230 mm

### The Chernigov-, Moscow-, and Vladimir-Suzdal-system

верста	сажени	локтя	пядям	Metric
<b>verst</b>				1064 m
700	fathom			1.52 m
2800	4	cubit		380 mm
5600	8	2	elbow	190 mm

During the fifteenth to sixteenth centuries, the elbow was gradually replaced by a larger unit, the old Russian fathom (древнерусская сажень).

верста	косая	сажени	локтя	пядей	Metric
<b>verst</b> <sup>a</sup>					1080 m
500	<b>oblique</b> <sup>b</sup>				2.16 m
—	—	<b>sazhen'</b>			1.52 m
—	—	4	elbow		380 mm
—	—	8	2	span	190 mm

<sup>a</sup>Also called **póprische**

<sup>b</sup>The oblique is the diagonal in a square of  $1 \times 1$  sazhen. Measurements of ancient monuments suggest the existence of a fathom (later called a *маховой*) equal to about 1.76 m. This gives us an oblique of about 2.48 m

During the sixteenth to seventeenth centuries

сажени		пядей	Metric
<b>sazhen'</b>			1.52 m
4	<b>chetvert'</b>		380 mm
8	2		190 mm

### Upper scale during the seventeenth – eighteenth century

			Metric
<b>mezhevaia versta</b>			~2160 m
2	<b>putevaia versta</b>		~1080 m
1000	500	<b>arshin</b>	~720 mm

During the seventeenth to nineteenth centuries

[illegible]

<sup>a</sup>Also reported as representing as little as 8 arshins and as many as 100 arshins

<sup>b</sup>Also romanized as **larenka**. Varied between 20 and 50 arshins

<sup>c</sup>Varied by location from 18 to 31 arshins

<sup>d</sup>Usually for cotton fabrics

<sup>e</sup>Varied between  $3\frac{3}{4}$  and 11 arshins

Other measures reported during the seven-teenth to nineteenth centuries:

1 **kipa** (for cloth) = 4–25 *polovinkas*;

1 **polovinka** (for cloth) = generally 15–27 arshins, typically 20 or 25 arshins, but also reported as  $5\frac{1}{2}$  to 60 arshins;

1 **konets** (for cloth) = 6, 7, 8, 10, 28, or 37 arshins;

1 **kusok** (for textile) = 7–9, 11–12, 22–29, or 50 arshins;

1 **shtuka** (a bolt of fabrics) = 10–52 arshins;

1 **kostër** (for firewood) = 10 sazhen = about 21.6 m;

1 **kamka** =  $6\frac{1}{8}$  arshins = about 4.4 m;

1 **aln** (Swedish measure) = 1.3 arshins = about 0.9 m;

1 **tschi** (at Kyakhta) = 335.300 mm;

1 **fut** (in Moscow) = 334.300 mm;

1 **pasmo** (for linen or hemp cloth) =  $\frac{43}{100}$  arshin = 309.6 mm;

1 **tún-miń** (used in Sakhalin Oblast by the Gilyak people) = a finger;

1 **mangatkən** (used in Northern Siberia by the Chukotian people) = a finger.

Upper scale after 1753 (1 diuym set by Peter the Great as = 318.3 lignes de Paris/28)

милія	межевая верста	верста́	са́жень	аршин	фут	чѣтверть ог пядь	Metric
<b>milia</b>							7538.16 m
$3\frac{1}{2}$	<b>mezhevaya versta<sup>a</sup></b>						2153.76 m
7	2	<b>versta</b>					1076.88 m
3500	1000	500	<b>sazhen</b>				2.153 76 m
10,500	3000	1500	3	<b>arshin</b>			717.92 mm
25,500	7000	3500	7	$2\frac{1}{3}$	<b>fut</b>		307.68 mm
306 000/7	12,000	6000	12	4	$1\frac{1}{7}$	<b>chetvert or piad</b>	179.48 mm

<sup>a</sup>Used to measure land plots and distances between settlements

Lower scale after 1753 (1 diuym set by Peter the Great as = 318.3 lignes de Paris/28)

чѣтверть ог пядь	вершо́к	дюйм	сотка				Metric
<b>chetvert or piad</b>							179.48 mm
4	<b>vershok</b>						44.87 mm
7	$1\frac{1}{4}$	<b>diuym</b>					25.64 mm
$8\frac{1}{3}$	$2\frac{1}{2}$	$1\frac{1}{21}$	<b>sotka</b>				21.537 6 mm
14	$3\frac{1}{2}$	2	$1\frac{1}{25}$	<b>paletz</b>			12.82 mm
70	$17\frac{1}{2}$	10	$8\frac{1}{5}$	5	<b>liniya</b>		2.564 mm
700	175	100	84	50	10	<b>tochka</b>	256.4 µm

British Imperial-linked upper scale after 1826 (1 fut = 1 English foot)

						Imperial	Metric
<b>milia</b>						294,000 in.	7467.465 103 m
7	<b>versta</b>					42,000 in.	1066.780 729 m
3500	500	<b>sazhen</b>				84 in.	2.133 561 458 m
10,500	1500	3	<b>archin</b>			28 in.	711.187 153 mm
25,500	3500	7	$2\frac{1}{3}$	<b>fut</b>		12 in.	304.794 494 mm
306 000/7	6000	12	4	$1\frac{1}{7}$	<b>chetvert</b>	7 in.	177.796 788 mm

British Imperial-linked lower scale after 1826 (1 fut = 1 English foot)

			сотка				Imperial	Metric
<b>chetvert</b>							7 in.	177.796 788 mm
4	<b>vershok</b>						1¼ in.	44.449 197 mm
7	1¼	<b>diuym</b>					1 in.	25.399 541 mm
8⅓	2½	1¼ <sub>21</sub>	<b>sotka</b>					21.335 615 mm
14	3½	2	1⅞ <sub>25</sub>	<b>paletz</b>			½ in.	12.699 771 mm
70	17½	10	8⅗	5	<b>liniya</b>		1/10 in.	2.539 954 mm
700	175	100	84	50	10	<b>tochka</b>	1/100 in.	253.995 4 µm

In Saint Petersburg before 1835, based on [MART3]

			Metric
<b>fut</b>			533.396 mm
12	<b>vershok</b>		44.450 mm
288	24	<b>liniya</b>	1.852 mm

After 1835, based on [BAUE] and [MART3]

верста́							Metric
<b>versta</b>							1066.790 424 m
500	<b>sazhen</b>						2.133 580 848 m
1500	3	<b>archin</b>					711.193 616 mm
3500	7	2⅓	<b>fut</b>				304.797 264 mm
24,000	48	16	6⅞	<b>vershok</b>			44.449 601 mm
42,000	84	28	12	1¼	<b>diuym</b>		25.399 772 mm
504,000	1008	336	144	21	12	<b>liniya</b>	2.116 648 mm

## 191.4 Units of Area

During Kiev Rus' era, the population lived within certain units called *dvor*. Several courts were arranged in a pattern, with lanes and squares known as *selo* or *xutor*. Villages along the Volga River, called *pogosty*, had to pay taxes to the capital city.

Before 1753, based on [HELL]

	десятина			квадратный сажень	Metric
<b>kunitsa</b>					671,846.4 m <sup>2</sup>
60	<b>desiatina</b> or <b>niva</b>				11,197.44 m <sup>2</sup>
120	2	<b>chetvert'</b> or <b>chet</b> <sup>a</sup> (40 × 30 sazhen)			5598.72 m <sup>2</sup>
2880	48	24	<b>mal'yi tretnik</b>		233.28 m <sup>2</sup>
144,000	2400	1200	50	<b>sazhen</b> <sup>2</sup>	4.665 6 m <sup>2</sup>

<sup>a</sup>The amount of land sown by one chetvert' of grain

The major unit for land tax calculation was the sokha, the system for which was called the *soshnoe pis'mo*. This system began after the annexation of Novgorod in 1478. The size of the sokha depended on the quality of soil combined with determination of the social category of its owner. Peasants whose lords were cavalrymen had to pay less directly to the state than those who had to support monasteries and churches. Landowners without lords had to pay the most in state taxes, as they only had to support themselves.

Other measures reported during the sixteenth to eighteenth centuries:

- 1 **obzha** = 15 desiatinas in 3 fields =  $126 \times 32$  sazhen of plow land;
- 1 **tretnik** = 1–3 chetvert's;
- 1 **iuft'** (a pair) = a chetvert' of rye and a chetvert' of oats.
- 1 **peremena** = a field in a 3-field rotation system;
- 1 **ostozh'e** = a land that yields one stog of hay.

The size of one field in a three-field system

	Good land	Average land	Poor land
service class (votchina <sup>a</sup> and pomest'e <sup>b</sup> )	800 chet's	1000 chet's	1200 chet's
church landowners	600 chet's	700 chet's	800 chet's
land owned by peasants themselves or by the court	500 chet's	600 chet's	700 chet's

<sup>a</sup>A votchina was a land estate that could be inherited. The owner of a votchina had both property rights and some administrative and legal power over the people living on this territory

<sup>b</sup>A pomest'e was an estate awarded to a servitor of the state on the condition of his continued service. The large-scale use of pomest'e began in Novgorod during the mid-fifteenth century. In 1714, pomest'e landholding replaced the votchina as the standard administrative method in the countryside

The size of sokhas in towns, determined by the wealth of households

Wealthy households	Middling households	Poor households	Impoverished households
40 chet's	60 chet's	80 chet's	100 chet's

Other tax assessment units:

- 1 **vyt'** (used on state and palace lands) = the amount of land considered necessary to support a peasant household. It varied in size, from three to fifteen desiatiny, depending upon the quality of the soil, but was usually about five to six desiatiny.
- 1 **osmina** = 1/8 vyt';
- 1 **kost'** = 1/16 vyt';

The size of one **vyt'** (a small field for tax assessment) in the North during the seventeenth century

Good land	Average land	Poor land	Soil
12 chet's	14 chet's	16 chet's	average
10 chet's	12 chet's	14 chet's	good

After 1753

квадратный верста́	десятина		квадратный са́жень	квадратный арши́н	Metric
<b>versta<sup>2</sup></b>					1.159 67 km <sup>2</sup>
100	<b>desiatina<sup>a</sup></b> (1/10 versta × 1/10 versta)				11,596.7 m <sup>2</sup>
200	2	<b>chetvert<sup>b</sup></b>			
250,000	2500	1250	<b>sazhen<sup>2</sup></b>		4.638 68 m <sup>2</sup>
2,250,000	22,500	11,250	9	<b>archin<sup>2</sup></b>	0.515 41 m <sup>2</sup>

<sup>a</sup>Also romanized as **déciatina** or **dessiatine**. In addition to this official desiatina, there were a number of other desiatinas in use, including 100 versta × 100 versta = 10,000 sazhen<sup>2</sup> (the hundred desiatina), 80 versta × 100 versta = 800 sazhen<sup>2</sup> (a melon field), 60 versta × 60 versta = 3600 sazhen<sup>2</sup> (the household circle desiatina), and 80 versta × 40 versta = 3200 sazhen<sup>2</sup> (the household or oblique desiatina)

<sup>b</sup>The chetvert<sup>2</sup> was mentioned as early as the late fifteenth century and was in official use until 1766. Depending on the size of the desiatina, equal to 1200, 1250, 1600, 1800, 4000, or 5000 sazhen<sup>2</sup>

British Imperial upper scale after 1826

квадратный верста́	владельческая десяти́на	казённая десяти́на	квадратный са́жень	квадратный арши́н	Metric
<b>kvadratnij versta</b>					1.138 021 124 km <sup>2</sup>
78⅓	<b>vladelcheskaya desiatina<sup>a</sup></b>				14,566.670 384 m <sup>2</sup>
104⅓	1⅓	<b>kazionnaya desiatina<sup>b</sup></b>			10,925.002 788 m <sup>2</sup>
250,000	3200	2400	<b>kvadratnia sazhen</b>		4.552 084 495 m <sup>2</sup>
2,250,000	28,800	21,600	9	<b>kvadratnij archin</b>	0.505 787 166 m <sup>2</sup>

<sup>a</sup>The proprietor's desiatina

<sup>b</sup>The treasury or official desiatina

British Imperial lower scale after 1826

квадратный арши́н	квадратный фут	квадратный вершо́к	квадратный дюйм	квадратный ли́ния	Metric
<b>kvadratnij archin</b>					0.505 787 166 m <sup>2</sup>
5%	<b>kvadratnij fut</b>				9.289 968 36 dm <sup>2</sup>
256	47⅞	<b>kvadratnij vershok</b>			19.757 311 2 cm <sup>2</sup>
784	144	3⅞	<b>kvadratnij diuym</b>		6.451 366 9 cm <sup>2</sup>
78,400	14,400	306¼	100	<b>kvadratnij liniya</b>	6.451 366 9 mm <sup>2</sup>

After 1835, based on [BAUE] and [MART3]

десяти́на	квадратный са́жень	квадратный фут	квадратный дюйм	Metric
<b>desiatina</b>				10,925.201 347 m <sup>2</sup>
2400	<b>kvadratnia sazhen</b>			4.552 167 228 m <sup>2</sup>
117,600	49	<b>kvadratnij fut</b>		9.290 137 2 dm <sup>2</sup>
16,934,400	7056	144	<b>kvadratnij diuym</b>	6.451 484 cm <sup>2</sup>

The use of the pre-metric measures was limited by a decree of the Sovnarcom on September 14, 1918, and was finally abolished on September 1, 1927.

## 191.5 Units of Volume

Units reported during the sixteenth to eighteenth centuries:

- 1 **politsa** (for foreign steel) = 6½ to 7 vershkas (290–315 mm) long × 5 vershkas (225 mm) wide × about 5 mm thick;  
 1 **leshchad'** (for rock) = ½ sazhen' = 5.04 m<sup>3</sup>;  
 1 **bochka** = 55.6 dm<sup>3</sup>.

## 191.6 Units of Dry Capacity

Some measures reported during the sixteenth to eighteenth centuries:

- 1 **lantukh** = a big sack of hops;  
 1 **burak** (for coal, copper, and honey) = a wicker basket or wooden box of various size;  
 1 **griada** (for vegetables) = a measure of unknown size;  
 1 **gorshok** (for butter and honey) = a measure of unknown size;  
 1 **stog** = a haystack;  
 1 **kopan'** (for grain) = a measure of unknown size;

After 1753 and after 1826, based on [BAUE]

кубическая сажень	кубическій аршин	кубическій вершок	кубическій дюйм	кубическій линия	Metric	Metric
<b>kubiceskaia sazhen</b>					9.990 608 041 m <sup>3</sup>	9.712 152 046 m <sup>3</sup>
27	<b>kubuceskij arshin</b>				370.022 520 m <sup>3</sup>	359.709 335 dm <sup>3</sup>
110,592	4096	<b>kubuceskij vershok</b>			90.337 529 cm <sup>3</sup>	87.819 662 cm <sup>3</sup>
592,704	21,952	5.359 375	<b>kubuceskij diuym</b>		16.855 982 cm <sup>3</sup>	16.386 176 cm <sup>3</sup>
592,704,000	21,952,000	5359%	1000	<b>kubuceskij ligne</b>	16.855 982 mm <sup>3</sup>	16.386 176 mm <sup>3</sup>

After 1835, based on [BAUE] and [MART3]

кубическая сажень	кубическій фут	кубическій дюйм	Metric
<b>kubiceskaia sazhen<sup>a</sup></b>			9.712 417 m <sup>3</sup>
343	<b>kubuceskij fut</b>		28.316 084 dm <sup>3</sup>
592,704	1728	<b>kubuceskij diuym</b>	16.387 cm <sup>3</sup>

<sup>a</sup>For lime, sand, hay and stones. 1 **kubiceskaia sazhen** (for hay) was reported as 327.609 248 kg

Other measures reported during the nineteenth to twentieth centuries:

- 1 **last marine** = 15.743 44 arshin<sup>3</sup> = 5,663.063 m<sup>3</sup>;  
 1 **tonne marine** = 7.871 72 arshin<sup>3</sup> = 2,831.531 m<sup>3</sup>;  
 1 **stack** (стек, for timber) = ¾ kubiceskaia sazhen = 7.284 313 m<sup>3</sup>;  
 1 **stack** (стек, for timber) = 5/24 kubiceskaia sazhen = 2.023 420 m<sup>3</sup>.

- 1 **kulëk** (for anise and flint) = a measure of unknown size;

- 1 **zakol'e** = a unit of hay of unspecified size;

## Upper scale

ласть		чѣтверть		осьмина		полосмина	четверик	Metric
<b>last<sup>a</sup></b>								2518.902 473 L
3	<b>kad'</b>							839.635 416 L
12	4	<b>chetvert<sup>b</sup></b>						209.908 539 L
19 $\frac{1}{5}$	6 $\frac{2}{5}$	1 $\frac{3}{5}$	<b>osmachka</b>					131.192 835 L
24	8	2	1 $\frac{1}{4}$	<b>osmina<sup>c</sup></b>				104.954 427 L
38 $\frac{34}{37}$	–	3 $\frac{9}{37}$	2 $\frac{1}{37}$	1 $\frac{23}{37}$	<b>lof</b>			64.721 800 L
48	–	4	2 $\frac{1}{2}$	2	1 $\frac{7}{30}$	<b>polouosmina<sup>d</sup></b>		52.477 135 L
96	–	8	5	4	2 $\frac{7}{15}$	2	<b>chetverik<sup>e</sup></b>	26.238 567 L

<sup>a</sup>According to [MCCA, Vol. 16, p. 437], 1 last = 12 chetvert = 2442.07 L

<sup>b</sup>Also romanized as **tchevert** or **tschetwert**. It was used principally for grain, groats, and flour. For rye flour, also called **kul'**. The official chetvert was equal to 4 poods of rye grain = 65.52 kg (during the sixteenth and early seventeenth centuries), 6 poods = 98.28 kg (from the mid-seventeenth century until the last quarter of the seventeenth century), and the 8 poods = 131.04 kg (from the last quarter of the seventeenth century until the mid-eighteenth century). [PROK, Vol. 29, p. 140]

<sup>c</sup>Also romanized as **osmin**

<sup>d</sup>Also romanized as **pajak** or **payok**. For sugar, also called **kul'**

<sup>e</sup>Also romanized as **tcheverik** and **tschetwerik**

## Lower scale

четверик		ведро	гáрнец	половины гáрнец	кру́жка	часть	Metric
<b>chetverik</b>							26.238 567 4 L
2	<b>malenka<sup>a</sup></b>						13.119 283 7 L
4	2	<b>vedro<sup>b</sup></b>					6.559 641 85 L
8	4	2	<b>garnets<sup>c</sup></b>				3.279 820 93 L
16	8	4	2	<b>polougarnets<sup>d</sup></b>			1.639 910 462 L
20	10	5	2 $\frac{1}{2}$	1 $\frac{1}{4}$	<b>kruzhka<sup>e</sup></b>		1,311.928 368 L
240	120	60	30	15	12	<b>chast<sup>f</sup></b>	109.327 364 mL

<sup>a</sup>Usually used for rye

<sup>b</sup>Also romanized as **tschetwerka**

<sup>c</sup>Also romanized as **garnetz** or **garnietz**

<sup>d</sup>Also romanized as **polougarnetz**

<sup>e</sup>Also romanized as **krushky**

<sup>f</sup>Also romanized as **becher** or **tchast**

## Scale used after October 11, 1835, based on [RURL]

	чѣтверть	осьмина	полосмина	четверик	четверика	гáрнец	часть	Metric
<b>okaw</b>								839.606 4 L
4	<b>chetvert</b>							209.901 6 L
8	2	<b>osmina</b>						104.950 8 L
16	4	2	<b>polouosmina</b>					52.475 4 L
32	8	4	2	<b>chetverik</b>				26.237 7 L
128	32	16	8	4	<b>chetverka</b>			6.559 4 L
256	64	32	16	8	2	<b>garnets</b>		3.279 7 L
7680	1920	960	480	240	60	30	<b>chast</b>	109.3 mL

Based on [CARD]

четверть	осьмина	полосмина	четверик	гарнец	часть	Metric
<b>chetvert</b>						209.909 888 L
2	<b>osmina</b>					104.954 944 L
3 <sup>9/37</sup>	1 <sup>23/37</sup>					64.722 215 L
4	2	<b>polouosmina</b>				52.477 472 L
8	4	2	<b>chetverik</b>			26.238 736 L
16	8	4 <sup>14/15</sup>	2			13.119 368 L
64	32	19 <sup>1/15</sup>	8	<b>garnets</b>		3.279 842 L
128	64	39 <sup>7/15</sup>	16	2	<b>polougarnets</b>	1.639 921 L
160	80	49 <sup>1/3</sup>	20	3 <sup>1/2</sup>	<b>kruzhka</b>	1.311 937 L
1920	960	592	240	30	15	109.328 mL

Based on [SMIT6] and [TOOK]<sup>a</sup>

	четверть	осьмина	полосмина	четверик	гарнец	Metric
<b>cool<sup>b</sup></b>						1889.518 94 L
10	<b>chetvert<sup>c</sup></b>					188.951 894 L
20	2	<b>osmina</b>				94.475 947 L
40	4	2	<b>polouosmina</b>			47.237 973 L
80	8	4	2	<b>chetverik</b>		23.618 987 L
640	64	32	16	8	<b>garnets</b>	2.952 373 L

<sup>a</sup>According to [TOOK, p. 566], 15 chetveriks was about 1 **Dutch last** = about 2834.3 L

<sup>b</sup>1 **cool** (for meat) = 324.154 kg; 1 **cool** (for wheat) = 8 poods = 130.892 kg (in bad years), 9 poods = 147.254 kg (in common years), and 10 poods = 163.615 kg (after a favourable harvest)

<sup>c</sup>The chetvert varied a lot by location, e.g., at Novgorod = 50% more than at Archangel and Saint Petersburg

Based on [HOLM] and [KENN3]

ласть	чѣтверть	осьмина	полосмина	четверік	четверика	гáрнець	Метріс	Метріс
<b>last<sup>a</sup></b>							3357.791 144 L	3358.466 624 L
16	<b>chetvert</b>						209.861 946 L	209.904 164 L
32	2	<b>osmina</b>					104.930 973 L	104.952 082 L
64	4	2	<b>polouosmina</b>				52.465 487 L	52.476 041 L
128	8	4	2	<b>chetverik</b>			26.232 743 L	26.238 020 L
512	32	16	8	4	<b>chetverka</b>		6.558 186 L	6.559 505 L
1024	64	32	16	8	2	<b>garnets</b>	3.279 093 L	3.279 753 L

<sup>a</sup>For barley, hemp, rye, linseed, and wheat

In Saint Petersburg after 1835, based on [MART3]

ласть	куль	чѣтверть	осьмина	полосмина	четверік	полчетверік	четверика	гáрнець	часть	Метріс
<b>last<sup>a</sup></b>										5247.690 000 L
20	<b>kul</b>									262.384 500 L
25	1¼	<b>chetvert</b>								209.907 600 L
50	2½	2	<b>osmina</b>							104.953 800 L
100	5	4	2	<b>polouosmina</b>						52.476 900 L
200	10	8	4	2	<b>chetverik</b>					26.238 450 L
400	20	16	8	4	2	<b>polchetverik</b>				13.119 225 L
800	40	32	16	8	4	2	<b>chetverka</b>			6.559 612 L
1600	80	64	32	16	8	4	2	<b>garnets</b>		3.279 806 L
48,000	2400	1920	960	480	240	120	60	30	<b>chast</b>	109.327 mL

<sup>a</sup>1 **last** (for cereal, except oats) = 16 chetverts = 3358.521 600 L

## 191.7 Units of Liquid Capacity

Before 1650

бóчка	анкер	ведрó	кру́жка		ча́рка	Metric
<b>bochka</b>						309.96 L
2⅓	<b>ankerok</b>					132.84 L
7	3	<b>vedro</b>				44.28 L
84	36	12	<b>kruzhka or kverta</b>			3.69 L
840	360	120	10	<b>kovsh</b>		369 mL
2520	1080	360	30	3	<b>charka</b>	123 mL

From 1650 to 1679

бóчка	анкер	ведрó	кру́жка	ча́рка	Metric
<b>bochka</b>					86.1 L
2⅓	<b>ankerok</b>				36.9 L
7	3	<b>vedro</b>			12.3 L
70	30	10	<b>kruzhka or kverta</b>		1.23 L
700	300	100	10	<b>kovsh or charka</b>	123 mL

After 1679

бóчка		ведрó		кру́жка				ча́рка	Metric
<b>bochka</b>									172.2 L
2⅓	<b>ankerok or kuvshin<sup>a</sup></b>								73.8 L
7	3	<b>vedro</b>							24.6 L
28	12	4	<b>kanna</b>						6.15 L
56	24	8	2	<b>kruzhka or kverta</b>					3.075 L
70	30	10	2½	1¼	<b>desiatina</b>				2.46 L
112	48	16	4	2	1⅓	<b>galënok</b>			1.54 L
560	240	80	20	10	8	5	<b>kovsh</b>		307.5 mL
1400	600	200	50	25	20	12½	2½	<b>charka</b>	123 mL

<sup>a</sup>For wine



For distilled spirits, linseed oil, hempseed oil, etc., before January 1, 1819

бочка	анкер	ведро		кру́жка	чарка	шкалик	Metric
<b>botschka<sup>a</sup></b>							491.94 L
13⅓	<b>ankerok<sup>b</sup></b>						36.90 L
40	3	<b>vedro<sup>c</sup></b>					12.30 L
160	12	4	<b>chetvert<sup>d</sup></b>				3.07 L
320	24	8	2	<b>kruzhka<sup>e</sup></b>			1.54 L
3520	264	88	22	11	<b>charka<sup>f</sup></b>		140 mL
7040	528	176	44	22	2	<b>chkalik<sup>g</sup></b>	70 mL

<sup>a</sup>Also romanized as **bochka** (бо́чка), **botchka**, **sarokowaja-botschka**, **sarokowaja**, or **sorokovka**

<sup>b</sup>Also romanized as **anker**

<sup>c</sup>Also romanized as **wedro**

<sup>d</sup>Also romanized as **tchetvert**, **tchetverte**, or **tshetwerka**

<sup>e</sup>Also romanized as **kroushka**, **krushka**, or **osmuschka**

<sup>f</sup>Also romanized as **charke**, **charkey**, **czarka**, **tcharka**, **tscharkey**, or **tscharka**

<sup>g</sup>For vodka and wine. Also romanized as **shkalik** (шка́лик) or **kosushka** (косу́шка). According to [JOHN], sometimes reported as 2 charkas, and according to [HELL], reported as about 60 mL

Upper scale according to an *ukase* of 1818<sup>a</sup> (legal from January 1, 1819, to 1835)

бочка	пипа	оксофтъ			анкерокъ		ведро́	Metric
<b>botschka</b>								491.976 4 L
1%	<b>pipa</b>							442.778 76 L
2%	2	<b>oxhoft</b>						221.389 38 L
3⅓	3	1½	<b>amna</b>					147.592 92 L
4	3⅓	1⅓	1⅓	<b>korce</b>				122.994 1 L
13⅓	12	6	4	3⅓	<b>ankerok</b>			36.898 23 L
26⅔	24	12	8	6⅔	2	<b>stekar</b>		18.449 115 L
40	36	18	12	10	3	1½	<b>vedro</b>	12.299 41 L

<sup>a</sup>Redefines the vedro as the volume of 30 lbs av of distilled water at a temperature of 13⅓ degree Réaumur = estimated as 750.57 cu in.

Lower scale according to an *ukase* of 1818 (legal from January 1, 1819, until 1835)

ведро́		косу́шка	ча́рка	шкалик	Metric
<b>vedro</b>					12.299 41 L
8	<b>stoof</b>				1.537 426 25 L
10	1¼	<b>kroushka</b>			1.229 941 L
100	12½	10	<b>charka</b>		122.994 1 mL
200	25	20	2	<b>chkalik</b>	61.497 05 mL

System according to an *ukase* of October 11, 1835, based on [MART3]

бочка	пила	оксофть	анкерокъ	полуанкерокъ	ведрó	чѣтверть	штфъ	кружка	чарка	шкалик	Metric
<b>botschka</b>											491.971 040 L
1¼	<b>pira</b>										442.773 936 L
2¼	2	<b>oxhoft</b>									221.386 963 L
13½	12	6	<b>ankerok</b>								36.897 828 L
26⅔	24	12	2	<b>polouankerok</b>							18.448 914 L
40	36	18	3	1½	<b>vedro</b>						12.299 276 L
160	144	72	12	6	4	<b>chetvert</b>					3.074 819 L
320	288	144	24	12	8	2	<b>stoof</b>				1.537 409 L
400	360	180	30	15	10	2½	1¼	<b>kruzhka</b>			1.229 928 L
4000	3600	1800	300	150	100	25	12½	10	<b>charka</b>		122.993 mL
8000	7200	3600	600	300	200	50	25	20	2	<b>chkalik</b>	61.496 mL

Scale legally defined in 1855

ведрó	чѣтверть	косушка	бутылка (винная)	бутылка (водочная)	чарка	шкалик	Metric
<b>vedro</b>							12.299 2 L
4	<b>chetvert</b>						3.074 8 L
8	2	<b>kruzhka</b>					768.7 mL
16	4	2	<b>butylka<sup>a</sup></b> (vinnaya)				384.35 L
20	5	2½	1¼	<b>butylka<sup>b</sup></b> (vodochnaya)			307.48 L
100	25	12½	6¼	5	<b>charka</b>		61.496 mL
200	50	25	12½	10	2	<b>chkalik</b>	30.748 mL

<sup>a</sup>For wine

<sup>b</sup>For vodka

## 191.8 Units of Weight

In ancient Russia, as in many other countries, coins functioned simultaneously as measures of weight.

During the early Kievan Rus' (882 to the tenth century)

		Metric
<b>grivna</b>		405.696 g
96	<b>zlotnik</b> or <b>zlatnik</b>	4.226 g

During the eleventh century

		Metric
<b>grivna</b>		202.848 g
48	<b>zlotnik</b> or <b>zlatnik</b>	4.226 g

Old Russian measures:

1 **berkov'sk** (used in wholesale trade for wax, honey, etc.; named for Birko, the medieval name of a Swedish market town) = about 164 kg;

The **berkov'sk** unit was mentioned in the twelfth century in the regulatory charter of Prince Vsevolod Gavriil Mstislavish to the Novgorod merchantry.

1 **puda** (used by the Nanai groups in Khabarovsk Krai) = 16.38 kg.

For rye during the seventeenth century

четверйк	чѣтверть	Poods <sup>a</sup>	Metric
<b>chetverik</b>		32–64	522.54–1045.08 kg
8	<b>chetvert'</b>	4–8	65.32–130.63 kg

<sup>a</sup>c. 1600 = 4 poods, c. 1624 = 6 poods, and c. 1679 = 8 poods

For rye flour during the seventeenth century

четверйк	чѣтверть	Poods	Metric
<b>chetverik</b>		26.4–52.8	431.09–862.19 kg
8	<b>chetvert'</b>	3.3–6.6	53.89–107.77 kg

For trade during the thirteenth to fifteenth centuries, based on (www.iro.yar.ru, access 2011-11-11) and estimated values

берковец	пуда	пуд	гривна	гривенка	полу гривенка	золотника	почка	пирога	Metric
<b>berkovets</b>									163.8 kg
4	<b>puda</b>								40.95 kg
10	2½	<b>pud</b>							16.93 kg
400	100	40	<b>hryvnia</b>						409.5 g
800	200	80	2	<b>grivenka</b>					204.75 g
1600	400	160	4	2	<b>grivenka</b> (small)				102.375 g
38,400	9600	3840	96	48	24	<b>holotnika</b>			4.266 g
960,000	240,000	96,000	2400	1200	600	25	<b>nochka</b>		1.706 g
3,840,000	960,000	384,000	9600	4800	2400	100	4	<b>nypora</b>	42.7 mg

For grain during the fourteenth to sixteenth centuries, based on [CHER]

			Metric
<b>chetvert'<sup>a</sup></b>			~914 kg
4	<b>kad</b> or <b>okov<sup>a</sup></b>		~229 kg
56	14	<b>pud</b>	~16 kg

<sup>a</sup>These units varied by location. 1 **chetvert'** (for wax during the seventeenth century) = 12 poods

Upper scale in Moscow during the seventeenth century

берковец <b>berkovets</b>	конгарь	пуд	полпуда	ыезмен	ансырь	полубезмен	гривенка	либра
4	<b>congar</b>							
10	2½	<b>pud</b>						
20	5	2	<b>polyna</b>					
160	40	16	8	<b>bezmen</b>				
300	75	30	15	1⅞	<b>ansyr</b>			
320	80	32	16	2	1⅚	<b>polubezmen</b>		
400	100	40	20	2½	1⅓	¼	<b>bolshaia grivenka or grívna</b>	
533⅓	133⅓	53⅓	26⅔	3⅓	1⅞	1⅔	1⅓	<b>libra</b>

Lower scale in Moscow during the seventeenth century

либра	гривенка малая	полугривенка	золотник
<b>libra</b>			
1½	<b>grivenka</b> (small)		
3	2	<b>polugrivenka</b>	
72	48	24	<b>zlotnik</b>

During the early eighteenth century

берковец	пуд		фунт		лот	золотник	дóля	Metric
<b>berkovets</b> <sup>a</sup>								163.8 kg
10	<b>pood</b>							16.38 kg
20	2	<b>lisfunt</b>						8.19 kg
266⅔	26⅔	13⅓	<b>gin</b>					614.2 g
300	30	15	1⅞	<b>ansyr</b>				546.0 g
400	40	20	1½	1⅓				409.5 g
800	80	40	3	2⅔				204.8 g
3200	320	160	12	10⅔	<b>markpund</b>			51.2 g
12,800	1280	640	48	42⅔	4	<b>lot or lóty</b>		12.8 g
38,400	3840	1920	144	128	96	3	<b>zlotnik</b>	4.26 g
122,880	12,288	6144	460⅔	409⅓	307⅓	9⅓	<b>garnet</b>	1.33 g
3,686,400	368,640	184,320	13,824	12,288	9216	288	<b>dolia</b>	44.4 mg

<sup>a</sup> Also called **shiffunt**

For cereal in Rubinsk, based on [MART3]

				пуд	фунт	Metric
<b>kul<sup>a</sup></b>						163.804 624 kg
—	<b>kul<sup>b</sup></b>					147.424 162 kg
—	—	<b>kul<sup>c</sup></b>				98.282 774 kg
—	—	—	<b>kul<sup>d</sup></b>			81.902 312 kg
10	9	6	5	<b>pud</b>		16.380 462 kg
400	360	240	200	40	<b>funt</b>	490.512 g

<sup>a</sup>For wheat

<sup>b</sup>For rye and rye flour

<sup>c</sup>For oats

<sup>d</sup>For wheat flour

Other measures reported during the sixteenth to nineteenth centuries:

- 1 **pavozok** (for salt) = 50,000 poods = 819,000 kg;
- 1 **poluvar'** (for salt) = the amount of salt produced by a boiler in one year = about 190 poods = 3112.2 kg;
- 1 **perdel** (for gunpowder) = 120–125 poods = 1965.6–2047.5 kg;
- 1 **last** (for salt) = 120–140 poods = 1965.6–2293.2 kg;
- 1 **kul'** (for salt) = 93 poods = 1523.34 kg;
- 1 **last** or **long ton** (ship tonnage) = 72 poods = 1179.36 kg;
- 1 **last** (for hemp) = 6 berkovets = 982.8 kg;
- 1 **sugreb** (for salt yielded by a 24-hour boiling) = 48–50 poods = 786.24–819 kg;
- 1 **bochka** (for beef fat) = 30 poods = 491.4 kg;
- 1 **mekh** or **meshok** (for salt) = 22–33 poods = 360.36–540.54 kg;
- 1 **voz** (for iron and sand) = 15–20 poods = 245.7–327.6 kg;
- 1 **kusha** (for hay) = 3 kopnas = 15 poods = 245.7 kg;
- 1 **kipa** (for hops) = 11–24 poods = 180.18–393.12 kg;
- 1 **tai** (for sugar) = 10 poods = 163.804 kg;
- 1 **last** (for tallow, hemp oil and linseed oil) = 10 poods = 163.804 kg;
- 1 **bezmen** (for small home goods) = 10 poods = 163.804 kg;
- 1 **chetvert** (for wheat) = 380 funts = 155.614 kg;
- 1 **last** (for hemp seed, linseed, wheat and oats) = 9 poods = 147.614 kg;

- 1 **kul'** (for rye) = 360 funts (gross weight) = 147.424 kg;
- 1 **chetvert** (for rye) = 354 funts = 144.967 kg;
- 1 **svin'ia** or **svintsa** (for iron) = 8.225–40 poods = 134.72–655.20 kg;
- 1 **kul'** (for wheat) = 300 funts (gross weight) = 122.853 kg, and 290 funts (net weight) = 118.758 kg;
- 1 **chetvert** (for barley) = 290 funts = 118.758 kg;
- 1 **mekh** or **meshok** (for wool) = 7 poods = 114.66 kg;
- 1 **korob** = 7 poods = 114.66 kg;
- 1 **kul'** (for barley) = 260 funts (gross weight) = 106.473 kg;
- 1 **kritsa** (for metal) = 6–8 poods = 92.283–131.04 kg; also reported as 24–36 funts in Tihkvin;
- 1 **sapets** (for salt) = 6 poods = 98.283 kg;
- 1 **kipa** (for raw cotton) = 6 poods = 98.283 kg;
- 1 **bochka** (for raisins and salted cod) = 6 poods = 98.283 kg;
- 1 **chetvert** (for oats) = 240 funts = 98.283 kg;
- 1 **kul'** (for oats) = 220 funts (gross weight) = 90.092 kg;
- 1 **kopna** (for hay) = 5 poods = 81.90 kg;
- 1 **lub** (for salt) = 5 poods = 81.90 kg;
- 1 **kad'** = 8 korytos = about 5 poods = about 82 kg;
- 1 **prut** (for iron) = 3 poods 37 funts = 64.3 kg;
- 1 **kadushka** = about 3½ poods = about 52.4 kg;
- 1 **kul'** (for hops) = 3–7 poods = 49.14–114.66 kg;
- 1 **mera** or **sapets** (for rye) = 3 poods = 49.14 kg;
- 1 **puz** (for salt) = 3 poods = 49.14 kg;
- 1 **kontar'** = 2½ to 3 poods = 40.95–49.14 kg;

- 1 **mera** (for rye flour) =  $2\frac{1}{2}$  poods = 40.95 kg;  
 1 **bezmen** (for salt) = 2 or 3 poods = 32.76 or 49.14 kg;  
 1 **bochënok** (for sugar) = 96 funts = 39.31 kg;  
 1 **vosmina** or **osmina** =  $1\frac{3}{4}$  to  $2\frac{1}{2}$  poods = 28.66–40.95 kg;  
 1 **tusha** (for pork) =  $1\frac{1}{2}$  poods = 24.57 kg;  
 1 **puz** (for rye) =  $1\frac{1}{2}$  poods = 24.57 kg;  
 1 **koryto** =  $\frac{1}{8}$  kad' = about 10.2 kg;  
 1 **cherep** (for butter) =  $\frac{1}{4}$  pood = 4.095 kg;  
 1 **kórob** (in Novgorod) = 7 pudy = 3.34 kg;  
 1 **bezmen** (for general use) =  $\frac{1}{16}$  pood = 5 grivenka malaia = 1.024 kg;  
 1 **funt** (in Moscow) = 427.339 g;  
 1 **grivenka bol'shaia** = 1 funt = 409.5 g;  
 1 **grivenka** = 0.518 funt = 212.1 g;  
 1 **grivenka malaia** =  $\frac{1}{2}$  funt = 204.8 g;  
 1 **lan** = 37.3 g;  
 1 **batman** = 10, 18, or 28 funts,  $1\frac{1}{2}$ , 4, 12, 25, or 26 poods;  
 1 **ostramok** (for hay) = a unit of unknown size;  
 1 **lukno** (for caviar) = a unit of unknown size;  
 1 **lukoshka** (for ashes) = a unit of unknown size;  
 1 **elka** or **ëlka** = a special unit, for measuring moss, of unknown size.
- for copper, iron, and lashing = 120 puds net weight = 1.965 655 kg;  
 for green soap, tar, pitch, rosin, and wax = 100 puds gross weight = 1.638 046 kg;  
 for stones, rye flour, buckwheat flour, and soap in pads = 100 puds net weight = 1.638 046 kg;  
 for Russian leather for the Italian market = 88 puds net weight = 1.441 481 kg or 60 rolls;  
 for rope yarn, anise, cumin, tallow-candles, and wax-candles = 80 puds gross weight = 1.310 434 kg;  
 for tobacco leaves and wax in barrels = 80 puds net weight = 1.310 434 kg;  
 for cotton, horse hair, rhubarb, glue, isinglass, and star anise = 60 puds gross weight = 982.828 g;  
 for flax, hemp, yarn, and tobacco leaves in barrels = 60 puds net weight = 982.828 g;  
 for hops = 30 puds gross weight = 491.414 g;  
 for plumage = 30 puds net weight = 491.414 g.

For hay, based on [GEOR, p. 30]

	пуд		Metric
<b>penna or parm</b>			3931.2 kg
240	<b>pud or pood</b>		16.38 kg
480	2	<b>grista</b>	8.19 kg

Various values for the **last** at Saint Petersburg, based on [NOBA]:

for caviar, oil, potash, nitrates, hog bristles, tallow, whale oil, and raw sugar = 120 puds gross weight = 1.965 655 kg;

At the end of the eighteenth century, spherical cast-iron weights were established in sizes of 2 and 1 pood, 27, 9, 3, and 1 funt, and 81, 27, 9, 3, and 1 zolotnik. These weights were used in weighing, and for graduating and checking scales.

Two reported upper scales after 1835

		берковец	пуд	фунт	Metric	Metric
<b>last</b>					2025.448 380 kg	2025.471 968 550 7 kg
–	<b>last</b>				1965.659 568 kg	1965.682 460 380 8 kg
–	12	<b>berkovets</b>			163.804 964 kg	163.806 871 698 4 kg
–	120	10	<b>pood</b>		16.380 496 4 kg	16.380 687 169 84 kg
4946	4800	400	40	<b>funt or ansyr</b>	409.512 41 g	409.517 179 246 g

Two reported lower scales after 1835

Фунт	лана	унция	лот	золотник	доля	Metric	Metric
<b>funt or ansyr</b>						409.512 41 g	409.517 179 246 g
12	<b>lana</b>					34.126 034 15 g	34.126 431 603 83 g
16	$1\frac{1}{3}$	<b>once</b>				25.594 525 61 g	25.594 823 702 88 g
32	$2\frac{2}{3}$	2	<b>lot</b>			12.797 262 81 g	12.797 411 851 44 g
96	8	6	3	<b>zolotnik</b>		4.265 754 27 g	4.265 803 950 48 g
9216	768	576	288	96	<b>dolia</b>	44.434 940 3 mg	44.435 457 817 5 mg

For lime after 1835, based on [MART3]

берковец	пуд	Metric
<b>berkovets</b>		163.804 624 kg
10	<b>pood</b>	16.380 462 kg

For general use and for gold at Kyakhta, based on [MART3]

		Metric	Metric
<b>chin</b>		583.426 g	595.333 g
16	<b>liang</b>	36.464 g	37.208 g

Other measures reported during the nineteenth and twentieth centuries:

1 **tonne marine** (for maritime use) = 22,123,200  
dolas = 983.043 071 2 kg.

For iron rod

		Funts	Metric
<b>sviazka</b>		80	32.76 kg
20	<b>batog</b>	4	1.638 kg

For gold and silver after 1835

фунтъ	золотникъ		дѡля			Metric
<b>fun</b>						409.511 560 g
96	<b>zolotnik<sup>a</sup></b>					4.265 745 g
120	1¼	<b>chervonet<sup>b</sup></b>				3.412 596 g
400	4½	3⅓	<b>dolia</b>			1.023 779 g
1920	20	16	4⅘	<b>zerno<sup>c</sup></b>		213.287 mg
2400	25	20	6	1¼	<b>pochka<sup>d</sup></b>	170.630 mg

<sup>a</sup>For precious metals, pearls, paint, and silk

<sup>b</sup>For gold. For other commodities, = 3.49 g

<sup>c</sup>For pearls. Sometimes reported as 1/20 to 1/25 zolotnik

<sup>d</sup>For gold, silver, and precious stones

For gold thread after 1835

фунтъ			золотникъ		Metric
<b>fun</b>					409.511 560 g
1⅓	<b>litra</b>				307.133 670 g
16	12	<b>tsevka</b> or <b>zhivet</b>			25.594 472 g
96	72	6	<b>zolotnik</b>		4.265 745 g
960 or 1120	720 or 840	60 or 70	10 or 11⅓	<b>nit<sup>e</sup></b>	426 or 366 mg

Apothecaries' weight after 1835

фунтъ	унція	драхма	скрупуль	гранъ	дѡля	Metric
<b>fun</b>						358.323 358 6 g
12	<b>onzia</b>					29.860 279 88 g
96	8	<b>drachma</b>				3.732 534 985 g
288	24	3	<b>scrupul</b>			1.244 178 328 g
5760	480	60	20	<b>gran</b>		62.208 916 42 mg
8064	672	84	28	1⅓	<b>dolia</b>	44.434 940 3 mg

192 Rwanda [Formerly: Ruanda]

Ruanda became part of German East Africa in 1884. Belgium occupied Ruanda in 1916, and received a League of Nations mandate over Ruanda-Urundi in 1922. Ruanda became a United Nations trust territory in 1946, and was granted full independence from Belgium, as Rwanda, in 1962. The metric system has been used since 1910. The metric units below are written in Kinyarwanda. *Main sources:* [NTIH] and [SUND]

- 1960–1963: 1 Ruanda-Urundi franc = 100 centimes
- 1952–1960: 1 Belgian Congo franc = 100 centimes
- 1916–1951: 1 Belgian franc = 100 centimes
- 1904–1916: 1 German East African rupie = 100 heller
- 1890–1904: 1 German East African rupie = 64 pesa

192.1 Currency

1964–: 1 Rwandan franc = 100 centimes

192.2 Units of Length

Premetric measures:

1 **doti** = 1.6 m.

Metric system

						Metric
<b>ibiro metero icumi</b>						10,000 m
10	<b>ikilometro</b>					1000 m
10,000	1000	<b>metero</b> <sup>a</sup>				1 m
100,000	10,000	10	<b>desimetro</b>			100 mm
1,000,000	100,000	100	10	<b>senti metero</b>		10 mm
10,000,000	1,000,000	1000	100	10	<b>mili metero</b>	1 mm

<sup>a</sup>Also described as **igikoresho gipima ibirebure bw’ikintu runaka**

192.3 Units of Area

Metric system

			Metric
<b>hegitari</b>			10,000 m <sup>2</sup>
100	<b>ari</b>		100 m <sup>2</sup>
10,000	100	<b>metero kare</b>	1 m <sup>2</sup>

192.4 Units of Capacity

Metric system

			Metric
<b>litiro</b>			1 L
10	<b>desilitiro</b>		1 dL
100	10	<b>seni litiro</b>	1 cL
1000	100	10	<b>mili litiro</b> 1 mL

192.5 Units of Weight

Metric system

					Metric
<b>toni</b>					1000 kg
1000	<b>kingana na garama</b> or <b>kilogaramu</b>				100 kg
10,000	10	<b>igipimisho amagarama ijana</b>			1 kg
1,000,000	1000	100	<b>garama</b>		1 g
100,000,000	100,000	10,000	100	<b>miligaramu</b>	1 mg

193 Ryukyu Islands [Formerly: Luchu, Loo-choo, or Lewchew]

The Ryukyu Kingdom was an independent kingdom between the 1300s and 1800s. In 1879, the Empire became part of Japan. In 1945, the area was occupied by the U.S., which administered the islands until 1972, when they were returned to Japan.

193.1 Currency

- 1972–: 1 Japanese yen = 100 sen = 1000 rin
- 1945–1972: 1 US dollar = 100 cents
- 1879–1945: 1 Japanese yen = 100 sen = 1000 rin

193.2 Units of Length

						Metric
<b>ri</b>						3 927.3 m
2160	<b>ken</b>					1.818 2 m
12,960	6	<b>shaku</b>				303.033 mm
129,600	60	10	<b>sun</b>			30.303 mm
1,296,000	600	100	10	<b>bu</b>		3.03 mm
12,960,000	6000	1000	100	10	<b>rin</b>	303.03 μm

### 193.3 Units of Area

For mountainous land

							Metric
<b>heiho-ri</b> <sup>a</sup>							15,422 km <sup>2</sup>
1555	<b>chô</b>						9917.4 m <sup>2</sup>
15,550	10	<b>tan</b>					991.74 m <sup>2</sup>
155,500	100	10	<b>se</b>				99.174 m <sup>2</sup>
4,665,000	3000	300	30	<b>tsubo</b>			3.305 8 m <sup>2</sup>
46,650,000	30,000	3000	300	10	<b>go</b>		0.330 58 m <sup>2</sup>
466,500,000	300,000	30,000	3000	100	10	<b>shaku</b>	0.033 058 m <sup>2</sup>

<sup>a</sup>According to [UN66], = 15,423 km<sup>2</sup>

### 193.4 Units of Volume

For lumber after 1891

						Metric
<b>ryutsubo</b>						6.010 5 m <sup>3</sup>
21 <sup>2</sup> / <sub>3</sub>	<b>koku</b>					0.278 263 m <sup>3</sup>
216	10	<b>sai or ripposhaku</b>				0.027 826 m <sup>3</sup>
216,000	10,000	1000	<b>sun</b>			27.826 cm <sup>3</sup>
216,000,000	10,000,000	1,000,000	1000	<b>bu</b>		27.826 mm <sup>3</sup>

### 193.5 Units of Capacity

					Metric
<b>koku</b>					180.39 L
10	<b>to</b>				18.039 L
100	10	<b>sho</b>			1.803 9 L
1000	100	10	<b>go</b>		180.39 mL
10,000	1000	100	10	<b>shaku</b>	18.039 mL

### 193.6 Units of Weight

			Metric
<b>kan</b>			3.75 kg
6 <sup>1</sup> / <sub>4</sub>	<b>kin</b>		600 g
1000	160	<b>monme</b>	3.75 g

## 194 Saar

See also *Germany*.

From the late fourteenth century until 1815, the city of Saarbrücken was ruled by the counts of

Nassau-Saarbrücken. After the Napoleonic era, the Saarland came under the control of Prussia. The area was part of Germany until 1918, when the Allies occupied it. Saar was administered by the League of Nations from 1920 to 1935, when it was reincorporated into Germany. After World

War II, the area was administered by France, and returned to Germany in 1957.

### 194.1 Currency

1947–1959: 1 Saar franc = 100 centimes

1947: 1 Saar Mark = 100 Pfennig

### 194.2 Units of Length

1 Wegstunde = 3692.3 m.

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## 195 Saharawi Arab Democratic Republic

See also *Morocco* and *Western Sahara*.

A Spanish trading post was established in this area in 1476, but it was abandoned in 1524. A Spanish protectorate for the region was proclaimed in 1884. In 1958, the status of the Spanish Sahara was changed from a colony to an overseas province. Spain relinquished its holdings in 1975, and in 1976, the Polisario Front proclaimed the Saharawi Republic. SADR is now a partially recognised state that claims sovereignty over the former Western Sahara. Today, the SADR government controls about 20% of the territory it claims. The territories under its control are called *the Free Zone*. Morocco controls and administers the majority of the territory as its Southern Provinces.

The Castilian system for weights and measures was in use until the early twentieth century.

### 195.1 Currency

1976–: 1 Sahrawi peseta = 100 céntimos

Also: 1 Moroccan dirham = 100 santimat

## 196 Sahelian Kingdom

See also *Algeria*, *Burkina Faso*, *Chad*, *Eritrea*, *Ethiopia*, *Mauritania*, *Niger*, *Nigeria*, *Senegal*, *Songhay Empire*, and *Sudan*.

A series of kingdoms were centered on the sahel, the area of grassland south of the Sahara, between the ninth and eighteenth centuries. Among the most important kingdoms were the Fulani Empire, the Kanem Empire, the Kingdom of Ghana, the Sosso Empire and the Songhay Empire.

Measures of length, capacity and weight were adapted by traders to local conditions and the commodities being traded. The mithqāl, the quarter and ‘the Prophet’s moud’ were frequently used measures. In the forrest areas, inhabited by the Edo, a range of metal and wooden objects were used as weights.

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## 197 Saint Bartholomew [Also Referred to by the French Name: Saint-Barthélemy]

This island was occupied by France in 1648 and sold to Sweden in 1784. In 1877, it was reacquired, through purchase, by France.

### 197.1 Currency

1864–1878: 1 U.S.dollar = 100 cents

1821–1864: 8 Spanish reales =  $18\frac{3}{4}$  bits =  $112\frac{1}{2}$  stivers

1797–1821: 1 Spanish real =  $1\frac{1}{2}$  bits = 9 stivers

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## 198 Saint Christopher-Nevis-Anguilla

See *Saint Kitts* and *Nevis*.

## 199 Saint Helena and Dependencies

This island was discovered by the Galician navigator João da Nova Castella in 1502. The island was temporarily occupied by Dutch invaders from 1645 to 1651, when the British East India Company took control of the island. The island became a Crown colony in 1834. In 1981, Saint Helena was reclassified as British Dependent Territories, and in 2002, it became a British Overseas Territory. In 2009, St Helena and its two territories, Ascension Island and the islands of Tristan da Cunha, received equal status under a new constitution, and the British Overseas Territory was renamed Saint Helena, Ascension and Tristan da Cunha.

### 199.1 Currency

1976–:	1 Saint Helena pound = 100 pence
–1976:	1 pound Sterling = 20 shillings = 240 pence
–1961:	1 South African pound = 20 shillings = 240 pence

## 200 Saint Kitts and Nevis [Formerly: Federation of Saint Christopher-Nevis-Anguilla]

Christopher Columbus arrived in St. Kitts in 1493. The island was settled by an Englishman, Thomas Warner, in 1623. Saint Kitts became a British colony in 1624, and a French colony in 1625, when the two nations decided to partition the island. In 1967, Saint Kitts was, together with the islands of Nevis and Anguilla, united politically as a self-governing British Associated State. In 1971, the island of Anguilla formally left the federation. In 1983, Saint Kitts and Nevis became an independent state.

### 200.1 Currency

1973–:	1 US dollar = 100 cents
1964–:	1 East Caribbean dollar = 100 cents
1950–1964:	1 British East Caribbean dollar = 100 cents
1935–1950:	1 British West Indies dollar = 100 cents
1830–1935:	1 pound Sterling = 20 shillings = 240 pence = 960 farthings
1750–1830:	1 Saint Kitts sou

## 201 Saint Lucia

St. Lucia was discovered by Christopher Columbus in 1602. The island alternated between British rule, French rule and neutrality between 1650 and 1803. It joined the Windward Islands in 1838. In 1885, the Statute of the Windward Islands was rearranged and excluded Grenada, St. Lucia and St. Vincent. Saint Lucia became a British Associated State in 1967, and an independent state of the Commonwealth of Nations in 1979.

The British Imperial system was used until 2005, when the metric system became compulsory.

### 201.1 Currency

1973–:	1 US dollar = 100 cents
1964–:	1 East Caribbean dollar = 100 cents
1950–1964:	1 British East Caribbean dollar = 100 cents
1935–1950:	1 British West Indies dollar = 100 cents
c.1860–1935:	1 pound Sterling = 20 shillings = 240 pence = 960 farthings

202 Saint Pierre and Miquelon

These islands were occupied by the French in 1604. They came under British possession from 1702 to 1763, when they were returned to France. They passed between British and French rule on six more occasions between 1778 and 1814, when the Treaty of Paris awarded the islands permanently to France. Saint Pierre and Miquelon became a French colony in 1816, a French overseas territory in 1946, a French overseas *département* in 1976, and a French *collectivité territoriale* in 1985.

The metric system has been official since 1824 (after official decrees of 1824 and 1827), and compulsory since 1839.

202.1 Currency

- 1999–: 1 euro = 100 euro-cents
- 1972–2002: 1 French franc = 100 centimes
- 1945–1972: 1 West African CFA franc = 100 centimes
- 1873–1945: 1 US dollar = 100 cents  
1 pound Sterling = 20 shillings = 240 pence = 960 farthings
- 1829–1942: 1 French franc = 100 centimes

203 Saint Thomas and Prince

See *São Tomé and Príncipe*.

204 Saint Vincent and the Grenadines [Formerly: Hairoun]

Saint Vincent was discovered by Columbus in 1498, but was left undisturbed until the early eighteenth century. Beginning in 1719, French settlers took control of the island, then known as Hairoun by the native Caribs. In 1763, France ceded control of Saint Vincent to Britain, but in 1779, France invaded the island. The Treaties of Versailles in 1783 made Saint Vincent a British

colony. It became a Crown Colony in 1877. Saint Vincent and the northern Grenadines became a British Associated State in 1969, and gained its independence in 1979.

There is no available information about the weights and measures used on these islands until the British colony era. The metric system has legally been stated as the official measurement system by Government regulation since 1924, but some British Imperial measures were still commonly employed in the late twentieth century.

Main source: [MLA]

204.1 Currency

- 1973–: 1 US dollar = 100 cents
- 1964–: 1 East Caribbean dollar = 100 cents
- 1950–1964: 1 British East Caribbean dollar = 100 cents
- 1935–1950: 1 British West Indies dollar = 100 cents
- 1783–1949: 1 pound Sterling = 20 shillings = 240 pence = 960 farthings

205 Saklava Kingdom

See *Madagascar*.

206 Samoa [Formerly: Western Samoa and German Samoa; During the Eighteenth to Nineteenth Centuries, Along with American Samoa, Also Known as Navigators Islands]

These islands were discovered by the Dutch navigator Jacob Roggeveen in 1722. Britain, the United States and Germany established consular representation at Apia in 1847, 1853 and 1861, respectively. A centralized government was inaugurated in 1873, and a provisional government was set up in 1899, consisting of the three consuls. Germany annexed the Samoan Islands,

except for what is now American Samoa, in 1900. New Zealand occupied Western Samoa in 1914 and received a League of Nations Mandate over Samoa in 1920. Western Samoa became a United Nations Trust Territory in 1946, and gained its independence in 1962. It was renamed Samoa in 1997.

The metric system is in use, but some British Imperial units are as well.

*Main sources:* [UN55] and [UN66]

### 206.1 Currency

1967–: 1 Samoan tālā = 100 sene  
 1914–1967: 1 New Zealand pound = 20 shillings = 240 pence = 960 farthings  
 1900–1915: 1 German Mark = 100 Pfennig  
 c.1820–1900: 1 pound Sterling = 20 shillings = 240 pence = 960 farthings

### 206.2 Units of Weight

1 **case** (for bananas) = 56 lbs net = 25.401 kg;  
 1 **case**<sup>8</sup> (for banana fingers and taro) = 72 lbs net = about 32.659 kg.

## 207 Samos

See also *Greece* and *Ottoman Empire*.

The island of Samos was granted, in 1834, self-government as the Principality of Samos.

*Main source:* [ROTT4]

### 207.1 Units of Length

1 **Samian-Ionian foot** = 347.7 mm.

## 208 San Marino

San Marino was founded in the ninth century, adopted a republican constitution in the eleventh

century, and became fully independent in 1631. In 1862, San Marino put itself under the protection of Italy.

The metric system was made obligatory on January 1, 1886, and has been compulsory since January 1, 1907. Some older units have been reported as being in use until the mid-twentieth century.

*Main sources:* [MART3] and [STAT1946]

### 208.1 Currency

1999–: 1 euro = 100 euro-cent  
 1862–2002: 1 Sammarinese lira = 100 centesimi

### 208.2 Units of Length

1 **braccio** = 652.985 mm.

### 208.3 Units of Weight

1 **libra** = 475.4 g.

## 209 São Tomé and Príncipe

These islands were uninhabited when they were discovered by Portuguese navigators Joao de Santarem and Pedro de Escobar in 1470. São Tomé became Portuguese in 1483, as did Príncipe in 1485. The islands were designated a Portuguese overseas province in 1951, and gained their independence in 1975.

There is no available information about systems of weights and measures used before the Portuguese system was introduced in the late fifteenth century. The metric system was introduced during the early nineteenth century, and is now compulsory.

### 209.1 Currency

1977–: 1 São Tomé and Príncipe dobra = 100 cêntimos

<sup>8</sup> A wooden case with outer measure =  $11\frac{1}{2} \times 11\frac{1}{2} \times 26\frac{1}{4}$  in. = about  $29.2 \times 29.2 \times 66.7$  cm [UN66].

1914–1977: 1 São Tomé and Príncipe  
escudo = 100 centavos  
–1914: 1 São Tomé and Príncipe real

## 209.2 Units of Length

Portuguese-linked system

				Metric
<b>vara</b>				4.84 m
11	<b>pé</b>			440 mm
22	2	<b>palmo</b>		220 mm
176	16	8	<b>polegada</b>	27.5 mm

## 209.3 Units of Dry Capacity

Dry commodities were generally sold by weight.

## 209.4 Units of Liquid Capacity

Portuguese-linked system

						Metric
<b>tonel</b>						840.000 L
2	<b>pipa</b>					420.000 L
50	25	<b>almude</b>				16.800 L
100	50	2	<b>pote</b>			8.400 L
600	300	12	6	<b>canada</b>		1.400 L
2400	1200	48	24	4	<b>quartilho</b>	350 mL

## 209.5 Units of Weight

Portuguese-linked system

							Metric
<b>tonelada</b>							793.152 kg
13½	<b>quintal</b>						58.752 kg
54	4	<b>arroba</b>					14.688 kg
1728	128	32	<b>arratel</b>				459.000 g
6912	512	128	4	<b>quarta</b>			114.750 g
27,648	2048	512	16	4	<b>onça</b>		28.687 g
221,184	16,384	4096	128	32	8	<b>oitava</b>	3.586 g

## 210 Sápmi

See also *Finland, Norway, Russia, and Sweden*.

Sápmi is a cultural region, traditionally inhabited by the Sami people, that includes the northern parts of Fennoscandia. Traditionally, the Sami have plied a variety of livelihoods, including coastal fishing, fur trapping, sheep herding, and semi-nomadic reindeer herding. These living conditions led to a measurement system that was adapted to the prevailing conditions, such as weather and terrain. Today, reindeer herding is legally reserved only for Sami people in certain regions of the Nordic countries.

*Main sources:* [JANN], [JANN2], [JANN3], [KÅVE], [NIEL], [SIVE], [SPII], and [SVON]

### 210.1 Units of Quantity

For reindeer, as used by the Sami in Lulea

	Number of reindeer
<b>stuor ällo</b>	large herd of reindeer
<b>ällo</b>	herd of reindeer
<b>sjtuhhttja</b>	c.1 500–2 000
<b>biehkke</b>	c. 300–1 500
<b>moadda tjuode</b>	c. 200–300
<b>návkká</b>	c. 50–200
<b>tjårå</b>	c. 20–50
<b>láhkegis</b>	c. 2–10
<b>aktagis</b>	1 reindeer

For reindeer, as used by the Sami in Gällivare and to the north

	Number of reindeer
<b>eallu</b>	>1000
<b>čoraeallu</b>	100–1000
<b>čora</b>	20–100
<b>sparru</b> or <b>gihppu</b>	10–20

Other units reported:

- 1 **málesnárre** (used by the Sami in Lulea) or **borranguolli** (used by the Sami in Gällivare and to the north) = the amount of fish needed for one meal for a family, according to [JANN2] = about 4–5 fish of normal size.

### 210.2 Units of Length

Traditional units:

- 1 **beaivvis** = the distance covered by walking or driving in a day;
- 1 **vuojáldat** = a considerable driving distance;
- 1 **vuojástat** = a short driving distance;
- 1 **beanagullan** or **bænâh-gullâm** (used by the Sami in Gällivare and to the north) = the distance at which it is possible to hear a dog barking (=about 10 km);
- 1 **gullosmierrin** (used by the Sami in Lulea) = the distance within which one can hear a person shout (=about 10 km);
- 1 **vuojnnemmierre** (used by the Sami in Lulea) = the distance within which a person is in sight;
- 1 **vuohjemmierre** (used by the Sami in Lulea) = the distance within which an elk is within range (=about 250–500 m);
- 1 **bâlkâstâk** (used by the Sami in the north) = the distance one can throw a stone (~35 m);
- 1 **suohpanbajis** or **suoppânbagge** = a comfortable distance to throw a lasso (=about 10–15 m);
- 1 **fânâs-bâggje** (used by the Sami in the north) = the length of a boat;
- 1 **viesso-bâggje** (used by the Sami in the north) = the length of a house;
- 1 **salla** or **sâlla** (used by the Sami in Lulea) = the distance between the fingertips of a man's outstretched arms;
- 1 **ola-muddo** (used by the Sami in the north) = as far as one can reach;
- 1 **állan** or **állân** (used by the Sami in Lulea) = the length of a man's arm;
- 1 **lavkas** (used by the Sami in Lulea) = one step;
- 1 **juolgi** (used by the Sami in Lulea) = the length of a foot;
- 1 **niib-simer** (used by the Sami in the north) = the back of a blade (used to measure how far the water level has dropped);
- 1 **baisti-gowdo** (used by the Sami in the north) = the width of a piece of salmon for roasting on a spit = about 2–4 in.;
- 1 **bael'gésarre** = the distance between two (other) fingers;

- 1 **cæggo-bælgest** (used by the Sami in the north) = a layer of fat that is as thick as the width of a fist with an outstretched thumb;
- 1 **gaskasuom-goartel** (used by the Sami in the north) = the distance from the tip of the thumb to the tip of the middle finger;
- 1 **gaskasangoartil**, **gās'kâsour'bma-vuok'se**, **čuwde-goartel**, or **čuovddegoartil** = the distance from the tip of the thumb to the tip of the middle finger;
- 1 **goartil** or **goar'tel** (also used to measure the depth of snow) = the distance from the tip of the thumb to the tip of the index finger;
- 1 **vuok'se** or **bael'gēhal'se** = the distance from the tip of the thumb to the tip of the index finger;
- 1 **doppitāk** (used by the Sami in the north) = the breadth of a clenched fist;
- 1 **giehtagovddu** (used by the Sami in Lulea) = the width of a palm;
- 1 **ceakkobealgi** = the height of an upright thumb (=about 150 mm);
- 1 **čuovdemihttu** (used by the Sami in Lulea) = the distance from the tip of the index finger to its knuckle;

- bahtarádjáj muohta** (used by the Sami in Lulea) = snow up to the trunk;
- buolvvarádjáj** (used by the Sami in Lulea) = water up to the knees;
- bahtarádjáj** (used by the Sami in Lulea) = water up to the trunk;
- ållet ålemij** (used by the Sami in Lulea) = water up to the waist;
- giedavuolláj** (used by the Sami in Lulea) = water up to the armpits.

Sometimes, a reindeer was used as a yardstick, when it had to trudge through deep snow:

- tjievttje vuolláj** (used by the Sami in Lulea) = when the snow touches the hind legs;
- tjoajve vuolláj** (used by the Sami in Lulea) = when the snow reaches up to the belly of the animal.

Other measures reported:

- oavnnjil** (=‘coming on a short distance behind’);
- menddo** (=‘very far away’).

Norwegian scale during the early nineteenth century

						Metric
<b>miilâ</b>						11,294.64 m
4	<b>miilâ-njælljadås</b>					2823.66 m
6000	1500	<b>sålla</b>				1.882 44 m
18,000	4500	3	<b>allân</b>			627.48 mm
36,000	9000	6	2	<b>juolge</b>		313.74 mm
72,000	18,000	12	4	2	<b>goartel</b>	156.87 mm

- 1 **bael'gēgovddu** or **duma** = the width of the thumb;
- 1 **suorbmâ** or **sourpmagovddu** (for measuring the thickness of the fat layer on the back of a reindeer) = the width of a finger.

Sometimes, the human body was used as a yardstick, such as when an individual would trudge through deep snow or wade in deep water:

- buolvvarádjáj muohta** (used by the Sami in Lulea) = snow up to the knee;

Other measures reported during the nineteenth to twentieth centuries:

- 1 **kaffekok** = a suitable distance between rests when walking = about 9 km.

Metric scale since the late nineteenth century

			Metric
<b>miilâ</b>			10,000 m
10	<b>kilomehter</b>		1000 m
10,000	1000	<b>mehter, mettar, or mēttēr</b>	1 m

210.3 Units of Volume

- 1 **sâlla** (for firewood) = a fathom;  
1 **jorbâmuor-sâllâ** (for uncleaved wood) = a fathom.

210.4 Units of Dry Capacity

Traditional units used in Norway:

- 1 **stabbâl** (for hay) = as much hay as one can hold in one’s arms;  
1 **goabmer** = two open hands put together as a bowl;  
1 **čorbmâ** = a handful;  
1 **saltě-čorbmâ** = a handful of salt;  
1 **gâzâstak** = a spoonful.

Traditional units (used by the Sami in Lulea):

- 1 **tjârmâ dievva** (for salt) = quite a handful.

Norwegian scale during the early nineteenth century

		Metric
fârpâl		138.9 L
8	skæppo	17.36 L

210.5 Units of Liquid Capacity

Norwegian scale during the early nineteenth century

						Metric
ānkâr						38.5 L
19½	gadmô					1.97 L
39	2	gadmô-bællě				987 mL
52	2⅔	1⅓	golmâ-pæitâsâš			740 mL
104	5⅓	2⅔	2	bælnub-pæilâsâš		370 mL
156	8	4	3	1½	pæilâ	247 mL

Metric scale:

- 1 **littër** = 1 L.

210.6 Units of Weight

Traditional units (used by the Sami in Lulea and to the north):

- 1 **gielka** (used by the Sami in the north) = the load a sledge is able to carry;  
1 **vækkâ-bâjadâs** = the load a grown man is able to lift, with the greatest effort;  
1 **bâjadâs** = the load a grown man is able to lift;  
1 **lahkkeduddno** = a barrel of fish = about 50–60 kg;  
1 **noade** = the load a grown man is able to carry a long distance = about 25–30 kg;  
1 **fieluk** = a small barrel of fish = about 15–20 kg;  
1 **væktâ** (for hay and fish) = about 20 kg.

Traditional system

			Metric
viehku or viekko			~18 kg
3	budde <sup>a</sup>		~6 kg
72	24	marke	~250 g

<sup>a</sup>A bismerpund

Metric scale since the late nineteenth century

			Metric
kilu or gilo			1 kg
10	hectogram		100 g
1000	100	gram	1 g

210.7 Temperature

Traditional units (used by the Sami in Lulea):

- ruosttetjoaskes** = very low temperatures, probably between –30 and –40 °C;  
**tjoaskes** = low temperatures, probably between –10 and –30 °C;

**májeldit** = a few degrees below zero (=about  $-5^{\circ}\text{C}$ );  
**njáhtso** = a few degrees above zero (=about  $1-2^{\circ}\text{C}$ );  
**siebladit** = so warm that the snow begins to melt (=probably about  $3-5^{\circ}\text{C}$ );  
**gálos** = cooler weather in the summer;  
**bivval** = slightly higher temperatures (can apply to both summer and winter);  
**tsáhtu** = warm weather, no sun and warm winds;  
**bálgo** = warm and sunny weather during summer;  
**báhkka** = high temperatures during summer.

## 211 Sarawak

See also *Malaysia* and *Straits Settlements*.

Sarawak was a loosely-governed territory under the control of the Brunei Sultanate in the early nineteenth century. Sir James Brooke was appointed Rajah by the Sultan of Brunei in 1841, and Sarawak became an independent state ruled by the White Rajah Dynasty until 1946, when it was ceded to Britain. In 1963, Sarawak joined the Federation of Malaysia.

The weights and measures were generally the same as those in the Straits Settlements and British North Borneo.

*Main sources:* [CHEW], [HARR3], [MART3], [ROTH], and [UN55]

### 211.1 Currency

1953–1963: 1 Malaya and British Borneo dollar = 100 cents  
 1945–1953: 1 Sarawak dollar = 100 cents  
 1942–1945: 1 Japanese government-issued dollar = 100 cents  
 1858–1942: 1 Sarawak dollar = 100 cents

### 211.2 Units of Quantity

1 **gelong** = coil of rattan in bundles, approximately 100 vines.

### 211.3 Units of Length

Traditional measures among the Iban tribes in Sarawak and Sabah:

- 1 **sedepa** or **depeh** = the span from the tip of the middle finger of one hand to the tip of the middle of the other with one's arms outstretched;
- 1 **depas** = an arm's length;
- 1 **hesta** = the span from the elbow joint to the end of the middle finger;
- 1 **jěngkal** or **jingkal** = the span from the tip of the outstretched thumb to the tip of the small finger;
- 1 **jěngkal amat** = the span from the tip of the thumb to the tip of the middle finger;
- 1 **jěnkak bakit** = the span from the tip of the thumb to the tip of the first finger.

### 211.4 Units of Volume

1 **panchang** = 108 stacked cubic feet =  $3.058\text{ m}^3$ .

### 211.5 Units of Dry Capacity

1 **gantang** (for rice and nyiru) = 4.546 L or about 3.7 kg of husked rice.<sup>9</sup>

### 211.6 Units of Weight

British Imperial-linked system

		Imperial	Metric
<b>picol</b>		133⅓ lbs	60.479 020 kg
100	<b>Catty</b>	1½ lbs	604.790 g

Other reported measures:

1 **tamping** = 24.131 129 kg.

<sup>9</sup> *The Sarawak Museum Journal*, vol. 35, p. 65, 1985.

212 Kingdom of Sardinia

See also *Crown of Aragon* and *Italy*.

The Kingdom of Sardinia was formed in 1297, and lasted until 1861, when the area became part of the Kingdom of Italy.

- 1720–1821  
(on the island):  
  
1 Sardinian scudo = 2½ lire  
1 Sardinian doppietta =  
2 scudi 1 Sardinian lira =  
4 reales = 20 soldi = 120  
cagliarese = 240 denari
- 1720–1800  
(on the mainland):  
  
1 Piedmontese scudo = 6 lire  
1 Piedmontese doppia =  
2 scudi 1 Piedmontese lira  
= 20 soldi = 240 denari

212.1 Currency

- 1816–1861: Sardinian lira = 100  
centesimi
- 1801–1815: 1 French franc = 100 centimes

212.2 Units of Length

Traditional system in Cagliari

								Metric
miglio <sup>a</sup>								2518.560 m
800	trabucco or canna							3.148 2 m
4800	6	piede						524.70 mm
9600	12	2	braccio or palmo					262.35 mm
38,400	48	8	4	quarta				65.587 mm
57,600	72	12	6	1½	oncia			43.725 mm
691,200	864	144	72	18	12	punto		3.644 mm
8,294,400	10,368	1728	864	216	144	12	atomo	303.6 µm

<sup>a</sup>1 miglio (used for road works) = 1 481.481 481 m (before 1823) and 1 851.851 852 m (after 1823)

Metric-linked system in Cagliari after 1845

				Metric
miglio				2400 m
800	canna			3 m
960	1⅕	trabucco		2.5 m
57,600	72	60	oncia	41.67 mm

In Cagliari and at Sassari

				Metric
rasiere				139.536 250 m
7	starello			19.933 750 m
14	2	corbula		9.966 875 m
56	8	4	imbuto	2.491 719 m

212.3 Units of Area

Upper scale in Cagliari

					canna <sup>2</sup>	Metric
restier					1400	13,875.628 536 m <sup>2</sup>
1¾	mouh				800	7928.930 592 m <sup>2</sup>
3½	2	starello di Cagliari or quarra di Cagliari			400	3964.465 296 m <sup>2</sup>
7	4	2	starello di Sassari		200	1982.232 648 m <sup>2</sup>
14	8	4	2	corbula or quaddo	100	991.116 324 m <sup>2</sup>
56	32	16	8	4	imbuto	247.779 081 m <sup>2</sup>

Lower scale in Cagliari

				Metric
<b>imbuto</b>				247.779 081 m <sup>2</sup>
25	<b>trabucco cuadrado</b>			9.911 163 m <sup>2</sup>
36	1 <sup>11</sup> / <sub>25</sub>	<b>canna cuadrada</b>		6.890 625 m <sup>2</sup>
3600	144	100	<b>palmo cuadrado</b>	6.890 625 dm <sup>2</sup>

Metric-linked system in Cagliari after February 26, 1839

			Metric
<b>starello</b>			4000 m <sup>2</sup>
16	<b>imbuto</b>		250 m <sup>2</sup>
400	25	<b>trabucco cuadrado</b>	10 m <sup>2</sup>

## 212.4 Units of Volume

In Cagliari

				Metric
<b>canna cubi</b>				187.213 945 m <sup>3</sup>
6	<b>trabucco cámaras</b>			31.202 324 m <sup>3</sup>
27	4 <sup>1</sup> / <sub>2</sub>	<b>misura cubi</b>		6.933 850 m <sup>3</sup>
1728	288	64	<b>palmo cubi</b>	108.341 dm <sup>3</sup>

## 212.5 Units of Dry Capacity

For grains

					Metric
<b>rasiere or restiera</b>					151.488 L
3	<b>starello or moggio</b>				50.496 L
6	2	<b>quarra</b>			25.248 L
12	4	2	<b>corbula</b>		12.624 L
48	16	8	4	<b>imbuto</b>	3.156 L

For other dry commodities

					Metric
<b>rasiere or restiera</b>					172.2 L
3 <sup>1</sup> / <sub>2</sub>	<b>quarro or starello in Cagliari</b>				49.2 L
7	2	<b>starello in Sassari</b>			24.6 L
14	4	2	<b>corbula</b>		12.3 L
56	16	8	4	<b>imbuto</b>	3.075 L

In Cagliari and at Sassari before and after 1844, based on [MART3]

				Metric	Metric
<b>rasiere or restiera</b>				176.750 000 L	175 L
3 <sup>1</sup> / <sub>2</sub>	<b>starello or moggio</b>			50.500 000 L	50 L
7	2	<b>quarra</b>		25.250 000 L	25 L
56	16	8	<b>imbuto</b>	3.156 250 L	3.125 L

212.6 Units of Liquid Capacity

Traditional system and metric-linked system for wine and brandy

				Metric	Metric
<b>botte</b>				44.840 L	50 L
10	<b>quartara</b>			4.484 L	5 L
40	4	<b>mezzetta</b>		1.121 L	1.25 L
160	16	4	<b>tazza</b>	280.250 mL	312.5 mL

For oil

					Metric
<b>barile</b>					33.635 2 L
2	<b>giarra</b>				16.817 6 L
8	4	<b>quartana</b> <sup>a</sup>			4.204 4 L
96	48	12	<b>quartuccio</b>		350.367 mL
192	96	24	2	<b>misura</b>	175.183 mL

<sup>a</sup>When sold by weight, said to equal 10 libbre = 4.065 631 kg

For beer

			Metric
<b>brenta</b>			49.284 L
36	<b>pinte</b>		1.369 L
72	2	<b>boccale</b>	684.5 mL

212.7 Units of Weight

In Cagliari

									Metric
<b>cantaro grosso</b>									42.282 562 kg
2 <sup>1</sup> / <sub>6</sub>	<b>cantaro commercio</b>								40.656 310 kg
4	1 <sup>11</sup> / <sub>13</sub>	<b>rubbio grosso</b>							10.570 640 kg
4 <sup>4</sup> / <sub>25</sub>	4	1 <sup>1</sup> / <sub>25</sub>	<b>rubbio commercio</b>						10.164 077 kg
104	100	26	25	<b>libbra commercio</b>					406.563 g
1248	1200	312	300	12	<b>uncia</b>				33.880 25 g
4992	4800	1248	1200	48	4	<b>quarto</b>			8.470 06 g
9984	9600	2496	2400	96	8	2	<b>ottavo</b>		4.235 03 g
19,968	19,200	4992	4800	192	16	4	2	<b>sedicesimo or argento</b>	2.117 52 g

For medical use before 1818 and after 1818

					Metric	Metric
<b>libbra medicinale</b>					307.390 g	307.399 818 g
12	<b>uncia</b>				25.615 833 g	25.616 652 g
96	8	<b>dramma</b>			3.201 979 g	3.202 081 g
288	24	3	<b>scrupolo</b>		1.067 326 g	1.067 360 g
5760	480	60	20	<b>grano</b>	53.366 mg	53.368 mg

For gold and silver

				Metric
<b>libbra</b>				325.250 480 g
12	<b>uncia</b>			27.104 207 g
192	16	<b>argento</b>		1.694 013 g
6912	576	36	<b>grano</b>	47-056 mg

Other reported measures:

- 1 **salma** (for salt) = 1400 libbre = 569.188 34 kg;
- 1 **colpo** (for mortar) = 1040 libbre = 422.825 624 kg;
- 1 **misura** (for coal) = 160 libbre = 65.050 096 kg;
- 1 **peseta** (for firewood) = 150 libbre = 60.984 465 kg.

213 Sassanid Empire (c. 224–651)

See also *Parthian Empire*.

The Sassanid empire was founded in 224 by Ardashir I, after the fall of the Parthian Empire, and lasted until 651, when the area was invaded by the Arab Caliphate. The Empire encompassed all of today’s Afghanistan, Armenia, Azerbaijan, Dagestan, Georgia, Iran, Iraq, Syria, and parts of Turkey, as well as the Persian Gulf area and parts of southwestern Pakistan.

Main sources: [DECO], [HENN], [KAHN], [MACL2], [MACK3], and [MANA2]

213.1 Units of Length

										Metric
<b>frasang</b>										~6112 m
4	<b>hās<sup>a</sup>r<sup>a</sup></b>									~1528 m
2000	500	<b>nāy<sup>b</sup></b>								~3.056 m
3333⅓	833⅓	1⅓	<b>schud-nāy<sup>c</sup></b>							~1.834 m
4000	1000	2	1⅓	<b>gām ī dō pāy<sup>d</sup></b>						~1.528 m
6666⅔	1666⅔	3⅓	2	1⅓	<b>gām or gāman</b>					~917 mm
13, 333⅓	3333⅓	6⅔	4	3⅓	2	<b>frārāst<sup>e</sup></b>				~458 mm
20,000	5000	10	6	5	3	1½	<b>pāy<sup>f</sup></b>			~306 mm
26, 666⅔	6666⅔	13⅓	8	6⅔	4	2	1⅓	<b>widest<sup>g</sup></b>		~229 mm
320,000	80,000	160	96	80	48	24	16	12	<b>angust<sup>h</sup></b>	~19 mm

<sup>a</sup>“Mile.” Sometimes reported as 1 frasang  
<sup>b</sup>“Pole”  
<sup>c</sup>“Fathom.” Also called **frabāzu** = ½ **vibāzu**  
<sup>d</sup>“Pace”  
<sup>e</sup>“Cubit”  
<sup>f</sup>“Foot”  
<sup>g</sup>“Span.” Also called **vitasti**  
<sup>h</sup>“Fingerbreadth”

## Lower Avestic scale

					Metric
<b>dišti<sup>a</sup></b>					~190 mm
1¼	<b>uz-ašti</b>				~152 mm
2½	2	<b>ašti<sup>b</sup></b>			~76 mm
5	4	2	<b>baši<sup>c</sup></b>		~38 mm
10	8	4	2	<b>angust</b>	~19 mm

<sup>a</sup>“Short span”<sup>b</sup>“Palm”<sup>c</sup>“Joint of a finger.” In Pahlavi, also called **bčk**

## 213.2 Units of Weight

## Arabian scale

					Metric
<b>raṭl, riṭl, or ruṭl</b>					~1.44 kg
12		<b>ūqīyah</b>			~120 g
24	2	<b>nish</b>			~60 g
96	8	4	<b>nawāt</b>		~15 g
480	40	20	5	<b>dirham</b>	~3 g

## Upper Byzantine scale in Armenia, according to [MANA2, p. 117] and [DECO]

										Metric
khankhar										45.33 kg
1⅓	talent									40.80 kg
1⅞ <sub>18</sub>	1¼	kentênarion								32.64 kg
2⅞	2½	2	payvasik							16.32 kg
138⅞ <sub>9</sub>	125	100	50	litra						326.40 g
1666⅔ <sub>3</sub>	1500	1200	600	12	oungia					27.20 g
2777⅞ <sub>9</sub>	2500	2000	1000	20	1⅓ <sub>3</sub>	stater				16.32 g
6666⅔ <sub>3</sub>	6000	4800	2400	48	4	2⅞ <sub>5</sub>	siklos			6.80 g
10,000	9000	7200	3600	72	6	3⅞ <sub>5</sub>	1½	dahekan or nomisma		4.53 g
11, 111⅓ <sub>9</sub>	10,000	8000	4000	80	6⅔ <sub>3</sub>	4	1⅔ <sub>3</sub>	1⅓ <sub>9</sub>	dram	4.08 g

## Lower Byzantine scale in Armenia, based on [MANA2, p. 117] and [DECO]

										Metric
dram										4.08 g
1⅓	stater or drachma									3.40 g
1⅘	1½	semission								2.27 g
2⅞	2¼	1½	trimission							1.51 g
3⅘	3	2	1⅓	grammarion						1.13 g
5⅘	4½	3	2	1½	snig					755 mg
21⅓	18	12	8	6	4	keration				189 mg
28⅘	24	16	10⅔	8	5⅓	1⅓	psit			142 mg
43⅘	36	24	16	12	8	2	1½	assarion or lepton		94 mg
86⅘	72	48	32	24	16	4	3	2	barley grain	47 mg

## 214 Saudi Arabia

The emergence of the Saudi dynasty began in central Arabia in 1744, when Muhammad ibn Saud, the ruler of the town of Ad-Dir'iyah, joined forces with Imam Muhammad ibn Abd-al-Wahhab, to create the Wahhabiyah movement that came to spread across the Arabian Peninsula. The House of Saud came to rule most of the present-day territory of Saudi Arabia, including the cities of Mecca and Medina. The Ottoman Sultan instructed Mohammed Ali Pasha to reconquer the area again. Ali sent his sons, Tusun Pasha and Ibrahim Pasha, who were successful in routing the Saudi forces in 1818, eventually weakening the hold of Al Saud. After a rebuilding period following the end of the First Saudi State, the House of Saud returned to power in the *Second Saudi State* in 1824. The state lasted until 1891, when it succumbed to the Al Rashid of Ha'il. In 1904, 'Abd al-'Aziz II had recovered all of the original Sa'udi territory in central Arabia. The British held Sa'udi lands as a protectorate after taking them from the Ottomans in 1915, during World War I. The Hejazi Kingdom was established in 1916, and the Sultanate of Nejd and its Dependencies were established in

1921. Jebel Shammar was incorporated into Nejd in 1921, and Asir was incorporated into Hejaz in 1930. Hejaz and Nejd were united to create Saudi Arabia in 1932. Asir was incorporated into the kingdom a year later.

The metric system was adopted in 1962, and became compulsory in 1964.

*Main sources:* [FĀḤU], [FORE], [UN55], and [UN66]

### 214.1 Currency

1963–:	1 Saudi Arabian riyal = 20 ghirsh, qursh or querche = 100 halalas
1960–1962:	1 Saudi Arabian riyal = 20 ghirsh, qursh or querche
1925–1960:	1 Saudi Arabian riyal = 11 ghirsh, qursh or querche
–1928:	1 Ottoman piastre = 40 paras

### 214.2 Units of Length

1 dhraa or diraa = 488 mm.

Traditional system as reported during the eighteenth century

مرحلة	بريد	فرسخ				Metric
<b>marhala</b>						38,640 m
2	<b>barid</b>					19,320 m
8	4	<b>parasang or farasakh</b>				4830 m
10,000	5000	1250	<b>cassaba</b>			3.864 m
60,000	30,000	7500	6	<b>gus or guz</b>		644 mm
80,000	40,000	10,000	8	1½	<b>covid or cubido</b>	483 mm

Traditional upper scale as reported during the nineteenth century

مرحلة	بريد	فرسخ				Metric
<b>marhala</b>						46,089 m
2	<b>barid</b>					23,044 m
8	4	<b>parasang or farasakh</b>				5761.1 m
200	100	25		<b>ghalva</b>		230.44 m
240	120	30		1½	<b>seir</b>	192.04 m

Traditional lower scale as reported during the nineteenth century

			ذراع	ذراع	قدم	قيضة	إصبع	Metric
<b>seir</b>								192.04 m
50	<b>qasaba</b>							3.84 m
100	2	<b>orgye</b>						1.92 m
300	6	3	<b>arsh</b>					640 mm
400	8	4	1 $\frac{1}{3}$	(small) <b>arsh</b>				480 mm
600	12	6	2	1 $\frac{1}{2}$	foot			320 mm
2400	48	24	8	6	4	<b>cabda</b> ("hand")		80 mm
9600	192	96	32	24	16	4	<b>assbā</b> ("finger")	20 mm

British Imperial-linked system

اليارد				قدم				بوصة	Imperial	Metric
yard									36 in.	914.4 mm
1 $\frac{1}{3}$	<b>hindaza or great ovido<sup>a</sup></b>								27 in.	685.8 mm
1 $\frac{1}{25}$	–	<b>gudge</b>							25 in.	635.0 mm
2	1 $\frac{1}{2}$	–	<b>dira<sup>b</sup></b>						18 in.	457.2 mm
3	2 $\frac{1}{4}$	–	–	foot					12 in.	304.8 mm
5 $\frac{1}{7}$	3 $\frac{1}{7}$	–	2 $\frac{1}{7}$	–	<b>shibr<sup>c</sup></b>				7 in.	177.8 mm
6	–	–	3	–	1 $\frac{1}{6}$	<b>fitr</b>			6 in.	152.4 mm
72/11	4 $\frac{10}{11}$	4 $\frac{1}{11}$	3 $\frac{7}{11}$	–	1 $\frac{3}{11}$	1 $\frac{1}{11}$	<b>baa</b>		5 $\frac{1}{2}$ in.	139.7 mm
36	27	25	18	12	7	6	5 $\frac{1}{2}$	<b>busa</b>	1 in.	25.4 mm

<sup>a</sup>Values varied by location from 691 to 724 mm

<sup>b</sup>Values varied by location from 439 to 483 mm. Also reported as **covido**, **cubido**, or **ovido**

<sup>c</sup>On October 31, 1923, it was described in a letter by Consul Bullard to the Marquess Curzon of Kedleston as a full hand span, the distance from the tip of the thumb to the tip of the outstretched little finger. See [FORE, p. 58]

Other reported measures:

1 ميل بحري = a nautical mile = 1852 m.

Metric-linked system

كيلومتر	هكتومتر	الديكامتر	متر	ديسيمتر	سنتيمتر	مليمتر	ميكرومتر	Metric
kilometer								1000 m
10	hectometer							100 m
100	10	dekameter						10 m
1000	100	10	meter					1 m
10,000	1000	100	10	decimeter				100 mm
100,000	10,000	1000	100	10	centimeter			10 mm
1,000,000	100,000	10,000	1000	100	10	millimeter		1 mm
1,000,000,000	100,000,000	10,000,000	1,000,000	100,000	10,000	1000	micrometer	1 $\mu$ m

### 214.3 Units of Area

Traditional system until the early twentieth century<sup>10</sup>

		Metric
<b>makhzan</b>		37.935 m <sup>2</sup>
75	<b>dhra</b> <sup>2</sup>	50.58 dm <sup>2</sup>

British Imperial-linked system

						Imperial	Metric
<b>hindaza</b> <sup>2</sup>						739 <sup>2</sup> / <sub>25</sub> sq in.	44.409 cm <sup>2</sup>
–	<b>dira</b> <sup>2</sup>					299 <sup>3</sup> / <sub>10</sub> sq in.	17.965 cm <sup>2</sup>
–	–	<b>shibr</b> <sup>2</sup>				49 sq in.	2.942 cm <sup>2</sup>
–	–	–	<b>fitr</b> <sup>2</sup>			36 sq in.	2.161 cm <sup>2</sup>
–	–	–	–	<b>baa</b> <sup>2</sup>		30 <sup>1</sup> / <sub>4</sub> sq in.	1.816 cm <sup>2</sup>
739 <sup>2</sup> / <sub>25</sub>	299 <sup>3</sup> / <sub>10</sub>	49	36	30 <sup>1</sup> / <sub>4</sub>	<b>busa</b> <sup>2</sup>	1 sq in.	6.002 5 mm <sup>2</sup>

Metric-linked system at ‘Asīr during the early twentieth century

فدان				Metric
<b>faddān or feddan</b>				4200 m <sup>2</sup>
2	<b>zahab</b>			2100 m <sup>2</sup>
8	4	<b>rakib</b>		525 m <sup>2</sup>
16	8	2	<b>falleja</b>	262.5 m <sup>2</sup>

Metric-linked system during the late twentieth century

فدان	دونم		Metric
<b>faddān or feddan</b>			50,000 m <sup>2</sup>
20	<b>mishara, meshara or dūnam</b>		2500 m <sup>2</sup>
500	25	<b>olc</b>	100 m <sup>2</sup>

### 214.4 Units of Dry Capacity

Traditional system in Medina

				Metric
<b>tomand or timan</b>				56.760 L
4 <sup>1</sup> / <sub>2</sub>	<b>farq</b>			12.613 L
13 <sup>1</sup> / <sub>2</sub>	3	<b>sâa</b>		4.204 L
40	8 <sup>8</sup> / <sub>9</sub>	2 <sup>26</sup> / <sub>27</sub>	<b>mekmeda</b>	1.419 L

Metric-linked system

			Metric
<b>téman</b>			85 L
40	<b>mekmeda or kella</b>		2.125 L
80	2	<b>mekdema</b>	1.062 5 L

<sup>10</sup> Based on Consul Bullard to the Marquess Curzon of Kedleston, October 31, 1923. *Foreign Office Annual Reports from Arabia, 1930–1960*. Vol. 1, 1930–1934. Archive Editions, 1993, p. 58.

## 214.5 Units of Liquid Capacity

Three reported scales

					Metric	Metric	Metric
<b>ardabb</b>					1574.56 L	1573.94 L	1314.56 L
208	<b>zudda</b> or <b>gudda</b>				7.570 L	7.567 L	6.32 L
416	2	<b>cuddy</b>			3.785 L	3.783 L	3.16 L
1664	8	4	<b>nusfiah, noosfia, or nusfiya</b>		946.25 mL	0.946 L	0.79 L
26,624	128	64	16	<b>vakia</b> or <b>wakei</b>	59.140 6 mL	59.117 mL	49.375 mL

Other measures used during the nineteenth century:

1 **taneka** = 4 Imp gal = 18.184 L.

Metric-linked system

		Metric
<b>ardeb</b>		198 L
40	<b>cuddy</b>	4.95 L

## 214.6 Units of Weight

Traditional systems

						Metric
<b>kantar</b>						57.12 kg
100	<b>ratl</b>					571.20 g
1200	12	<b>once</b>				47.60 g
2133 $\frac{1}{3}$	21 $\frac{1}{3}$	1 $\frac{7}{9}$	<b>istar</b>			26.78 g
9600	96	8	4 $\frac{1}{2}$	<b>misqal</b>		5.95 g
14,400	144	12	6 $\frac{3}{4}$	1 $\frac{1}{2}$	<b>dirhem</b>	3.967 g

Alternative lower scale

			Metric
<b>ratl</b>			566.66 g
12 $\frac{1}{2}$	<b>once</b>		45.33 g
100	8	<b>misqal</b>	5.666 g

Alternative scale

						Metric
<b>behar</b>						199.32 kg
2 $\frac{2}{3}$	<b>kantar</b>					83.05 kg
36	15	<b>frasil</b>				5.536 7 kg
360	150	10	<b>mahud</b>			553.67 g
720	300	20	2	<b>rottol</b>		276.83 g
6000	2500	166 $\frac{2}{3}$	16 $\frac{2}{3}$	8 $\frac{2}{3}$	<b>uqia</b>	33.22 g

## Traditional system reported during the nineteenth century

							Metric
<b>memma</b>							2.036 kg
$1\frac{1}{3}$	<b>oke</b>						1.221 9 kg
$3\frac{1}{3}$	2	<b>rottolo</b>					610.96 g
$5\frac{1}{2}$	$3\frac{1}{3}$	$1\frac{1}{3}$	<b>yusdroman</b>				349.77 g
—	—	—	$1\frac{29}{200}$	<b>cheki</b>			305.48 g
—	—	20	$11\frac{1}{20}$	10	<b>once</b>		30.55 g
$666\frac{9}{20}$	—	200	$114\frac{1}{2}$	100	10	<b>drachme</b>	3.055 g

## British Imperial-linked system

							Imperial	Metric
<b>behar</b>							450 lbs	204.116 kg
—	<b>kantar</b>						112 lbs	50.802 kg
—	16	<b>kela</b>					7 lbs	3.175 kg
—	32	2	<b>wazna</b>				$3\frac{1}{2}$ lbs	1.587 6 kg
—	40	$2\frac{1}{2}$	$1\frac{1}{4}$	<b>oka</b>			$2\frac{1}{5}$ lbs	1.270 1 kg
225	56	$3\frac{1}{2}$	$1\frac{3}{4}$	$1\frac{1}{5}$	<b>mahud</b>		2 lbs	907.184 g
450	112	7	$3\frac{1}{2}$	$2\frac{1}{5}$	2	<b>ratl or rottol</b>	1 lb	453.592 g

## Metric-linked system

							Metric
<b>behar</b>							202.5 kg
3	<b>kantar</b>						67.5 kg
15	5	<b>frasil</b>					13.5 kg
150	50	10	<b>maund</b>				1.35 kg
450	150	30	3	<b>ratl</b>			450 g
6000	2000	400	40	$40/3$	<b>uqia, vakia or tukea</b>		33.75 g
60,000	20,000	4000	400	$400/3$	10	<b>coffila or coffala</b>	3.375 g

## For rice

			Metric
<b>tomand or timan</b>			84.899 kg
5	<b>surate mahnd</b>		16.979 8 kg
40	8	<b>kella</b>	2.122 5 kg

## For gold and silver

		Metric
<b>uqia, vakia or tukea</b>		31.10 g
10	<b>coffila or coffala</b>	3.11 g

## In Basra during the nineteenth century

					Metric
<b>tughar</b>					2052.8 kg
20	<b>wazna or wazma</b>				102.64 kg
26 $\frac{2}{3}$	1 $\frac{1}{3}$	<b>mann</b> (for hillana)			76.98 kg
32	1 $\frac{3}{5}$	1 $\frac{1}{5}$	<b>mann</b> (for coffee)		64.15 kg
640	32	24	20	<b>okiya</b>	3.207 5 kg

## In Mosul during the nineteenth century

					Metric
<b>tughar</b>					266.864 kg
20	<b>wazna or wazma</b>				13.343 2 kg
21 $\frac{2}{3}$	1 $\frac{1}{12}$	(small) <b>mann</b>			12.316 8 kg
130	6 $\frac{1}{2}$	6	(big) <b>hogga</b>		2.052 8 kg
173 $\frac{1}{3}$	8 $\frac{2}{3}$	8	1 $\frac{1}{3}$	(small) <b>hogga</b>	1.539 6 kg
2080	104	96	16	12	<b>okiya</b> 128.3 g

## Metric-linked system in Baghdad

					Metric
<b>tughar</b>					2000 kg
20	<b>wazna or wazma</b>				100 kg
80	4	<b>mann</b>			25 kg
480	24	6	<b>hogga or hukka</b>		4.167 kg
1920	96	24	4	<b>okiya or oqiya</b>	1.041 7 kg

Other values reported during the nineteenth century:

- 1 **ratl**, **rattle**, **rot'l**, or **rottlet** = 462.5 g;
- 1 **mahud** = 2 rotls = 925 g;
- 1 **oke** = 1.248 kg or 1.270 1 kg;
- 1 **wazna** = 1.587 6 kg;
- 1 **faunt** = 1.769 kg;
- 1 **kela** = 3.220 5 kg;
- 1 **rubā** = 9.344 kg;
- 1 **maund** = 37.32 kg or 37.285 kg;
- 1 **kantar** = 51.25 kg or 51.347 kg;
- 1 **tomande** (for rice) = 84.90 kg;
- 1 **behar** or **bahar** = 199.3 kg.

## 215 Savage Island

See *Niue*.

## 216 Scotland

See also *United Kingdom*.

The formation of Scotland began in 843, when the King of Scots, Kenneth Mac Alpin, became King of the Picts and the two countries were merged. In 1707, Scotland and England were merged into the Kingdom of Great Britain.

There was much confusion and diversity in early Scottish weights and measures, and there appear to have been few general regulations of weights and measures before the twelfth century. The old Scottish system of weights and measures, used in trading, probably had its origins in the early English systems. Standard measures and weights were kept in each burgh. These standards were periodically compared against one another at assizes, usually during the early years of the

reign of a new monarch. Such Measures and Weights Assizes are known from *c.* 1150 (the ‘Assisa Regis David,’ at Newcastle upon Tyne, during the reign of David I), *c.* 1325 (during the reign of Robert I), *c.* 1393 (during the reign of Robert III), 1426 (contained in the 68th, 69th, and 70th chapters of the 4th parliament of James I), and 1587 (contained in the 115th chapter of the 11th parliament of James VI). Nevertheless, there was considerable local variation in many of the units, and some units and scales were also introduced through the commercial influence of trading partners from Amsterdam. At any rate, these enactments were limited in scope. Thus, the pint used in the burghs was generally larger than the statutory pint, as it included an allowance of one-sixteenth of the volume, and the pint for dry commodities generally included an allowance of one eighth. In an act of parliament on February 19, 1618, a general regulation was applied to grain and meal measures, although an allowance (the ‘charity to the ball’) of a quarter-firlot per boll was often applied subsequently. In 1661, a commission was set up by parliament that recommended the establishment of national standards, the exemplars of which were to be kept in the custody of certain burghs. By an act of the Scottish parliament, the ell for linear measure was to be kept by Edinburgh, the firlot for dry capacity by Linlithgow, the jug for liquid capacity by Stirling, and the troy stone for weight by Lanark. This arrangement was made by the legislature, with a view towards improving the internal commerce of the country, by giving attention to the different regions with respect to the type of goods they were known for in those days. Edinburgh was then the principal market for cloth, Perth for yarn, Lanark for wool, Linlithgow for grain, and Stirling for distilled and fermented liquors. The Units of Length were replaced by the English system by an Act of the Parliament of Scotland in 1685. The Units of Capacity and weight were replaced by the Treaty of Union with England in 1706. Through adoption of the new simplified ‘Imperial system,’ by the Act 5 Geo. IV. C.74 in 1824, a uniformity of weights and measures was statutorily established in England and Scotland.

*Main sources:* [ANDE], [APS], [BALD], [BALF], [BREW], [BRIT], [BUCH], [CARD], [CLEL], [COCH], [CRAI], [CONN2], [CRAW2], [DWEL], [GEMM], [GIBS2], [GRAY4], [HUNT4], [JAMI], [KERR], [MART3], [MCKE], [MORY], [POWE4], [SIMP], [SINC], [SKEN], [SOME], [SWIN], [SWIN2], [TORR], [ZUPK7], and [WATS2]

216.1 Currency

The Scots currency was roughly equivalent in value to that of England until the late fourteenth century, when it began to depreciate by stages until the time of the Act of Union in 1707.

- 1 merk = 12 shillings and 4 pence
- 1 shilling = 2 bawbees = 3 placks = 6 bodles = 12 pennies

216.2 Units of Quantity

Measures reported during the sixteenth to eighteenth centuries:

- 1 **barrel** (for herring during the reign of James V, 1513–1542) = 435/520, 570/680, or 748/896 (for barrels of the assize of Glasgow);
- 1 **barrel** (for herring during the reign of James V, 1513–1542) = 868/1040 or 866.67/1040 (for barrels of the assize of Leith).

216.3 Units of Length

Traditional system before the sixteenth century

				Metric
old country mile				~2290 m
375	fall, raip, or rood			~6.11 m
1500	4	pace		~1.53 m
7500	20	5	foot	~305 mm

Traditional system after the sixteenth century, based on [SWIN2]

								Metric
<b>mile</b>								1804.416 m
8	<b>furlong<sup>a</sup></b>							225.552 m
80	10	<b>Gunter chain<sup>b</sup></b>						22.555 2 m
320	40	4	<b>fall, raip, rope, or rood</b>					5.638 8 m
1920	240	24	6	<b>ell<sup>c</sup></b>				939.8 mm
5952	744	74 $\frac{2}{5}$	18 $\frac{1}{2}$	3 $\frac{1}{12}$	<b>English foot</b>			304.80 mm
8000	1000	100	25	4 $\frac{18}{125}$	1 $\frac{43}{125}$	<b>Gunter link</b>		226.77 mm
71,424	8928	892 $\frac{4}{5}$	223 $\frac{3}{5}$	37 $\frac{1}{5}$	12	8 $\frac{116}{125}$	<b>English inch</b>	25.4 mm

<sup>a</sup>In concept, equal to the length that could be ploughed by a team of oxen without a rest

<sup>b</sup>During the eighteenth century, also known as a Scots chain. Alternatively equal to 22.677 12 m, using the ell of 37.2 in. The **English chain** = 66 ft = 20.116 8 m, was also used for surveying in southern Scotland

<sup>c</sup>The ell was usually also divided into halves, quarters, eighths, etc.

Standard system, by act 18. in 1663 and act 44. James VII in 1685, based on [SWIN2]

							Metric
<b>mile</b>							1618.043 148 058 m
61 $\frac{41}{259}$	<b>bolt</b>						26.456 639 858 m
1712 $\frac{19}{137}$	28	<b>ell</b>					944.879 994 92 mm
5280	86 $\frac{1}{3}$	3 $\frac{1}{12}$	<b>Scotch foot</b>				306.447 565 92 mm
63,360	1036	37	12	<b>Scotch inch</b>			25.537 297 16 mm

Standard system, according to the standard Ell of Edinburgh, based on [ROBI5]

								Metric
<b>mile</b>								1804.416 m
8	<b>furlong</b>							225.552 m
80	10	<b>chain</b>						22.555 2 m
320	40	4	<b>fall or raip</b>					5.638 8 m
1920	240	24	6	<b>ell</b>				939.8 mm
5920	740	74	18 $\frac{1}{2}$	3 $\frac{1}{12}$	<b>foot</b>			304.8 mm
7992	999	543 $\frac{9}{10}$	135 $\frac{39}{40}$	4 $\frac{39}{240}$	1 $\frac{7}{20}$	<b>Scots link</b>		225.78 mm
386,773 $\frac{1}{3}$	48,346 $\frac{2}{3}$	4834 $\frac{2}{3}$	1208 $\frac{2}{3}$	37	12	8 $\frac{1}{6}$	<b>inch</b>	25.4 mm

Theoretical system used before 1824 (with Scottish Gaelic names of units), based on [CARD]

Mile	Furlong	Chain	Fall	Ell	Foot	Inch	Metric
<b>mile or mhile</b>							1814.160 820 785 m
8	<b>ochdamh (de mhile)</b>						226.770 102 598 1 m
80	10	<b>slabhraidh</b>					22.677 010 259 81 m
320	40	4	<b>fall or raip</b>				5.669 252 564 952 m
1920	240	24	6	<b>t-slat thomhais</b>			944.875 427 492 mm
5920	740	74	18 $\frac{1}{2}$	3 $\frac{1}{12}$	<b>troigh</b>		306.446 084 592 mm
71,040	8880	888	222	37	12	<b>òirleach</b>	25.537 173 716 mm

British Imperial system after 1824 (with Scottish Gaelic names of units)

Mile	Furlong	Chain	Yard	Foot	Inch	Metric
<b>mile</b> or <b>mhile</b>						1609.344 000 m
8	<b>ochdamh (de mhile)</b>					201.168 000 m
80	10	<b>slabhraidh</b>				20.116 800 m
1760	220	22	<b>t-slat</b>			914.400 000 mm
5280	660	66	3	<b>troigh</b>		304.800 000 mm
63,360	7920	792	36	12	<b>òirleach</b>	25.400 000 mm

Other units reported during the early nineteenth century:

- 1 **rig** or **rig-length** (a strip of plowed ground) = variously described as 200–270 yards long;
- 1 **ell** (for coarse cloth) = 39–40 in. = ~1.0 m;
- 1 **ell** (for unbleached cloth) = 38¼–38½ in. = ~0.98 m.

During the seventeenth and eighteenth centuries, the yarn measures varied considerably with the kind of yarn spun.

For linen and handspun woollen yarn during the nineteenth century

					Yards	Metric
<b>spinle</b>					14,400	13,167.36 m
4	<b>hank</b> or <b>hesp</b>				3600	3291.84 m
12	3	<b>heid</b>			1200	1097.28 m
24	6	2	<b>heere</b>		600	548.64 m
48	12	4	2	<b>cut</b>	300	274.32 m

216.4 Units of Area

When it comes to Units of Area, a number of conflicting systems were used. Some systems were based on production or taxation, rather than the physical area.

Traditional system for land areas, based on [CONN2]

							Metric
<b>ploughgate, pleuchgate, or carrucate<sup>a</sup></b>							529,311.74 m <sup>2</sup>
8	<b>oxgang<sup>b</sup></b>						66,163.97 m <sup>2</sup>
104	13	<b>acre<sup>c</sup></b>					5089.54 m <sup>2</sup>
416	52	4	<b>rood or particate<sup>d</sup></b>				1272.38 m <sup>2</sup>
1040	130	10	2½	<b>square chain</b>			508.95 m <sup>2</sup>
16,640	2080	160	40	16	<b>square fall<sup>e</sup></b>		31.81 m <sup>2</sup>
599,040	74,880	5760	1440	576	36	<b>square ell</b>	88.36 dm <sup>2</sup>

<sup>a</sup>An area of arable land, which could be tilled by an eight-ox team in the course of a ploughing season  
<sup>b</sup>An area of arable land, considered to be the contribution of a single ox in a eight-ox ploughing team  
<sup>c</sup>Taking the linen ell at 37⅞ in makes one acre (also called the **Inverness acre**) = 6150% sq yd, but taking the ell at 37 in. makes the acre equal to 6084% sq yd  
<sup>d</sup>During the sixteenth century, this unit was sometimes referred to as a particate  
<sup>e</sup>A ploughed area of 40 falls × 1 fall

Traditional system for taxation used in the Eastern districts, based on [SKEN]

Davoch	Ploughgate	Oxgang	Metric <sup>d</sup>
<b>dabhach<sup>a</sup>, davach, daugh, or davocho</b>			~52 to ~208 ha
1–4	<b>ploughgate<sup>b</sup> or carrucate</b>		~52 ha
8–32	8	<b>damh-imir<sup>c</sup>, bovat, or oxangang</b>	~65,000 m <sup>2</sup>

<sup>a</sup>It was called an **arachor** in the district of Lennox. The davoch tended to be based on how much livestock it could support, as the fertility would vary widely in these districts. In the east, it would be a portion of land that could support 60 cattle or oxen, but it varied by location and over time. Sometimes, a **dabhach m(h)òr** (big davoch) was reported, as well as a **dabhach b(h)eag** (little davoch). The measure was probably adopted from the Norse during the twelfth century. [JAMI] reported it as enough to produce about 48 bolls, and equal to an average area of 1½ square miles = about 3.88 km<sup>2</sup>. See also [POWE]

<sup>b</sup>In concept, the area that eight oxen were said to be able to plough in one year. It was often reported as 104 Scots acres (= ~52.83 ha) and sometimes as 96 Scots acres (= ~48.77 ha)

<sup>c</sup>Because of the variable land quality, this could be a number of different actual land areas

<sup>d</sup>The area an ox could plough in a year

Traditional system used in Gaelic-speaking areas in eastern Scotland, based on [DWEL]

Davoch	Ploughgate	Oxgang			Metric
<b>dabhach, daugh, davach or davocho<sup>a</sup></b>					~3,380,000 m <sup>2</sup>
1–4	<b>ploughgate</b>				~845,000 m <sup>2</sup>
8–32	8	<b>damh-imir</b>			~106,000 m <sup>2</sup>
160–640	160	~20	<b>acair<sup>b</sup></b>		~5300 m <sup>2</sup>
640–2560	640	~80	4	<b>rood</b>	~1320 m <sup>2</sup>

<sup>a</sup>This unit was mainly a tax assessment term for land. According to [WATS2], usually equal to 4 ploughgates. [MACB] reckoned the dabhach to be “either one or four ploughgates,” according to locality and land

<sup>b</sup>Standardised in 1661

Traditional system for taxation used in the West Highlands, Galloway, and the Hebrides

Markland or merkland	Ounceland	Quarterland	Eighth	Pennyland	Groatland	Twopennyland
<b>marg-fhearann<sup>a</sup></b>						
8	<b>tir-unga<sup>b</sup>, teiroung, teroung, dabhach, or unciata</b>					
32	4	<b>ceathramh</b>				
64	8	2	<b>ochdamh</b>			
128	16	4	2	<b>leorthas, peighinn, deniariata, or nummata</b>		
256	32	8	4	2	<b>còta bàn<sup>c</sup></b>	
512	64	16	8	4	2	<b>dha sgillin</b>

<sup>a</sup>Name derived from the *merk*, a silver coin that was in circulation during the late sixteenth and early seventeenth centuries

<sup>b</sup>It was, according to [SKEN], equal to 20 pighinnns

<sup>c</sup>Name based on a *groat*, a silver coin equivalent to four pence. Also known as **fourpennyland** or **fourpenceland**

Traditional system for taxation used in Islay, the southernmost island of the Inner Hebrides

Merkland	Ounceland	Half-pennyland	Quarterland	Half-fartingland	Pennyland
<b>marg-fhearann</b>					
12	<b>tir-unga</b>				
24	2	<b>leth-pheighinn</b>			
48	4	2	<b>ceathramh</b>		
96	8	4	2	<b>ochdamh</b>	
192	16	8	4	2	<b>leorthas</b>

Traditional system used in the Isle of Skye, the northernmost large island in the Inner Hebrides

Ounceland or davach	Half-pennyland	Quarterland	Half-fartingland		Groatland	Half-groatland	marg-fhearann (merkland)	Sterling
<b>tir-unga<sup>a</sup></b>							12	20d
2	<b>leth-pheighinn</b>						5	10d
4	2	<b>ceathramh</b>					2½	5d
8	4	2	<b>ochdamh</b>				1¼	2½d
16	8	4	2	<b>leorthas</b>			5/8	1¼d
32	16	8	4	2	<b>còta-bàn</b>		5/16	5/8d
64	32	16	8	4	2	<b>dà sgillin</b>	5/32	5/16d

<sup>a</sup>Also called **teroung** or **teiroung**. The extent of land that paid the rent of an ounce of silver. The land term was *unga*. This area was divided into 20 parts, sometimes only 18, called *peighinn*

Traditional system for taxation used in the Argyll and Bute areas

Markland	Half-markland	Shillingland	Pennyland	Half-pennyland	Farthingland
<b>marg-fhearann</b>					
2	<b>leth-margfhearann</b>				
13⅓	6⅔	<b>sgillinnland</b>			
80	40	6	<b>peighinn</b>		
160	80	12	2	<b>leth-peighinn</b>	
320	160	24	4	2	<b>fheòirling</b>

Saxon Scotland denomination for land areas during the late sixteenth century

			Scots acres
<b>carucate</b>			104
4	<b>husbandland<sup>a</sup></b>		26
8	2	<b>oxgait, oxgang, or bovat</b>	13

<sup>a</sup>The average amount of land used by a husbandman

Other amounts reported:

- Gardener's measure** (in the County of Fife) = about 1189 m<sup>2</sup>;
- rig** = a rig-length long and 15 feet wide;
- rude** or **rood** = 40 square falls = 1271.84 m<sup>2</sup>.

For craftsmen, carpenters, notably masons, painters, slaters, and wrights, defined by the Covention of Burghs in 1625

				Metric
<b>square fall or rood of work</b>				31.796 065 44 m <sup>2</sup>
36	<b>square ell</b>			88.322 404 dm <sup>2</sup>
576	16	<b>Scots glaziers' square foot<sup>a</sup></b>		5.520 150 25 dm <sup>2</sup>
49,284	1369	85% <sub>16</sub>	<b>English quare inch</b>	6.451 60 cm <sup>2</sup>

<sup>a</sup>The English glaziers' foot of about 8 inches was also commonly used

For common use after 1661, based on [SWIN2]

								Metric
<b>acre</b>								5142.517 715 m <sup>2</sup>
4	<b>rood</b>							1285.629 429 m <sup>2</sup>
10	2½	<b>Gunter's chain</b>						514.251 771 m <sup>2</sup>
160	40	16	<b>fall</b>					32.140 736 m <sup>2</sup>
5760	1440	576	36	<b>ell</b>				89.279 821 dm <sup>2</sup>
55,353⅓	13,833⅔	5535⅞ <sub>25</sub>	345⅔ <sub>25</sub>	9⅞ <sub>100</sub>	<b>square English foot</b>			9.290 304 dm <sup>2</sup>
100,000	25,000	10,000	625	17 <sup>361</sup> / <sub>1000</sub>	1 <sup>806</sup> / <sub>1000</sub>	<b>Gunter link</b>		5.142 518 dm <sup>2</sup>
7,970,918⅔	1,992,729⅔	797,091⅔	49,818⅔	1383⅔	144	79 <sup>709</sup> / <sub>1000</sub>	<b>English square inch</b>	6.451 6 cm <sup>2</sup>

Theoretical system used before 1824, based on [CARD]

					Metric
<b>nook</b>					102,849.358 863 3 m <sup>2</sup>
20	<b>acre</b>				5142.467 943 165 m <sup>2</sup>
80	4	<b>rood</b>			1285.616 985 791 m <sup>2</sup>
3200	160	40	<b>square fall or faw</b>		32.140 424 644 781 m <sup>2</sup>
1,095,200	54,760	13,690	342¼	<b>square foot</b>	9.390 920 276 05 dm <sup>2</sup>

216.5 Units of Dry Capacity

c. 1150 (during the reign of David I); based on the dimensions of the boll given in the ‘Assisa,’ of the gallon given in the ‘Assisa,’ and of a gallon containing 12 pounds of seawater

		Cubic inches	Metric	Cubic inches	Metric	Cubic inches	Metric
<b>boll</b>		3667.22	60.095 L	4 000.68	65.559 L	4 073.16	66.747 L
12	<b>gallon</b>	305.602	5.008 L	333.39	5.463 L	339.43	5.562 L

Dry measures were, from the Assize of 1426, defined by the dry fills of the pint. Most burghs likely used this principle for the measurement of

dry goods. The statutory pint was increased in 1426 to hold 1.36 L, and in about 1500, further increased to 1.70 L.

Presumed legal values for wheat in 1426

		Cubic inches	Metric
<b>firlot</b>		1202.1	19.7 L
16	<b>pint</b>	75.1	1.23 L

For grain in 1450

		Metric
<b>sester or boll</b>		~140 L
12	<b>gallon</b>	~12 L

Presumed legal values, trading values, and customary values with an 1/8th allowance for wheat in 1497

		Cubic inches	Metric			Cubic inches	Metric			Cubic inches	Metric
<b>firlot</b>		1556	25.5 L	<b>firlot</b>		1653.3	27.1 L	<b>firlot</b>		1750.5	28.7 L
20	<b>pint</b>	77.8	1.27 L	21¼	<b>pint</b>	77.8	1.27 L	22½	<b>pint</b>	77.8	1.27 L

Presumed legal values, trading values, and customary values with an 1/8<sup>th</sup> allowance for wheat in 1512

		Cubic inches	Metric			Cubic inches	Metric			Cubic inches	Metric
<b>firlot</b>		1555.5	25.5 L	<b>firlot</b>		1652.7	27.1 L	<b>firlot</b>		1749.9	28.7 L
15	<b>pint</b>	103.7	1.7 L	15.937 5	<b>pint</b>	103.7	1.7 L	16⅞	<b>pint</b>	103.7	1.7 L

Presumed legal values, trading values, and customary values with an 1/8th allowance for wheat in 1555

		Cubic inches	Metric			Cubic inches	Metric			Cubic inches	Metric
<b>firlot</b>		1749.9	28.7 L	<b>firlot</b>		1859.3	30.5 L	<b>firlot</b>		1968.7	32.2 L
16⅞	<b>pint</b>	103.7	1.7 L	17.93	<b>pint</b>	103.7	1.7 L	18.98	<b>pint</b>	103.7	1.7 L

Presumed legal values, trading values, and customary values with an 1/8th allowance for wheat in 1563

		Cubic inches	Metric			Cubic inches	Metric			Cubic inches	Metric
<b>firlot</b>		1726.3	28.3 L	<b>firlot</b>		1834.2	30.0 L	<b>firlot</b>		1942.1	31.8 L
16⅞	<b>pint</b>	102.3	1.67 L	17.93	<b>pint</b>	102.3	1.67 L	18.98	<b>pint</b>	102.3	1.67 L

Presumed legal values, trading values, and customary values with an 1/8th allowance for wheat in 1587

		Cubic inches	Metric			Cubic inches	Metric			Cubic inches	Metric
<b>firlot</b>		1726.3	28.3 L	<b>firlot</b>		1834.2	30.0 L	<b>firlot</b>		1942.1	31.8 L
16⅞	<b>pint</b>	102.3	1.67 L	17.929 69	<b>pint</b>	102.3	1.67 L	18.984 38	<b>pint</b>	102.3	1.67 L

During the late sixteenth century, the standard unit for cereal became the firlot, a shallow cylindrical wooden coppered vessel. Its volume, calculated as the volume occupied by a given weight of grain, was progressively increased over the assizes. Before the 1618 assize, barley had been sold by counting 2 firlots for every 3 measures. At

the Measure and Weights Assize in 1618, one firlot was said to equal 21¼ dry pints = 2210 cu in. = about 34.6 L. Barley, malt, and oats, previously sold by a notional heaped measure of 1½ times the size, were, in 1618, said to equal a firlot of 31 dry pints = 3020 cu in. = about 49.5 L. As this new

measure was nowhere near the previous 2:3 ratio, this change was never accepted among the public, which instead assigned a value, with a 1/16th allowance, of about 3208 cu in. for the barley firloot. In the 1820s, these standard measures were determined as 36.3 L and 52.9 L. Below, I have included two reported values from the second half of the 1800s.

Theoretical scale<sup>a</sup> for pulses, peas, rye, rice, white salt and wheat at the 1618 Assize, with 1/16th allowance, and the official value in 1820

					Cubic inches	Metric	Cubic inches	Metric	1820	[DOUR]	[ALEX]
<b>chalder</b>					135,040	2214.4 L	143 480	2350.3 L	2323.2 L	2304.5 L	2304.3 L
16	<b>boll</b>				8840	138.4 L	8967½	146.9 L	145.2 L	144.03 L	144.02 L
64	4	<b>firlot</b>			2210	34.6 L	2241⅒	36.7 L	36.3 L	36.0 L	36.0 L
256	16	4	<b>peck</b>		527½	8.65 L	560½	9.2 L	9.1 L	9.0 L	9.0 L
1024	64	16	4	<b>lippy or forpet</b>	131⅞	2.16 L	140⅒	2.3 L	2.3 L	2.25 L	2.25 L

<sup>a</sup>In practice, the relationships were different, because of heaping allowances

Theoretical scale<sup>a</sup> for barley, potatoes, oatmeal, fruit, and malt at the 1618 Assize, with 1/16th allowance, and the official value in 1820

					Cubic inches	Metric	Cubic inches	Metric	1820	[DOUR]	[ALEX]
<b>chalder</b>					193,280	3168 L	205,360	3363.9 L	3386 L	3361.8 L	3361.6 L
16	<b>boll</b>				12,080	198 L	12,835	210.2 L	211.6 L	210.11 L	210.10 L
64	4	<b>firlot</b>			3020	49.5 L	3208⅒	52.6 L	52.9 L	52.5 L	52.5 L
256	16	4	<b>peck</b>		755	12.37 L	802⅞	13.1 L	13.2 L	13.1 L	13.1 L
1024	64	16	4	<b>lippy or forpet</b>	188¾	3.09 L	200½	3.3 L	3.3 L	3.3 L	3.3 L

<sup>a</sup>In practice, the relationships were different, because of heaping allowances

Scottish standard for barley, malt and oats after 1661, based on [SWIN2]

						Cubic inches	Metric
<b>chalder</b>						205,153.53	3361.864 L
16	<b>boll</b>					12,822.096	210.116 L
64	4	<b>firlot</b>				3205.524	52.529 L
256	16	4	<b>peck</b>			801.381	13.132 L
1024	64	16	4	<b>lippie or forpet</b>		200.345	3.283 L
1984	124	31	7¾	1⅒	<b>pint</b>	103.404	1.694 L

Scottish standard for beans, peas, rye, white salt and wheat after 1661, based on [SWIN2]

						Cubic inches	Metric
<b>chalder</b>						140,629.44	2304.460 L
16	<b>boll</b>					8789.34	144.029 L
64	4	<b>firlot</b>				2197.335	36.007 L
256	16	4	<b>peck</b>			549.333	9.002 L
1024	64	16	4	<b>lippie or forpet</b>		137.333	2.250 L
1360	85	21¼	5⅞	1⅒	<b>pint</b>	103.404	1.694 L

Various units reported during the fourteenth to eighteenth centuries:

- 1 **boll** (for unbeaten bark by act 1686, James VII parl. 1, cap. 30) = 22 Scotch gallons = 298.23 L;
- 1 **salmon barrel** (for salmon in 1478) = 14 gallons by the measure of Hamburg;
- 1 **salmon barrel** (for salmon and herring after 1641) = 12 gallons of the Stirling pint = about 122.4 L;

- 1 **salmon barrel** (for salmon after 1661) = 10 Scotch gallons = 135.559 L;
- 1 **herring-barrel** (for herring after 1661) = 8½ Scotch gallons = 115.225 L;
- 1 **barrel** (for apples, beef, and pork) = 8 Scotch gallons = 13.556 L.

216.6 Units of Liquid Capacity

For wine in c. 1150

		Metric
<b>sester</b>		~24 L
3	<b>gallon</b>	~8 L

Ale and wine scale, both sold with an 1/16th allowance (below in parentheses), according to the Assize of c. 1325

					Metric	Metric
<b>gallon</b>					5.08 L (5.42 L)	7.62 L (8.16 L)
6	<b>pint</b>				0.85 L (0.90 L)	1.27 L (1.36 L)
12	2	<b>chopin</b>			0.42 L (0.45 L)	0.63 L (0.68 L)
24	4	2	<b>mutchkin</b>		0.21 L (0.23 L)	0.32 L (0.34 L)
96	16	8	4	<b>jowcat</b>	0.05 L (0.06 L)	0.08 L (0.085 L)

Other measures reported during the sixteenth to eighteenth centuries:

- 1 **barrel** (for ale in 1513) = 10 or 12 gallons;
- 1 **barrel** (for beer during the reign of James V, 1513–1542) = 9½ gallons;
- 1 **barrel** (for ale in 1532) = 5 gallons;

During the late seventeenth century, based on [SWIN2]

								Cubic inches	Metric
<b>Bourdeaux hogshead<sup>a</sup></b>								~14,063	~230.45 L
~2⅞	<b>barrel</b>							6617.856	108.447 L
~17	8	<b>gallon</b>						827.232	13.556 L
~68	32	4	<b>quart</b>					206.808	3.389 L
~136	64	8	2	<b>pint<sup>b</sup></b>				103.404	1.694 5 L
~272	128	16	4	2	<b>chopin</b>			51.702	847.244 mL
~544	256	32	8	4	2	<b>mutchkin</b>		25.851	423.622 mL
~2176	1024	128	32	16	8	4	<b>gill</b>	6.462 75	105.905 mL

<sup>a</sup>There was no Scotch hogshead, but 17 standard gallons were reckoned as almost equal to one Bourdeaux hogshead of wine

<sup>b</sup>Based on a pint that weighs 3 lbs 7 oz. Scotch Troye of river water. In charging the duties on the variety called two-penny ale or beer, the barrel was said to equal 36 English gallons. As this, in practice, was held to equal 12 Scotch gallons, the **two-penny ale pint** became equal to 105¾ cu in. = 1.733 L. The customary ale gallon, ale pint, and ale chopin, as used by brewers, generally held 1/16 part above the standard measures, which brings the **customary ale pint** to 109.866 cu in. = 1.800 4 L

The statutory Scots pint was based on a standard in the keeping of the burgh of Stirlingshire. It is mentioned in acts of parliament as being in the town before the reign of James II in 1437. The pint jug was made of brass, in the form of a hollow truncated cone. The mean diameter of the mouth was 4.17 inches, the mean diameter of the bottom 5.25 inches, and the mean depth 6 inches.

According to the standard of Stirling, based on [ROBI5]

					Cubic inches	Metric
<b>gallon</b>					833.627 2	13.660 7 L
8	<b>stoup, jug, or pint</b>				104.203 4	1.707 6 L
16	2	<b>chopin</b>			52.101 7	853.8 mL
32	4	2	<b>mutchkin</b>		26.050 8	426.9 mL
128	16	8	4	<b>gill</b>	6.512 7	106.7 mL

Theoretical scale used before 1824, according to [CARD]

								Metric
<b>barrel</b>								108.447 229 814 4 L
3⅓	<b>anker</b>							33.889 759 317 L
8	2½	<b>gallon</b>						13.555 903 726 8 L
32	10	4	<b>quart</b>					3.388 975 931 7 L
64	20	8	2	<b>jug or pint</b>				1.694 487 965 85 L
128	40	16	4	2	<b>chopin</b>			847.243 982 925 mL
256	80	32	8	4	2	<b>mutchkin</b>		423.621 991 462 mL
1024	320	128	32	16	8	4	<b>gill</b>	105.905 497 866 mL

216.7 Units of Weight

Scale c. 1150 (during the reign of David I)

						Metric
<b>stone<sup>a</sup></b>						6.560 85 kg
15	<b>pound</b>					437.39 g
225	15	<b>ounce</b>				29.159 g
4218¾	281¼	18¾	<b>pennyweight</b>			1.555 2 g
8437½	6750	450	24	<b>English Troy grain</b>		64.80 mg

<sup>a</sup>The ‘Assisa’ also referred to a stone equal to 8 pounds, of which 12 made a wey

Scale according to the Assize of c. 1325

			Metric
<b>stone</b>			6.55 kg
15	<b>pound</b>		437.1 g
225	15	<b>tower ounce or Cologne ounce</b>	29.14 g

As defined by the Measures and Weights Assize of March 11, 1426

			Metric	Metric
<b>stone</b>			7.46 kg	7.34 kg
15	<b>troyis pound</b>		497.28 g	489.6 g
240	16	<b>ounce<sup>a</sup></b>	31.08 g	30.60 g

<sup>a</sup>After 1426, = the English troy ounce = 31.08 g, and around about 1510, defined as the French or Flemish troyes bullion ounce = 30.60 g

As used after the Measures and Weights Assize of March 11, 1426

			Metric
<b>stone</b>			7.46 kg
16	<b>merchant pound or Scots pound</b>		466.24 g
256	16	<b>Cologne ounce</b>	29.14 g

For ale and wine according to the Measures and Weights Assize of 1426

			Metric
<b>gallon</b>			10.194 kg
8	<b>pint</b>		1.274 kg
328	41	<b>troy ounce</b>	31.08 g

For ale and wine in about 1510

			Metric
<b>gallon</b>			13.464 kg
8	<b>pint</b>		1.683 kg
440	55	<b>French ounce</b>	30.60 g

The “Troye” and the Lanark trone scales in 1563

						Metric	Metric
<b>stone</b>						7.83 kg	9.80 kg
16	<b>pound</b>					489.60 g	612.50 g
256	16	<b>ounce</b>				30.60 g	38.28 g
4096	256	16	<b>drop</b>			1.91 g	2.39 g
6144	384	24	1½	<b>denier</b>		1.27 g	1.59 g
147,456	9216	576	36	24	<b>grain</b>	53 mg	66 mg

Revised “Troye” scale for fine goods in 1587, when 1 ounce was officially stated as the Flemish troois ounce = 30.72 g

						Metric
<b>stone</b>						7.86 kg
16	<b>pound</b>					491.52 g
256	16	<b>ounce</b>				30.72 g
4096	256	16	<b>drop</b>			1.92 g
6144	384	24	1½	<b>denier</b>		1.28 g
147,456	9216	576	36	24	<b>grain</b>	53 mg

Troy scale for butcher-meat, hemp, iron, and meal before 1617

								Metric
<b>last</b>								1184.409 kg
1½	<b>fodder<sup>a</sup></b>							987.007 5 kg
12	10	<b>barrel<sup>b</sup></b>						98.700 75 kg
150	125	12½	<b>stone</b>					7.896 06 kg
2400	2000	200	16	<b>pound</b>				493.504 g
38,400	32,000	3200	256	16	<b>ounce</b>			30.844 g
614,400	512,000	51,200	4,96	256	16	<b>drop</b>		1.927 7 g
18,278,400	15,232,000	1,523,200	121,856	7616	476	29¾	<b>English Troy grain</b>	64.80 mg

<sup>a</sup>For lead

<sup>b</sup>For ashes, bacon, butter, and beef

Troy scale according to the standard of Lanard, based on [ROBI5]

				Metric
<b>stone</b>				7.936 kg
16	<b>pound</b>			496 g
256	16	<b>ounce</b>		31 g
4096	256	16	<b>drop</b>	1.94 mg

“Dutchweight” or Troy scale for general imported goods after 1618

					Metric
<b>stone</b>					7.896 268 8 kg
16	<b>Scotch pound<sup>a</sup></b>				493.516 8 g
256	16	<b>ounce</b>			30.844 8 g
4096	256	16	<b>drop</b>		1.927 8 g
121,856	7616	476	29¾	<b>grain</b>	64.8 mg

<sup>a</sup>1 **Dutch pound** (belonging to a gentleman in Edinburgh) = 7633½ English troy grains, and 1 **Dutch pound** (belonging to the city of Glasgow) = 7628 English troy grains. Besides these Dutch pounds, there was also the **Houfe pound**, equal to 16 ounces and 9 drams. [SWIN2, p. 39]

Trone scale for home-productions before 1617, according to the custom of Edinburgh<sup>a</sup>

					Metric
<b>stone</b>					9.870 8 kg
16	<b>pound</b>				616.880 g
320	20	<b>ounce</b>			30.844 g
5120	320	16	<b>drop</b>		1.927 7 g
152,320	9520	476	29¾	<b>English Troy grain</b>	64.80 mg

<sup>a</sup>This scale was abolished by act in 1617, but reported still in constant use by [SWIN2] in the late eighteenth century. The values were also reported to differ from one county to another. At the time that these weights were abolished, Sir George Mackenzie reported the Trone pound as containing only 18 ounces and 8 drops. [SWIN2, p. 39]

Trone scale according to the standard of Edinburgh, based on [ROBI5]

				Metric
<b>stone</b>				9.996 kg
16	<b>pound</b>			624.740 g
256	16	<b>ounce</b>		39.046 g
4096	256	16	<b>drop</b>	2.440 4 g

Avoirdupois scale in 1759, based on the Report of the Committee of the House of Commons

								Metric
<b>ton</b>								1016.354 3 kg
8	<b>sack<sup>a</sup></b>							127.044 3 kg
20	2½	<b>hundredweight</b>						50.817 7 kg
160	20	8	<b>stone</b>					6.352 2 kg
2240	280	112	14	<b>pound</b>				453.729 6 g
35,840	4480	1792	224	16	<b>ounce</b>			28.358 1 g
573,440	71,680	28,672	3584	256	16	<b>dram</b>		1.772 4 g
15,684,480	1,960,560	784,224	98,028	7002	437⅞	27 <sup>45</sup> / <sub>128</sub>	<b>English Troy grain</b>	64.80 mg

<sup>a</sup>For flour

For ashes, sope ashes, bacon, beef, butter, honey, and tar after 1661

		Scotch Troye	Metric
<b>Last</b>		2400 lbs	1183.709 kg
12	<b>barrel</b>	200 lbs	98.642 kg

For wool trading to Scandinavia during the sixteenth century

		Metric
<b>serplathe or sirplithe</b>		632 kg
80	<b>stane</b>	7.9 kg

Inscriptions on the stone-weight in Lanark and the pound-weight at Edinburgh state that the pound weighed 7620 English troy grains.

These standards were raised to the authority of the 1618 act. In 1743, the Scotch troy pound was determined to be 7594 English troy grains. In 1779, [SWIN] reckoned it to be 7616 English troy grains, whilst [SINC] reported the Scotch troy pound as 7621⅕ English troy grains.

Theoretical trone scale before 1824 according to [CARD]

					Metric
<b>stone</b>					9.870 169 971 2 kg
16	<b>pound</b>				616.885 623 2 g
320	20	<b>ounce</b>			30.844 281 16 g
5 120	320	16	<b>drop</b>		1.927 767 572 g
152 320	9 520	476	29¾	<b>grain</b>	64.798 91 mg

Troy scale for gold, silver, jewels, and liquors

				Metric
<b>pound</b>				373.241 721 6 g
12	<b>ounce</b>			31.103 476 8 g
192	16	<b>drop</b>		1.943 967 3 g
5760	480	30	<b>grain</b>	64.798 91 mg

Apothecary scale for medicine

					Metric
<b>pound</b>					373.241 721 6 g
12	<b>ounce</b>				31.103 476 8 g
96	8	<b>dram</b>			3.887 934 6 g
288	24	3	<b>scruple</b>		1.295 978 2 g
5760	480	60	20	<b>grain</b>	64.798 91 mg

Money changers’ weight

This system was used, from the late sixteenth century until the mid-nineteenth century, for medicine, precious metals, and to compute exact coin weight. See also [MALY, p. 292] and [MORY, Pt. I, Book III, Ch. 6, p. 136].

						Metric
<b>denier</b>						1.295 958 333 g
24	<b>grain</b>					53.998 263 9 mg
576	24	<b>prime</b>				2.249 927 7 mg
13,824	576	24	<b>second</b>			93.746 986 µg
331,776	13,824	576	24	<b>third</b>		3.906 124 µg
7,962,624	331,776	13,824	576	24	<b>fourth</b>	0.162 755 µg

Below are some of the systems for weights and measures used in each County between the seventeenth and nineteenth centuries.

216.8    **Aberdeenshire**

216.8.1    **Units of Length**

1 **plaiding yard** (for plaiding and other coarse home stuffs) =  $38\frac{7}{12}$  yd = 35.128 2 m.

216.8.2    **Units of Dry Capacity**

For barley, malt, and oats, based on [SWIN2]

					Cubic inches	Metric
<b>boll</b>					14,062.944	230.450 L
4	<b>firlot</b>				3515.736	57.612 L
16	4	<b>peck</b>			878.934	14.403 L
64	16	4	<b>lippie</b>		219.733 5	3.601 L
136	34	$8\frac{1}{2}$	$2\frac{7}{8}$	<b>Stirling pint</b>	103.404	1.694 L

For beans, meal, peas, rye, seeds and wheat based on [SWIN2]

					Cubic inches	Metric
<b>boll</b>					10,754.016	176.227 L
4	<b>firlot</b>				2688.504	44.057 L
16	4	<b>peck</b>			672.126	11.014 L
64	16	4	<b>lippie</b>		168.031 5	2.753 L
104	26	$6\frac{1}{2}$	$1\frac{7}{8}$	<b>Stirling pint</b>	103.404	1.694 L

216.8.3 Units of Liquid Capacity

[SWIN2] reported that the Aberdeen pint contained 3 lbs 15 oz of water, or about 108.89 cu in. = 1.784 L.

W. Kennedy, see [KENN2, p. 295], states that the Aberdeen pint weighs 26,600 English troy grain. This would make it about 105.56 cu in. = 1.730 L.

216.8.4 Units of Weight

For English goods and groceries, and salt-butter in the shops

		Metric
<b>stone</b>		6.352 kg
14	<b>pound</b>	453.729 6 g

For butter, cheese, flesh, hog's lard, tallow and wool in wholesale

		Metric
<b>stone<sup>a</sup></b>		12.704 kg
28	<b>pound</b>	453.729 6 g

<sup>a</sup>In some parts of the county, 22 lbs, and in others 26 lbs, for a stone of cheese and butter

For butter, cheese, flesh, hog's lard, tallow and wool in retail

		Metric
<b>stone</b>		7.896 kg
16	<b>Scotch pound</b>	493.516 8 g

For meal

			Metric
<b>boll</b>			63.170 kg
8	<b>stone</b>		7.896 kg
128	16	<b>Scotch pound</b>	493.516 8 g

For coal

			Metric
<b>boll</b>			284.266 kg
36	<b>stone</b>		7.896 kg
576	16	<b>Scotch pound</b>	493.516 8 g

For feathers and hay

			Metric
<b>stone</b>			13.603 kg
21	<b>pound</b>		647.741 g
441	21	<b>ounce</b>	30.844 8 g

216.9 Argyleshire or Argyll

216.9.1 Units of Dry Capacity

For beans, peas, rye, and wheat at Inverary, based on [SWIN2]

					Cubic inches	Metric
<b>boll</b>					10,217.608	167.436 L
4	<b>firlot</b>				2554.402	41.859 L
16	4	<b>peck</b>			638.600 5	10.465 L
64	16	4	<b>lippie</b>		159.650 125	2.616 L
93	23¼	5 <sup>17</sup> / <sub>16</sub>	1 <sup>29</sup> / <sub>64</sub>	<b>ale pint</b>	109.866 75	1.800 4 L

For barley, malt, and oats at Inverary based on [SWIN2]

					Cubic inches	Metric
<b>boll</b>					13,752.732	225.367 L
4	<b>firlot</b>				3438.183	56.342 L
16	4	<b>peck<sup>a</sup></b>			859.545 75	14.085 L
64	16	4	<b>lippie</b>		214.886 44	3.521 L
133	33¼	8⅞ <sub>16</sub>	2⅝ <sub>64</sub>	<b>Stirling pint</b>	103.404	1.694 L

<sup>a</sup>For potatoes, = 1473.507 cu in. = 24.146 L

For barley, malt, and oats at Campbelltown, based on [SWIN2]

					Cubic inches	Metric
<b>boll</b>					17,190.912	281.709 L
4	<b>firlot</b>				4297.728	70.427 L
16	4	<b>peck<sup>a</sup></b>			1074.432	17.607 L
64	16	4	<b>lippie</b>		268.608	4.402 L
166¼	41 <sup>14</sup> / <sub>25</sub>	10 <sup>39</sup> / <sub>100</sub>	2 <sup>59</sup> / <sub>100</sub>	<b>Stirling pint</b>	103.404	1.694 L

<sup>a</sup>For potatoes, = 2079 cu in. = 34.069 L

216.9.2 Units of Weight

For flour, groceries, iron and salt

		Metric
<b>stone</b>		6.352 kg
14	<b>pound</b>	453.729 6 g

For butter, cheese, flesh, fish, hay, tallow and wool

		Metric
<b>stone</b>		10.889 kg
24	<b>pound</b>	453.729 6 g

For meal at Campbelltown

				Metric
<b>boll</b>				78.963 kg
10	<b>stone</b>			7.896 kg
16	1⅓	<b>peck</b>		4.935 kg
160	16	10	<b>Scotch pound</b>	493.516 8 g

For meal at Inverary

			Metric
<b>boll</b>			69.092 kg
8	<b>stone</b>		8.636 kg
140	17½	<b>Scotch pound</b>	493.516 8 g

216.10 Ayrshire

216.10.1 Units of Dry Capacity

Old measures for barley, malt and oats, based on [SWIN2]

					Cubic inches	Metric
<b>boll</b>					16,128.144	264.293 L
4	<b>firlot</b>				4032.036	66.073 L
8	2	<b>half firlot</b>			2016.018	33.037 L
16	4	2	<b>peck</b>		1008.009	16.518 L
64	16	8	4	<b>forpet</b>	252.002 25	4.130 L

Old measures for barley, malt and oats in Cunningham, based on [SWIN2]

		Cubic inches	Metric
<b>boll</b>		8143.024	133.440 L
4	<b>fow</b>	2035.756	33.360 L

Old measures for beans, peas, rye, and wheat in Cunningham, based on [SWIN2]

		Cubic inches	Metric
<b>boll</b>		10,178.781	133.440 L
4	<b>fow</b>	2035.756	33.360 L

For beans, peas, rye and wheat in Ayr, based on [BREW]

				Cubic inches	Metric
<b>boll</b>				8600.68	140.940 L
4	<b>firlot</b>			2150.17	35.235 L
8	2	<b>half firlot</b>		1075.085	17.617 L
16	4	2	<b>peck</b>	537.542 5	8.809 L
64	16	8	4 <b>forpet or stumpard</b>	134.385 6	2.202 L

For beans, peas, rye, and wheat in Cunningham, based on [SWIN2]

				Cubic inches	Metric
<b>boll</b>				10,052.096	164.724 L
4	<b>firlot</b>			2513.024	41.181 L
16	4	<b>peck</b>		628.256	10.295 L
64	16	4	<b>forpet</b>	157.064	2.574 L

For beans, peas, rye and wheat in Kyle and Carrick, based on [SWIN2]

				Cubic inches	Metric
<b>boll</b>				9830.4	161.091 L
4	<b>firlot</b>			2457.6	40.273 L
8	2	<b>half firlot</b>		1228.8	20.136 L
16	4	2	<b>peck</b>	614.4	10.068 L
64	16	8	4 <b>forpet or stumpard</b>	153.6	2.517 L

For barley, malt and oats in Ayr, based on [BREW]

				Cubic inches	Metric
<b>boll</b>				9954	163.117 L
4	<b>firlot</b>			2488.5	40.779 L
8	2	<b>half firlot</b>		1244.25	20.390 L
16	4	2	<b>peck</b>	622.125	10.195 L
64	16	8	4 <b>forpet or stumpard</b>	155.531 25	2.549 L

For barley, malt and oats in Kyle and Carrick, based on [SWIN2]

				Cubic inches	Metric
<b>boll</b>				14,487.04	237.400 L
4	<b>firlot</b>			3621.76	59.350 L
8	2	<b>half firlot</b>		1810.88	29.675 L
16	4	2	<b>peck</b>	905.44	14.837 L
64	16	8	4 <b>forpet or stumpard</b>	226.36	3.709 L

For barley, beans, malt, oats, peas, rye and wheat during the late eighteenth century, based on [SWIN2]

				Cubic inches	Metric
<b>boll</b>				8601.68	140.956 L
4	<b>bushel</b>			2150.42	35.239 L
16	4	<b>peck</b>		537.605	8.810 L
64	16	4	<b>forpet</b>	134.401 25	2.202 L

For coal

		Cubic inches	Metric
<b>box</b>		~10,752	~176 L
5	<b>bushel</b>	~2150	~35.2 L

For lime

		Cubic inches	Metric
<b>boll</b>		8601.68	140.956 L
4	<b>bushel</b>	2150.42	35.239 L

For potatoes

		Cubic inches	Metric
<b>boll</b>		23,344	382.540 L
16	<b>peck</b>	1459	23.909 L

216.10.2 Units of Liquid Capacity

				Cubic inches	Metric
<b>pint</b>				110.624	1.793 4 L
2	<b>chopin</b>			54.721	896.70 mL
4	2	<b>Mutchkin</b>		27.36	448.35 mL
16	8	4	<b>gills</b>	6.84	112.09 mL

216.11 Banffshire

216.11.1 Units of Area

1 Banff acre, Renfrewshire acre, or Dumbarton acre = 6084% sq yd.

Traditional system, based on [SWIN2]

						Cubic inches	Metric
<b>gallon</b>						842.272	13.802 L
4	<b>Quart</b>					210.568	3.451 L
8	2	<b>pint</b>				105.284	1.725 L
16	4	2	<b>chopin</b>			52.642	862.65 mL
32	8	4	2	<b>mutchkin</b>		26.321	431.32 mL
128	32	16	8	4	<b>gill</b>	6.580	107.83 mL

216.11.2 Units of Dry Capacity

For beans, peas, rye, wheat and white salt, based on [SWIN2]

					Cubic inches	Metric
<b>boll</b>					9264.992	151.826 L
4	<b>firlot</b>				2316.248	37.956 L
16	4	<b>peck</b>			579.062	9.489 L
64	16	4	<b>lippie</b>		144.765 5	2.372 L
88	22	5½	1⅞	<b>pint</b>	105.284	1.725 L

For barley, malt and oats, based on [SWIN2]

					Cubic inches	Metric
<b>boll</b>					13,476.352	220.838 L
4	<b>firlot</b>				3369.088	55.209 L
16	4	<b>peck</b>			842.272	13.802 L
64	16	4	<b>lippie</b>		210.568	3.451 L
128	32	8	2	<b>pint</b>	105.284	1.725 L

For coal

		Cubic inches	Metric
<b>barrel</b>		7580.448	124.221 L
72	<b>pint</b>	105.284	1.725 L

216.11.3 Units of Liquid Capacity

216.11.4 Units of Weight

For English goods and groceries

						Metric
<b>hundredweight</b>						50.817 7 kg
8	<b>stone</b>					6.352 2 kg
112	14	<b>pound</b>				453.729 6 g
1 792	224	16	<b>ounce</b>			28.358 1 g
28 672	3 584	256	16	<b>dram</b>		1.772 4 g
784 224	98 028	7 002	437 <sup>7</sup> / <sub>8</sub>	27 <sup>45</sup> / <sub>128</sub>	<b>English Troy grain</b>	64.80 mg

For coal

		Metric
<b>weigh</b>		157.925 kg
20	<b>stone</b>	7.896 kg

For meal

			Metric
<b>boll</b>			63.170 kg
8	<b>stone</b>		7.896 kg
128	16	<b>Scotch pound</b>	493.516 8 g

For butcher-meat and green hides

		Metric
<b>stone</b>		7.896 kg
16	<b>Scotch pound</b>	493.516 8 g

For butter, cheese, hay, tallow and wool

			Metric
<b>stone</b>			9.870 kg
16	<b>pound</b>		616.896 g
320	20	<b>Ounce</b>	30.844 8 g

For butter, cheese, and tallow in the fairs of Cornhill, Fordyce, Keith, and Ruthven

		Metric
<b>stone</b>		10.857 kg
22	<b>Scotch pound</b>	493.516 8 g

For butter, cheese and tallow in Banff and Portsoy

		Metric
<b>stone</b>		11.844 kg
24	<b>Scotch pound</b>	493.516 8 g

216.12 Berwickshire

216.12.1 Units of Dry Capacity

Medium values for cereal, based on [SWIN2], [BREW], and [KERR]

					Cubic inches	Metric	Cubic inches	Metric	Cubic inches	Metric
<b>boll</b> <sup>a</sup>					13,442.52	220.283 L	12,900.52	211.402 L	13,412.17	219.786 L
4	<b>firlot</b>				3360.63	55.071 L	3225.13	52.850 L	3353.04	54.946 L
16	4	<b>peck</b>			840.157 5	13.768 L	806.282 5	13.213 L	838.26	13.734 L
64	16	4	<b>cap</b>		210.039 375	3.442 L	201.570 625	3.303 L	209.565	3.434 L
130	32½	8 <sup>7</sup> / <sub>8</sub>	2 <sup>1</sup> / <sub>32</sub>	<b>pint</b>	103.404	1.694 L	—	—	—	—

<sup>a</sup>1 **boll** (at Berwick) = 12,902.52 cu in. = 211.434 L, 1 **boll** (at Dunse) = ~13,848 cu in. = ~226.9 L, and 1 **boll** (at Lauder) = 11,374.44 cu in. = 186.394 L. 1 **boll** (for ship-borne lime at Eyemouth, according to [KERR]) = about ½ Winchester quart = about 1.10 L

## 216.12.2 Units of Weight

For goods in general at Berwick and Eymouth

						Metric
<b>hundredweight</b>						50.817 7 kg
8	<b>stone<sup>a</sup></b>					6.352 2 kg
112	14	<b>pound<sup>b</sup></b>				453.729 6 g
1792	224	16	<b>ounce</b>			28.358 1 g
28,672	3584	256	16	<b>dram</b>		1.772 4 g
784,224	98,028	7002	437 $\frac{5}{8}$	27 $\frac{45}{128}$	<b>English Troy grain</b>	64.80 mg

<sup>a</sup>1 **Northumberland stone** (for wool) = 24 pounds = 10.889 kg

<sup>b</sup>1 **pound** (for sweet butter and fish) = 18 ounces = 510.44 g

For shop goods and groceries at Dunse

						Metric
<b>hundredweight</b>						50.817 7 kg
8	<b>stone</b>					6.352 2 kg
112	14	<b>pound</b>				453.729 6 g
1792	224	16	<b>ounce</b>			28.358 1 g
28,672	3584	256	16	<b>dram</b>		1.772 4 g
784,224	98,028	7002	437 $\frac{5}{8}$	27 $\frac{45}{128}$	<b>English Troy grain</b>	64.80 mg

For flesh, flour and meal at Dunse

		Metric
<b>stone</b>		7.896 kg
16	<b>Scotch pound</b>	493.516 8 g

For butter, cheese, raw hides and tallow at Dunse

		Metric
<b>stone</b>		10.436 kg
23	<b>pound</b>	453.729 6 g

For butcher meat, English goods and English groceries at Coldstream

						Metric
<b>hundredweight</b>						50.817 7 kg
8	<b>stone<sup>a</sup></b>					6.352 2 kg
112	14	<b>pound</b>				453.729 6 g
1792	224	16	<b>ounce</b>			28.358 1 g
28,672	3 584	256	16	<b>dram</b>		1.772 4 g
784,224	98,028	7002	437 $\frac{5}{8}$	27 $\frac{45}{128}$	<b>English Troy grain</b>	64.80 mg

<sup>a</sup>1 **Northumberland stone** (for wool) = 24 pounds = 10.889 kg, 1 **stone** (for hay) = 21 pounds 14 ounces = 9.925 kg, and 1 **stone** (for raw hides and tallow) = 23 pounds 8 ounces = 10.663 kg

For butter, cheese, hides and wool at Lauder

			Metric
<b>stone</b>			10.857 kg
16	<b>pound</b>		678.585 6 g
352	22	<b>ounce</b>	30.844 8 g

## 216.13 Buteshire and Arran

### 216.13.1 Units of Dry Capacity

For beans, peas and wheat, based on [SWIN2]

				Cubic inches	Metric
<b>boll</b>				11,512.312	188.653 L
4	<b>firlot</b>			2878.078	47.163 L
16	4	<b>peck</b>		719.519 5	11.791 L
111 $\frac{1}{3}$	27 $\frac{1}{6}$	6 $\frac{23}{24}$	<b>pint</b>	103.404 L	1.694 L

For barley, malt and oats, based on [SWIN2]

				Cubic inches	Metric
<b>boll</b>				17,268.468	282.979 L
4	<b>firlot</b>			4317.117	70.745 L
16	4	<b>peck</b>		1079.279 25	17.686 L
167	41 $\frac{3}{4}$	10 $\frac{1}{16}$	<b>pint</b>	103.404	1.694 L

For potatoes at Rothesay,<sup>a</sup> based on [SWIN2]

			Cubic inches	Metric
<b>boll</b>			26,471.424	433.789 L
16	<b>peck</b>		1654.464	27.112 L
256	16	<b>pint</b>	103.404	1.694 L

<sup>a</sup>In the country, according to [SWIN2, p. 68], the values were somewhat less

### 216.13.2 Units of Weight

For beef, butter, cheese, hay, hemp, lint, mutton, raw hides, straw, tallow and wool

			Metric
<b>stone</b>			10.889 kg
24	<b>pound</b>		453.729 6 g
384	16	<b>ounce</b>	28.358 1 g

For pork meal

			Metric
<b>boll<sup>a</sup></b>			63.177 or 71.074 kg
8 or 9	<b>stone</b>		7.897 kg
128 or 144	16	<b>Scotch pound</b>	493.57 g

<sup>a</sup>1 **boll** (for imported meal in Bute) = 9 stones, and 1 **boll** (in Arran) = 8 stones

## 216.14 Caithness-shire

### 216.14.1 Units of Dry Capacity

For barley and oats, based on [SWIN2]

						Cubic inches	Metric
<b>boll</b>						13,623.48	223.249 L
2	<b>belly</b>					6811.74	111.624 L
4	2	<b>firlot</b>				3405.87	55.812 L
16	8	4	<b>peck</b>			851.467 5	13.953 L
64	32	16	4	<b>lippie</b>		212.866 875	3.488 L
131 $\frac{3}{4}$	65 $\frac{7}{8}$	32 $\frac{15}{16}$	8 $\frac{15}{64}$	2 $\frac{15}{256}$	<b>pint</b>	103.404	1.694 L

### 216.14.2 Units of Weight

For meal

			Metric
<b>boll</b>			67.118 kg
8 $\frac{1}{2}$	<b>stone</b>		7.896 kg
136	16	<b>Scotch pound</b>	493.516 8 g

For butter, cheese, feathers, tallow and wool

		Metric
<b>stone</b>		11.844 kg
24	<b>Scotch pound</b>	493.516 8 g

## 216.15 Clackmannanshire

### 216.15.1 Units of Dry Capacity

For beans, peas, rye and wheat, based on [BREW]

				Cubic inches	Metric
<b>boll</b>				9513	155.890 L
4	<b>firlot</b>			2378.25	38.972 L
16	4	<b>peck</b>		594.562 5	9.743 L
64	16	4	<b>lippie or forpet</b>	148.640 625	2.436 L

For barley, malt and oats, based on [BREW]

				Cubic inches	Metric
<b>boll</b>				13,753	225.371 L
4	<b>firlot</b>			3438.25	56.343 L
16	4	<b>peck</b>		859.562 5	14.086 L
64	16	4	<b>lippie or forpet</b>	214.890 625	3.521 L

216.16 Dumbartonshire

216.16.1 Units of Area

1 Dumbarton acre, Banff acre, or  
Renfrewshire acre = 6084<sup>4</sup>/<sub>9</sub> sq yd.

216.16.2 Units of Dry Capacity

For beans, meal, peas and wheat, based on [SWIN2]

					Cubic inches	Metric
<b>boll</b>					10,251	167.984 L
4	<b>firlot</b>				2562.75	41.996 L
16	4	<b>peck</b>			640.687 5	10.499 L
64	16	4	<b>lippie</b>		160.171 875	2.625 L
102	25½	6 <sup>3</sup> / <sub>8</sub>	1 <sup>19</sup> / <sub>32</sub>	<b>pint</b>	100.50	1.647 L

For barley, malt and oats, based on [SWIN2]

					Cubic inches	Metric
<b>boll</b>					13,668	223.978 L
4	<b>firlot</b>				3417	55.996 L
16	4	<b>peck</b>			854.25	13.999 L
64	16	4	<b>lippie</b>		213.562 5	3.500 L
136	34	8½	2 <sup>1</sup> / <sub>8</sub>	<b>pint</b>	100.50	1.647 L

216.16.3 Units of Liquid Capacity

1 **pint** = 100.5 cu in. = 1.647 L.

216.16.4 Units of Weight

For butcher-meat, butter, cheese, fish and Scotch lint

			Metric
<b>stone</b>			10.436 kg
16	<b>pound</b>		652.24 g
368	23	<b>ounce</b>	28.358 1 g

For English goods and groceries

			Metric
<b>stone</b>			6.352 2 kg
14	<b>pound</b>		453.729 6 g
224	16	<b>ounce</b>	28.358 1 g

## 216.17 Dumfries-shire and Part of Kirkcudbright Stewartry

### 216.17.1 Units of Length

1 **Barony ell** (for land measurement in the Four Towns near Lochmaben) = 42 in. = 1.066 8 m  
[SINC2, p. 240];

1 **Langholm ell** =  $37\frac{7}{8}$  in. = 943.0 mm.

### 216.17.2 Units of Dry Capacity

Old measures for cereal in Annan

		Cubic inches	Metric
<b>boll</b>		24,817.2	406.678 L
24	<b>cap</b>	1034.042 5	16.945 L

Old measures for cereal in Eskdale

			Cubic inches	Metric
<b>boll</b>			27,298.656	447.345 L
16	<b>peck</b>		1706.166	27.959 L
264	$16\frac{1}{2}$	<b>pint</b>	103.404	1.694 L

Alternative old measures for cereal in Eskdale

		Cubic inches	Metric
<b>Carlisle bushel</b>		6451.26	105.717 L
4	<b>peck</b>	1612.815	26.429 L

Alternative old measures for cereal in Eskdale

		Cubic inches	Metric
<b>Roxburghshire boll</b>		11,374.440	186.394 L
5	<b>firlot</b>	2274.888	37.279 L

Old measures for cereal in Moffat

			Cubic inches	Metric
<b>boll</b>			29,780.352	488.012 L
16	<b>peck</b>		1861.272	30.501 L
288	18	<b>pint</b>	103.404	1.694 L

For beans, pease, meal, and wheat in Lochmaben, Nithsdale, and along the River Nith

				Cubic inches	Metric
<b>boll</b>				21,848.719 227	358.036 L
16	<b>peck</b>			1365.544 952	22.377 L
64	4	<b>forpet</b>		341.386 238	5.594 L
$232\frac{24}{25}$	$14\frac{14}{25}$	$3\frac{16}{25}$	<b>pint</b>	93.787 428	1.537 L

For barley, malt and oats in Lochmaben, Nithsdale, and along the River Nith

				Cubic inches	Metric
<b>boll</b>				34,406.72	563.825 L
16	<b>peck</b>			2150.42	35.239 L
64	4	<b>forpet</b>		537.605	8.810 L
301 <sup>81</sup> / <sub>100</sub>	18 <sup>43</sup> / <sub>50</sub>	4 <sup>7</sup> / <sub>100</sub>	<b>pint</b>	114.141 19	1.870 L

216.17.3 Units of Liquid Capacity

1 **pint** = 113.996 cu in = 1.868 L.

216.17.4 Units of Weight

For bark, butter, cheese, hay, raw hides, tallow and wool

		Metric
<b>stone<sup>a</sup></b>		14.805 kg
24	<b>pound</b>	616.896 g

<sup>a</sup>In the upper parts of Nithsdale, the stone contained only 22 pounds = 13.571 kg

For butcher-meat and cheese at Annan

		Metric
<b>stone</b>		7.260 kg
14	<b>pound</b>	453.729 6 g

For butcher-meat, bale-goods and cheese

		Metric
<b>stone</b>		7.260 kg
16	<b>pound</b>	453.729 6 g

For iron and oat meal; and for butcher-meat in Eskdale

		Metric
<b>stone</b>		7.940 kg
17½	<b>pound</b>	453.729 6 g

For coal

		Metric
<b>tun</b>		711.448 kg
14	<b>hundredweight</b>	50.817 7 kg

216.18 Edinburghshire or Mid-Lo-Thian

216.18.1 Units of Length

Scale based on [MART3]

				Metric
<b>mile</b>				1810.472 334 m
1916 <sup>7</sup> / <sub>37</sub>	<b>yard</b>			944.863 mm
5908	3½ <sub>12</sub>	<b>foot</b>		306.444 mm
70,896	37	12	<b>inch</b>	25.537 mm

216.18.2 Units of Area

1 **acre** = 5,142.331 6 m<sup>2</sup>.

216.18.3 Units of Dry Capacity

For beans, peas, and wheat, based on [SWIN2] (Linlithgow measures), [BREW] (Edinburgh measures) and [MART3] (Edinburgh measures)

					Cubic inches	Metric	Cubic inches	Metric	Metric
<b>boll</b>					8944.444	146.573 L	8 789.332	144.031 L	144.029 80 L
4	<b>firlot</b>				2236.111	36.643 L	2 197.333	36.008 L	36.007 45 L
16	4	<b>peck</b>			559.027 75	9.161 L	549.333	9.002 L	9.001 862 L
64	16	4	<b>lippie</b>		139.756 94	2.290 L	137.333	2.250 L	2.250 466 L
86½	21¾	5 <sup>13</sup> / <sub>32</sub>	1 <sup>45</sup> / <sub>128</sub>	<b>pint</b>	103.403 977	1.694 L	101.610 774	1.665 L	1.665 084 L

For barley, malt and oats, based on [SWIN2] (Linlithgow measures), [BREW] (Edinburgh measures) and [MART3] (Edinburgh measures)

					Cubic inches	Metric	Cubic inches	Metric	Metric
<b>boll</b>					13,028.904	213.505 L	12,822.126	210.117 L	213.817 312 L
4	<b>firlot</b>				3257.226	53.376 L	3205.531 5	52.529 L	53.454 328 L
16	4	<b>peck</b>			814.306 5	13.344 L	801.382 875	13.132 L	13.363 582 L
64	16	4	<b>lippie</b>		203.576 625	3.336 L	200.345 719	3.283 L	3.340 895 L
126	31½	7⅞	1⅓ <sub>32</sub>	<b>pint</b>	103.404	1.694 L	101.762 905	1.668 L	1.696 963 L

Theoretical scale at Edinburgh for pulses, peas, rye, rice, white salt and wheat from 1618 to 1860, according to [CARD]

						Metric
<b>chalder</b>						2304.496 292 157 44 L
16	<b>boll</b>					144.031 018 259 84 L
64	4	<b>firlot or fow</b>				36.007 754 564 96 L
128	8	2	<b>full</b>			18.003 877 282 48 L
256	16	4	2	<b>peck or auchlet</b>		9.001 938 641 24 L
1024	64	16	8	4	<b>lippy</b>	2.250 484 660 31 L

Theoretical scale at Edinburgh for barley, oatmeal and malt from 1618 to 1860, according to [CARD]

						Metric
<b>chalder</b>						3361.859 929 169 92 L
16	<b>boll</b>					210.116 245 573 12 L
64	4	<b>firlot or fow</b>				52.529 061 393 28 L
256	16	4	<b>peck or auchlet</b>			13.132 265 348 32 L
1024	64	16	4	<b>lippy or forget</b>		3.283 066 337 08 L

216.18.4 Units of Liquid Capacity

1 **pint** = 1.694 L.

216.18.5 Units of Weight

For hay, hemp, Scotch lint, tallow and wool

			Metric
<b>stone</b>			9.870 336 kg
16	<b>pound</b>		616.896 g
320	20	<b>ounce</b>	30.844 8 g

For butter and cheese

		Metric
<b>stone</b>		12.646 kg
20½	<b>pound</b>	616.896 g

For wool

			Metric
<b>stone</b>			10.487 kg
17	<b>pound</b>		616.896 g
340	20	<b>ounce</b>	30.844 8 g

For butcher-meat, feathers, iron, old lead and pewter

			Metric
<b>stone</b>			7.896 kg
16	<b>Scotch pound</b>		493.516 g
256	16	<b>ounce</b>	30.844 g

For coal

				Metric
<b>deal</b>				1676.984 kg
2¾	<b>cart-load</b>			609.812 kg
33	12	<b>hundredweight</b>		50.817 kg
264	96	8	<b>stone</b>	6.352 kg

Other reported measures:

1 old **Scotch pound** = 492.758 g (based on [MART3]).

## 216.19 Elgin and Forres shire

### 216.19.1 Units of Dry Capacity

For beans, peas, rye and wheat, based on [SWIN2]

					Cubic inches	Metric
<b>boll</b>					9384.026	153.777 L
4	<b>firlot</b>				2346.006	38.444 L
16	4	<b>peck</b>			586.501	9.611 L
64	16	4	<b>lippie</b>		146.625	2.403 L
89	22¼	5⅞	1⅔	<b>pint</b>	105.438	1.728 L

For barley, based on [SWIN2]

					Cubic inches	Metric
<b>boll</b>					13,496.128	221.162 L
4	<b>firlot</b>				3374.032	55.290 L
16	4	<b>peck</b>			843.508	13.823 L
64	16	4	<b>lippie</b>		210.877	3.456 L
128	32	8	2	<b>pint</b>	105.438	1.728 L

For oats,<sup>a</sup> based on [SWIN2]

					Cubic inches	Metric
<b>boll<sup>b</sup></b>					16,870.16	276.452 L
5	<b>firlot</b>				3374.032	55.290 L
20	4	<b>peck</b>			843.508	13.823 L
80	16	4	<b>lippie</b>		210.877	3.456 L
160	32	8	2	<b>pint</b>	105.438	1.728 L

<sup>a</sup>1 **boll** (for black oats) = 8 firlots = 26,992.256 cu in. = 442.324 L

<sup>b</sup>The boll of oats varied between 4½ and 8 firlots, according to the quality of the grain

## 216.19.2 Units of Liquid Capacity

1 **pint** = 105.438 cu in. = 1.728 L.

## 216.19.3 Units of Weight

For English goods and groceries

			Metric
<b>stone</b>			6.352 2 kg
14	<b>pound</b>		453.729 6 g
224	16	<b>ounce</b>	28.358 1 g

For flowers

			Metric
<b>peck</b>			3.630 kg
8	<b>pound</b>		453.729 6 g

For salt

				Metric
<b>boll</b> <sup>a</sup>				152.453 kg
1½	<b>boll</b> <sup>b</sup>			101.635 kg
3	2	<b>hundredweight</b>		50.817 7 kg
24	16	8	<b>stone</b>	6.352 2 kg

<sup>a</sup>For foreign salt

<sup>b</sup>For native salt

For butcher-meat and Dutch goods

				Metric
<b>stone</b>				7.896 kg
16	<b>Scotch pound</b>			493.516 8 g

For meal

				Metric
<b>boll</b>				71.066 kg
9	<b>stone</b>			7.896 kg
16	1½	<b>peck</b>		4.442 kg
144	16	9	<b>Scotch pound</b>	493.516 8 g

For butter,cheese, hay, lint of Scotch product and wool

				Metric
<b>stone</b>				10.364 kg
21	<b>Scotch pound</b>			493.516 8 g

## 216.20 Fifeshire

### 216.20.1 Units of Length

1 **ell** (for Scotch woollen cloth) = 37½ in. = 943.0 mm;

1 **ell** (for general use) = 37 in. = 939.8 mm;

1 **English yard** (for most types of good) = 36 in. = 914.4 mm.

### 216.20.2 Units of Dry Capacity

Medium values for beans, peas and wheat, based on [SWIN2]

					Cubic inches	Metric
<b>boll</b>					9099.552	149.115 L
4	<b>firlot</b> <sup>a</sup>				2274.888	37.279 L
16	4	<b>peck</b>			568.722	9.320 L
64	16	4	<b>forpet</b>		142.180 5	2.330 L
88	22	5½	1⅞	<b>pint</b>	103.404	1.694 L

<sup>a</sup>According to [THOM3], = 21½ Scots pints = 2223.207 5 cu in. = 36.432 L

For apples, barley, malt and oats, based on [SWIN2]

					Cubic inches	Metric
<b>boll</b>					13,235.712	216.894 L
4	<b>firlot</b> <sup>a</sup>				3308.928	54.224 L
16	4	<b>peck</b>			827.232	13.556 L
64	16	4	<b>forpet</b>		206.808	3.389 L
128	32	8	2	<b>pint</b>	103.404	1.694 L

<sup>a</sup>According to [THOM3], = 31 Scots pints = 3205.555 cu in. = 52.530 L

### 216.20.3 Units of Weight

English weight for pot-barley, bread, flour, English goods and groceries

		Ounce av.	Metric
<b>stone</b>		256	7.260 kg
16	<b>pound</b>	16	453.729 6 g

Dutch weight for butcher-meat, foreign flax, hemp, iron, meal and Dutch goods

		Ounce av.	Metric
<b>stone</b>		280	7.940 kg
16	<b>pound</b>	17½	496.267 g

Tron weight for butter, cheese, hay, hides, tallow, Scotch wool and other Scotch products<sup>a</sup>

		Ounce av.	Metric
<b>stone</b>		352	9.982 kg
16	<b>pound</b>	22	623.878 g

<sup>a</sup>Butcher-meat, in Kirkaldy, was sold by the Tron weight

216.21 Forfarshire

216.21.1 Units of Length

1 **ell** (for Scotch woollen) = 37¼ in. = 946.1 mm.

216.21.2 Units of Dry Capacity

Medium values for beans, peas and wheat, based on [SWIN2]

					Cubic inches	Metric
<b>boll</b>					9,099.552	149.115 L
4	<b>firlot</b> <sup>a</sup>				2,274.888	37.279 L
16	4	<b>peck</b>			568.722	9.320 L
64	16	4	<b>cap</b>		142.180 5	2.330 L
88	22	5 ½	1 ⅜	<b>pint</b>	103.404	1.694 L

<sup>a</sup>1 **firlot** (at Arbroath) = 22⅙ pints = 277.898 25 cu in. = 4.554 L, and 1 **firlot** (at Brechin and Dundee) = 21½ pints = 2223.186 cu in. = 36.431 L

Medium values for barley, malt and oats, based on [SWIN2] and [BREW]

					Cubic inches	Metric	Cubic inches	Metric
<b>boll</b>					13,287.414	217.742 L	12,926	211.819 L
4	<b>firlot</b> <sup>a</sup>				3321.853	54.435 L	3231.5	52.955 L
16	4	<b>peck</b>			830.463 4	13.609 L	807.875	13.239 L
64	16	4	<b>cap</b>		207.615 8	3.402 L	201.968 75	3.310 L
128½	32⅞	8⅓ <sub>32</sub>	2⅙ <sub>128</sub>	<b>pint</b>	103.404	1.694 L	100.591	1.648 L

<sup>a</sup>1 **firlot** (for barley, malt, and oats at Arbroath) = 31¼ pints = 3231.375 cu in. = 52.953 L, 1 **firlot** (for barley at Brechin, Dundee, Kirciemuir, and Montrose) = 31½ pints = 3257.226 cu in. = 53.376 L, and 1 **firlot** (for barley, malt and oats at Forfar) = 32 pints = 3308.928 cu in. = 54.224 L

216.21.3 Units of Weight

For English goods and groceries

			Metric
<b>hundredweight</b>			50.817 7 kg
8	<b>stone</b>		6.352 2 kg
112	14	<b>pound</b>	453.729 6 g

For butchers-meat, Dutch goods and goods from the Baltic

			Metric
<b>stone</b>			7.896 kg
16	<b>Scotch pound</b>		493.516 8 g
256	16	<b>ounce</b>	30.844 8 g

For coal at Arbroath

			Metric
<b>boll</b>			552.74 kg
70	<b>stone</b>		7.896 kg
1,120	16	<b>Scotch pound</b>	493.516 8 g

For meal

			Metric
<b>boll</b>			63.170 kg
8	<b>stone</b>		7.896 kg
128	16	<b>Scotch pound</b>	493.516 8 g

For home flax, butter, cheese and wool

		Metric <sup>a</sup>	Metric <sup>b</sup>	Metric <sup>c</sup>	Metric <sup>d</sup>
<b>stone</b>		9.982 kg	10.889 kg	11.797 kg	12.251 kg
16	<b>pound</b>	623.88 g	680.59 g	737.31 g	765.67 g

<sup>a</sup>At Arbroath, Cupar, and Dundee. 1 tron pound = 22 oz. av.  
<sup>b</sup>At Brechin, Forfar, and Montrose. 1 tron pound = 24 oz. av.  
<sup>c</sup>At Glamis. 1 tron pound = 26 oz. av.  
<sup>d</sup>At Kirriemuir. 1 tron pound = 27 oz. av.

216.22 Haddingtonshire

216.22.1 Units of Dry Capacity

Medium values for beans, peas and wheat, based on [SWIN2]

					Cubic inches	Metric
<b>boll</b>					9,047.848	148.268 L
4	<b>firlot</b>				2,261.962	37.067 L
16	4	<b>peck</b>			565.490 5	9.267 L
64	16	4	<b>forpet</b>		141.372 6	2.317 L
87½	21 7/8	5 15/32	1 47/128	<b>pint</b>	103.404	1.694 L

Medium values for barley, malt and oats, based on [SWIN2]

					Cubic inches	Metric
<b>boll</b>					13,209.856	216.471 L
4	<b>firlot</b>				3302.464	54.118 L
16	4	<b>peck</b>			825.616	13.529 L
64	16	4	<b>forpet</b>		206.404	3.382 L
127¾	31 <sup>15</sup> / <sub>16</sub>	7 <sup>63</sup> / <sub>64</sub>	1 <sup>255</sup> / <sub>266</sub>	<b>pint</b>	103.404	1.694 L

## 216.22.2 Units of Weight

For English goods and groceries

			Metric
<b>hundredweight</b>			50.817 7 kg
8	<b>stone</b>		6.352 2 kg
112	14	<b>pound</b>	453.729 6 g

For meal and butcher-meat

			Metric
<b>stone</b>			7.896 kg
16	<b>Scotch pound</b>		493.516 8 g
256	16	<b>ounce</b>	30.844 8 g

For home goods

			Metric
<b>stone</b>			9.870 336 kg
16	<b>pound</b>		616.896 g
320	20	<b>ounce</b>	30.844 8 g

## 216.23 Iverness-shire

### 216.23.1 Units of Length

1 **ell** (for coarse linen and woollen) =  
38 in. = 965.2 mm.

### 216.23.2 Units of Dry Capacity

For beans, meal, peas, rye, ryegrass-seed and wheat, based on [SWIN2]

					Cubic inches	Metric
<b>boll</b>					10,059.868	164.852 L
4	<b>firlot</b>				2514.967	41.213 L
16	4	<b>peck</b>			628.741 7	10.303 L
64	16	4	<b>lippie</b>		157.185 4	2.576 L
96	24	6	1½	<b>pint</b>	104.790	1.717 L

For barley and malt, based on [SWIN2]

					Cubic inches	Metric
<b>boll</b>					14,076.9	230.679 L
4	<b>firlot</b>				3519.225	57.670 L
16	4	<b>peck</b>			879.806 2	14.417 L
64	16	4	<b>lippie</b>		219.951 6	3.604 L
128	32	8	2	<b>pint</b>	109.976	1.802 L

For oats, based on [SWIN2]

					Cubic inches	Metric
<b>boll</b> <sup>a</sup>					17,596.125	288.349 L
5	<b>firlot</b>				3519.225	57.670 L
20	4	<b>peck</b>			879.806 2	14.417 L
80	16	4	<b>lippie</b>		219.951 6	3.604 L
160	32	8	2	<b>pint</b>	109.976	1.802 L

<sup>a</sup>When oats are sold for export, there were only 4 firlots to the boll = 14,076.9 cu in. = 230.679 L

For coal, based on [SWIN2]

		Cubic inches	Metric
<b>barrel</b>		6451.26	105.717 L
3	<b>bushel</b>	2150.42	35.239 L

### 216.23.3 Units of Liquid Capacity

For ale, fish-oil and Scotch spirits

					Cubic inches	Metric
<b>gallon</b>					921.290 4	15.097 L
8	<b>jug or pint</b>				115.161 3	1.887 L
16	2	<b>chopin</b>			57.580 6	943.58 mL
32	4	2	<b>mutchkin</b>		28.790 3	471.79 mL
128	16	8	4	<b>gill</b>	7.197 6	117.95 mL

### 216.23.4 Units of Weight

For meal

				Metric
<b>boll</b>				71.066 kg
9	<b>stone</b>			7.896 kg
144	16	<b>Scotch pound</b>		493.516 8 g
2304	256	16	<b>ounce</b>	30.844 8 g

For butcher-meat, butter, cheese and wool

		Metric
<b>stone</b>		10.376 kg
16	<b>pound</b>	647.741 g

For flour

			Metric
<b>boll</b>			58.077 kg
16	<b>peck</b>		3.630 kg
128	8	<b>pound</b>	453.729 6 g

216.24 Kincardineshire

216.24.1 Units of Length

1 **yard** (for English cloths) = 0.914 m;  
1 **plaiding ell** (for home manufacturers',  
labourers' and trademens' work) = 38½ in. =  
977.9 mm.

216.24.2 Units of Dry Capacity

For peas, rye and wheat, based on [SWIN2]

					Cubic inches	Metric
<b>boll</b>					9926.784	162.671 L
4	<b>firlot</b>				2481.696	40.668 L
16	4	<b>peck</b>			620.424	10.167 L
64	16	4	<b>lippie</b>		155.106	2.542 L
96	24	6	1½	<b>pint</b>	103.404	1.694 L

For barley and oats, based on [SWIN2]

					Cubic inches	Metric
<b>boll</b>					13,649.328	223.672 L
4	<b>firlot<sup>a</sup></b>				3412.332	55.918 L
16	4	<b>peck</b>			853.083	13.979 L
64	16	4	<b>lippie</b>		213.271	3.295 L
132	33	8¼	2⅙	<b>pint</b>	103.404	1.694 L

<sup>a</sup>1 **firlot** (for oats at Bervie) = 32½ pints = 3308.928 cu in. = 54.224 L

216.24.3 Units of Weight

For English goods

			Metric
<b>hundredweight</b>			50.817 7 kg
8	<b>stone</b>		6.352 2 kg
112	14	<b>pound</b>	453.729 6 g

For salt

			Metric
<b>boll</b>			123.414 kg
17	<b>stone</b>		7.260 kg
272	16	<b>pound</b>	453.729 6 g

For butter, cheese, tallow and wool

			Metric
<b>stone</b>			12.831 kg
16	<b>pound</b>		801.96 g
416	26	<b>ounce</b>	30.844 8 g

For home goods

			Metric
<b>stone</b>			7.896 kg
16	<b>pound</b>		493.516 8 g
256	16	<b>ounce</b>	30.844 8 g

For meal

			Metric
<b>boll</b>			63.170 kg
8	<b>stone</b>		7.896 kg
128	16	<b>pound</b>	493.516 8 g

For coal

		Metric
<b>boll</b>		568.531 kg
72	<b>stone</b>	7.896 kg

For English coal

		Metric
<b>boll</b>		284.266 kg
36	<b>stone</b>	7.896 kg

For hay

		Metric
<b>boll</b>		157.925 kg
20	<b>stone</b>	7.896 kg

216.25 Kinross-shire

216.25.1 Units of Dry Capacity

The corn measure varied a lot before 1775. In 1778, a set of measures was found as below.

For beans, peas and wheat, based on [SWIN2]

					Cubic inches	Metric
<b>boll</b>					9022	147.844 L
4	<b>firlot</b>				2255.50	36.961 L
16	4	<b>peck</b>			563.875	9.240 L
64	16	4	<b>lippie</b>		140.968 7	2.310 L
87¼	21 13⁄16	5 29⁄64	1 93⁄256	<b>pint</b>	103.404	1.694 L

For barley, malt and oats, based on [SWIN2]

					Cubic inches	Metric
<b>boll</b>					13,209.86	216.471 L
4	<b>firlot</b>				3302.465	54.118 L
16	4	<b>peck</b>			825.616 2	13.529 L
64	16	4	<b>lippie</b>		206.404 1	3.382 L
127¾	31 15⁄16	7 63⁄64	1 255⁄256	<b>pint</b>	103.404	1.694 L

216.25.2 Units of Weight

For groceries

			Metric
<b>stone</b>			7.896 kg
16	<b>Scotch pound</b>		493.516 8 g
256	16	<b>ounce</b>	30.844 8 g

For butter, cheese, hay, rough hides and wool

			Metric
<b>stone</b>			9.870 kg
16	<b>pound</b>		616.896 g
320	20	<b>ounce</b>	30.844 8 g

For butcher-meat and meal

				Metric
<b>hundredweight</b>				50.817 7 kg
8	<b>stone</b>			6.352 2 kg
112	14	<b>pound</b>		453.729 6 g
1792	224	16	<b>ounce</b>	28.358 1 g

216.26 Kirkcudbright stewartry

The system of weights and measures below was used in Anwath, Balmaclellan, Balmaghie, Borgue, Buittle, Carsfairn, Crossmichael, Dalry, Girton, Kells, Kelton, Kirkcudbright, Parton, Rerick, Tongland, and Tyneholme.

216.26.1 Units of Dry Capacity

For beans, peas, rye, and wheat, based on [SWIN2] and [BREW]

					Cubic inches	Metric	Cubic inches	Metric
<b>boll</b>					14,274	233.909 L	23,654	387.620 L
8	<b>peck</b>				1784.25	29.239 L	2956.75	48.452 L
16	2	<b>auchlet or half peck</b>			892.125	14.619 L	1478.375	24.226 L
64	8	4	<b>forpet</b>		223.031	3.655 L	369.594	6.056 L
117	14 <sup>3</sup> / <sub>8</sub>	7 <sup>7</sup> / <sub>16</sub>	1 <sup>3</sup> / <sub>64</sub>	<b>pint</b>	122.00	1.999 L	202.171	3.313 L

For barley, malt and oats, based on [SWIN2]

					Cubic inches	Metric
<b>boll</b>					23,117.015	378.820 L
8	<b>peck</b>				2889.627	47.352 L
16	2	<b>auchlet or half peck</b>			1444.813	23.676 L
64	8	4	<b>forpet</b>		361.203	5.919 L
193 <sup>22</sup> / <sub>25</sub>	24 <sup>9</sup> / <sub>25</sub>	12 <sup>7</sup> / <sub>25</sub>	3 <sup>7</sup> / <sub>100</sub>	<b>pint</b>	119.209	1.953 L

216.26.2 Units of Liquid Capacity

					Cubic inches	Metric
<b>gallon</b>					976	15.142 L
8	<b>jug or pint</b>				122	1.893 L
16	2	<b>chopin</b>			57.75	946.35 mL
33 <sup>4</sup> / <sub>5</sub>	4 <sup>9</sup> / <sub>40</sub>	2 <sup>9</sup> / <sub>80</sub>	<b>mutchkin</b>		28.875	473.18 mL
135 <sup>1</sup> / <sub>5</sub>	16 <sup>9</sup> / <sub>10</sub>	8 <sup>9</sup> / <sub>20</sub>	4	<b>gill</b>	7.218 75	118.29 mL

216.26.3 Units of Weight

For butcher-meat and English goods and groceries

				Metric
<b>hundredweight</b>				50.817 7 kg
8	<b>stone</b>			6.352 2 kg
112	14	<b>pound</b>		453.729 6 g
1792	224	16	<b>ounce</b>	28.358 1 g

For meal

			Metric
<b>stone</b>			7.940 kg
17½	<b>pound</b>		453.729 6 g
280	16	<b>ounce</b>	28.358 1 g

For home commodities

		Metric <sup>a</sup>			Metric <sup>b</sup>
<b>pound</b>		737.311 g	<b>pound</b>		794.027 g
26	<b>ounce</b>	28.358 1 g	28	<b>ounce</b>	28.358 1 g

<sup>a</sup>At Balmaclellen, Carsfairn, Dalry, and Kells

<sup>b</sup>At Anwath, Borgue, Buittle, Crissmichael, Girton, Kelton, Kirkcudbright, Parton, Rerick, Tongland, and Tynholm

## 216.27 Lanarkshire

### 216.27.1 Units of Length

For thread in Clydesdale during the late eighteenth to early nineteenth centuries, based on [SECO]

				Metric
<b>spindle</b>				131.674 m
48	<b>cut</b>			2.743 m
120	2½	<b>thread<sup>a</sup></b>		1.097 m
14,400	300	120	<b>yard</b>	914.4 mm

<sup>a</sup>Each tread had a reel that was 2½ yd in circumference

### 216.27.2 Units of Dry Capacity

For wheat in Glasgow and Lower Ward, based on [SWIN2]

					Cubic inches	Metric
<b>boll</b>					9256.760	151.690 L
4	<b>firlot</b>				2314.190	37.923 L
16	4	<b>peck</b>			578.547	9.481 L
64	16	4	<b>cap</b>		144.637	2.370 L
89 <sup>26</sup> / <sub>50</sub>	22 <sup>19</sup> / <sub>50</sub>	5 <sup>119</sup> / <sub>200</sub>	1 <sup>319</sup> / <sub>800</sub>	<b>pint</b>	103.404	1.694 L

For beans and peas in Glasgow and Lower Ward, based on [SWIN2]

					Cubic inches	Metric
<b>boll</b>					13,084.80	214.422 L
4	<b>firlot</b>				3271.20	53.605 L
16	4	<b>peck</b>			817.80	13.401 L
64	16	4	<b>cap</b>		204.45	3.350 L
126.540 8	31.635 2	7.908 8	1.977 2	<b>pint</b>	103.404	1.694 L

For bear and oats in Glasgow and Lower Ward, based on [SWIN2]

					Cubic inches	Metric
<b>Boll</b>					13,357.60	218.891 L
4	<b>firlot</b>				3339.40	54.723 L
16	4	<b>peck</b>			834.85	13.681 L
64	16	4	<b>cap</b>		208.712	3.420 L
129 <sup>89</sup> / <sub>500</sub>	~32.294 5	~8.073 6	~2.018 4	<b>pint</b>	103.404	1.694 L

For beans, peas, and wheat in Lanark and Upper Ward, based on [SWIN2] and [BREW]

					Cubic inches	Metric
<b>boll</b>					8789.332	144.031 L
4	<b>firlot</b>				2197.333	36.008 L
8	2	<b>half firlot</b>			1098.666	18.004 L
64	16	8	<b>lippie</b>		137.333	2.250 L
85	21¼	10⅞	1 <sup>2</sup> ⅙ <sub>64</sub>	<b>pint</b>	103.404	1.694 L

For bear and oats in Lanark and Upper Ward, based on [SWIN2]

					Cubic inches	Metric
<b>boll</b>					13,235.712	218.891 L
4	<b>firlot</b>				3308.928	54.224 L
16	4	<b>peck</b>			827.232	13.556 L
64	16	4	<b>cap</b>		206.808	3.389 L
128	32	8	2	<b>pint</b>	103.404	1.694 L

Other units used during the nineteenth century:

1 **sleek** (for apples and pears in Clydesdale) = 2½ gal.

216.27.3 Units of Weight

For butcher-meat, butter and cheese in Glasgow

			Metric
<b>stone</b>			9.870 kg
16	<b>pound</b>		616.896 g
320	20	<b>ounce</b>	30.844 8 g

For butter, cheese and wool in Lanark

			Metric
<b>stone</b>			9.982 kg
22	<b>pound</b>		453.729 6 g
352	16	<b>ounce</b>	30.844 8 g

For all kinds of meal in Glasgow

			Metric
<b>stone</b>			7.896 kg
16	<b>Scotch pound</b>		493.516 8 g
256	16	<b>ounce</b>	30.844 8 g

For barley, butcher-meat, iron and meal in Lanark

			Metric
<b>stone</b>			7.896 kg
16	<b>Scotch pound</b>		493.516 8 g
256	16	<b>ounce</b>	30.844 8 g

For English goods and groceries

				Metric
<b>hundredweight</b>				50.817 7 kg
8	<b>stone</b>			6.352 2 kg
112	14	<b>pound</b>		453.729 6 g
1792	224	16	<b>ounce</b>	28.358 1 g

## 216.28 Linlithgowshire

### 216.28.1 Units of Area

1 **acre** (before 1827, based on the chain being 74 ft) = 6084% sq yd = 5,087.370 5 m<sup>2</sup>;

1 **acre** (after 1827, based on the chain being 74.119 6 ft) = 6104.127 893 511 sq yd = 5103.828 3 m<sup>2</sup>.

### 216.28.2 Units of Dry Capacity

For barley, malt and oats, based on [SWIN2]

					Cubic inches	Metric
<b>boll</b>					13,206.76	216.420 L
4	<b>Firlot</b>				3301.69	54.105 L
16	4	<b>peck</b>			825.42	13.526 L
64	16	4	<b>lippie</b>		206.35	3.382 L
~127.72	~31.93	~7.982	~1.996	<b>pint</b>	103.404	1.694 L

For barley, malt and oats, based on [ROBI5] and [CLEL]

				Cubic inches	Metric	Cubic inches	Metric
<b>boll</b>				12,921.22	211.664 L	12,920.80	211.734 L
4	<b>Firlot</b>			3230.305	52.916 L	3230.20	52.933 L
16	4	<b>peck</b>		807.576	13.229 L	807.550	13.233 L
64	16	4	<b>lippie</b>	201.894	3.307 L	201.887 5	3.308 L

For beans, peas, rye, white salt and wheat,  
based on [SWIN2]

					Cubic inches	Metric
<b>boll</b>					9140.91	144.029 L
4	<b>firlot</b>				2285.23	36.007 L
16	4	<b>peck</b>			571.31	9.002 L
64	16	4	<b>lippie</b>		142.83	2.250 L
~88.4	~22.1	~5.525	~1.381	<b>pint</b>	103.404	1.694 L

For beans, meal, peas and wheat, based on [ROBI5] and [CLEL]

				Cubic inches	Metric	Cubic inches	Metric
<b>boll</b>				8857.288	145.145 L	8857.015 6	145.140 L
4	<b>firlot</b>			2214.322	36.286 L	2214.253 9	36.285 L
16	4	<b>peck</b>		554.580 5	9.072 L	553.563 475	9.071 L
64	16	4	<b>lippie</b>	138.395 1	2.268 L	138.390 869	2.268 L

### 216.28.3 Units of Liquid Capacity

1 **gallon** (for wine) = 231 cu in. = 3.785 L;

1 **Scotch pint** (for ale, beer, porter, and butter-milk) = 111.562 5 cu in. = 1.828 L;

1 **Scotch pint** (for oil, spirits, vinegar, and sweet milk) = 105 cu in. = 1.721 L.

### 216.28.4 Units of Weight

For combed wool, dressed flax, groceries and tanned hides

				Metric
<b>hundredweight</b>				50.817 7 kg
8	<b>stone</b>			6.352 2 kg
112	14	<b>pound</b>		453.729 6 g
1792	224	16	<b>ounce</b>	28.358 1 g

For butcher-meat, calf-skins, iron, meal and undressed flax

				Metric
<b>stone</b>				7.896 kg
16	<b>pound</b>			493.516 8 g
256	16	<b>ounce</b>		30.844 8 g

For butter, cheese, rough hides, tallow and wool

			Metric
<b>stone</b>			9.870 336 kg
16	<b>pound</b>		616.896 g
320	20	<b>ounce</b>	30.844 8 g

### 216.29 Morayshire

See also *Elgin* and *Forres*.

#### 216.29.1 Units of Dry Capacity

1 **boll** (for oats at Elgin and Forres) = 16,870 cu in.;

1 **boll** (for barley at Elgin and Forres) = 13,496 cu in.;

1 **boll** (for beans, peas, rye and wheat at Elgin and Forres) = 9384 cu in.;

### 216.30 Nairnshire

#### 216.30.1 Units of Length

1 **yard** (for coarse cloth) = 38 in. = 965.2 mm.

#### 216.30.2 Units of Dry Capacity

For barley-meal, beans, oat-meal, peas, rye, ryegrass-seed and wheat, based on [SWIN2]

					Cubic inches	Metric
<b>boll</b> <sup>a</sup>					10,720.884	175.684 L
4	<b>firlot</b>				2680.221	43.921 L
16	4	<b>peck</b>			670.055	10.980 L
64	16	4	<b>lippie</b>		167.514	2.745 L
96	24	6	1½	<b>pint</b>	111.676	1.830 L

<sup>a</sup>1 **boll** (for black oats) = 9 firlots = 24,121.989 cu in. = 395.289 L

For barley, based on [SWIN2]

					Cubic inches	Metric
<b>boll</b>					14,294.528	234.245 L
4	<b>firlot</b>				3573.632	58.561 L
16	4	<b>peck</b>			893.408	14.640 L
64	16	4	<b>lippie</b>		223.352	3.660 L
128	32	8	2	<b>pint</b>	111.676	1.830 L

For oats, based on [SWIN2]

					Cubic inches	Metric
<b>boll</b>					17,868.160	292.807 L
5	<b>firlot</b>				3573.632	58.561 L
20	4	<b>peck</b>			893.408	14.640 L
80	16	4	<b>lippie</b>		223.352	3.660 L
160	32	8	2	<b>pint</b>	111.676	1.830 L

216.30.3 Units of Liquid Capacity

					Cubic inches	Metric
<b>gallon</b>					893.408	14.640 L
8	<b>jug or pint</b>				111.676	1.830 L
16	2	<b>chopin</b>			55.838	915.021 mL
32	4	2	<b>mutchkin</b>		27.919	457.510 mL
128	16	8	4	<b>gill</b>	6.980	114.378 mL

216.30.4 Units of Weight

For beef, flax, hemp, hides, pork and twine for nets

			Metric
<b>stone</b>			7.896 kg
16	<b>Scotch pound</b>		493.516 8 g
256	16	<b>ounce</b>	30.844 8 g

For meal

				Metric
<b>boll</b>				71.066 kg
9½	<b>stone</b>			7.896 kg
152	16	<b>Scotch pound</b>		493.516 8 g
2432	256	16	<b>ounce</b>	30.844 8 g

For butter, cheese, tallow, wool and other domestic commodities

		Metric
<b>stone</b>		10.376 kg
16	<b>pound</b>	647.741 g

For groceries and foreign goods

			Metric
<b>hundredweight</b>			50.817 7 kg
8	<b>stone</b>		6.352 2 kg
112	14	<b>pound</b>	453.729 6 g

For flour

			Metric
<b>boll</b>			58.077 kg
16	<b>peck</b>		3.630 kg
128	8	<b>pound</b>	453.729 6 g

216.31 Orkney

216.31.1 Units of Area

The chief units of land measurement in Orkney and Shetland were ‘eyrislands,’ or ‘ouncelands,’ and ‘pennylands’. It seems likely that the units have been associated with an assessment system of taxation from the beginning.

During the fifteenth to eighteenth centuries

<b>uresland<sup>a</sup></b>				
18	<b>pennyland<sup>b</sup></b>			
72	4	<b>farthingland</b>		
108	6	1½	<b>mæliscope<sup>c</sup></b>	
180	10	2½	1⅔	<b>cowsworth, yowisworth, or zowisworth</b>

<sup>a</sup>A division that formed a basic district for fiscal and ecclesiastical purposes  
<sup>b</sup>According to [THOM4, p. 20], the extent of a pennyland varied in 1766 as follows: Wasbister = 22.7 Scots acres, Swandale = 22.3 Scots acres, Houseby = 11.5 Scots acres, Knarston = 13.9 Scots acres, and Trumland = Scots acres  
<sup>c</sup>Value-based land measure

Other measures reported during the fourteenth to eighteenth centuries:

1 **mælirland** = an area of land sown with one mælir of grain.

216.31.2 Units of Dry Capacity

Norwegian scale for corn during the fourteenth to sixteenth centuries

<b>sáld</b>	
6	<b>Mælir</b>

For grain

<b>last</b>			
24	<b>meil</b>		
144	6	<b>setten</b>	
3456	144	24	<b>mark</b>

For butter in the Orkney Islands before 1580, after the 1580s, after 1600, after 1691, in 1743 and in 1826

				Scots troye	Scots troye	Scots troye	Scots troye	Scots troye	Scots troye
<b>span</b>									
5 or 5½	<b>lispund</b>			12 pounds	15 pounds	18 pounds	24 pounds	27¾ pounds	29 pounds 10 oz 12 dr
20 or 21	4	<b>pennies-worth</b>							
120 or 126	24	6	<b>mark</b>						

216.31.3 Units of Weight

Before 1584

			Metric
<b>setteen or lyspund</b>			14.800 kg
15	<b>pund</b>		986.718 g
24	1⅓	<b>mark</b>	616.699 g

After 1584 (values below are taken from the proof in the process, at the instance of the Orkney vassals, against the Earl of Morton, in 1759)

						Metric
<b>last or chalder<sup>a</sup></b>						2131.97 kg
24	<b>meil or meill<sup>b</sup></b>					88.832 kg
32	1 $\frac{1}{3}$	<b>meil or meill<sup>c</sup></b>				66.624 kg
144	6	4 $\frac{1}{2}$	<b>setteen, leispound, or lyspund</b>			14.805 kg
2160	90	67 $\frac{1}{2}$	15	<b>pund</b>		987.025 g
3456	144	108	24	1 $\frac{1}{3}$	<b>mark</b>	616.891 g

<sup>a</sup>The chalder for bear was reported as about 29 or 30 barrels, thus 1 **barrel** = 4.88 lysounds = 72.248 kg

<sup>b</sup>Meil on the malt-pundler. Pundler was the name of a beam with marks, which had a stone on the one end and a hook on the other end. The stone on the malt pundler should be a set weight, and on the bear pundler, a stone weighing sixteen mark

<sup>c</sup>For meal. Also reported as 1/38 last

For butter and oil

					Metric
<b>barrel</b>					98.702 kg
2	<b>half-barrel</b>				49.351 kg
6 $\frac{2}{3}$	3 $\frac{1}{3}$	<b>setteen or lyspund</b>			14.805 kg
160	80	24	<b>mark</b>		616.891 g

## 216.32 Peebles-shire

### 216.32.1 Units of Dry Capacity

For beans, peas, rye, and wheat, based on [SWIN2]

					Cubic inches	Metric
<b>boll</b>					9417.60	438.974 L
4	<b>firlot</b>				2354.40	109.743 L
16	4	<b>peck</b>			588.60	27.436 L
64	16	4	<b>lippie</b>		147.15	6.859 L
90	22 $\frac{1}{2}$	5 $\frac{5}{8}$	1 $\frac{13}{32}$	<b>pint</b>	104.64	1.715 L

For barley, malt and oats, based on [SWIN2]

					Cubic inches	Metric
<b>boll<sup>a</sup></b>					13,393.92	219.487 L
4	<b>firlot</b>				3348.48	54.872 L
16	4	<b>peck</b>			837.12	13.718 L
64	16	4	<b>lippie</b>		209.28	3.429 L
128	32	8	2	<b>pint</b>	104.64	1.715 L

<sup>a</sup>In sales of barley and oats, farmers gave a boll to the score, except for seed-barley and seed-oats

216.32.2 Units of Liquid Capacity

					Cubic inches	Metric
<b>gallon</b>					837.12	13.718 L
8	<b>jug or pint</b>				104.64	1.715 L
16	2	<b>chopin</b>			52.32	857.37 mL
32	4	2	<b>mutchkin</b>		26.16	428.69 mL
128	16	8	4	<b>gill</b>	6.54	107.17 mL

216.32.3 Units of Weight

For groceries and foreign goods

			Metric
<b>hundredweight</b>			50.817 7 kg
8	<b>stone</b>		6.352 2 kg
112	14	<b>pound</b>	453.729 6 g

For butter, cheese, coal, hay, hides, tallow and wool

		Metric
<b>stone<sup>a</sup></b>		10.436 kg
16	<b>pound</b>	652.236 3 g

<sup>a</sup>Farmers, in selling cheese and wool, gave a pound to the stone

For barley, butcher-meat, iron and meal

			Metric
<b>stone</b>			7.896 kg
16	<b>Scotch pound</b>		493.516 8 g
256	16	<b>ounce</b>	30.844 8 g

216.33 Perthshire

216.33.1 Units of Dry Capacity

Presumed old standard (Linlithgow measure) for beans, peas and wheat, based on [SWIN2]

				Cubic inches	Metric
<b>boll</b>				13,272.56	217.498 L
4	<b>firlot</b>			3318.14	54.374 L
16	4	<b>peck</b>		829.535	13.594 L
64	16	4	<b>lippie</b>	207.384	3.398 L

Presumed old standard (Linlithgow measure) for barley, malt and oats, based on [SWIN2]

				Cubic inches	Metric
<b>boll</b>				8.871.08	145.370 L
4	<b>firlot</b>			2.217.77	36.342 L
16	4	<b>peck</b>		554.442	9.086 L
64	16	4	<b>lippie</b>	138.611	2.271 L

For beans, peas and wheat after 1774<sup>a</sup>, based on [SWIN2]

					Cubic inches	Metric
<b>boll</b>					9.051.84	148.333 L
4	<b>firlot</b>				2.262.96	37.083 L
16	4	<b>peck</b>			565.74	9.271 L
64	16	4	<b>lippie</b>		141.435	2.318 L
86¾	21 11/16	5 27/64	1 9/256	<b>pint</b>	104.344	1.710 L

<sup>a</sup>According to [SWIN2, p. 110], a new set of standard firlots was tried in March 1778, and found to contain as above

For barley, malt and oats after 1774<sup>a</sup>, based on [SWIN2]

					Cubic inches	Metric
<b>boll<sup>b</sup></b>					13,356.00	218.866 L
4	<b>firlot</b>				3339.00	54.716 L
16	4	<b>peck</b>			834.750	13.679 L
64	16	4	<b>lippie</b>		208.688	3.420 L
128	32	8	2	<b>pint</b>	104.344	1.710 L

<sup>a</sup>According to [SWIN2, p. 110], a new set of standard firlots was tried in March 1778, and found to contain as above

<sup>b</sup>1 **boll** (for apples) = 4 heaped firlots or 6 striked firlots

216.33.2 Units of Liquid Capacity

					Cubic inches	Metric
<b>gallon</b>					834.752	13.679 L
8	<b>jug or pint</b>				104.344	1.710 L
16	2	<b>chopin</b>			52.172	854.95 mL
32	4	2	<b>mutchkin</b>		26.086	427.47 mL
128	16	8	4	<b>gill</b>	6.521	106.87 mL

216.33.3 Units of Weight

For merchant goods

				Metric
<b>hundredweight</b>				58.077 kg
8	<b>stone</b>			7.260 kg
128	16	<b>pound</b>		453.729 6 g
2048	256	16	<b>ounce</b>	28.358 1 g

For butcher,meat and undressed flax

			Metric
<b>stone</b>			7.896 kg
16	<b>pound</b>		493.516 8 g
256	16	<b>ounce</b>	30.844 8 g

For meal

			Metric
<b>boll</b>			63.170 kg
8	<b>stone</b>		7.896 kg
128	16	<b>pound</b>	493.516 8 g

For coal

				Metric
<b>chalder</b>				5053.612 kg
16	<b>boll</b>			315.851 kg
640	40	<b>stone</b>		7.896 kg
10,240	640	16	<b>pound</b>	493.516 8 g

For butter, cheese, Scotch undressed lint and rough tallow

			Metric
<b>stone</b>			9.982 kg
16	<b>pound</b>		623.878 2 g
352	22	<b>ounce</b>	28.358 1 g

For butter, cheese, Scotch undressed lint and rough tallow at Culross and Dumblain

			Metric
<b>stone</b>			9.870kg
16	<b>pound</b>		616.896 g
320	20	<b>ounce</b>	30.844 8 g

For coal

			Metric
<b>great chalder</b>			266.500 kg
1¼	<b>small chalder</b>		213.200 kg
3¾	27	<b>stone</b>	7.896 3 kg

## 216.34 Renfrewshire

### 216.34.1 Units of Area

1 Renfrewshire acre, Banff acre, or Dumbarton acre = 6084⁄9 sq yd.

### 216.34.2 Units of Dry Capacity

For beans, peas and vetches, based on [SWIN2]

					Cubic inches	Metric
<b>boll</b>					9616.572	157.587 L
4	<b>firlot</b>				2404.143	39.967 L
16	4	<b>peck</b> <sup>a</sup>			601.036	9.849 L
93	23¼	5 <sup>13</sup> / <sub>16</sub>	<b>pint</b>		103.404	1.694 L
99	24¾	6 <sup>3</sup> / <sub>16</sub>	1 <sup>2</sup> / <sub>31</sub>	<b>peas jug</b>	97.137	1.592 L

<sup>a</sup>Sometimes used, heaped, for bear and oats. Corn of all kinds were exported from Greenock and Glasgow, by the Winchester bushel. [SWIN2, p. 113]

For bear and oats, based on [SWIN2]

					Cubic inches	Metric
<b>boll</b>					13,623.476	223.249 L
4	<b>firlot</b>				3405.869	55.812 L
16	4	<b>peck</b>			851.467	13.953 L
124	31	7¼	<b>pint</b>		109.867	1.800 L

216.34.3 Units of Liquid Capacity

					Cubic inches	Metric
<b>gallon</b>					885.728 9	14.514 L
8	<b>jug or pint</b>				110.716 1	1.814 L
17	2⅞	<b>chopin</b>			52.101 7	853.8 mL
34	4¼	2	<b>mutchkin</b>		26.050 8	426.9 mL
136	17	8	4	<b>gill</b>	6.512 7	106.7 mL

216.34.4 Units of Weight

For English goods and groceries

				Metric
<b>hundredweight</b>				58.077 kg
8	<b>stone</b>			7.260 kg
128	16	<b>pound</b>		453.729 6 g
2048	256	16	<b>ounce</b>	28.358 1 g

For meal

			Metric
<b>boll</b>			63.170 kg
8	<b>stone</b>		7.896 kg
128	16	<b>pound</b>	493.516 8 g

For iron

		Metric
<b>Stone</b>		7.896 kg
16	<b>pound</b>	493.516 8 g

For butcher, meat, butter, cheese, fish and tallow

			Metric
<b>stone</b>			10.209 kg
16	<b>pound</b>		638.057 g
360	22½	<b>ounce</b>	28.358 1 g

216.35 Ross and Cromarty Shire

216.35.1 Units of Length

1 Scotch **ell** (for home manufacture in Fortrose) = 38 in. = 965.2 mm.

216.35.2 Units of Dry Capacity

For beans, lime, peas, rye and wheat, based on [SWIN2]

					Cubic inches	Metric
<b>boll</b>					9926.784	162.671 L
4	<b>firlot<sup>a</sup></b>				2481.696	40.668 L
16	4	<b>peck</b>			620.424	10.167 L
64	16	4	<b>lippie</b>		155.106	2.542 L
96	24	6	1½	<b>pint<sup>b</sup></b>	103.404	1.694 L

<sup>a</sup>Also used, heaped, for potatoes. Wheat, at the time, was sold by the Linlithgow firlot

<sup>b</sup>Also used for flax seed

For beans, peas, rye, and wheat based on [BREW]

				Cubic inches	Metric
<b>boll</b>				8789.332	144.031 L
4	<b>firlot</b>			2197.333	36.008 L
64	16	<b>lippie</b>		137.333	2.250 L
85	21¼	1 <sup>2</sup> / <sub>64</sub>	<b>pint</b>	103.404	1.694 L

For barley, malt, and oats, based on [SWIN2]

					Cubic inches	Metric
<b>boll</b>					13,235.712	216.894 L
4	<b>firlot</b>				3308.928	54.224 L
16	4	<b>peck</b>			827.232	13.556 L
64	16	4	<b>lippie</b>		206.808	3.389 L
128	32	8	2	<b>pint</b>	103.404	1.694 L

216.35.3 Units of Weight

For butcher meat and wheat flour

				Metric
<b>boll</b>				58.077 kg
8	<b>stone</b>			7.260 kg
128	16	<b>pound</b>		453.729 6 g
2048	256	16	<b>ounce</b>	28.358 1 g

For meal

			Metric
<b>boll</b>			71.066 kg
9	<b>stone</b>		7.896 kg
144	16	<b>pound</b>	493.516 8 g

For butter, cheese, fish, flax and tallow

			Metric
<b>stone<sup>a</sup></b>			10.364 kg
21	<b>pound</b>		493.516 8 g
336	16	<b>ounce</b>	30.844 8 g

<sup>a</sup>In Tain, reported as 22 lbs av = 9.982 kg

216.36 Roxburghshire or Teviotdale

216.36.1 Units of Dry Capacity

For beans, peas and wheat, based on [SWIN2]

					Cubic inches	Metric
<b>boll</b>					11,374.44	186.394 L
5	<b>firlot</b>				2274.888	37.279 L
20	4	<b>peck</b>			568.722	9.320 L
80	16	4	<b>forpet</b>		142.180	2.330 L
110	22	5½	1⅞	<b>Stirling pint</b>	103.404	1.694 L

For barley, malt and oats, based on [SWIN2]

					Cubic inches	Metric
<b>boll<sup>a</sup></b>					17,061.66	279.590 L
5	<b>firlot</b>				3412.332	55.918 L
20	4	<b>peck</b>			853.083	13.979 L
80	16	4	<b>forpet</b>		213.271	3.495 L
165	33	8¼	2⅙	<b>Stirling pint</b>	103.404	1.694 L

<sup>a</sup>1 **boll** (for hummil corn, oats, and coarse wheat-meal in Teviotdale) = 34,123.32 cu in. = 559.181 L. [SWIN2, p. 118]

For peas and wheat in the Kelso market, based on [SWIN2]

					Cubic inches	Metric
<b>boll</b>					13,442.52	220.283 L
4	<b>firlot</b>				3360.63	55.071 L
12	3	<b>Kelso peck</b>			1120.21	18.357 L
48	12	4	<b>cap</b>		280.052 5	4.589 L
130	32½	10⅞	2 <sup>17</sup> / <sub>24</sub>	<b>Stirling pint</b>	103.404	1.694 L

Alternative scale for peas and wheat in the Kelso market, based on [BREW]

					Cubic inches	Metric
<b>boll</b>					12,902.52	211.434 L
4	<b>firlot</b>				3225.63	52.859 L
12	3	<b>Kelso peck</b>			1075.21	17.619 L
48	12	4	<b>cap</b>		268.802 5	4.405 L
124⅔	31⅔ <sub>36</sub>	10 <sup>43</sup> / <sub>108</sub>	2 <sup>259</sup> / <sub>432</sub>	<b>Stirling pint</b>	103.404	1.694 L

For barley, malt, and oats in the Kelso market, based on [SWIN2]

					Cubic inches	Metric
<b>boll</b>					17,061.66	279.590 L
5	<b>firlot</b>				3412.332	55.918 L
15	3	<b>Kelso peck</b>			1137.444	18.693 L
60	12	4	<b>cap or forpet</b>		284.361	4.660 L
165	33	11	2¾	<b>Stirling pint</b>	103.404	1.694 L

Alternative scale for barley and oats in the Kelso market

					Cubic inches	Metric
<b>boll<sup>a</sup></b>					16,131.024	264.340 L
5	<b>firlot</b>				3226.205	52.868 L
15	3	<b>Kelso peck</b>			1075.402	17.623 L
60	12	4	<b>cap or forpet</b>		268.850 4	4.406 L
156	31⅓	10⅔ <sub>5</sub>	2⅔ <sub>5</sub>	<b>Stirling pint</b>	103.404	1.694 L

<sup>a</sup>Also said to equal about 7½ Winchester bu = 16,128.15 cu in.

216.36.2 Units of Liquid Capacity

In Jedburgh

					Cubic inches	Metric
<b>gallon</b>					885.729	14.514 L
8	<b>jug or pint</b>				110.716 1	1.814 L
17	2 <sup>7</sup> / <sub>8</sub>	<b>chopin</b>			52.101 7	853.8 mL
34	4 <sup>1</sup> / <sub>4</sub>	2	<b>mutchkin</b>		26.050 8	426.9 mL
136	17	8	4	<b>gill</b>	6.512 7	106.7 mL

In Roxburgh

					Cubic inches	Metric
<b>gallon</b>					878.934	14.403 L
8	<b>jug or pint</b>				109.866 75	1.800 4 L
16	2	<b>chopin</b>			54.933 4	900.20 mL
32	4	2	<b>mutchkin</b>		27.466 7	450.10 mL
128	16	8	4	<b>gill</b>	6.866 7	112.52 mL

216.36.3 Units of Weight

For groceries and English goods

			Metric
<b>hundredweight</b>			50.817 7 kg
8	<b>stone</b>		6.352 2 kg
112	14	<b>pound</b>	453.729 6 g

For flesh, flour, iron, meal and pot barley

			Metric
<b>stone</b>			7.896 kg
16	<b>Scotch pound</b>		493.516 8 g
256	16	<b>ounce</b>	30.844 8 g

For butter, cheese, hay, lint, raw hides, tallow and wool

		Metric
<b>stone<sup>a</sup></b>		10.889 kg
16	<b>pound</b>	680.594 g

<sup>a</sup>In Kelso, the stone was equal to 10.436 kg, but sweet butter was sold in the market by the pound indicated above

216.37 Selkirkshire

216.37.1 Units of Dry Capacity

For beans, peas, rye and wheat, based on [SWIN2] and [BREW]

					Cubic inches	Metric	Cubic inches	Metric
<b>boll</b>					11,406.75	186.923 L	9225	151.171 L
5	<b>firlot</b>				2281.35	37.385 L	1845	30.234 L
10	2	<b>peck</b>			1140.675	18.692 L	922.5	15.117 L
80	16	8	<b>lippie</b>		142.584	2.336 L	115.312 5	1.890 L
110 <sup>3</sup> / <sub>16</sub>	22 <sup>3</sup> / <sub>16</sub>	11 <sup>1</sup> / <sub>32</sub>	1 <sup>97</sup> / <sub>256</sub>	<b>pint</b>	103.404	1.694 L	—	—

For barley, malt and oats, based on [SWIN2]

					Cubic inches	Metric	Cubic inches	Metric
<b>boll</b>					16,156.85	264.763 L	12,925	211.803 L
5	<b>firlot</b>				3231.37	52.953 L	2585	42.360 L
10	2	<b>full</b>			1615.685	26.476 L	1292.5	21.180 L
80	16	8	<b>lippie</b>		201.961	3.309 L	161.562 5	2.647 L
156¼	31¼	15⅝	1⅞ <sub>64</sub>	<b>pint</b>	103.404	1.694 L	–	–

216.37.2 Units of Weight

For groceries and English goods

			Metric
<b>hundredweight</b>			50.817 7 kg
8	<b>stone</b>		6.352 2 kg
112	14	<b>pound</b>	453.729 6 g

For butter, cheese, hay, raw hides, tallow and wool

		Metric
<b>stone</b>		10.889 kg
16	<b>pound</b>	680.594 4 g

For barley, butcher-meat, fish, iron and meal

			Metric
<b>stone</b>			7.940 kg
16	<b>pound</b>		493.516 8 g
256	16	<b>ounce</b>	30.844 8 g

216.38 Shetland

Main sources: [GIFF], [GRAH3], [JAKO], and [MACK]

216.38.1 Units of Length

1 **knuckle** = the length of the second finger from tip to knuckle.

216.38.2 Units of Area

During the fifteenth century

<b>pennyland</b>	
6	<b>mæliscop</b>

During the early nineteenth century

		Metric
<b>last</b>		36,000–145,800 m <sup>2</sup>
18	<b>merk</b>	2000–8100 m <sup>2</sup>

216.38.3 Units of Weight

After 1584 (values below are taken from the proof in the process, at the instance of the Orkney vassals, against the Earl of Morton, in 1759)

					Metric
<b>last or chalder</b>					2131.97 kg
24	<b>meil or meill</b>				88.832 kg
144	6	<b>setteen, leispound, or lyspund</b>			14.805 kg
2160	90	15	<b>pund</b>		987.025 g
3456	144	24	1⅔	<b>mark</b>	616.891 g

During the mid-nineteenth century

		Metric
<b>setteen or lyspund</b>		13.813 kg
24	<b>mark</b>	575.563 kg

Other reported measures:

1 **lispond** (for butter) = 28 lbs = 12.7 kg (according to [GIFF, p. 62]).

216.39 Stirlingshire and Clackman-  
Nanshire

216.39.1 Units of Dry Capacity

In August 1754, with the assistance of Dr John Stewart, professor of Natural Philosophy in Edinburgh, and Mr James Gray of the Iron-Mill, it was stated that the legal standard should be the rule for all sorts of corn. [SWIN2, p. 122]

For meal

			Metric
<b>boll</b>			58.050 kg
8	<b>stone</b>		7.896 kg
128	16	<b>pound</b>	493.516 8 g

For beans, peas, rye and wheat, based on [SWIN2]

					Cubic inches	Metric
<b>boll</b>					9513.168	155.893 L
4	<b>firlot</b>				2378.292	38.973 L
16	4	<b>peck</b>			594.573	9.743 L
64	16	4	<b>forpet</b>		148.643	2.436 L
92	23	5¼	1⅞	<b>pint</b>	103.404	1.694 L

For barley, malt and oats, based on [SWIN2]

					Cubic inches	Metric
<b>boll<sup>a</sup></b>					13,752.732	225.367 L
4	<b>firlot</b>				3438.183	56.342 L
16	4	<b>peck</b>			859.545	14.085 L
64	16	4	<b>forpet</b>		214.886	3.521 L
133	33¼	8⅞	2¾	<b>pint</b>	103.404	1.694 L

<sup>a</sup>At Alloa, in Clackmannanshire, 1 **boll** = 17 peck = 14,612.278 cu in. = 239.452 L

216.39.2 Units of Weight

For bread, dressed lint, dressed wool and groceries

				Metric
<b>hundredweight</b>				50.817 7 kg
8	<b>stone</b>			6.352 2 kg
112	14	<b>pound</b>		453.729 6 g
1792	224	16	<b>ounce</b>	28.358 1 g

For butchers, meat, coal, hay, iron and salmon

		Metric
<b>stone</b>		7.896 3 kg
16	<b>pound</b>	493.516 8 g

For butter, cheese, feathers, rough hides, tallow, and wool<sup>a</sup>

			Metric
<b>stone</b>			9.870 336 kg
16	<b>pound</b>		616.896 g
320	20	<b>ounce</b>	30.844 8 g

<sup>a</sup>Also for butcher, meat at Falkirk

216.40 Sutherlandshire

216.40.1 Units of Dry Capacity

For beans, peas and rye, based on [SWIN2]

					Cubic inches	Metric
<b>boll</b>					10,340.40	169.449 L
4	<b>firlot</b>				2585.10	42.362 L
16	4	<b>peck</b>			646.275	10.590 L
64	16	4	<b>lippe</b>		161.568 7	2.648 L
100	25	6¼	1⅙	<b>pint</b>	103.404	1.694 L

For barley, malt and oats, based on [BREW]

					Cubic inches	Metric
<b>boll</b>					14,076.928	230.679 L
4	<b>firlot</b>				3519.232	57.670 L
16	4	<b>peck</b>			879.808	14.417 L
64	16	4	<b>lippe</b>		219.952	3.604 L
128	32	8	2	<b>pint</b>	109.976	1.802 L

For barley, malt and oats at Dornock, based on [BREW] and [SWIN2]

					Cubic inches	Metric
<b>boll</b>					14,186.876	232.481 L
4	<b>firlot</b>				3546.719	58.120 L
16	4	<b>peck</b>			886.680	14.530 L
64	16	4	<b>lippe</b>		221.670	3.632 L
129	32¼	8⅙	2⅙	<b>pint</b>	109.976	1.802 L

216.40.2 Units of Weight

For English goods and groceries

				Metric
<b>hundredweight</b>				50.817 7 kg
8	<b>stone</b>			6.352 2 kg
112	14	<b>pound</b>		453.729 6 g
1792	224	16	<b>ounce</b>	28.358 1 g

For meal

			Metric
<b>Boll</b>			67.118 kg
8½	<b>stone</b>		7.896 kg
136	16	<b>pound</b>	493.516 8 g

For butter, cheese, tallow and wool

		Metric
<b>stone</b>		10.889 kg
16	<b>pound</b>	680.594 4 g

For other products

			Metric
<b>stone</b>			12.971 kg
21	<b>pound</b>		616.896 g
420	20	<b>ounce</b>	30.844 8 g

216.41 Wigtonshire

216.41.1 Units of Length

1 ell (for woollen cloth) = 40 in. = 1.016 m, but  
commonly 41 in. = 1.041 4 m;  
1 ell (for green linen) = 38 in. = 965.2 mm.

For butter, cheese and wool

		Metric
stone		12.024 kg
26½	pound	453.729 6 g

216.41.2 Units of Dry Capacity

For beans, peas and wheat, based on [SWIN2] and [BREW]

				Cubic inches	Metric	Cubic inches	Metric
boll				17,206.426	281.963 L	17,203.36	281.913 L
16	auchlet stricken			1075.402	17.623 L	1075.21	17.619 L
64	4	forpet		268.850 4	4.406 L	268.802 5	4.405 L
166⅔	10⅔	2⅔	pint	103.404	1.694 L	–	–

For barley, malt and oats, based on [SWIN2] and [BREW]

				Cubic inches	Metric	Cubic inches	Metric
boll				25,809.638	422.944 L	24,605.04	403.204 L
16	auchlet heaped <sup>a</sup>			1613.102	26.434 L	1537.815	25.200 L
64	4	forpet or dish		403.276	6.608 L	384.454	6.300 L
249⅔	15⅔	3⅔ <sub>10</sub>	pint	103.404	1.694 L	–	–

<sup>a</sup>[SWIN2, p. 129] referred to an experiment, which had found the heaped auchlet to contain 15⅔ Stirling pints = 1563.985 5 cu in. = 25.629 L

216.41.3 Units of Weight

For English goods and butcher,meat

				Metric
hundredweight				50.817 7 kg
8	stone			6.352 2 kg
112	14	pound		453.729 6 g
1792	224	16	ounce	28.358 1 g

For meal

			Metric
Boll			126.340 kg
16	stone		7.896 kg
256	16	pound	493.516 8 g

For butter, cheese and wool in Whithorn

		Metric
stone		11.797 kg
26	pound	453.729 6 g

217 Sealand or Principality of Sealand

An unrecognised micronation that is actually a former World War II Maunsell Sea Fort in the North Sea.

217.1 Currency

1972–: 1 Sealand dollar (=1 US dollar) = 100 cents

218 Seleucid Empire (312–63 BCE)

See also *Achaemenid Empire* and *Parthian Empire*.

219 Seljuq Empire

See also *Ottoman Empire*.  
This empire was founded in 1037, and eventually controlled an area stretching from the Hindu Kush to eastern Anatolia and from Central Asia to the Persian Gulf. In 1194, the dynasty was replaced by the Khwarezmian Empire.

219.1 Units of Weight

1 männ = 977 g.

		Metric
ūḳiya or lidre		320.7 g
100	dirhem	3.207 g

220 Sena Empire (1070–1230)

See *India*.

221 Sénégal

The French first settled Senegal in 1626, establishing the town of St. Louis and taking over the Dutch settlement of Gorée. Senegal became a French colony in 1815, a part of French West Africa in 1895, and a French overseas territory in 1946. In 1959, Senegal and French Sudan

established the Mali Federation. Senegal gained its independence in 1960, when the Mali Federation was dissolved. Senegal, in confederation with Gambia, formed the nominal confederation of Senegambia from 1982 until 1989.

The metric system has been official since 1840.

*Main sources:* [FAL], [GOUI], and [MART3]

221.1 Currency

1945–: 1 West African CFA franc = 100 centimes  
1903–1945: 1 French West African franc = 100 centimes  
1895–1903: 1 French franc = 100 centimes  
fourteenth to nine- 1 cypraea shells  
teenth centuries:

221.2 Units of Quantity

1 saam = a bunch or heap.

221.3 Units of Length

French colonial system

		Metric
condée		487.26 mm
18	pouce de Paris	27.07 mm

Other reported measures:

1 metar = 1 m;  
1 yaar = 914.4 mm.

## 221.4 Units of Area

During the nineteenth century, there were not, in general, any land area measures reported. During the early twentieth century, some travellers reported use of the ordinary French arpent carré = 4220.825 m<sup>2</sup>, called a **waar** by the Wolof culture.

## 221.5 Units of Capacity

Both dry commodities and liquids were generally measured by weight before metrification.

Some reported measures:

1 **bórig** = 1 English barrel = about 119 L;

1 **liitar** = 1 L;

1 **ndab** = a small bowl;

1 **pot** = a small cup.

## 221.6 Units of Weight

French colonial system

			Metric
<b>livre</b>			489.505 8 g
16	<b>once</b>		30.593 1 g
128	8	<b>gros</b>	3.824 3 g

For natural rubber

		Metric
<b>bottich</b>		979 kg
5	<b>gamellen</b>	195.8 kg

Metric-linked system

							Metric
<b>barrique<sup>a</sup></b>							250 kg
1 <sup>7</sup> / <sub>18</sub>	<b>barrique<sup>b</sup></b>						180 kg
2 <sup>1</sup> / <sub>2</sub>	1 <sup>4</sup> / <sub>5</sub>	<b>cantaro</b>					100 kg
3 <sup>4</sup> / <sub>7</sub>	2 <sup>4</sup> / <sub>7</sub>	1 <sup>3</sup> / <sub>7</sub>	<b>matar<sup>b</sup></b>				70 kg
142 <sup>6</sup> / <sub>7</sub>	102 <sup>6</sup> / <sub>7</sub>	57 <sup>1</sup> / <sub>7</sub>	40	<b>moule</b>			1.75 kg
250	180	100	70	1 <sup>3</sup> / <sub>4</sub>	<b>kiló</b>		1 kg
500	360	200	140	3 <sup>1</sup> / <sub>2</sub>	2	<b>liibar</b>	500 g

<sup>a</sup>Usually for lime

<sup>b</sup>Usually for rice

For fine use

		Metric
<b>once</b>		20.384 g
16	<b>aki</b>	1.274 g

## 221.7 Units of Time

						Metric
<b>At</b>						1 year
12	<b>weer</b>					1 month
48	4	<b>bés bu ay</b>				1 week
336	28	7	<b>bés</b>			1 day
8064	672	168	24	<b>waxtu</b>		1 h
29,030,400	2,419,200	604,800	86,400	3600	<b>ñaareel</b>	1 s

## 222 Serbia [Part of Former Yugoslavia. Included Two Autonomous Provinces: Socialist Autonomous Province of Kosovo and Socialist Autonomous Province of Vojvodina]

Serbia fell under Ottoman rule in 1459. Slavonia and northern Yugoslavia remained mostly under Hungarian rule, while Montenegro remained independent. The Principality of Serbia, founded in 1815, became the Kingdom of Serbia in 1882. Serbia merged with the other parts of Yugoslavia in 1918 to form the Kingdom of Serbs, Croats and Slovenes. Croatia, Slavonia, and western Banat were annexed from Hungary by the Treaty of Trianon in 1920, and the country was renamed the Kingdom of Yugoslavia in 1929. In 1941, Serbia was separated from Croatia to form a separate state under German occupation. After Yugoslavia was liberated from the Nazis, the country was reconstituted as the Federal People's Republic of Yugoslavia in 1945. Yugoslavia began to break up in 1991. In 2002, Serbia and Montenegro decided to continue as a union and took the name of Serbia and Montenegro. Serbia gained its independence in 2006. In 2008, the autonomous province of Kosovo declared its independence from Serbia.

The metric system has been official since September 29, 1859, and compulsory since 1876.

*Main sources:* [BAUE], [BELD], [INAL2], [MART3], [MEYE2], [NELK2], and [SEEB]

### 222.1 Currency

1994–:	1 new dinar or novi dinar = 100 para
1944–1994:	1 Yugoslav dinar = 100 para
1919–1944:	1 Serbian dinar = 100 para
1918–1919:	1 krone = 100 heller
1866–1918:	1 Serbian dinar = 100 para

### 222.2 Units of Length

During ancient times, the cubit (лакaт) = the distance between the elbow and the top of the extended middle finger, was the most common unit of length.

Old measures used in Serbia until the 1880s:

- 1 **elle** (аршин; Vienna scale; a yardstick usually made of wood or metal) = 777.559 mm;
- 1 **hâlebi**, **pik hâlebi**, or **arschin** = 708.647 mm, 711.25 mm, or 685.8 mm.

## Traditional system

хват	стопа	шака	палац	црта	Metric
<b>hvat<sup>a</sup></b>					1.896 484 m
6	<b>stopa<sup>b</sup></b>				316.081 mm
18	3	<b>waka<sup>c</sup></b>			105.360 mm
72	12	4	<b>palac<sup>d</sup></b>		26.34 mm
864	144	48	12	<b>cрта<sup>e</sup></b>	2.195 mm

<sup>a</sup>A fathom. Also reported as 1 **klafter** (клафтер)<sup>b</sup>A foot<sup>c</sup>A handbreadth<sup>d</sup>A thumb<sup>e</sup>A line

## Metric scale

километар	метар	дециметар	центиметар	милиметар	Metric
<b>kilometar</b>					1000 m
1000	<b>metar</b>				1 m
10,000	10	<b>decimeter</b>			100 mm
100,000	100	10	<b>centimeter</b>		10 mm
1,000,000	1000	100	10	<b>millimeter</b>	1 mm

## 222.3 Units of Area

## Traditional system

ланац	јутро <sup>a</sup>	мотика	квадратни хват	квадратна стопа	Metric
<b>lanac or lanatz</b>					7193.272 781 m <sup>2</sup>
1¼	<b>jitro</b>				5754.618 225 m <sup>2</sup>
10	8	<b>motika<sup>b</sup></b>			719.327 278 m <sup>2</sup>
2000	1600	200	square <b>hvat</b> or square <b>klafter</b>		3.596 636 m <sup>2</sup>
72,000	57,600	7300	36	square <b>stopa</b>	9.990 66 dm <sup>2</sup>

<sup>a</sup>Also reported as катастарско јутро and ланац (in Vojvodina). Sometimes also called **dan oranja** (дан орања), = a day of plowing<sup>b</sup>For vineyards

## Traditional system for cultivated land areas

плут <sup>a</sup>	ралица	дунум	Metric
<b>plig</b>			~4000 m <sup>2</sup>
1⅓	<b>palica</b>		~2500 m <sup>2</sup>
4	2½	<b>dunum</b>	~1000 m <sup>2</sup>

<sup>a</sup>A day's ploughing

## In Belgrade

ланац	мотика	квадратни хват	Metric
<b>lanac or lanatz</b>			5754.643 1 m <sup>2</sup>
8	<b>motika</b>		719.330 4 m <sup>2</sup>
1600	200	<b>dan oranja</b> , square <b>hvat</b> , or square <b>klafter</b>	3.596 652 m <sup>2</sup>

## 222.4 Units of Volume

For a ship's internal volume during the nineteenth to twentieth centuries

бруто регистарска тона	енглеској кубних стопа	Metric
gross register <b>tona</b>		2.831 685 m <sup>3</sup>
100	English cubic foot	28.316 847 dm <sup>3</sup>

## 222.5 Units of Dry Capacity

Dry commodities were sold by weight. The price was usually set for 100 okas.

## 222.6 Units of Liquid Capacity

Most liquid commodities were sold by weight.

Values in 1828, based on [MART3] and as reported by [NELK2, p. 52]

	ока			Metric	Metric
<b>товар</b>				176.840 6 L	175.9 L
100	<b>ока</b>			1.768 406 L	1.759 L
400	4	<b>litra</b>		442.210 mL	439.75 mL
40,000	400	100	<b>dram</b>	4.421 mL	4.40 mL

For brandy and general use

		Metric	Metric
<b>Eimer</b>		54.137 1 L	53.348 8 L
64	<b>Halbe</b>	845.892 mL	833.575 mL

Metric scale

хектолитара	литара	децилитара	центилитара	милилитара	Metric
<b>hektolitara</b>					100 L
100	<b>litara</b>				1 L
1000	10	<b>desilitara</b>			100 mL
10,000	100	10	<b>sentilitara</b>		10 mL
100,000	1000	100	10	<b>mililitara</b>	1 mL

## 222.7 Units of Weight

For charcoal at Kratovo during the fourteenth century

						Metric
<b>himl or kabal</b>						65.664 kg
2	<b>polovač</b>					32.832 kg
4	2	<b>četvirnik</b>				16.416 kg
16	8	4	<b>kapa</b>			4.104 kg
128	64	32	8	<b>kutla</b>		513 g
20,480	10,240	5120	1280	160	<b>dirhem</b>	3.2 g

For charcoal at Novo Brdo during the fourteenth century, according to [INAL2, p. 444] and [BELD, p. 304]

			Metric	Metric
<b>ših̃ta, ših̃sa, or ših̃se</b>			1313.280 kg	2052.48 kg
120	<b>verk̃če</b>		10.944 kg	17.104 kg
600	5	<b>ilrvlagi</b>	2.188 8 kg	3.420 8 kg

Two reported traditional systems during the nineteenth century and Wiener scale during the late nineteenth century

				Metric	Metric	Metric
<b>tovar</b>				128.103 6 kg	127.848 kg	126.002 7 kg
100	<b>oca or okka</b>			1.281 036 kg	1 278.48 kg	1.260 027 kg
400	4	<b>litra</b>		320.259 g	319.620 g	315.007 g
40,000	400	100	<b>dirhem</b>	3.202 59 g	3.196 20 g	3.150 07 g
840,000	6400	1600	16	<b>chirat</b>	200.161 mg	199.762 mg

Metric scale

				Metric
<b>тона</b>				1000 kg
1000	<b>килограм</b>			1 kg
1,000,000	1000	<b>грам</b>		1 g
1,000,000,000	1,000,000	1000	<b>милиграм</b>	1 mg

## 223 Serendib

See *Sri Lanka*.

the Seychelles broke from Mauritius. The Seychelles gained their independence in 1976.

The metric system has been official since 1876, and optional since 1880.

*Main sources:* [ECON], [PRIE], [UN55], and [UN66]

## 224 Seychelles

An expedition of the British East India Company made a landing on the Seychelles in 1609. The islands were first claimed for France by Captain Lazare Picault in 1743, again by Captain Nicholas Morphey in 1756, and they were permanently settled in 1768. The islands were captured by the British in 1810, and became a part of the colony of Mauritius in 1814. The Seychelles became a British Crown Colony in 1903, when

### 224.1 Currency

1914–:	1 Seychellois rroupi or rupee = 100 cents
1877–1914:	1 Mauritan rupee = 100 cents
1822–1877:	1 Mauritan dollar = 100 cents
1814–1877:	1 pound Sterling = 20 shillings = 240 pence

### 224.2 Units of Length

British Imperial-linked upper scale

				Metric
<b>perche</b>				6.496 8 m
2	<b>gaulette<sup>a</sup></b>			3.248 4 m
3 <sup>1</sup> / <sub>3</sub>	1 <sup>2</sup> / <sub>3</sub>	<b>brasse or toise<sup>b</sup></b>		1.949 m
5 <sup>1</sup> / <sub>3</sub>	2 <sup>2</sup> / <sub>3</sub>	1 <sup>2</sup> / <sub>5</sub>	<b>ell<sup>c</sup></b> (= 4 ft)	1.219 m

<sup>a</sup>Field measure. Also reported as 4.57 m

<sup>b</sup>For masonry

<sup>c</sup>For fabric; old elle = 3<sup>3</sup>/<sub>4</sub> ft

British Imperial-linked lower scale

					Metric
<b>ell</b> <sup>a</sup> (= 4 ft)					1.219 m
1 <sup>1</sup> / <sub>44</sub>	<b>aune</b> <sup>a</sup>				1.191 077 m
3 <sup>3</sup> / <sub>4</sub>	3 <sup>3</sup> / <sub>3</sub>	<b>pied</b>			324.839 mm
45	44	12	<b>pouce</b>		27.070 mm
540	528	144	12	<b>ligne</b>	2.255 8 mm

<sup>a</sup>For fabric

Other measures reported during the twentieth century:

1 **lieue** = 3 mi = 4828.244 7 m.

224.3 Units of Area

			Metric
<b>arpent</b>			4220.815 m <sup>2</sup>
1111	<b>toise</b> <sup>2</sup>		3.799 11 m <sup>2</sup>
40,000	–	<b>pied</b> <sup>2</sup>	10.552 dm <sup>2</sup>

224.4 Units of Volume

British Imperial-linked scale

		Imperial	Metric
<b>corde</b>		159 ft <sup>3</sup>	4.47 m <sup>3</sup>
4	<b>toise</b>	39 <sup>3</sup> / <sub>4</sub> ft <sup>3</sup>	1.12 m <sup>3</sup>

224.5 Units of Capacity

Traditional and metric-linked system

		Metric	Metric
<b>bouteille</b>		680 mL	800 mL
2	<b>chopine</b>	340 mL	400 mL

Traditional system

		Metric
<b>quart de bouteille</b>		757.2 mL
2	<b>pinte</b>	378.6 mL

British colonial system

			Metric
<b>cash</b>			223.515 L
30	<b>velte</b>		7.450 5 L
240	8	<b>pinte</b>	931.3 L

Other measures reported during the twentieth century:

1 **toque** = 22 L;

1 **barrique** (for beer) = 163.5 645 L;

1 **muid** = 268.2 L.

224.6 Units of Weight

Traditional system

						Metric
<b>livre</b>						489.508 g
2	<b>demi-livre</b> <sup>a</sup>					244.754 g
8	4	<b>huitième</b> <sup>a</sup>				61.188 g
16	8	2	<b>once</b>			30.594 g
128	64	16	8	<b>gros</b>		3.824 g
9216	4608	1152	576	72	<b>grain</b>	53.115 mg

<sup>a</sup>For sugar

Metric-linked system

		Metric
<b>livre</b>		500 g
16	<b>once</b>	31.25 g

225 Sharjah

See *United Arab Emirates*.

The Al Qasimi clan established itself in Sharjah c. 1727, declaring Sharjah independent. Sharjah was an important pirate base in the eighteenth and early nineteenth centuries. In 1820, Sheikh Sultan I signed the General Maritime Treaty with Britain, accepting a protectorate to keep the Ottoman Turks out. In 1971, Sheikh Khalid III joined the United Arab Emirates.

**226 Siam**

*Main sources:* [FERR], [GALT], [ITAL], and [MART3]

See *Thailand*.

**227 Sicily**

See also *Italy* and *Two Sicilies*.

The Kingdom of Sicily existed between 1130 and 1816, when it merged with the Kingdom of Naples into the Kingdom of the Two Sicilies.

Almost every town in Sicily had a different weight and measure before 1809. On December 31, 1809, a decree ordered that from January 1, 1811, there should be a uniformity of weights and measures throughout the island. The metric system became legally adopted in 1861.

**227.1 Currency**

1816–1861: 1 Sardinian lira = 100 centesimi  
 1815–1860: 1 Two Sicilies piastra = 120 grani = 240 tomes; 1 ducato = 100 grani  
 –1815: 1 Sicilian piastra = 12 tari = 240 grani = 1440 piccoli; 1 onza = 30 tari

**227.2 Units of Length**

Legal scale between 1809 and 1861

										Metric
<b>miglio</b>										1486.643 328 m
45	<b>corda</b>									33.036 518 m
180	4	<b>catene</b>								8.259 130 m
720	16	4	<b>canna</b>							2.064 782 m
1440	32	8	2	<b>mezza canna</b>						1.032 391 m
2880	64	16	4	2	<b>passetto</b>					516.196 mm
5760	128	32	8	4	2	<b>palmο or palmο legale</b>				258.098 mm
69,120	1536	384	96	48	24	12	<b>oncia</b>			21.508 mm
829,440	18,432	4608	1152	576	288	144	12	<b>linea</b>		1.792 mm
9,953,280	221,184	55,296	13,824	6912	3456	1728	144	12	<b>punto</b>	149.4 μm

**227.3 Units of Area**

At Agrigento; at Castrolifippo (two reported systems); at Enna; at Ribera

						Metric	Metric	Metric	Metric	Metric
<b>salma</b>						39,108.310 0 m <sup>2</sup>	51,888 m <sup>2</sup>	37,786.24 m <sup>2</sup>	35,424 m <sup>2</sup>	33,152 m <sup>2</sup>
16	<b>tomolo</b>					2444.269 4 m <sup>2</sup>	3243 m <sup>2</sup>	2361.64 m <sup>2</sup>	2214 m <sup>2</sup>	2072 m <sup>2</sup>
64	4	<b>mondello</b>				611.067 3 m <sup>2</sup>	810.7 m <sup>2</sup>	590.41 m <sup>2</sup>	553.5 m <sup>2</sup>	518 m <sup>2</sup>
256	16	4	<b>carozzo</b>			152.766 8 m <sup>2</sup>	202.7 m <sup>2</sup>	147.60 m <sup>2</sup>	138.4 m <sup>2</sup>	129.5 m <sup>2</sup>
1024	64	16	4	<b>quarto</b>		38.191 7 m <sup>2</sup>	50.7 m <sup>2</sup>	36.90 m <sup>2</sup>	34.6 m <sup>2</sup>	32.4 m <sup>2</sup>
4096	256	64	16	4	<b>quartiglio</b>	9.547 9 m <sup>2</sup>	12.7 m <sup>2</sup>	9.22 m <sup>2</sup>	8.6 m <sup>2</sup>	8.1 m <sup>2</sup>

In Caltanissetta (two reported systems)

						Metric	Metric
<b>salma</b>						37,786.24 m <sup>2</sup>	43,399.68 m <sup>2</sup>
16	<b>tummino</b>					2361.64 m <sup>2</sup>	2712.48 m <sup>2</sup>
64	4	<b>mondello</b>				590.41 m <sup>2</sup>	678.12 m <sup>2</sup>
256	16	4	<b>carozzo</b>			147.60 m <sup>2</sup>	169.53 m <sup>2</sup>
1024	64	16	4	<b>quarto</b>		36.90 m <sup>2</sup>	42.38 m <sup>2</sup>
4096	256	64	16	4	<b>quartiglio</b>	9.22 m <sup>2</sup>	10.60 m <sup>2</sup>

In Catania, Enna and Messina before 1809 and after 1809

						Metric	Metric	Metric	Metric
<b>salma</b>						34,297.430 m <sup>2</sup>	34,828.16 m <sup>2</sup>	22,650.160 m <sup>2</sup>	17,896.420 m <sup>2</sup>
16	<b>tomolo</b>					2143.589 4 m <sup>2</sup>	2176.76 m <sup>2</sup>	1415.635 m <sup>2</sup>	1118.526 m <sup>2</sup>
64	4	<b>mondello</b>				535.897 3 m <sup>2</sup>	544.19 m <sup>2</sup>	353.908 7 m <sup>2</sup>	279.631 6 m <sup>2</sup>
256	16	4	<b>carozzo</b>			133.974 3 m <sup>2</sup>	136.047 m <sup>2</sup>	88.477 2 m <sup>2</sup>	69.907 9 m <sup>2</sup>
1024	64	16	4	<b>quarto</b>		33.493 6 m <sup>2</sup>	34.012 m <sup>2</sup>	22.119 3 m <sup>2</sup>	17.477 0 m <sup>2</sup>
4096	256	64	16	4	<b>quartiglio</b>	8.373 4 m <sup>2</sup>	8.503 m <sup>2</sup>	5.529 8 m <sup>2</sup>	4.369 2 m <sup>2</sup>

At Catania

		Metric
<b>salma (piccolo)</b>		17,148.715 m <sup>2</sup>
16	<b>tomolo</b>	1 071.794 7 m <sup>2</sup>

At Trapani

				Metric
<b>salma</b>				33,492.96 m <sup>2</sup>
16	<b>tomolo</b>			2093.31 m <sup>2</sup>
96	6	<b>mondello</b>		348.88 m <sup>2</sup>
2304	144	24	<b>quartiglio</b>	14.54 m <sup>2</sup>

At Palermo (...“di consuetudinario”) before 1809; at Dubrovnic and Syracuse

							Metric	Metric
salma							22,310.910 0 m <sup>2</sup>	27,907.2 m <sup>2</sup>
4	bisaccia or bisacce						5577.727 5 m <sup>2</sup>	6976.8 m <sup>2</sup>
16	4	tomolo or tumolo					1394.431 9 m <sup>2</sup>	1744.2 m <sup>2</sup>
64	16	4	mondello				348.608 0 m <sup>2</sup>	436.05 m <sup>2</sup>
256	64	16	4	carozzo			87.151 992 m <sup>2</sup>	109.01 m <sup>2</sup>
1024	256	64	16	4	quarto		21.797 998 m <sup>2</sup>	27.25 m <sup>2</sup>
4096	1024	256	64	16	4	quartiglio	5.447 000 m <sup>2</sup>	6.81 m <sup>2</sup>

General scale (“legale” ...) after 1809

							corda <sup>2</sup>	Metric
<b>miglio quadre</b>							2025	2,210,108.384 7 m <sup>2</sup>
–	<b>salma legale</b>						16	17,462.579 2 m <sup>2</sup>
–	4	<b>bisaccia or bisacce</b>					4	4365.644 8 m <sup>2</sup>
2025	16	4	<b>tomolo or tumolo</b>				1	1091.411 1 m <sup>2</sup>
8100	64	16	4	<b>mondello</b>			¼	272.852 8 m <sup>2</sup>
32,400	256	64	16	4	<b>carozzo</b>		1/16	68.213 195 m <sup>2</sup>
518,400	4096	1024	256	64	16	<b>quartiglio</b>	1/256	4.263 325 m <sup>2</sup>

## 227.4 Units of Dry Capacity

For grain during the fourteenth to eighteenth century

		Metric
<b>salma generale<sup>a</sup></b>		~245 L
16	<b>tomolo</b>	~15.3 L

<sup>a</sup>The burden for a mule to carry in a mountainous country. There was also a **salma piccolo** (during the fourteenth to fifteenth centuries) of unknown size

In Augusta, Bendichar, Bronchola, Catania, Falchioniera, Gazi, Gela, Messina, Pozzallo, Sargossa, and Thaberina during the fifteenth century

		Metric
<b>salma grossa</b>		~295 L
16	<b>tomolo grossa</b>	~18.4 L

In Catania during the late nineteenth century

				Metric
<b>salma<sup>a</sup></b>				386.843 737 L
–	<b>salma<sup>b</sup></b>			365.352 419 L
–	–	<b>salma<sup>c</sup></b>		343.861 100 L
22½	21¼	20	<b>tomolo raso</b>	17.193 055 L

<sup>a</sup>For canary seed, mustard seed, hemp seed, pistachios, noisettes, walnuts, almonds, and beans

<sup>b</sup>For beans and chickpeas

<sup>c</sup>For barley and wheat

For grains after 1809

								Metric
<b>salma</b>								275.088 844 L
4	<b>bisaccia</b>							68.772 211 L
8	2	<b>barile</b>						34.386 105 L
16	4	2	<b>tumolo legale or quartaro</b>					17.193 053 L
64	16	8	4	<b>mondello</b>				4.298 263 L
256	64	32	16	4	<b>carozzo</b>			1.074 566 L
1024	256	128	64	16	4	<b>quarto</b>		268.641 mL
4096	1024	256	128	64	16	4	<b>quartiglio</b>	67.160 mL

For barley and vegetables at Agrigento after 1809

		Metric
<b>salma</b>		343.861 100 L
20	<b>tomolo</b>	17.193 055 L

For charcoal in Messina after 1809

		Metric
<b>salma</b>		343.861 100 L
20	<b>tomolo</b>	17.193 055 L

Other reported measures in Palermo:

- 1 **salma** (for salt) = 36 tomoli = 618.949 899 L;
- 1 **salma** (for lime) = 24 tomoli = 412.633 266 L;
- 1 **salma** (for barley, dried fruits and legumes) = 20 tomoli = 343.861 055 L;
- 1 **salma** (for linseed) = 18 tomoli = 309.474 950 L;
- 1 **salma** (for gypsum, wheat and coal) = 16 tomoli = 275.088 844 L.

227.5 Units of Liquid Capacity

For wine at Agrigento after 1809, based on [MART3]

			Metric
<b>botte</b>			550.177 700 L
64	<b>lancella</b>		8.596 527 L
640	10	<b>quartuccio</b>	859.653 mL

In Calabria during the early nineteenth century

		Metric
<b>salma</b>		304.69 L
300	<b>pignatolo</b>	1.016 L

In Castiglione di Sicilia during the early nineteenth century

			Metric
<b>salma</b>			92.209 L
8	<b>quartaro</b>		11.526 L
160	20	<b>quartuccio</b>	576.306 mL

In Catania during the late nineteenth century

				Metric
<b>salma</b> <sup>a</sup>				85.965 265 L
1¼	<b>salma</b> <sup>b</sup>			68.772 212 L
10	8	<b>quartara</b>		8.596 526 5 L
100	80	10	<b>quartuccio (legale)</b>	859.652 65 mL

<sup>a</sup>For must  
<sup>b</sup>For wine

For oil in Catania

		Metric	Metric
<b>cafiso</b>		17.193 053 L	15.868 kg
20	<b>rotolo</b>	859.652 65 mL	793.5 g

For must in Fiumefreddo di Sicilia during the early nineteenth century

<b>salma</b>			
10		<b>quartaro</b>	
101¼		10⅞	<b>quartuccio</b>

For wine in Fiumefreddo di Sicilia during the early nineteenth century

<b>salma</b>		
2⅞	<b>baril</b>	
8½	4	<b>quartaro</b>

In Marsala, based on [MART3]

				Metric
<b>botte<sup>a</sup></b>				464.212 500 L
1⅞	<b>botte<sup>b</sup></b>			412.633 333 L
18	16	<b>barile</b>		25.789 583 L
540	480	30	<b>quartuccio</b>	859.653 mL

<sup>a</sup>For must

<sup>b</sup>For wine

For oil in Marsala, based on [MART3]

		Metric	Metric
<b>cafiso</b>		8.596 527 L	7.934 000 kg
10	<b>rotol</b>	859.653 mL	793.400 g

For must in Messina, based on [MART3]

					Metric
<b>botte</b>					513.275 500 L
6	<b>salma</b>				85.545 917 L
12	2	<b>barile</b>			42.772 958 L
48	8	4	<b>quartara</b>		10.693 240 L
816	136	68	17	<b>quartuccio</b>	629.014 mL

For wine in Messina, based on [MART3]

					Metric
<b>botte</b>					483.082 900 L
6	<b>salma</b>				80.513 817 L
12	2	<b>barile</b>			40.256 908 L
48	8	4	<b>quartara</b>		10.064 227 L
768	128	64	16	<b>quartuccio</b>	629.014 mL

For oil in Messina, based on [MART3]

		Metric	Metric
<b>cafiso</b>		11.820 224 L	10.910 000 kg
96	<b>misura</b>	123.127 mL	113.646 g

For wine in Palermo before 1809

			Metric
<b>botte</b>			412.633 266 L
12	<b>barile</b>		34.386 105 L
480	40	<b>quartuccio</b>	859.653 mL

Legal scale after 1809

							Metric
<b>botte or butt</b>							1100.355 376 L
4	<b>salma</b>						275.088 844 L
32	8	<b>barile</b>					34.386 106 L
64	16	2	<b>quartara</b>				17.193 053 L
1280	320	40	20	<b>quartuccio</b>			859.653 mL
2560	640	80	40	2	<b>caraffa</b>		429.826 mL
5120	1280	160	80	4	2	<b>bicchiere</b>	214.913 mL

Other reported measures:

1 **cafiso** (for oil at Agrigento after 1809, based on [MART3]) = 8.596 527 L or 10 rotoli = 7.934 kg.

## 227.6 Units of Weight

In Catania

			Metric
<b>cantaro</b>			79.342 kg
100	<b>rotolo</b>		793.420 g
3000	30	<b>oncia</b>	26.447 g

Upper scale in Palermo and Messina before 1809

						Metric
<b>quintale grosso</b>						87.276 200 kg
$1\frac{1}{10}$	<b>quintale sottile</b>					79.342 000 kg
100	$90\frac{9}{11}$	<b>rotolo grosso</b>				872.762 g
110	100	$1\frac{1}{10}$	<b>rotolo</b>			793.420 g
275	250	$2\frac{3}{4}$	$2\frac{1}{2}$	<b>libbra</b>		317.368 g
3300	3000	33	30	12	<b>oncia sottile</b>	26.447 g

Lower scale in Palermo and Messina before 1809

						Metric
<b>oncia sottile</b>						26.447 g
4	<b>quarta</b>					6.615 g
24	6	<b>scrupulo</b>				1.102 5 g
30	$7\frac{1}{2}$	$1\frac{1}{4}$	<b>trappeso</b>			882 mg
480	120	20	16	<b>coccio or grano</b>		55.125 mg
3840	960	160	128	8	<b>dramma</b>	6.891 mg

After 1809

								Metric
<b>cantar or quintale</b>								79.342 000 kg
100	<b>rotolo<sup>a</sup></b>							793.420 g
3000	30	<b>uncia</b>						26.447 g
12,000	120	4	<b>quarta</b>					6.612 g
24,000	240	8	2	<b>dramma</b>				3.306 g
72,000	720	24	6	3	<b>danaro or scruple</b>			1.102 g
1,440,000	14,400	480	120	60	20	<b>coccio or grano</b>		55 mg
11,520,000	115,200	3840	960	480	160	8	<b>ottavo or octave</b>	7 mg

<sup>a</sup>The weight of a quartuccio of clear olive oil at a temperature of 64 °F = about 17.77 °C

For oil in Palermo after 1809

						Metric
<b>botte</b>						1015.577 600 kg
4	<b>salma</b>					253.894 400 kg
32	8	<b>barile</b>				31.736 800 kg
64	16	2	<b>quartara</b>			15.868 400 kg
1280	320	40	20	<b>rotolo</b>		793.420 g

For medical use in Palermo

						Metric
<b>libbra</b>						317.368 000 g
12	<b>uncia</b>					26.447 333 g
96	8	<b>dramma</b>				3.305 917 g
288	24	3	<b>scrupolo</b>			1.101 972 g
5760	480	60	20	<b>grano</b>		55.099 mg
46,080	3840	480	160	8	<b>ottavo</b>	6.887 mg

For gold and silver in Messina

					Metric
<b>libbra</b>					320.759 000 g
12	<b>uncia</b>				26.729 917 g
360	30	<b>trappeso</b>			890.997 mg
7200	600	20	<b>coccio</b>		44.550 mg

For gold and silver in Palermo

						Metric
<b>libbra</b>						317.368 000 g
12	<b>uncia</b>					26.447 333 g
288	24	<b>scrupolo</b>				1.101 972 g
360	30	1¼	<b>trappeso</b>			881.578 mg
5760	480	20	16	<b>coccio</b>		55.099 mg
46,080	3840	160	128	8	<b>ottavo</b>	6.887 mg

In Dubrovnic

				Metric
<b>oka</b>				1.303 001 3 kg
3½	<b>libbra</b>			372.286 g
42	12	<b>oncia</b>		31.024 g
420	120	10	<b>dramma</b>	3.102 4 g

Other measures reported during the early nineteenth century:

- 1 **cafiso** (for oil in Palermo) = 20.047 kg;
- 1 **cafiso** (for oil in Syracuse) = 11.126 kg;
- 1 **lancedda** (in San Fratello, according to [KENN, p. 127]) = 5 rotoli = 3.97 kg.

228 Sierra Leone

During the early fifteenth century, Portuguese sailors began to visit the area. The British established their first settlements at Freetown in 1787. In 1808, the coast of the country became a British protectorate, and in 1896, the entire area became a British colony. Sierra Leone gained its independence in 1961.

*Main sources:* [FENN], [GERA], [GODD], [MART3], and [UN66]

228.1 Currency

- 1964–: 1 Sierra Leonean leone = 100 cents
- 1913–1964: 1 West African pound = 20 shillings = 240 pence
- 1796–1915: 1 pound sterling = 20 shillings = 20 pence = 960 farthings
- 1791–1796: 1 dollar = 10 macutas = 100 cents
- 1791: 1 macuta = 2000 cowries or zembis 1 barren

228.2 Units of Length

British Imperial-linked system

			Metric
<b>jackutan</b>			3.657 6 m
6⅓	<b>covid</b>		577.5 mm
12	1⅞	<b>foot</b>	304.8 mm

228.3 Units of Area

1 town lot = 3760 ft² = 348.39 m².

228.4 Units of Dry Capacity

British-linked system before 1826

		Metric
<b>bushel</b>		36.369 L
8	<b>gallon</b>	4.546 L

Metric-linked system after 1826

		Metric
<b>bag</b>		80 L
2	<b>bushel</b>	40 L

For grain

		Metric
<b>kettle</b>		9.990 L
30	<b>cup</b>	0.333 L

Other reported measures:

- 1 **cup** (for rice) = the heaped content of a “Capstan,” “Churchman’s No. 1” or other Virginian cigarette tin.

228.5 Units of Weight

British-linked system

		Metric
<b>Pound</b>		453.6 g
16	<b>ounce</b>	28.35 g

Other reported measures:

- 1 **bag** or **chest** (for cocoa) = 140 lbs = 63.503 kg;
- 1 **bushel** = 84 lbs (for milled rice) = 38.10 kg,  
and =60 lbs (for rough rice) = 27.21 kg;
- 1 **load** (for cocoa) = 60 lbs = 27.21 kg.

229 Silesia

See also *Austrian-Silesia*, *Bohemia*, *Czech Republic*, and *Moravia*.

This area became part of Great Moravia during the late ninth century and part of Bohemia in the early tenth century. In 990, the area was incorporated into Poland. From the twelfth century to the fourteenth century, Silesia was broke into independent Silesian Piasts Duchies of Silesia, and

from 1335 to 1526, as Duchies of Silesia within the Bohemian Crown. In 1526, Silesia, still within the Bohemian Crown, became part of the Habsburg Monarchy. Most of Silesia was conquered by Prussia in 1742. In 1918, after World War I, the easternmost part of the area was awarded to Poland. In 1945, after World War II, the bulk of Silesia became a part of Poland. Today, smaller areas in the former Silesia belong to the Czech Republic, and the area around Görlitz is part of Germany.

229.1 Currency

–1744: 1 Poltura = 1½ Kreuzer = 2  
Gröschel = 2½ Denare = 6 Pfennige

Main source: [ROTT2]

229.2 Units of Length

Traditional system

				Metric
<b>pręt</b> or <b>Rute</b>				4.319 m
7½	<b>łokieć</b> or <b>Elle</b>			575.87 mm
14	2	<b>stopa</b> or <b>Fuß</b>		287.93 mm
168	24	12	<b>cal</b> or <b>Zoll</b>	23.99 mm

Austrian scale during the late nineteenth century

				Metric
<b>Meile</b>				7050 m
30	<b>Gewende</b>			235 m
1500	50	<b>Rute</b>		4.7 m
22,500	750	15	<b>Fuß</b>	313.33 mm

Special dimensions for cloth at Eger

		Metric
<b>Stück</b>		53.343 947 m
90	<b>Elle</b>	592.710 53 mm

For surveying in Breslau, present-day Wrocław in Poland

		Metric
<b>Ruthe</b>		4.319 349 m
15	<b>Fuss</b>	287.956 6 mm

For linen yarn in Breslau, present-day Wrocław in Poland

									Metric
<b>Stück</b>									5530.713 6 m
4	<b>Strenne</b>								1382.678 4 m
12	3	<b>Zaspel</b>							460.892 800 m
240	60	20	<b>Gewind</b>						23.044 640 m
2400	600	200	10	<b>Faden</b>					2.304 464 m
9600	2400	800	40	4	<b>Elle</b>				576.116 mm
19,200	4800	1600	80	8	2	<b>Fuss</b>			288.058 mm
230,400	57,600	19,200	960	96	24	12	<b>Zoll</b>		24.005 mm
2,764,800	691,200	230,400	11,520	1152	288	144	12	<b>Linie</b>	2.000 4 mm

For wire in Breslau, present-day Wrocław in Poland

								Metric
<b>Schoch</b>								663,685.632 m
60	<b>Stück</b>							11,061.427 200 m
240	4	<b>Strähn</b>						2765.356 800 m
720	12	3	<b>Zaspel</b>					921.785 600 mm
14,400	240	600	20	<b>Gebinde</b>				46.089 280 mm
288,000	4800	1200	400	20	<b>Faden</b>			2.304 464 mm

For tissue in Breslau, present-day Wrocław in Poland

					Metric
<b>Ganzes Stück</b>					34.566 96 m
1 $\frac{1}{2}$	<b>Stück</b> (long)				28.805 80 m
1 $\frac{1}{2}$	1 $\frac{1}{4}$	<b>Stück</b> (ordinary)			23.044 64 m
60	50	40	<b>Elle</b>		576.116 mm

For cloth in Breslau, present-day Wrocław in Poland

				Metric
<b>Saum</b>				405.585 66 m
2 $\frac{1}{2}$	<b>Ballen</b>			184.357 12 m
22	10	<b>Stück</b>		18.435 712 m
704	320	32	<b>Elle</b>	576.116 mm

### 229.3 Units of Area

			Metric
<b>włóka</b>			167,883.85 m <sup>2</sup>
30	<b>morga śląska</b>		5596.13 m <sup>2</sup>
9000	300	<b>kwadratowy przęt wrocławski</b>	18.654 m <sup>2</sup>

Traditional system

			Metric
<b>kleine Hufe</b>			14.1 ha
12	<b>Geviertrute</b>		1.175 ha
30	2½	<b>schlesischer Morgen</b>	0.47 ha

Flemish scale

			Metric
<b>kleine flämische Hufe</b>			16.8 ha
12	<b>Rute</b>		1.4 ha
30	2½	<b>flämische Morgen</b>	0.56 ha

Franconian scale

			Metric
<b>große Hufe or Waldhufe</b>			24.2 ha
12	<b>Rute</b>		2.02 ha
30	2½	<b>fränkische Morgen</b>	0.807 ha

## 229.4 Units of Dry Capacity

Traditional values and metric-linked values

						Metric	Metric
<b>Malter or malder</b>						898.56 L	888 L
4	<b>Viertel</b>					224.64 L	222 L
12	3	<b>Scheffel or korzec</b>				74.88 L	74 L
16	4	1⅓	<b>Metzen</b>			56.16 L	55.5 L
64	16	5⅓	4	<b>Maaschen</b>		14.04 L	13.875 L
192	48	16	12	3	<b>garniec</b>	4.68 L	4.625 L

					Metric
<b>Scheffel</b>					76.382 L
4	<b>Viertel</b>				19.095 5 L
16	4	<b>Metzen</b>			4.773 9 L
64	16	4	<b>Maassel</b>		1.193 5 L

In Breslau, present-day Wrocław in Poland

					Metric
<b>Malter</b>					838.840 920 L
12	<b>Scheffel</b>				69.903 410 L
48	4	<b>Viertel</b>			17.475 852 L
192	16	4	<b>Metze</b>		4.368 963 L
768	64	16	4	<b>Maassel</b>	1,092 241 L

For grain during the late nineteenth century

					Metric
<b>Malter</b>					660 L
12	<b>Scheffel</b>				55 L
36	3	<b>Mud</b>			18.3 L
48	4	1½	<b>Viertel</b>		13.75 L
144	12	4	3	<b>Metze</b>	4.583 L

**229.5 Units of Liquid Capacity**

						Metric
<b>Eimer</b>						1112 L
20	<b>Topf or wiadro</b>					55.6 L
80	4	<b>Quart</b>				13.9 L
320	16	4	<b>Quartiere</b>			3.475 L
400	20	5	1¼	<b>garniec</b>		2.78 L
1600	80	20	5	4	<b>kwarta</b>	695 mL

			Metric
<b>Eimer</b>			56.152 L
80	<b>Quart</b>		701.90 mL
320	4	<b>Quartier</b>	175.47 mL

**229.6 Units of Weight**

			Metric
<b>cetnar</b>			53.49 kg
5½	<b>kamień</b>		9.725 kg
132	24	<b>funt</b>	405 g

After 1756

		Metric
<b>Pfund</b>		529.840 g
32	<b>Lot</b>	16.557 5 g

**230 Singapore**

See also *Malaysia* and *Straits Settlements*.

Purchased from the Sultan of Johore, Singapore was settled for the British East India Company by the British administrator Sir Thomas Stamford Raffles in 1819. Singapore became part

of the Straits Settlements in 1826. The Straits Settlements were ruled by the British East India Company from 1826 to 1858, and by British India from 1858 to 1867, when it became a crown colony. Singapore became a separate crown colony in 1946, and became the State of Singapore in 1959. Briefly independent in 1963 before joining the Malaysian federation, Singapore did not become an independent state until 1965.

Not much is known about the weights and measures used before the arrival of the British East Indian Company during the early nineteenth century. Some Chinese, Indian and Malayan measures were in use until the mid-nineteenth century, when British Imperial-linked commercial systems were in regular use. The metric system has been official since 1968, and compulsory since 1970.

*Main sources:* [ECON], [MART3], [REIT], and [UN66]

**230.1 Currency**

- 1967–: 1 Singaporean dollar = 100 cents  
1939–1967: 1 Malayan dollar = 100 cents

1904–1939: 1 Straits dollar = 100 cents

1867–1904: 1 Spanish dollar = 8 reales

1837–1867: 1 Indian rupee = 16 anna

## 230.2 Units of Quantity

1 **corge** (for tobacco from Java) = 40 baskets;

1 **kodi** = 20 kaya (pieces).

## 230.3 Units of Length

Chinese-linked system

			Metric
<b>cheung</b>			3.746 5 m
10	<b>chhek</b> or <b>check</b>		374.65 mm
100	10	<b>chhun</b> or <b>chum</b>	37.465 mm

British Imperial-linked system

						Imperial	Metric
<b>orlong</b>						80 yd	73.151 343 m
20	<b>jěmba</b> or <b>giumba</b>					4 yd	3.657 567 m
40	2	<b>depa</b> or <b>vadem</b>				2 yd	1.828 784 m
80	4	2	<b>yard</b> or <b>ela</b>			1 yd	0.914 392 m
160	8	4	2	<b>astah, hesta,</b> or <b>covid</b>		18 in	457.196 mm
320	16	8	4	2	<b>jengkal</b>	9 in	228.598 mm

British Imperial-linked system for surveying

		Imperial	Metric
<b>depa</b> or <b>vadem</b>		2 yd	1.828 8 m
6	<b>kaki</b>	1 ft	304.8 mm

## 230.4 Units of Area

System based on [MART3]

					Metric
<b>orlong</b>					5351.190 m <sup>2</sup>
400	<b>giumba, jěmba, or jumba</b>				13.378 m <sup>2</sup>
1600	4	<b>depa</b>			3.344 m <sup>2</sup>
6400	16	4	<b>ela</b>		83.612 dm <sup>2</sup>
25,600	64	16	4	<b>covid</b>	20.903 dm <sup>2</sup>

## British Imperial-linked system

							Imperial	Metric
<b>orlong</b>							57,600 ft <sup>2</sup>	5351.121 470 m <sup>2</sup>
4	<b>penjuru</b>						1600 yd <sup>2</sup>	1337.780 367 m <sup>2</sup>
24	6	<b>lelong</b>					2400 ft <sup>2</sup>	222.963 396 m <sup>2</sup>
400	100	16 $\frac{2}{3}$	<b>giumba, jěmba, or jumba</b>				16 yd <sup>2</sup>	13.378 804 m <sup>2</sup>
1600	400	66 $\frac{2}{3}$	4	<b>depa</b>			4 yd <sup>2</sup>	3.344 451 m <sup>2</sup>
6400	1600	266 $\frac{2}{3}$	16	4	<b>ela</b>		1 yd <sup>2</sup>	83.611 3 dm <sup>2</sup>
25,600	6400	1066 $\frac{2}{3}$	64	16	4	<b>covid</b>	324 in <sup>2</sup>	20.902 8 dm <sup>2</sup>

Other reported measures:

1 **relong** = 0.709 acre = about 2870 m<sup>2</sup>.

## 230.5 Units of Dry Capacity

Traditional system for rice, grain and fruit

				Metric
<b>gantang</b>				4.731 638 L
2	<b>bamboo</b>			2.365 819 L
4	2	<b>chupak</b>		1.182 910 L
16	8	4	<b>pau</b>	295.727 mL

British Imperial-linked system for rice, grain and fruit

					Imperial	Metric
<b>coyan<sup>a</sup></b>					800 gal	3636.80 L
40	<b>bag<sup>a</sup></b>				20 gal	90.92 L
800	20	<b>gantang</b>			1 gal	4.546 L
3200	80	4	<b>chupak</b>		1 qt	1.137 L
12,800	320	16	4	<b>pau</b>	½ pt	284.1 mL

<sup>a</sup>Mainly for rice

## 230.6 Units of Liquid Capacity

Traditional system

				Metric
<b>gantang</b>				4.731 638 L
2	<b>bamboo</b>			2.365 819 L
4	2	<b>chupak</b>		1.182 910 L
16	8	4	<b>pau</b>	295.727 mL

## British Imperial-linked system

						Imperial	Metric
<b>koyan</b>						800 gal	3636.88 L
$3\frac{1}{63}$	<b>tun</b>					252 gal	1145.617 L
$6\frac{2}{63}$	2	<b>pipe</b>				126 gal	572.809 L
$12\frac{44}{63}$	4	2	<b>hogshead</b>			63 gal	286.404 L
80	$25\frac{1}{5}$	$12\frac{3}{5}$	$6\frac{3}{10}$	<b>para or bandu</b>		10 gal	45.461 L
800	252	126	63	10	<b>gantang</b>	1 gal	4.546 L

**230.7 Units of Weight**

## British Imperial-linked system for rice and sesame seeds

					Imperial	Metric
<b>coyan<sup>a</sup></b>					5333 $\frac{1}{3}$ lb	2419.159 136 kg
$13\frac{1}{3}$	<b>bhara</b>				400 lb	181.436 935 kg
40	3	<b>picul</b>			133 $\frac{1}{3}$ lb	60.478 978 kg
4000	300	100	<b>catty or kati</b>		1 $\frac{1}{3}$ lb	604.789 8 g
64,000	4800	1600	16	<b>tahil</b>	1 $\frac{1}{3}$ oz	37.799 4 g

<sup>a</sup>For salt, equal to 52 piculs = 3144.906 9 kg

## For tin

			Metric
<b>kip</b>			18.450 000 kg
15	<b>bedoor</b>		1.230 000 kg
30	2	<b>tampang</b>	615.000 g

## For precious metals, salt and rice

				Metric
<b>catty or kati<sup>a</sup></b>				1.079 340 kg
20	<b>bongkal or bunkal</b>			53.967 000 g
320	16	<b>mayam or meiam</b>		3.372 937 g
3840	192	12	<b>saga</b>	281.078 mg

## British Imperial-linked system for precious metals, salt and rice

				Imperial	Metric
<b>catty or kati<sup>a</sup></b>				9984 gr	646.952 4 g
12	<b>bongkal or bunkal</b>			832 gr	53.912 7 g
192	16	<b>mayam or meiam</b>		52 gr	3.369 5 g
2304	192	12	<b>saga</b>	4 $\frac{1}{3}$ gr	280.8 mg

<sup>a</sup>For commercial use, also reported as 18 bongkals = 970.429 1 g

For medical use

				Metric
<b>tael</b>				34.447 g
10	<b>chien</b>			3.444 74 g
100	10	<b>fern</b>		344.474 mg
1000	100	10	<b>lea</b>	34.447 mg

Money changers' weights

				Metric
<b>mace or chee</b>				3.779 94 g
10	<b>candareen</b>			377.99 mg
100	10	<b>cash</b>		37.80 mg

For opium

				Metric
<b>Tahil</b>				37.799 4 g
10	<b>chee</b>			3.779 9 g
100	10	<b>hoon</b>		377.99 mg
1000	100	10	<b>tee</b>	37.80 mg

Other measures reported during the nineteenth century:

- 1 **ton** (for coal) = 1016.047 542 kg;
- 1 **bhara** or **bahar** (for cotton) = 81.437 061 kg;
- 1 **bhara** or **bahar** (for thread of cotton) = 90.718 530 kg;
- 1 **sack** (for rice, wheat, vegetables, corn and beans) = 2 Bengali muns or bazaar-mands = 74.648 391 kg.

## 231 Sint Maarten

See *Netherlands Antilles*.

## 232 Slovakia

See *Austria*, *Bohemia*, *Czech Republic*, and *Hungary*.

The Czech and Slovak lands were united as Czechoslovakia after the dissolution of the Austro-Hungarian Empire in 1918. Slovakia unilaterally declared independence in 1939, and the remainder of Czechoslovakia was occupied by the Germans, who referred to the occupied area

as the "Protectorate of Bohemia and Moravia." The Czechoslovak Republic was reconstituted in 1945, only to be separated into the Czech and Slovak Republics in 1993.

### 232.1 Currency

- 1993–: 1 Slovak koruna = 100 halers
- 1945–1993: 1 Czechoslovak koruna = 100 halers
- 1939–1945: 1 Slovak koruna = 100 halierov
- 1918–1939: 1 Czechoslovak koruna = 100 halers
- 1892–1918: 1 Austro-Hungarian krone = 100 heller

## 233 Slovenia [Formerly People's Republic of Slovenia and Former a Part of Yugoslavia]

See also *Yugoslavia*.

Slovenia was part of the Austro-Hungarian Empire until the country gained its independence in 1918 as part of the United Kingdom of Serbs, Croats and Slovenes, which was renamed Yugoslavia in 1929. After invasion by Italy and Germany, the current area of Slovenia was split in two, with the coast and Ljubljana becoming part of Italy while the hinterlands became part of the Gross-Deutsche Reich. Slovenia was reincorporated into Yugoslavia after liberation in 1945 and remained part of Yugoslavia until 1991, when it gained its independence.

Traditional measures were influenced by Venetian and German systems for weights and measures. The metric system became official in 1869 and has been compulsory since 1876.

*Main sources:* [JAVO] and [MART3]

### 233.1 Currency

- 2007–: 1 euro = 100 euro-cent
- 1991–2007: 1 Slovenian tolar = 100 stotins

1990–1991:	1 Yugoslav Convertible dinar = 100 para
1966–1989:	1 Yugoslav Hard dinar = 100 para
1944–1965:	1 Yugoslav Federation dinar = 100 para
1919–1944:	1 Serbian dinar = 100 para
1918–1919:	1 krone = 100 heller
1892–1918:	1 Austro-Hungarian krone = 100 heller
–1892:	1 Austrian gulden = 100 kreuzer

## 233.2 Units of Length

Vienna-linked system

					Metric
<b>dunajski milja</b> <sup>a</sup>					7584 m
4000	<b>seženj</b> <sup>b</sup>				1.896 m
8000	2	<b>dvorišče</b>			948 mm
24,000	6	3	<b>dunajski čevlja</b>		316 mm
288,000	72	36	12	<b>col or palčni</b>	26.3 mm

<sup>a</sup>1 **dunajski poštna milja** = 7585.9 m

<sup>b</sup>Also reported as 1.894 m

In Gorizia

		Metric
<b>goriski čevlja</b>		344 mm
12	<b>col</b>	28.7 mm

In Ljubljana

			Metric
<b>seženj</b>			1.643 m
5	<b>ljubljski čevlja</b>		328.6 mm
60	12	<b>col</b>	27.38 mm

Venetian scale in Koper

						Metric
<b>milja</b>						1738.674 m
1000	<b>seženj</b>					1.738.674 m
5000	5	<b>čevlja</b>				347.735 mm
60,000	60	12	<b>col or onča</b>			28.978 mm
720,000	720	144	12	<b>linija</b>		2.415 mm
7,200,000	7200	1440	120	10	<b>decimo</b>	241.5 μm

Other reported measures:

1 **dunajski vatel** (in Ljubljana) =  
773–777.75 mm;

1 **dunajski komolec** (in Ljubljana) = 511 mm.

### 233.3 Units of Area

In Koper

			Metric
<b>campo</b>			3161.911 2 m <sup>2</sup>
560	<b>tavole</b>		5.646 27 m <sup>2</sup>
26, 148 <sup>8/9</sup>	46 <sup>25/36</sup>	<b>piede quadro</b>	12.091 9 dm <sup>2</sup>

### 233.4 Units of Dry Capacity

In Celje, as reported in 1857

				Metric
<b>kobal</b> or <b>Schaff</b>				26.580 137 L
4	<b>bokal</b> or <b>Viertel</b>			6.645 034 L
8	2	<b>poliča</b> or <b>Halbe</b>		3.322 517 L
16	4	2	<b>Massl</b>	1.661 258 L

In Kranj during the fifteenth century

				Metric
<b>Mut</b>				241.773 6 L
3	<b>kobal, Kaufmess, Scheffel, or Schaff</b>			80.591 2 L
12	4	<b>Viertelmess</b> or <b>Stempf</b>		20.147 8 L
24	8	2	<b>povolnik</b>	10.073 9 L

In Koper during the late nineteenth century

					Metric
<b>modij</b>					333.268 8 L
4	<b>star žita</b> or <b>staio</b>				83.317 20 L
8	2	<b>kobal</b> or <b>vagan</b>			41.658 60 L
16	4	2	<b>mernik</b>		20.829 3 L
48	12	6	3	<b>mala merica</b> or <b>quartarolo</b>	6.943 1 L

In Maribor, as reported in 1857

					Metric
<b>Viertel</b>					86.465 84 L
1 $\frac{13}{32}$	<b>Metze</b>				61.486 82 L
2	1 $\frac{19}{45}$	<b>Görz</b>			43.232 92 L
4	2 $\frac{39}{45}$	2	<b>halbe Görz</b>		21.616 46 L
56 $\frac{1}{4}$	40	8 $\frac{1}{8}$	14 $\frac{1}{16}$	<b>Massl</b>	1.537 170 5 L

In Ptuj

		Metric
<b>Kuppelfutter-Viertel</b>		13.431 8 L
6	<b>Kupelnik</b>	2.238 63 L

Other reported measures:

- 1 **Viertel** (stricken measure for oats in Slovenske Konjice) = 117.53 L;
- 1 **vedro** = 95.4–103 L;
- 1 **Star gross** (in Ljubljana in 1571) = 88.056 264 L;
- 1 **Viertel** (in Slovenske Konjice) = 87.308 L;
- 1 **čeber** or **spod** = 63.6–70 L;
- 1 **Khübl** (in Podravska, as reported in 1670) = 52.850 L;
- 1 **Vogtei-Hafer** (in Kranj during the fifteenth century) = 50.044 4 L;
- 1 **Unschuldig-Kindlein-Hafer** (in Kranj during the fifteenth century) = 40.295 4 L;
- 1 **Korb-Forstfutter** (in Kranj during fifteenth century) = 39.789 4 L;
- 1 **Star klein** (in Ljubljana in 1571) = 35.772 857 L;
- 1 **Zins-Schaff-Hafer** (in Kočevje during the sixteenth century) = 34.456 8 L;
- 1 **Kasten-Zins-Schaff** (in Flöding) = 33.021 1 L;
- 1 **Zins-Schaff-Getreide** (in Kočevje during the sixteenth century) = 31.175 2 L;

1 **Stadtkauf-Mass-Hafer** (in Kočevje during the sixteenth century) = 27.893 6 L;

1 **Stadtkauf-Mass-Mais** (in Kočevje during sixteenth century) = 22.971 2 L.

## 233.5 Units of Liquid Capacity

In Koper

		Metric
<b>barilla</b>		64.385 9 L
60	<b>boccale</b>	1.073 098 L

In Vipava

		Metric
<b>Landeimer</b>		84.883 5 L
1 $\frac{1}{5}$	<b>Zuber</b>	70.736 25 L

Other reported measures:

1 **Landeimer** (in Kostanjevica) = 45.271 2 L;

1 **Landeimer** (in Črnomelj and Kočevje) = 28.294 5 L.

## 233.6 Units of Weight

Venetian scale in Koper

						Metric
<b>migliaio</b>						476.998 720 kg
10	<b>centinaio</b>					47.698 872 kg
1000	100	<b>funt</b>				476.988 72 g
12,000	1200	12	<b>onča</b>			39.749 06 g
2,304,000	230,400	2304	192	<b>karat</b>		207.03 mg
9,216,000	921,600	9216	768	4	<b>pšenica</b>	51.76 mg

## 234 Society Islands [Formerly: King George Islands]

See *France*.

These islands were discovered in 1768 by the British Seafarer Samuel Wallis. The area was further explored in 1769 by a British expedition under James Cook, who named the islands after the Royal Society in London. The area became a French protectorate in 1843 and was, in 1903, incorporated along with other islands into French Polynesia.

## 235 Solanki Empire (942–1244)

See *India*.

## 236 Solomon Islands [Formerly: British Solomon Islands]

The Solomon Islands were discovered by the Spanish navigator Alvaro de Mendana in 1567, though colonization didn't begin until 1885, when the northern Solomon Islands were declared a German protectorate with German New Guinea. The British Solomon Islands became a British protectorate in 1893. In 1899, Germany transferred its claim to all Solomon Islands, except Buka and Bougainville. Australia occupied the German islands in 1914, and administrated them after 1920. After World War II, the islands were returned to the status of a British protectorate. The islands became a self-governing dependency in 1976 and gained their independence, as the Solomon Islands, in 1978.

The metric system has been compulsory since 1970.

### 236.1 Currency

1977–:	1 Solomon Islands dollar = 100 cents
1966–1977:	1 Australian dollar = 100 cents

1945–1966:	1 Australian pound = 20 shillings = 240 pence = 960 farthings
1942–1945:	1 Oceanian pound = 20 shillings
1920–1942:	1 Australian pound = 20 shillings = 240 pence = 960 farthings
1893–1920:	1 pound sterling = 20 shillings = 240 pence = 960 farthings

## 237 Somalia [Formerly: Somali Republic, Somali Democratic Republic]

See also *Somaliland* and *Italian Somaliland*.

Somalia is divided into a northern part with a British colonial background, also known as Somaliland, and a southern part with an Italian colonial background. Somalia was purchased by Italy from the sultan of Zanzibar, creating Italian Somaliland. Italian Somaliland existed in the northeast beginning in 1889, and in the south beginning in 1905. Italian Somaliland was incorporated into Italian East Africa in 1936. When the British defeated Italian forces in Africa in 1941, Somaliland fell under British occupation until 1948. Somaliland was under British military administration from 1948 until 1950. Italian Somalia became a UN trust territory in 1950 under Italy. It gained its independence and unified with Somaliland in 1960 to form the Somali Republic. Since 1991, no national government has existed, and various warlords rule the country. The northeastern part of Somalia has also formed the separate state of Puntland, whose leaders declared it an autonomous state in 1998, though it is not internationally recognized.

The metric system was adopted in 1950 and has been compulsory since 1972.

*Main source:* [MANG]

### 237.1 Currency

1962–:	1 Somali shilin or shilling = 100 senti or cents (shanteesmi)
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			Metric
<b>mayl laba jibbaaran</b>			2,589,988.110 m <sup>2</sup>
3,097,600	<b>waar laba jibaaran</b>		83.614 dm <sup>2</sup>
4,014,489,600	1296	<b>inj laba jibaaran</b>	6.542 cm <sup>2</sup>

## Metric-linked system

		Metric
<b>darat</b>		8000 m <sup>2</sup>
3⅓	<b>dareb</b>	2500 m <sup>2</sup>

## Metric system

			Metric
<b>mitir laba jibbaaran</b>			1 m <sup>2</sup>
10,000	<b>sento mitir laba jibbaaran</b>		1 cm <sup>2</sup>
1,000,000	100	<b>milli mitir laba jibbaaran</b>	1 mm <sup>2</sup>

## 237.5 Units of Dry Capacity

Many common commodities were sold by weight.

## Traditional system

				Metric
<b>gisla or gizla</b>				163.08 L
8	<b>tabla</b>			20.385 L
120	15	<b>chela</b>		1.359 L
360	45	3	<b>caba</b>	453 mL

Some measures reported during the late nineteenth century:

1 **safiha** (a tin bucket of unspecified size used for measuring various commodities such as onion and grain) = about 16 L for peanuts.

## Metric system

			Metric
<b>litir</b>			1 L
100	<b>senti litir</b>		10 mL
1000	10	<b>milli litir</b>	1 mL

## 237.6 Units of Liquid Capacity

## Traditional system

		Metric
<b>tanica</b>		18.12 L
40	<b>caba</b>	453 mL

Other measures reported since the late nineteenth century:

1 **midd** (in South Kordofan among the Lafofa people) = about 5 L;

1 **galoon** (for beer) = 4.546 09 L;

1 **safiha** (a tin bucket of unspecified size).

## Metric-linked system

					Metric
<b>quart</b>					960 mL
2	<b>baynt</b>				480 mL
4	2	<b>koob</b>			240 mL
64	32	16	<b>qaado</b> <sup>a</sup>		15 mL
192	96	48	3	<b>mulqaacad buuxda</b>	5 mL

<sup>a</sup>A tablespoon

## Metric system

			Metric
<b>litir</b>			1 L
100	<b>senti litir</b>		10 mL
1000	10	<b>milli litir</b>	1 mL

## 237.7 Units of Weight

Traditional system

				Metric
<b>gisla</b> or <b>gizla</b>				161.28 kg
10	<b>frasla</b> or <b>farsalah</b>			16.128 kg
360	36	<b>rotolo</b> , <b>rottolo</b> , or <b>ruotoli</b>		448 mg
5760	576	16	<b>okia</b> or <b>ughia</b>	28 mg

In South Kordofan among the Lafofa people

		Metric
<b>rotl</b>		449.28 g
12	<b>waqia</b>	37.44 g

British-linked system

				Metric
<b>dhagax</b>				6.354 kg
11 <sup>19</sup> / <sub>39</sub>	<b>sus</b>			1.474 kg
14	3 <sup>1</sup> / <sub>4</sub>	<b>rodol</b>		453.592 g
224	19 <sup>1</sup> / <sub>2</sub>	16	<b>wiqiyad</b>	28.37 g

Other measures reported during the mid-nineteenth century:

1 **ras** = what a man can carry on his head, often 50–70% of their own weight;

1 **midd** (for sorghum and porridge) = about 3 kg.

Metric system

				Metric
<b>tan</b>				1000 kg
1000	<b>kiiloo garaam</b>			1 kg
1,000,000	1000	<b>garaam</b>		1 g
1,000,000,000	1,000,000	1000	<b>milli garaam</b>	1 mg

## 237.8 Units of Time

<b>sanad</b>							1 year
12	<b>bil</b>						1 month
48	4	<b>toddobaad</b>					1 week
336	28	7	<b>maalin</b>				1 day
8064	672	168	24	<b>saacad</b>			1 hour
483,840	40,320	10,080	1440	60	<b>daqiiqad</b>		1 minute
29,030,400	2,419,200	604,800	86,400	3600	60	<b>seken</b> or <b>il-biriqsi</b>	1 second

Monday = Isniin, Tuesday = Talaado, Wednesday = Arbaco, Thursday = Khamiis, Friday = Jimce, Saturday = Sabti, Sunday = Axad

## 238 Somaliland [Formerly: British Somaliland Protectorate; Officially a Part of the Somali Republic]

See also *Somalia*.

Since 1991, this region has been an unrecognized, self-declared state that is internationally recognized as an autonomous region of Somalia.

*Main source:* [HERT]

238.1 Currency

- 1994–: 1 Somaliland shilling = 100 cents (shanteesi)  
1991–1994: 1 Somali shilin or shilling = 100 senti or cents (Shanteesi)  
1921–1962: 1 East African shilling = 100 cents

238.2 Units of Capacity

For fresh water

		Metric
ngoma		~123.75 L (Liitar)
7½	keila or pishi	~16.5 L

239 Somers Islands

See *Bermuda*.

240 Songhay Empire

See also *Niger* and *Nigeria*.

In 1340, the Songhai people took advantage of the decline of the Mali Empire and asserted an independent state, known as the Songhay Empire.

large mithqāl		
1¼	gros or small mithqāl	
2½	2	ackie

The Empire lasted until 1591, when it was invaded by the Moroccans. The former empire was soon splintered into dozens of smaller kingdoms, including Benin, Borgu, Calabar, Cayor, Gobir, Gurma, Igala, Jukun, Kaabu, Kalam, Katsina, Mane, Masina, Mossi, Ningi, Nupe, Oyo, Sabe, Shira, Sine, and Zamfara. The Songhai people established the Dendi Kingdom.

Askia the Great (r.1493–1528) introduced a uniform system for weights and measures and,

to benefit trade and consumers, he also placed inspectors to be in charge of each important market.

*Main sources:* [DUPU], [DUPU2], [HUNW], and [OHAE]

240.1 Currency

The main currency was cowrie shells from the Indian Ocean region. Gold dust and salt were also used as currencies.

240.2 Units of Weight

The weights, used in the gold trade, were shaped like animals, people, plates, and household objects, and made of brass or bronze. There have also been found various geometrical figures with symbolic patterns. Every trader carried a set of these weights, which could be compared with the weights of costumers to determine how much gold was involved in a transaction.

The weights generally came in three different sizes. There was a large mithqal of about 0.15 ounces, a small mithqal of about 0.12 ounces, and an ackie of about 0.06 ounces. [DUPU2] presumed that the maithqal was equal to 4.5–5.0 g, while [HUNW] presumed it to be the normal value = about 4.25 g.

		Cowries		Metric
		12 × 100 = 1 200	3/20 = 0.15 ounces	4.25 g
		12 × 80 = 960	12/100 = 0.12 ounces	3.40 g
		12 × 40 = 480	6/100 = 0.06 ounces	1.70 g

241 South Africa [Formerly: Union of South Africa]

Mew Diaz rounded the Cape of Good Hope in 1488. In 1652, Jan van Riebeeck of the Dutch East India Company established Cape Town as a stopping point for the Company’s ships. In 1795, the Cape colony was captured by the British, and again in 1806, receiving permanent

establishment in 1814. To escape British rule, many Afrikaner farmers migrated northward, establishing the Zuid Afrikaansche Republic and the Boer South African Republic in 1852, and the Orange Free State in 1854. The British Bechuanaland was incorporated into the Cape Colony in 1895. In 1902, the Boer South African Republic and the Zuid Afrikaansche Republic became the Transvaal colony. In 1910, Transvaal and the Orange Free State were joined with the British colonies of Cape of Good Hope and Natal, and gained *de facto* independence as a Dominion. South Africa was granted full sovereignty in 1931.

From the late seventeenth century until the mid-nineteenth century, many measures used in Amsterdam were also used here. Along with the Dutch system for weights and measures, the British Imperial system was established from 1861. The metric system became official in 1922, and has been compulsory since 1967 and 1974.

*Main sources:* [EUR2], [MART3], [MART5], [UN55], and [UN66]

241.1 Currency

- 1961–: 1 South African rand = 100 cents
- 1920–1961: 1 South African pound = 20 shillings = 240 pence = 960 farthings
- c.1825–1920: 1 pound sterling = 20 shillings = 240 pence = 960 farthings
- c.1825: 1 Dutch Rijksdaaler = 8 shillingen = 24 dubbeltjes = 48 stuivers

241.2 Units of Length

Dutch-linked system

					Metric
<b>roede</b>					3.767 3 m
2	<b>faden</b>				1.883 6 m
12	6	<b>voet</b>			313.946 mm
144	72	12	<b>duim</b>		26.162 mm
1728	864	144	12	<b>linie</b>	2.180 2 mm

British Imperial-linked system<sup>a</sup>

			Metric
<b>Cape rood</b>			3.778 3 m
12	<b>Cape foot</b>		314.858 mm
144	12	<b>Cape inch</b>	26.238 mm

<sup>a</sup>Used in certain parts of Natal and in the provinces of Cape, Orange Free States and Transvaal

Other reported measures:

- 1 **el** = 685.794 mm (new scale) or 687.810 mm (old scale).

241.3 Units of Area

Dutch-linked system

			Metric
<b>morgen</b> <sup>a</sup>			8128.66 m <sup>2</sup>
600	<b>roede</b> <sup>2</sup>		13.548 m <sup>2</sup>
101,400	169	<b>voet</b> <sup>2</sup>	8.016 dm <sup>2</sup>

<sup>a</sup>1 **morgen** (old Dutch scale) = 8,093.567 6 m<sup>2</sup>

British Imperial-linked system<sup>a</sup>

			Metric
<b>morgen</b>			8565.3 m <sup>2</sup>
600	<b>Cape rood</b> <sup>2</sup>		14.275 5 m <sup>2</sup>
86,400	144	<b>Cape foot</b> <sup>2</sup>	9.913 5 dm <sup>2</sup>

<sup>a</sup>Used in certain parts of Natal and in the provinces of Cape, Orange Free States and Transvaal

## 241.4 Units of Dry Capacity

Old Amsterdam system

			Metric
<b>last</b>			3003.912 L
27	<b>mud</b>		111.256 L
108	4	<b>schepel</b>	27.814 L

Dutch-linked system

					Metric
<b>last</b>					1112.560 L
10	<b>mud</b>				111.256 L
40	4	<b>schepel</b>			27.814 L
160	16	4	<b>vierdevat</b>		6.953 5 L
640	64	16	4	<b>kopp</b>	1.738 4 L

British-linked system

						Metric
<b>Legger</b>						691.005 L
$4\frac{3}{4}$	<b>mud</b>					145.475 L
19	4	<b>schepel or scheffel</b>				36.368 7 L
152	32	8	<b>gallon</b>			4.546 L
608	128	32	4	<b>quart</b>		1.136 L
1216	256	64	8	2	<b>pint</b>	568.26 mL

## 241.5 Units of Liquid Capacity

Traditional system at the Cape of Good Hope

						Metric
<b>legger or leaguer</b>						516.2 L
4	<b>ahm</b>					129.1 L
$5\frac{7}{82}$	$1\frac{15}{82}$	<b>muid or mud</b>				109.1 L
$11\frac{3}{35}$	$2\frac{37}{35}$	$2\frac{12}{35}$	<b>balli or bali</b>			46.6 L
$55\frac{7}{7}$	$13\frac{7}{7}$	$11\frac{3}{7}$	5	<b>gantang</b>		9.31 L
388	97	82	35	7	<b>kanne or kanna</b>	1.33 L

Dutch-linked system

								Metric
<b>vat</b>								863.050 68 L
$1\frac{1}{2}$	<b>legger</b>							575.367 120 L
$2\frac{7}{55}$	$1\frac{27}{55}$	<b>pipe</b>						416.384 100 L
4	$2\frac{7}{3}$	$1\frac{53}{57}$	<b>okshoofd</b>					215.762 670 L
6	4	$2\frac{17}{19}$	$1\frac{1}{2}$	<b>aam</b>				143.841 780 L
24	16	$11\frac{11}{19}$	6	4	<b>anker<sup>a</sup></b>			35.960 445 L
48	32	$23\frac{3}{19}$	12	8	2	<b>steekkan</b>		17.980 222 L
228	152	110	57	38	$9\frac{1}{2}$	$4\frac{3}{4}$	<b>gallon</b>	3.785 310 L
384	256	$185\frac{5}{19}$	96	64	16	8	$1\frac{13}{19}$	<b>flask</b> 2.247 528 L

<sup>a</sup>Also reported as 34.10 L

Old Amsterdam system

							Metric
<b>aam</b>							155.563 L
4	<b>anker</b>						38.890 75 L
16	4	<b>steekkanne</b>					9.722 69 L
32	8	2	<b>stoop</b>				4.861 34 L
64	16	4	2	<b>mengel</b>			2.430 67 L
128	32	8	4	2	<b>pintje</b>		1.215 34 L
512	128	32	16	8	4	<b>mutsje</b>	303.83 mL

British Imperial-linked system during the late nineteenth century

			Metric
<b>leaguer<sup>a</sup></b>			577.034 914 L
5 <sup>7</sup> / <sub>24</sub>	<b>mud or muid</b>		109.045 968 L
127	24	<b>gallon</b>	4.543 582 L

<sup>a</sup>[MART5] reported that the leaguer was a fictitious measure, as there were no casks of that size. In 1904, he reported that a leaguer of brandy would be about 133 gal or more

Metric-linked system during the twentieth century

			Metric
<b>bali or balli</b>			46 L
5	<b>gantang</b>		9.200 L
35	7	<b>kannne or kannna</b>	1.314 L

British Imperial-linked system for various commodities

						Metric
<b>Capeton</b>						907.184 000 kg
10	<b>bag</b>					90.718 400 kg
–	–	<b>bag</b>				72.574 720 kg
–	–	–	<b>bag</b>			68.038 800 kg
–	–	–	–	<b>bundle</b>		3.175 144 kg
2000	200	160	150	7	<b>pound</b>	453.592 g

For medical use

						Metric
<b>pfund</b>						369.125 8 g
12	<b>unze</b>					30.760 48 g
96	8	<b>drachm</b>				3.845 06 g
288	24	3	<b>skrupel</b>			1.281 69 g
5760	480	60	20		<b>gran</b>	64.08 mg

241.6 Units of Weight

Dutch-linked system

				Metric
<b>centner</b>				4.940 904 kg
100	<b>pfund</b>			494.090 4 g
3200	32	<b>loth</b>		15.440 3 g
12,800	128	4	<b>drachm</b>	3.860 1 g

Dutch-linked system

		Metric
<b>centenaar</b>		49.303 549 kg
100	<b>pond</b>	493.035 491 g

241.7 Units of Time

South Africa has eleven official languages. Below are weekday names and names of the months in some of these languages.

<i>English</i>	<i>Afrikaans</i>	<i>Ndebele</i>	<i>Northern Sotho</i>	<i>Tsonga</i>	<i>Tswana</i>	<i>Venda</i>	<i>Xhosa</i>	<i>Zulu</i>
Monday	Maandag	uMvulo	Mošupologo	Musumbunuku	Mosupologo	Musumbuluwo	Mvulo	UMsombuluko
Tuesday	Dinsdag	uLesibili	Labobedi	Ravumbirhi	Labobedi	Ḳavhuvhili	Lwesibini	ULwesibili
Wednesday	Woensdag	uLesithathu	Laboraro	Ravurharhu	Laboraro	Ḳavhuraru	Lwesithathu	ULwesithathu
Thursday	Donderdag	uLesine	Labone	Ravumune	Labone	Ḳavhuṇa	Lwesine	ULwesine
Friday	Vrydag	uLesihlanu	Labohlano	Ravunthlanu	Labothlano	Ḳavhuṱlanu	Lwesihlanu	ULwesihlanu
Saturday	Saterdag	uMgqibelo	Mokibelo	Muqivela	Lamatlhatso	Mugivhela	Mgqibelo	UMgqibelo
Sunday	Sondag	uSonto	Lamorena	Sonto	Latshipi	Swondaha	Cawe	ISonto

## 242 South Arabia

See *South Yemen*.

## 243 South Georgia and the South Sandwich Islands

South Georgia was claimed for Britain in 1775 by Captain James Cook. The South Sandwich Islands were claimed for Britain in 1908, when Britain annexed both islands as part of the Falkland Islands Dependencies. The British overseas territory of “South Georgia and the South Sandwich Islands” was formed in 1985. The islands have no native population.

## 244 South Kasai

See also *Congo*.

A secessionist state that sought independence during the political turmoil arising from the decolonisation of the Belgian Congo. In 1960, Luba chief Albert Kalonji (b. 1929) proclaimed the independence of the diamond-rich region of South Kasai, with Bakwanga as its capital. Kalonji also declared himself as *Chef Suprême du Peuple Muluba et Protecteur Incontesté des Tribus Associées à son sort*. After a bloody four-month military campaign, the Congolese central government reconquered the region in late 1961.

## 245 South Korea

See also *Korea* and *North Korea*.

When Russia refused to permit a U.N. commission designated to supervise reunification elections to enter North Korea, an election was held in South Korea in 1948, and the Republic of South Korea was inaugurated later that year.

The metric system has been compulsory since 1949.

*Main sources:* [MACL], [UN55], and [UN66]

245.1 Currency

1962–: 1 new South Korean won = 100 jeon  
1953–1962: 1 South Korean hwan = 100 jeon  
1945–1953: 1 South Korean won = 100 jeon

245.2 Units of Length

			尺	치	푼			Metric
li								3927.273 m
36	chung							109.090 9 m
2160	60	kan or ken						1.818 18 m
12,960	360	6	chok or cheok					303.03 mm
129,600	3600	60	10	chi or chon				30.303 mm
1,296,000	36,000	600	100	10	pun			3.030 3 mm
12,960,000	360,000	6000	1000	100	10	ri		303.03 μm
129,600,000	3,600,000	60,000	10,000	1000	100	10	mo	30.303 μm

245.3 Units of Area

정은	단 or 단위		평	습				Metric
chungbo								9917.4 m <sup>2</sup>
10	tan							991.74 m <sup>2</sup>
100	10	myo						99.174 m <sup>2</sup>
3000	300	30	pyong					3.305 8 m <sup>2</sup>
30,000	3000	300	10	hop				33.058 dm <sup>2</sup>
108,000	10,800	1080	36	3⅓	chok <sup>2</sup> or cheok <sup>2</sup>			9.182 8 dm <sup>2</sup>
300,000	30,000	3000	100	10	2%		jak	3.305 8 dm <sup>2</sup>

245.4 Units of Volume

Some reported measures:

1 pyong (for timber) = 72 chok<sup>3</sup> = 2.003 5 m<sup>3</sup>;  
1 jae (for timber) = 1 chi<sup>2</sup> × 12 chok = 3.339 m<sup>3</sup>;

1 ippyong = 1 kan<sup>3</sup> = 6.010 5 m<sup>3</sup>;  
1 pyong (for gravel) = 6.010 5 m<sup>3</sup>.

245.5 Units of Capacity

섬, 석, or 石	말, 두, or 斗		되, 승, or 升	홑			Metric
sŏm, sŏk, seom, suk, or seok							180.39 L
10	(big) mal						18.039 L
20	2	(small) mal					9.019 5 L
100	10	5	dai, dwe, tai, or tu				1.803 9 L
1000	100	50	10	hop			180.39 mL
10,000	1000	500	100	10	jak		18.039 mL

245.6 Units of Weight

	斤	兩		Metric
kwan				3.75 kg
6¼	geun, keun, kon, or catty			600 g
100	16	yang		37.5 g
1000	160	10	don or donchung	3.75 g

Other measures reported during the twentieth century:

1 sŏm, sŏk, seom, suk, or seok = 100 kg (for rough rice), 144 kg (for milled rice), and 155 kg (for brown rice).

246 South Ossetia

See also *Georgia*.

In 1990, this region declared its independence from Georgia, and has ever since been a partly recognized state.

247 Southern Rhodesia

See *Zimbabwe*.

248 South Sudan

See also *Egypt* and *Sudan*.

This area became an autonomous part of the Sudan in mid-2005, and achieved independence in mid-2011.

248.1 Currency

2011–: 1 South Sudanese pound = 100 piasters

249 South West Africa

See *Namibia*.

250 South Yemen [1967–1990]

See also *Aden*, *North Yemen*, and *Yemen*.

By 1517, Yemen had fallen to the Ottoman Empire. In 1636, the Ottomans were expelled by the Zaydis of San’a, who took Aden but failed to hold it past 1735. Egypt’s attempts to extend its influence over Yemen led to the British occupation of Aden in 1839. The Federation of Arab Emirates of the South was formed in 1959, and included 17 South Arabian countries. In 1962, the Aden colony joined the Federation, and was renamed the Federation of South Arabia. The Federation gained its independence as the People’s Republic of South Yemen in 1967. South Yemen and the Yemen Arab Republic were united as the Republic of Yemen in 1990.

250.1 Currency

1968–1996: 1 South Yemeni dinar = 1000 fils

I have not found any data directly related to this state.

251 Spain

See also *Balearic Islands*, *Canary Islands*, *Crown of Castile*, *Kingdom of Castile*, and *Kingdom of León*.

Roman Spain was invaded by the Suevi and the Vandals before falling to the Visigoths in the fifth century. In 711, the Moors invaded the entire peninsula. The Caliphate of Cordoba was founded in 756, and soon broke most of present-day Spain into many Kingdoms. The dominant Kingdoms, Aragon and Castile, were unified in 1479. Joseph Napoleon was made King of Spain from 1808 to 1813, when the Bourbón dynasty was restored. A liberal monarchy (1870–1873) under an Italian King was replaced by the First Republic. In 1874, a restored Bourbón monarchy was established. After the Second Republic (1931–1939) and the Spanish State (1936–1975), the Kingdom was reestablished in 1975.

In prehistoric times, the Celts and the Iberians brought some of their weights and measures to the Iberian Peninsula. After the Roman invasion, the Roman coins, weights and measures were established as a standard for the entire peninsula. The uniformity achieved by the Romans was partly maintained by the Visigoths. At any rate, most of the Roman measures seem more or less to have disappeared soon after the invasion of the Visigoths. Many different units were used and were to be included in various metrological systems throughout the peninsula during medieval times. Some units had been settling in over time, such as the Roman foot and digit, as well as the Moorish cahiz and adarme. During the twelfth and thirteenth centuries, every region, every province, and often every town had its own metrolog-

- 1868–2002: 1 Spanish peseta = 4 real = 100 céntimos  
 1864–1869: 1 Spanish escudo = 100 céntimos de escudo (gold escudo)  
 1737–1833: 1 Spanish escudo = 40 reales de vellón  
 1642–1736: 1 Spanish escudo = 16 reales de plata fuerte  
 1566–1641: 1 Spanish escudo = 16 reales

In Alicante

peso or libra			
10	real		
20	2	suelto	
240	24	12	dinero

## 251.2 Units of Length

Scale abolished in 1568–1587 by Phillip II

						Metric
<b>legua juridical or legua legal</b>						4174.35 m
3	<b>milla</b>					1391.45 m
24	8	<b>estadio</b>				173.93 m
3000	1000	125	<b>paso</b>			1.391 m
5000	1666⅔	208⅓	1⅓	<b>vara</b>		834.87 mm
15,000	5000	625	5	3	<b>pie</b>	278.29 mm

ical system. The lack of uniformity in standards was a major handicap to trade, and led to many attempts at introducing a nationwide standard system. In a decree of January 26, 1801, Charles IV (1748–1819) ruled that weights and measures in all his possessions should be adjusted to a standard metrological system (see below). The metric system has been official since 1848, legally adopted since January 1, 1859, and compulsory since 1871.

*Main sources:* [ALSI], [ALTE], [ARAV], [CLAU], [COLE], [DIRE], [LLYD], and [TORR2]

### 251.1 Currency

1999–: 1 euro = 100 euro-cent

For scales on maps, made obligatory in 1718 by Phillip V

			Metric
<b>legua géographique<sup>a</sup></b>			6349.21 m
7605	<b>vara</b>		834.87 mm
22,815	3	<b>pie</b>	278.29 mm

<sup>a</sup>Also reported as about 6368 m

scale based on the legua at a given degree of the terrestrial meridian:

- 1 **meridiano terrestre** = 111,111.11 m;  
 1 **legua de quince al grado** = 15 legua to a degree of the meridian = about 7429 m;  
 1 **legua de diecisiete y medio al grado** = 17½ legua to a degree of the meridian = about 6368 m;  
 1 **legua de dieciocho al grado** = 18 legua to a degree of the meridian = about 6173 m;

1 **legua marina** or **legua marítima** = 20 legua to a degree of the meridian = about 5555.55 m;

1 **legua terrestre** or **legua de veinticinco al grado** = 25 legua to a degree of the meridian = about 4225 m.

Ordinary scale

				Metric
<b>legua común</b>				5511 m
800	<b>corde</b>			6.889 m
6600	8¼	<b>vara</b>		835.0 mm
19,800	24¾	3	<b>pie</b>	278.3 mm

For roads constructed after 1766

				Metric
<b>legua de camino</b>				6620 m
4800	<b>paso</b>			1.379 m
8000	1⅓	<b>vara</b>		827.5 mm
24,000	5	3	<b>pie</b>	275.8 mm

Traditional upper scale for general use

								Metric
<b>milla</b>								1393.175 m
16⅔	<b>cuadra</b>							83.590 5 m
69⅔	4⅔	<b>mecate</b> or <b>task</b>						20.061 72 m
—	—	2 <sup>10</sup> / <sub>11</sub>	<b>cuerda</b>					6.896 22 m
416⅔	25	6	2⅙	<b>estadal</b>				3.343 62 m
833⅓	50	12	4⅘	2	<b>estado, braza</b> or <b>toesa</b>			1.671 81 m
1000	60	14⅔	4 <sup>19</sup> / <sub>20</sub>	2⅔	1⅓	<b>paso</b>		1.393 18 m
1666⅔	100	24	8¼	4	2	1⅔	<b>vara de Burgos</b>	835.905 mm

Traditional lower scale for general use

									Metric
<b>vara</b>									835.905 mm
2	<b>codo</b>								417.952 mm
3	1½	<b>pié</b>							278.635 mm
4	2	1⅓	<b>palma, cuarta</b> or <b>palmo mayor</b>						208.976 mm
6	3	2	1½	<b>sesma</b> or <b>geme</b>					139.318 mm
36	18	12	9	6	<b>pulgada</b>				23.220 mm
48	24	16	12	8	1⅓	<b>diedo</b>			17.415 mm
576	288	192	144	96	16	12	<b>linea</b>		1.451 mm
6912	3456	2304	1728	1152	192	144	12	<b>punto</b>	120.935 µm

For legal use after 1766

			Metric
<b>legua de posta<sup>a</sup></b>			3894 m
4633⅓	<b>vara</b>		840.4 mm
13,900	3	<b>pie</b>	280.1 mm

<sup>a</sup>Also reported as about 6368 m

Some other measures reported before 1801:

1 **legua** (old) = 5000 or 8000 varas = 3840–6144-m, or 4560–7296 m;

1 **vara** (old) = 768–912 mm;

1 **palmo de ribera** = 3 pulgadas = 69.66 mm.

In 1801, the following standards were declared to be legal:

Linear measures: the standard vara of Burgos,

Dry measures: the medio fanega of Ávila,

Liquid measures: the standard cuartillo preserved in Toledo,

Weights: the standard mark in possession of the Council of Castile.

## Castilian upper scale

								Metric
<b>legua real</b>								6687.239 m
$1\frac{1}{5}$	<b>legua<sup>a</sup></b>							5572.699 m
$4\frac{4}{5}$	4	<b>milla</b>						1393.176 m
$53\frac{1}{3}$	$44\frac{4}{5}$	$11\frac{1}{5}$	<b>cuadra</b>					125.386 m
2000	$1666\frac{2}{3}$	$416\frac{2}{3}$	$37\frac{1}{2}$	<b>estado or estadal</b>				3.343 623 m
4000	$3333\frac{1}{3}$	$833\frac{1}{3}$	75	2	<b>braza or towzo</b>			1.671 811 m
4800	4000	1000	90	$2\frac{2}{5}$	$1\frac{1}{5}$	<b>paso</b>		1.393 176 m
8000	$6666\frac{2}{3}$	$1666\frac{2}{3}$	150	4	2	$1\frac{1}{3}$	<b>vara de Castilla</b>	835.905 mm

<sup>a</sup>In medieval times, equal to 5000 varas. The number of varas,  $6666\frac{2}{3}$ , arises from the use of the paso in measuring itinerant distances. Hence, 4000 paces made one legua, and the paso was equal to  $1\frac{1}{5}$  varas. This legua was in use during the nineteenth century, in the provinces of Álava, Almería, Badajoz, Burgos, Cádiz, Castellón, Córdoba, Coruña, Granada, Huelva, Logroño, Madrid, Málaga, Murcia, Oviedo, Salamanca, Santander, Sevilla, Teruel, Toledo, Valladolid, Vizcaya and Zaragoza

## Castilian lower scale

								Metric
<b>vara de Castilla</b>								835.905 mm
$1\frac{1}{2}$	<b>codo de ribiera</b>							557.270 mm
2	$1\frac{1}{3}$	<b>codo</b>						417.953 mm
3	2	$1\frac{1}{2}$	<b>pie</b>					278.635 2 mm
4	$2\frac{2}{3}$	2	$1\frac{1}{3}$	<b>palmo</b>				208.976 mm
36	24	18	12	9	<b>pulgado</b>			23.220 mm
48	32	24	16	12	$1\frac{1}{3}$	<b>dedo</b>		17.415 mm
432	288	216	144	96	12	9	<b>linea</b>	1.935 mm
5184	3456	2592	1728	1296	144	108	12	<b>punto</b> 161.25 µm

## Maritime scale

							Metric
<b>legua marina</b>							5557.096 44 m
3	<b>milla marítima</b>						1 852.365 48 m
$27\frac{7}{10}$	$9\frac{7}{10}$	<b>cable</b>					200.617 2 m
3324	1108	120	<b>braza</b>				1.671 81 m
6646	2216	240	2	<b>vara</b>			835.905 mm
19,938	6648	720	6	3	<b>pie de Burgos</b>		278.719 m

## Metric scale after 1869

							Metric
<b>miriámetro</b>							10,000 m
10	<b>kilómetro</b>						1000 m
100	10	<b>hectómetro</b>					100 m
1000	100	10	<b>decámetro</b>				10 m
10,000	1000	100	10	<b>metro</b>			1 m
100,000	10,000	1000	100	10	<b>decímetro</b>		100 mm
1,000,000	100,000	10,000	1000	100	10	<b>centímetro</b>	10 mm
10,000,000	1,000,000	100,000	10,000	1000	100	10	<b>milímetro</b> 1 mm

### 251.3 Units of Area

Other measures reported during the thirteenth to nineteenth centuries:

1 **aradúra** = a quantity of land that a yoke of oxen can conveniently plough in the course of a day.

Traditional system for agricultural land

							Metric
<b>yugada</b>							321,979.2 m <sup>2</sup>
37½	<b>fenega</b> or <b>fanegada</b> <sup>a</sup>						8586.112 m <sup>2</sup>
72	1 <sup>23</sup> / <sub>25</sub>	<b>aranzada</b> <sup>b</sup>					4471.933 m <sup>2</sup>
600	12	8⅓	<b>celemin</b>				536.63 m <sup>2</sup>
2400	48	33⅓	4	<b>cuartilla</b>			134.158 m <sup>2</sup>
28,800	576	400	48	12	<b>estadal cuadrada</b>		11.179 8 m <sup>2</sup>
460,800	9216	6400	768	192	16	<b>vara cuadrada</b>	69.873 72 dm <sup>2</sup>

<sup>a</sup>In concept, equal to the land necessary to plant one fanega of wheat

<sup>b</sup>Usually used for vineyards

Upper Castilian scale

						Metric
<b>fanega de tierra</b>						6439.561 7 m <sup>2</sup>
1 <sup>11</sup> / <sub>25</sub>	<b>aranzada</b>					4471.917 8 m <sup>2</sup>
12	8⅓	<b>celemin de tierra</b> (12 × 4 estadales)				536.630 14 m <sup>2</sup>
48	33⅓	4		<b>cuartillo</b>		134.157 5 m <sup>2</sup>
576	400	48		12	<b>estadal cuadrada</b>	11.179 8 m <sup>2</sup>

Lower Castilian scale

					Metric
<b>vara cuadrada</b>					69.873 7 dm <sup>2</sup>
9	<b>pie cuadrada</b>				7.763 7 dm <sup>2</sup>
1296	144	<b>pulgada cuadrada</b>			5.391 cm <sup>2</sup>
186,624	20,736	144		<b>línea cuadrada</b>	3.744 mm <sup>2</sup>

Legal scale for agricultural land, established by law of 1801

					Metric
<b>yugada</b>					20,080.08 m <sup>2</sup>
3⅞	<b>fanegada</b> or <b>marco real</b>				6425.63 m <sup>2</sup>
4½	1 <sup>11</sup> / <sub>25</sub>	<b>aranzada</b>			4462.24 m <sup>2</sup>
1800	576	400	<b>estadal cuadrada</b>		11.155 6 m <sup>2</sup>
28,800	9216	6400	16	<b>vara cuadrada</b>	0.697 225 m <sup>2</sup>

Metric scale after 1869

							Metric
<b>miriámetro cuadrada</b>							100,000,000 m <sup>2</sup>
100	<b>kilómetro cuadrada</b>						1,000,000 m <sup>2</sup>
10,000	100	<b>hectómetro cuadrada</b>					10,000 m <sup>2</sup>
1,000,000	10,000	100	<b>decámetro cuadrada</b>				100 m <sup>2</sup>
100,000,000	1,000,000	10,000	100	<b>metro cuadrada</b>			1 m <sup>2</sup>
10,000,000,000	100,000,000	1,000,000	10,000	100	<b>decímetro cuadrada</b>		1 dm <sup>2</sup>
1 000 000 000 000	10,000,000,000	100,000,000	1,000,000	10,000	100	<b>centímetro cuadrada</b>	1 cm <sup>2</sup>

251.4 Units of Volume

For timber

		Metric
<b>tonelada de arqueo</b>		1.384 m <sup>3</sup>
8	<b>codo cubicos de ribera</b>	173 dm <sup>3</sup>

Castilian scale

				Metric
<b>vara cúbico</b>				584.077 9 dm <sup>3</sup>
27	<b>pie cúbico</b>			21.632 5 dm <sup>3</sup>
46,656	1728	<b>pulgada cúbico</b>		12.519 cm <sup>3</sup>
80,621,568	2,985,984	1 728	<b>línea cúbico</b>	7.245 mm <sup>3</sup>

Metric scale after 1869

			Metric
<b>metro cúbico</b>			1000 L
1000	<b>decímetro cúbico</b>		1 L
1,000,000	1000	<b>centímetro cúbico</b>	1 mL

## 251.5 Units of Dry Capacity

Traditional system

									Metric
<b>cahiz</b>									222.004 L
$1\frac{1}{2}$	<b>rubbio</b>								194.253 L
4	$3\frac{1}{2}$	<b>fanega</b>							55.501 L
16	14	4	<b>cuartilla</b>						13.875 L
48	42	12	3	<b>celemin or almude</b>					4.625 L
96	84	24	6	2	<b>medio</b>				2.312 L
192	168	48	12	4	2	<b>cuartillo</b>			1.156 L
768	672	192	48	16	8	4	<b>ración or ochavo</b>		289.07 mL
3072	2688	768	192	64	32	16	4	<b>ochavillo</b>	72.267 mL

## 251.6 Units of Liquid Capacity

1 **cortagne** = 7.13 L.

For wine according to the standard of Castile

									Metric
<b>bota</b>									483.99 L
$1\frac{3}{27}$	<b>pipa</b>								435.59 L
$1\frac{1}{8}$	$1\frac{11}{16}$	<b>moio or moyo</b>							258.125 L
30	27	16	<b>cántara or arroba mayor<sup>a</sup></b>						16.132 8 L
120	108	64	4	<b>cuartilla</b>					4.033 2 L
240	216	128	8	2	<b>azumbre</b>				2.016 6 L
960	864	512	32	8	4	<b>cuartillo</b>			504.16 mL
1920	1728	1024	64	16	8	2	<b>octavillo</b>		252.08 mL
3840	3456	2048	128	32	16	4	2	<b>copa</b>	126.04 mL

<sup>a</sup>1 **arroba mayor** (usually for wine) or **cántara** = the volume of 35 libra of river water = 16.132 8 L

For oil according to the standard of Castile

								Metric
<b>bota</b>								481.582 L
$1\frac{1}{2}$	<b>pipa</b>							433.423 L
$38\frac{1}{3}$	$34\frac{1}{2}$	<b>arroba menor<sup>a</sup></b>						12.563 06 L
$153\frac{1}{3}$	138	4	<b>quartillo</b>					3.140 75 L
$958\frac{1}{3}$	$862\frac{1}{2}$	25	$6\frac{1}{4}$	<b>libra</b>				502.52 mL
$3833\frac{1}{3}$	3450	100	25	4	<b>quarterone, cuarteron, or panilla</b>			125.63 mL
$15,333\frac{1}{3}$	13,800	400	100	16	4		<b>ounce</b>	31.41 mL

<sup>a</sup>1 **arroba menor** (for oil) = the volume of 25 libra of oil = 12.563 06 L

## 251.7 Units of Capacity

Metric scale for both liquids and dry commodities after 1869

						Metric
<b>kilólítro</b> or <b>tonelada de arqueo</b>						1000 L
10	<b>hectólítro</b>					100 L
100	10	<b>decálítro</b>				10 L
1000	100	10	<b>lítro</b>			1 L
10,000	1000	100	10	<b>decílítro</b>		100 mL
100,000	10,000	1000	100	10	<b>centílítro</b>	10 mL

## 251.8 Units of Weight

1 **libra** (old) = 350–575 g.

Traditional upper scale for general use

							Metric
<b>tonelada longa</b>							1030.47 kg
$1\frac{7}{25}$	<b>tonelada</b>						920.06 kg
$14\frac{4}{15}$	$13\frac{1}{3}$	<b>quintalmacho</b>					69.004 5 kg
$22\frac{7}{5}$	20	$1\frac{1}{2}$	<b>quintal</b>				46.003 kg
$44\frac{4}{5}$	40	3	2	<b>barril</b>			23.001 5 kg
$89\frac{3}{5}$	80	6	4	2	<b>arroba</b>		11.500 75 kg
2240	2000	150	100	50	25	<b>libra</b>	460.03 g

Traditional mid scale for general use

				Metric
<b>libra</b>				460.03 g
2	<b>marco</b>			230.015 g
16	8	<b>onza</b>		28.752 g
$21\frac{1}{3}$	$10\frac{2}{3}$	$1\frac{1}{3}$	<b>escrupulo</b>	21.564 g

Traditional lower scale for general use

							Metric
<b>libra</b>							460.03 g
128	<b>ochava</b> or <b>caracter</b>						3.594 g
256	2	<b>adarme</b> or <b>dracma</b>					1.797 g
384	3	$1\frac{1}{2}$	<b>dinero</b>				1.198 g
768	6	3	2	<b>tomin</b>			599.0 mg
2304	18	9	6	3	<b>arienzo</b> or <b>quilate</b>		199.7 mg
9216	72	36	24	12	4	<b>grano</b>	49.9 mg

According to the standard of Castile

										Metric
<b>tonelada</b>										920.186 kg
20	<b>quintal</b>									46.009 3 kg
80	4	<b>arroba</b>								11.502 325 kg
500	25	6¼	<b>arrelde</b>							1.840 372 kg
2000	100	25	4	<b>libra</b>						460.093 g
4000	200	50	8	2	<b>marco</b>					230.046 5 g
32,000	1600	400	64	16	8	<b>onza</b>				28.755 8 g
512,000	25,600	6400	1024	256	128	16	<b>adarme</b>			1.797 g
1,536,000	76,800	19,200	3072	768	384	48	3	<b>tomin</b>		599.08 mg
18,432,000	921,600	230,400	36,864	9216	4608	576	36	12	<b>grano</b>	49.92 mg

For gold (prohibited for use within Spain by a royal ordinance of 31 August 1731)<sup>11</sup>

						Metric
<b>marco de Castile</b>						230.045 g
8	<b>onça</b>					28.756 g
50	6¼	<b>castellano</b>				4.601 g
400	50	8	<b>tomin</b>			575.1 mg
4800	600	96	12	<b>grano</b>		47.9 mg

For silver<sup>12</sup>

							Metric
<b>marco de Castile</b>							230.045 g
8	<b>onça</b>						28.756 g
64	8	<b>ochava</b>					3.594 g
128	1	2	<b>adarme</b>				1.797 g
384	48	6	3	<b>tomin or escrúpulo</b>			599.08 mg
1152	144	18	9	3	<b>quilate</b>		199.69 mg
4608	576	72	36	12	4	<b>grano</b>	49.92 mg

Apothecaries' weights

							Metric
<b>Libra</b>							345 g
12	<b>onza</b>						28.8 g
96	8	<b>dracma</b>					3.6 g
288	24	3	<b>escrúpulo</b>				1.2 g
576	48	6	2	<b>obolo</b>			0.6 g
1728	144	18	6	3	<b>caractero</b>		0.2 g
6912	576	72	24	12	4	<b>grano</b>	0.05 g

<sup>11</sup> [FURB, p. 464].

<sup>12</sup> Journal of the Franklin Institute, Volym 45. Pergamon Press, 1848, p. 315.

Below I have compiled some local measures:

**251.9 Province of Huesca  
in the Community of Aragon**

**251.9.1 Units of Area**

					Metric
fanega					715.180 8 m <sup>2</sup>
3	cuartal				238.393 6 m <sup>2</sup>
12	4	almud			59.598 4 m <sup>2</sup>
1200	400	100	vara cuadrada		59.598 4 dm <sup>2</sup>
10,800	3600	900	9	tercia cuadrada	6.622 0 dm <sup>2</sup>

**251.9.2 Units of Dry Capacity**

				Metric
cahiz				359.36 L
8	fanega or hanega			44.92 L
24	3	cuartal		14.97 L
96	12	4	almud	3.743 L

For retail liquor

			Metric
arroba			12.96 L
36	libra		360 mL
432	12	onza	30 mL

For oil

					Metric
<b>carga</b>					159.84 L
12	<b>arroba</b>				13.32 L
18	1½	<b>arrobeta</b>			8.88 L
432	36	24	<b>libra</b>		370 mL
5184	432	288	12	<b>onza</b>	30.83 mL

**251.9.3 Units of Liquid Capacity**

				Metric
nietro				159.68 L
16	cántaro			9.98 L
128	8	jarro		1.247 5 L
256	16	2	cuartillo	623.75 mL

**251.9.4 Units of Weight**

									Metric
carga									151.632 kg
3	quintal								50.544 kg
12	4	arroba							12.636 kg
144	48	12	pescado or libra de carne						1.053 kg
432	144	36	3	libra					351 g
5184	1728	432	36	12	onza				29.25 g
20,736	6912	1728	144	48	4	arienzo			7.312 g
82,944	27,648	6912	576	192	16	4	adarme		1.828 g
2,654,208	884,736	221,184	18,432	6144	512	128	32	grano	57.1 mg

251.10 Basque Country

This region is divided into three provinces: Álava, Biscay, and Guipúzcoa.

251.10.1 Units of Length

Castilian scale in Álava and Bilbao

											Metric
<b>legua</b>											5572.699 m
44%	<b>cuadra</b>										125.386 m
1666⅔	37½	<b>estado</b>									3.343 619 m
3333⅓	75	2	<b>braza</b>								1.671 810 m
4000	90	2⅔	1⅓	<b>paso</b>							1.393 175 m
6666⅔	150	4	2	1⅔	<b>vara de Castilla</b>						835.904 85 mm
20,000	450	12	6	5	3	<b>pie</b>					278.634 9 mm
30,000	675	18	9	7½	4½	1½	<b>palmo</b>				185.756 6 mm
240,000	5400	144	72	60	36	12	8	<b>pulgado</b>			23.219 579 mm
2,880,000	64,800	1728	864	720	432	144	96	12	<b>linea</b>		1.934 965 mm
34,560,000	777,600	20,736	10,368	8640	5184	1728	1152	144	12	<b>punto</b>	161.25 µm

In Guipúzcoa

										Metric
<b>legua</b>										5480 m
1666⅔	<b>estado</b>									3.348 m
3333⅓	2	<b>braza</b>								1.674 m
6666⅔	4	2	<b>vara</b>							837 mm
20,000	12	6	3	<b>pie</b>						279 mm
240,000	144	72	36	12	<b>pulgado</b>					23.25 mm

251.10.2 Units of Area

In Álava

						Metric
<b>fanega de tierra</b>						2510.795 6 m <sup>2</sup>
2	<b>media fanega</b>					1255.397 8 m <sup>2</sup>
12	6	<b>celemin</b>				209.232 97 m <sup>2</sup>
48	24	4	<b>cuartillo</b>			52.308 24 m <sup>2</sup>
660	330	55	13¾	<b>estado or estadal</b>		3.804 24 m <sup>2</sup>
				5⅔	<b>vara cuadrada</b>	69.873 716 902 5 dm <sup>2</sup>

In Guipúzcoa

						Metric
<b>Fanega</b>						3432.788 1 m <sup>2</sup>
8 <sup>2</sup> / <sub>3</sub>	<b>peonada</b>					411.934 6 m <sup>2</sup>
100	12	<b>postura</b>				34.327 9 m <sup>2</sup>
900	108	9	<b>estado</b>			3.814 2 m <sup>2</sup>
4900	588	49	5%	<b>vara cuadrada</b>		70.056 9 dm <sup>2</sup>
44,100	5292	441	49	9	<b>píe cuadrada</b>	7.784 1 dm <sup>2</sup>

Other reported measures during the nineteenth century:

1 **peonada** (in Bilbao) = 544% varas cuadradas = 380.423 433 m<sup>2</sup>.

### 251.10.3 Units of Volume

1 **vara cúbico** (in Álava) = 584.077 893 273 842 625 dm<sup>3</sup>;

1 **vara cúbico** (in Guipúzcoa) = 586.376 253 dm<sup>3</sup>.

### 251.10.4 Units of Dry Capacity

In Álava

							Metric
<b>cahiz</b>							667.44 L
12	<b>fanega</b>						55.62 L
24	2	<b>media fanega</b>					27.81 L
144	12	6	<b>celemin</b>				4.635 L
576	48	24	4	<b>cuartille</b>			1.159 L
2304	192	96	16	4	<b>ochavo</b>		289.69 mL
9216	768	384	64	16	4	<b>ochaville</b>	72.42 mL

Two reported scales at Bilbao in Biscay

		Metric	Metric
<b>fanega</b>		56.994 14 L	56.920 L
12	<b>celemin</b>	4.749 5 L	4.743 3 L

In Guipúzcoa

				Metric
<b>fanega</b>				55.30 L
4	<b>cuartilla</b>			13.825 L
16	4	<b>celemin</b>		3.456 L
64	16	4	<b>chilla</b>	864.1 mL

251.10.5 Units of Liquid Capacity

In Álava

						Metric
<b>bota</b>						490.95 L
1 <sup>⁄</sup> <sub>8</sub>	<b>moyo</b>					261.84 L
30	16	<b>cántara</b>				16.365 L
240	128	8	<b>azumbre</b>			2.046 L
960	512	32	4	<b>cuartile</b>		511.4 mL
3 840	2 048	128	16	4	<b>copa</b>	127.8 mL

For wine in Bilbao

			Metric
<b>azumbre</b>			2.220 L
4	<b>cuartile</b>		555 mL
16	4	<b>copa</b>	138.75 mL

For oil in Bilbao

				Metric
<b>arroba</b>				13.480 L
25	<b>libra</b>			539.2 mL
100	4	<b>cuarteron</b>		134.8 mL
200	8	2	<b>ochava</b>	67.4 mL

In Guipúzcoa

				Metric
<b>arroba</b>				20.16 L
8	<b>azumbre</b>			2.52 L
32	4	<b>cuartillo</b>		630 mL
128	16	4	<b>copa</b>	157.5 mL

251.10.6 Units of Weight

At Álava (the standard of Castile)

									Metric
tonelada									920.186 kg
20	quintal								46.009 3 kg
80	4	arroba							11.502 325 kg
2000	100	25	libra						460.093 g
4000	200	50	2	marco					230.046 5 g
32,000	1600	400	16	8	onza				28.755 8 g
512,000	25,600	6400	256	128	16	adarme			1.797 g
1,536,000	76,800	19,200	768	384	48	3	tomin		599.08 mg
18,432,000	921,600	230,400	9216	4608	576	36	12	grano	49.92 mg

At Bilbao in Biscay

					Metric
<b>quintal</b>					48.800 kg
4	<b>arroba</b>				12.200 kg
100	25	<b>libra</b>			488 g
1600	400	16	<b>onza</b>		30.50 g
25,600	6400	256	16	<b>adarme</b>	1.906 25 g

Alternative scale at Bilbao in Biscay

				Metric
<b>quintal</b>				48.889 3 kg
4	<b>arroba</b>			12.222 kg
100	25	<b>libra</b>		488.893 g
1700	425	17	<b>onza</b>	28.758 g

In Guipúzcoa

				Metric
<b>quintal<sup>a</sup></b>				49.692 kg
4	<b>arroba</b>			12.423 kg
101	25 <sup>1</sup> / <sub>4</sub>	<b>libra</b>		492.0 g
1717	429 <sup>1</sup> / <sub>4</sub>	17	<b>onza</b>	28.9 g

<sup>a</sup>For iron, = 150 libras = 73.80 kg, and for cod, = 105 libras = 51.66 kg

Other measures reported during the nineteenth century:

1 **quintal macho** (for iron) = 146 libras = 71.378 kg.

251.11 Cantabria

251.11.1 Units of Length

1 **pié** (in Santander) = 278.33 mm.

251.11.2 Units of Dry Capacity

Mercantile scale in Santander

		Metric
<b>fanega</b>		54.729 L
37	<b>picotin</b>	1.479 L

For cereal in Santander

						Metric
<b>cahiz</b>						658.08 L
12	<b>fanega</b>					54.84 L
24	2	<b>medio fanega</b>				27.42 L
144	12	6	<b>celemin</b>			4.57 L
576	48	24	4	<b>cuartillo</b>		1.142 5 L
2304	192	96	16	4	<b>ochavo</b>	285.625 mL

Other measures reported during the nineteenth century:

- 1 **quintal** (in Santander) = 46.26 L;
- 1 **quintal** (in Santander) = 71.30 L (for iron bars), 46.92 L (for cod), and 49.22 L (for cacao).

251.11.3 Units of Liquid Capacity

In Santander

				Metric
<b>cántara</b>				15.80 L
8	<b>azumbre</b>			1.975 L
32	4	<b>cuartillo</b>		493.75 mL
128	16	4	<b>copa</b>	123.437 5 mL

251.11.4 Units of Weight

In Santander

		Metric
<b>libra</b>		460.10 g
16	<b>onza</b>	28.756 g

251.12 Castile

A former kingdom that gradually merged with its neighbors to become the Crown of Castile and later the Kingdom of Spain. Today, the area is divided into three different regions, namely, Castile-La Mancha, Castile and León, and Madrid.

251.12.1 Units of Length

										Metric
<b>legua</b>										5572.7 m
3333⅓	<b>toesa or braza</b>									1.672 m
4000	1⅕	<b>paso geométrico</b>								1.393 m
6666⅔	2	1⅓	<b>vara</b>							835.9 mm
20,000	6	5	3	<b>pie</b>						278.6 mm
80,000	24	20	12	4	<b>palmo</b>					69.66 mm
240,000	72	60	36	12	3	<b>pulgada</b>				23.22 mm
960,000	288	240	144	48	12	4	<b>dedo</b>			5.805 mm
2,880,000	864	720	432	144	36	12	3	<b>línea</b>		1.935 mm
34,560,000	10,368	8640	5184	1728	432	144	36	12	<b>punto</b>	0.161 mm

251.12.2 Units of Dry Capacity

Scale based on [KELL], [DOUR] and [NELK]

							Metric	Metric	Metric
<b>cahiz</b>							677.952 L	657.60 L	685.80 L
12	<b>fanega</b>						56.496 L	54.80 L	57.15 L
144	12	<b>celemin or almud</b>					4.708 L	4.567 L	4.762 L
288	24	2	<b>medio</b>				2.354 L	2.283 L	2.381 L
576	48	4	2	<b>cuartillo</b>			1.177 L	1.142 L	1.191 L
2304	192	16	8	4	<b>ochavo or recione</b>		294.25 mL	285.42 mL	297.66 mL
9216	768	64	32	16	4	<b>ochavillo</b>	73.562 5 mL	71.354 mL	74.414 mL

251.12.3 Units of Liquid Capacity

For wine

							Metric
<b>moyo</b>							
16	<b>arroba mayor or cántara</b>						16.137 L
64	4		<b>quartilla</b>				4.034 25 L
128	8		2	<b>azumbre</b>			2.017 12 L
512	32		8	4	<b>cuartillo</b>		504.281 mL
					2	<b>medio</b>	
2048	128		32	16	4		<b>copa</b> 126.070 mL

For oil

					Metric
<b>arroba</b>					12.55 L
4	<b>cuartilla</b>				
25	6¼	<b>libra</b>			
100	25	4	<b>panilla</b>		
400	100	16	4	<b>onza</b>	

## 251.13 Castile-La Mancha

This region is divided into five provinces: Ibacete, Cuidad Real, Cuenca, Guadalajara, and Toledo

[DIRE] reported 1 **legua** (in the province of Ciudad Real) = 8000 Castilian varas = 6687.24 m.

## 251.14 Foral Community of Navarre

### 251.14.1 Currency

1 ducado = 20 sueldos = 240 dineros

1 real = 4½ tarxas = 6 gruesos = 18 ochavos = 36

maravedis = 72 cornados

### 251.14.2 Units of Length

In Pamplona

								Metric
<b>legua</b>								5495.000 000 m
7000	<b>vara</b>							785.000 mm
21,000	3	<b>píe</b>						261.667 mm
252,000	36	12	<b>pulgada</b>					21.806 mm
1,008,000	144	48	4	<b>palmo</b>				5.451 mm
3,024,000	432	144	12	3	<b>linea</b>			1.817 mm
12,096,000	1728	576	48	12	4	<b>dedo</b>		454 µm
36,288,000	5184	1728	144	36	12	3	<b>punto</b>	15 µm

### 251.14.3 Units of Area

Traditional mesure in Pamplona:

1 **robada** = the amount of land that would be sown with 1 robo of seed = 1485 vara cuadrada = 898.456 m<sup>2</sup>.

In Pamplona

					Metric
<b>robada</b>					898.456 0 m <sup>2</sup>
2	<b>media robada</b>				449.228 0 m <sup>2</sup>
4	2	<b>cuarto de robada</b>			224.614 0 m <sup>2</sup>
1458	729	364½	<b>vara cuadrada</b>		61.622 5 dm <sup>2</sup>
13,122	6561	3280½	9	<b>píe cuadrada</b>	6.846 9 dm <sup>2</sup>

251.14.4 Units of Dry Capacity

For cereal in Pamplona

					Metric
<b>robo</b>					28.130 000 L
2	<b>medio robo</b>				14.065 000 L
4	2	<b>cuartal</b>			7.032 500 L
8	4	2	<b>medio cuartal</b>		3.516 250 L
16	8	4	2	<b>almud</b>	1.758 125 L

251.14.5 Units of Liquid Capacity

For oil in Pamplona

					Metric
<b>Arroba</b>					14.760 000 L
3	<b>docena</b>				4.920 000 L
36	12	<b>libra</b>			410.000 mL
432	144	12	<b>cuarteron</b>		34.167 mL
1296	432	36	3	<b>onza</b>	11.389 mL

In Pamplona

					Metric
<b>cántaro</b>					11.770 000 L
4	<b>cuarton</b>				2.942 500 L
16	4	<b>pinta</b>			735.625 mL
64	16	4	<b>cuartillo</b>		183.906 mL
128	32	8	2	<b>medio cuartillo</b>	91.953 mL

251.14.6 Units of Weight

In Pamplona

								Metric
quintal								37.200 000 kg
4	arroba							9.300 000 kg
33⅓	8⅓	libra de carne						1.116 000 kg
66⅔	16⅔	2	libra de pescado fresco					558.000 g
100	25	3	1½	libra prima				372.000 g
400	100	8⅓	4⅓	4	cuarteron			93.000 g
1600	400	33⅓	16⅔	16	4	onza		23.250 g
12,800	3200	266⅔	133⅓	128	32	8	ochava	2.906 g

251.15 Valencian Community

See *Crown of Aragon*.

This region is divided into three provinces: Alicante, Castelló and Valencia.

255 Spanish North Africa (Ceuta and Melilla)

Ceuta and Melilla are autonomous cities of Spain, but claimed by Morocco.

252 Spanish East Indies

See also *Spain*.

These were the Spanish colonies in Asia-Pacific from 1565 until 1898.

255.1 Currency

2002–: 1 euro = 100 euro-cents  
1869–2002: 1 Spanish peseta = 100 céntimos

252.1 Currency

1863–1898: 1 Philippine peso fuerte = 100 sentimos or céntimos  
1852–1863: 1 Philippine peso fuerte = 8 reales  
1728–1852: 1 Philippine barrilla  
1565–1728: 1 Mexican peso = 8 reales

255.2 Units of Length

Traditional system

		Metric
pic		610.0 mm
8	tomni	76.25 mm

Other reported measures:

1 canna or cubit = 533 mm.

253 Spanish Guinea

See *Equatorial Guinea*.

254 Spanish Morocco

See *Morocco*.

### 255.3 Units of Capacity

Metric-linked system

		Metric
<b>fanega</b> or <b>saâ</b>		56 L
4	<b>almude</b> or <b>mudd</b>	14 L

### 255.4 Units of Weight

Traditional system

				Metric
<b>kantar</b>				50.75 kg
$4\frac{7}{11}$	<b>kula</b>			11.165 kg
$16\frac{2}{3}$	$3\frac{2}{3}$	<b>gerbe</b>		3.045 kg
100	22	6	<b>rotal</b> or <b>artal</b>	507.5 g

### 256 Spanish Sahara

See *Western Sahara*.

### 257 Spanish West Africa

See *Western Sahara*.

### 258 Spitsbergen

See also *Norway*.

These islands were probably originally discovered in 1194, but were officially discovered in modern times by the Dutch navigator Willem Barentsz in 1596. Quarrels among the nationalities involved in the whaling industry, set up in 1611, resulted in the division of the coasts. Claims to the islands were made by the British, the Dutch, Danes, Norwegians, Swedes, Russians and Americans, but the question of sovereignty was not resolved until 1920, when a treaty officially ceded the islands to Norway.

### 259 Spratly Islands

A group of more than 650 islands in the South China Sea claimed by the Philippines, Brunei, China, Malaysia, Taiwan and Vietnam.

I have not found any data directly related to these islands.

### 260 Sri Lanka [Formerly: Taprobane, Serendib and Ceylon]

Singhalese Kingdoms flourished here from the fifth century BCE. Portuguese intervention began in 1505, and by 1612, the Portuguese controlled most of the island. In 1658, it had come under the control of the Dutch East India Company. In 1796, the Dutch were defeated by the British, and as a result, the island became a Crown Colony in 1802, and became complete when the Kingdom of Kandy was annexed in 1815. Ceylon became independent as the Dominion of Ceylon in 1948, and subsequently became a republic under the name of Sri Lanka in 1972.

Traditional units, also influenced by ancient Arabic and Indian systems, were used well into the eighteenth century. From the mid-seventeenth century, these were used along with units based on Portuguese and Dutch systems. From the early nineteenth century, English units were used officially and in trading. The metric system has been official since 1970, and compulsory since 1974. A gradual conversion from the Imperial system began in 1974 and was, in general, completed by 1980.

*Main sources:* [DAVY], [DOUR], [EB60], [FLÜG], [KELL], [MACM], [MART], [SMED], [UN55], [UN66], [URQU], and [WINS]

#### 260.1 Currency

1978–:	1 Sri Lankan rupee = 100 cents
1870–1978:	1 Ceylonese rupee = 100 cents
1860–1870:	1 pound sterling = 20 shilling = 240 pence
1825–1860:	1 British East Indian Company's rupee = 100 cents
1802–1825:	1 Ceylonese rixdollar = 12 fanams = 48 stuivers = 144 tscelis = 192 duit
–1802:	1 star pagoda (gold) = $3\frac{3}{4}$ rixdollar = 45 fanams = 180 stuivers
	1 ducatoon (silver) = 140 stuivers
	1 Dambadinia rhatra (gold coin used in the Seven Korles, present-day Wadenawagallaf)

## 260.2 Units of Quantity

1 **ton** (for cotton) = 5 bales of cotton.

## 260.3 Units of Length

Different scales and measures of distances and space, none of which were very precise, have been reported as being used during the seven-teenth and eighteenth centuries.

Scale used in estimating the distance between places

				Metric
a day's travel				~48,000 m
5	<b>gow</b> or <b>gawe</b>			~9600 m
20	4	<b>attakmé</b> or <b>stakme</b>		~2400 m
40	8	2	<b>whoo</b> <sup>a</sup>	~1 200 m

<sup>a</sup>The distance from which you can hear a loud shout

Scale used for measuring roads and more precise distances

				Metric
<b>attakmé</b> or <b>stakme</b>				~1350 m
500	<b>bandera bamba</b> <sup>a</sup>			~2.7 m
750	1½	<b>bamba</b> <sup>b</sup>		~1.8 m
4500	9	6	foot	~0.3 m

<sup>a</sup>The height to which a man can reach above his head with his hand

<sup>b</sup>The distance between the tip of the fingers, when the arms are extended

Scale for general use

							Metric
<b>youdoona</b> , <b>yúduna</b> , or <b>yoduna</b>							~21,600 m
4	<b>gow</b> or <b>gawe</b>						~5400 m
16	4	<b>attakmé</b> or <b>stakme</b>					~1350 m
8000	2000	500	<b>doona</b> or <b>dúna</b> <sup>a</sup>				~2.7 m
72,000	18,000	4500	9	<b>veata</b> or <b>veyata</b>			~300 mm
504,000	126,000	31,500	63	7	<b>angula</b>		~43 mm
3,528,000	882,000	220,500	441	49	7	<b>veetè</b> or <b>vitè</b> <sup>b</sup>	~6 mm

<sup>a</sup>The Sinhalese bow was usually considered equal to 3 feet

<sup>b</sup>A grain of paddy

Scale based on the width of a finger

					Metric
<b>gow</b> or <b>gawe</b>					~5400 m
80	<b>isbé</b>				~67.5 m
1600	20	<b>játé</b>			~3.4 m
11,200	140	7	<b>riéné<sup>a</sup></b>		~480 mm
224,000	2800	140	20	fingerbreadth	~24 mm

<sup>a</sup>A cubit

Scale used by carpenters and other artists

<b>wadduranea</b>		~360 mm
24	carpenters' <b>angula<sup>a</sup></b>	~15 mm

<sup>a</sup>The distance between the second and the third joint on the forefinger

During the nineteenth century, based on [CARD], [MART3], [KELL], and [WINS]

		Metric	Metric	Metric	Metric
<b>covid</b>		464 mm	469.90 mm	470 mm	472 mm
5	<b>palm</b>	92.8 mm	93.98 mm	94.0 mm	94.4 mm

## 260.4 Units of Area

Traditional system for land area<sup>13</sup>

				Metric
<b>ammunam, ammómam, or anoman<sup>a</sup></b>				~11,200 m <sup>2</sup>
4	<b>peyla</b>			~2800 m <sup>2</sup>
40	10	<b>coorney</b>		~280 m <sup>2</sup>
320	80	8	<b>laha</b>	~35 m <sup>2</sup>

<sup>a</sup>The land area that requires an ammómam of seed, taking the nature of the soil into account

Scale linked to Dutch and English systems during the nineteenth century

				Metric
<b>morgen</b>				9443 m <sup>2</sup>
1 <sup>13</sup> / <sub>15</sub>	<b>bau</b>			5059 m <sup>2</sup>
2 <sup>2</sup> / <sub>3</sub>	1 <sup>1</sup> / <sub>4</sub>	<b>acre</b>		4047 m <sup>2</sup>
9 <sup>2</sup> / <sub>3</sub>	5	4	<b>rood</b>	1012 m <sup>2</sup>

Measures reported during the twentieth century:

1 **square** (used in the building trade) = 100 yd<sup>2</sup>  
= 83.613 m<sup>2</sup>.

<sup>13</sup> According to [MART, p.396] and [DAVY, p.245], the measurement of land was calculated from the quantity of seed required to be sown on it, and consequently varied according to its fertility.

## 260.5 Units of Volume

1 **cord** (for wood) = 128 cu ft = 3.624 m<sup>3</sup>.

## 260.6 Units of Dry Capacity

Traditional system, based on [DAVY]

						Metric <sup>a</sup>
<b>ammunam, ammómam, or anoman</b> <sup>b</sup>						~33.6 L
4	<b>pála</b> <sup>b</sup>					~8.4 L
40	10	<b>lochoo-lahà</b>				~840 mL
60	15	1½	<b>punchy-lahà</b>			~560 mL
240	60	6	4	<b>nelleà, nellea, or nelliya</b>		~140 mL
480	120	12	8	2	<b>hundua</b> <sup>c</sup>	~70 mL

<sup>a</sup>These measures varied, depending on the size of the human hands. Larger measures were made of rattan

<sup>b</sup>Seldom used

<sup>c</sup>A handful. The size used above is a value estimated by me

English-linked scale reported during the early eighteenth century

								Metric
<b>amuna</b>								140.96 L
4	<b>pela</b>							35.24 L
16	4	<b>bera or karatuwa</b>						8.81 L
80	20	5	<b>kuruni or laha</b>					1.762 L
112	28	7	1⅔	<b>séru</b>				1.259 L
320	80	20	4	2⅔	<b>nelli</b>			440.5 mL
640	160	40	8	5⅔	2	<b>manawa</b>		220.2 mL
1280	320	80	16	11⅔	4	2	<b>chundu or chundoon</b>	110.1 mL

Sinhalese scale for cereal during the early nineteenth century, based on [DAVY] and [URQU]

								Metric <sup>a</sup>	Metric
<b>garce</b>								5085.10 L	5109.70 L
2⅔	<b>last</b>							1906.915 L	1916.139 L
25	9⅞	<b>ammunam, ammómam, or anoman</b>						203.404 L	204.388 L
200	75	8	<b>parrah</b>					25.425 L	25.548 L
400	150	16	2	<b>mercal</b>				12.713 L	12.774 L
1000	375	40	5	2½	<b>coorney</b>			5.085 L	5.110 L
4800	1800	192	24	12	4⅔	<b>cut measure, seer, or sihr</b>		1.059 4 L	1.064 5 L
19,200	7200	768	96	48	19⅓	4	<b>cut chundu or cut chundoon</b>	264.85 mL	266.13 mL

<sup>a</sup>The standard seer was a perfect cylinder with a depth of 4.35 inches and a diameter of 4.35 inches

In Colombo during the nineteenth century, based on [FLÜG]

							Metric
<b>last</b>							1945.068 L
9%	<b>ammunam, ammómam, or anoman</b>						204.744 L
75	8	<b>parrah<sup>a</sup></b>					25.593 L
150	16	2	<b>marcal</b>				12.796 L
400	42 $\frac{2}{3}$	5 $\frac{1}{3}$	2 $\frac{2}{3}$	<b>coorney</b>			4.799 L
1800	192	24	12	4 $\frac{1}{2}$	<b>cut measure, seer, or sihr</b>		1.066 38 L
7296	768	96	48	18	4	<b>cut chundu or cut chundoon</b>	266.594 mL

<sup>a</sup>The standard parrah was 16.7 in. × 16.7 in. × 5.6 in.

For wheat in Colombo during the nineteenth century, based on [MART3]

						Metric	Metric
<b>gahrs</b>						4198.680 388 kg	5112.400 L
25	<b>amoman or amomam</b>					167.947 215 kg	204.496 L
200	8	<b>parrah</b>				20.993 402 kg	25.562 L
400	16	2	<b>marcal</b>			10.496 701 kg	12.781 L
4800	192	24	12	<b>sihr</b>		847.725 g	1.065 083 L
19,200	768	96	48	4	<b>cundu</b>	218.681 g	266.271 mL

British Imperial-linked system during the late nineteenth century

		Imperial	Metric
<b>bushel</b>		1 bu	36.368 7 L
32	<b>measure</b>	1 qt	1.136 52 L

## 260.7 Units of Liquid Capacity

Traditional system, based on [DAVY]

			Metric <sup>a</sup>
<b>punchy-lahà</b>			~560 mL
4	<b>nelleà, nellea, or nelliya</b>		~140 mL
8	2	<b>hundua<sup>b</sup></b>	~70 mL

<sup>a</sup>These measures varied, depending on the size of the human hands. Larger measures were made of bamboo

<sup>b</sup>A handful. The size used above is a value estimated by me

For ghee and milk in Colombia

			Metric
<b>parrah</b>			25.593 L
24	<b>measure</b>		1.066 L
96	4	<b>chundu or chundoon</b>	266.6 mL

British Imperial-linked system for arrak, oil and wine during the late nineteenth century

						Metric
<b>legger<sup>a</sup></b>						567.796 500 L
75	<b>welt</b>					7.570 620 L
150	2	<b>gallon</b>				3.785 310 L
375	5	2½	<b>canada</b>			1.514 124 L
750	10	5	2	<b>quart</b>		757.062 L
11,250	150	75	30	15	<b>dram</b>	50.470 8 L

<sup>a</sup>Arrak and oil are bought at 80 welts per legger and sold by 77.6 welts or 388 canades per gegger

Other measures reported during the nineteenth century:

1 **ton** (for coconut oil) = 210 gal = 954.66 L;

1 **hogshead** (for beer in Colombia) = 238.7 L;

1 **bottle** = 727.4 mL.

## 260.8 Units of Weight

During the twelfth century

									Metric
<b>bharā</b>									96.80 kg
2	<b>tulā</b>								48.40 kg
5	2½	<b>nikkha</b>							19.36 kg
40	20	8	<b>phala</b>						2.42 kg
200	100	40	5	<b>suvanṇa<sup>a</sup></b>					484 g
400	200	80	10	2	<b>dharāṇa</b>				242 g
800	400	160	20	4	2	<b>akkha<sup>b</sup></b>			121 g
40,000	20,000	8000	1000	200	100	50	<b>masāka<sup>c</sup></b>		2.42 g
800,000	400,000	160,000	20,000	4000	2000	1000	20	<b>gunjā<sup>d</sup></b>	121 mg

<sup>a</sup>Generally used for gold

<sup>b</sup>Fruit from *Terminalia bellirica*

<sup>c</sup>Bean (*Phaseolus* sp.)

<sup>d</sup>Seed from *Abrus precatorius*

Traditional system for seed and brass

			Metric
<b>palam</b>			112 g
20	<b>kalandé</b>		5.6 g
480	24	madatea-gah seed <sup>a</sup>	233 mg

<sup>a</sup>This is the average value

Traditional system for trading

				Metric
<b>parama</b>				~254 kg
9 <sup>13</sup> / <sub>28</sub>	<b>thukka</b>			~26.8 kg
20	2 <sup>6</sup> / <sub>53</sub>	<b>thulama</b>		~12.7 kg
530	56	26½	<b>rathala</b>	~480 g

Scale used in trading with southern India

		Imperial	Metric
<b>ton</b>		2616 lbs	1186.6 kg
4	<b>candy</b>	654 lbs	296.6 kg

British Imperial-linked system for general use

								Metric
<b>candy or bahar<sup>a</sup></b> (= 500 lb)								226.796 326 kg
20	<b>maund</b>							11.339 816 kg
160	8	<b>vis</b>						1.417 477 kg
800	40	5	<b>seer</b>					283.495 407 g
3200	160	20	4	<b>powa</b>				70.873 85 g
6400	320	40	8	2	<b>pollam or varahan</b>			35.436 025 g
32,000	1600	200	40	10	5	<b>pagoda</b>		7.087 385 g
1,152,000	57,600	7200	1440	360	180	36	<b>fanam</b>	196.871 mg

<sup>a</sup>[NELK] reported 236.21 kg

Apothecaries' weights used by the Sinhalese during the late nineteenth century

							Metric
<b>rathala</b> (= 1 lb)							453.592 g
8	<b>palama</b>						56.699 g
96	12	<b>kalanda</b>					4.725 g
1920	240	20	<b>madatiya-eta<sup>a</sup></b>				236.25 mg
3840	480	40	2	<b>vee-eta<sup>b</sup></b>			118.125 mg
11,520	1440	120	6	3	<b>amu-eta<sup>c</sup></b>		39.375 mg
34,560	4320	360	18	9	3	<b>thala-eta<sup>d</sup></b>	13.125 mg

<sup>a</sup>*Adenathera pavonina*

<sup>b</sup>Paddy grain

<sup>c</sup>*Paspalam* seed

<sup>d</sup>Gingelly seed

British Imperial scale, based on [MART3]

					Imperial	Metric
<b>gahrs or garce<sup>a</sup></b>					9256½	4198.680 388 kg
–	<b>candy<sup>b</sup></b>				560	254.011 885 kg
–	–	<b>candy or bahar<sup>c</sup></b>			545	247.207 996 kg
–	–	–	<b>hundredweight<sup>d</sup></b>		112	50.802 377 kg
–	10	–	2	<b>pingo<sup>e</sup></b>	56	25.401 189 kg

<sup>a</sup>For wheat

<sup>b</sup>For copra and tobacco

<sup>c</sup>For hemp and coconuts. [NELK] reported it as 236.210 kg. Later also reported as 500 lbs = 226.796 326 kg

<sup>d</sup>For coffee, cowries, sugar and metals

<sup>e</sup>For cinnamon

Other measures reported during the nineteenth and twentieth centuries:

- 1 **ton** (for ebony and plumbago) = 20 Cwt = 1016.046 9 kg;  
 1 **ton** (for coffee and pepper, in bags) = 18 Cwt = 914.442 21 kg;  
 1 **ton** (for pepper in robbins, for coffee in casks, and for horns) = 16 Cwt = 812.837 52 kg;  
 1 **ton** (for coir-rope, junks, and yarn) = 12 Cwt = 609.628 14 kg;  
 1 **ton** (for cinnamon) = 800 lbs = 362.873 89 kg;  
 1 **anna** (for rice) = 240 lbs = 108.862 17 kg;  
 1 **bale** (for cinnamon) = 94 lbs = 42.637 68 kg, later also reported by [MART3] as 100 lbs = 45.359 265 kg;  
 1 **bushel** (for milled rice) = 64 lbs = 32 measures of rice = 29.029 930 kg;  
 1 **bushel** (for rough rice) = 46 lbs = 20.865 262 kg;  
 1 **parrah** (for salt) = 44–55 lbs = 19.958 048–24.947 560 kg;  
 1 **parrah** (for rice) = 42–46 lbs = 19.050 864–20.865 232 kg;  
 1 **parrah** (for coffee) = 30–35 lbs = 13.607 760–15.875 720 kg;  
 1 **parrah** (for paddy (= unhusked rice)) = 30–33 lbs = 13.607 760–15.875 720 kg;  
 1 **parrah** (for pepper) = 27–30 lbs = 12.246 984–13.607 760 kg;

1 **measure** (for milled rice) = 2 lbs = 14.514 965 kg.

## 261 Straits Settlements

See also *Singapore*.

The Straits Settlements are a former British colony from 1826 that comprised Malacca, Penang (including Province Wellesley and the Dindings) and Singapore (including Christmas Island and the Keeling Islands). The Straits Settlements were ruled by the British East India Company from 1826 to 1858, and by British India from 1858 to 1867, when it became a Crown Colony. In 1906, Labuan joined the colony. The colony was dissolved in 1946.

A system for weights and measures, linked to the British Imperial system, were already in general use in 1826.

*Main source:* [BALF]

### 261.1 Currency

- 1939–1946: 1 Malayan dollar = 100 cents  
 1904–1939: 1 Straits dollar = 100 cents  
 1867–1904: 1 Spanish dollar = 8 reales  
 1837–1867: 1 Indian rupee = 16 anna = 192 pies

### 261.2 Units of Length

British Imperial-linked system

									Imperial	Metric
<b>orlong</b>									2880 in.	73.16 m
20	<b>jěmba</b> or <b>jumba</b>								144 in.	3.658 m
40	2	<b>depa</b> or <b>depoh</b>							72 in.	1.829 m
80	4	2	<b>ela</b> or <b>hailoh</b>						36 in.	914.4 mm
160	8	4	2	<b>hasta,</b> <b>astah,</b> or <b>esto</b>					18 in.	457.2 mm
240	12	6	3	1½	<b>kaki</b>				12 in.	304.8 mm
320	16	8	4	2	1⅓	<b>jengkal</b>			9 in.	228.6 mm
640	32	16	8	4	2⅔	2	<b>tempoh</b>		4½ in.	114.3 mm
1280	64	32	16	8	5⅓	4	2	<b>plempap</b>	2¼ in.	57.15 mm

261.3 Units of Liquid Capacity

British Imperial-linked upper scale

					Imperial	Metric
<b>koyan</b>					100 bu	3636.768 L
5	<b>kunca</b>				20 bu	727.353 6 L
44%	8%	<b>pikal</b>			2¼ bu	81.827 3 L
50	10	1⅞	<b>nalih</b>		2 bu	72.735 4 L
80	16	1⅝	1⅝	<b>para or parra</b>	10 gal	45.459 6 L

British Imperial-linked lower scale

						Imperial	Metric
<b>para or parra</b>						10 gal	45.459 6 L
10	<b>gantang</b>					1 gal	4.545 96 L
16	1⅝	<b>adoulie</b>				5 pt	2.841 225 L
40	4	2½	<b>cupak</b>			1 qt	1.136 49 L
80	8	5	2	<b>lang</b>		1 pt	568.245 mL
160	16	10	4	2	<b>pau or pauh</b>	½ pt	284.122 5 mL

261.4 Units of Weight

British Imperial-linked upper scale

						Metric
<b>koyan</b>						2419.159 6 kg
13⅓	<b>bhara</b>					181.436 97 kg
40	3	<b>pikul</b>				60.478 99 kg
400	30	10	<b>tan</b>			6.047 899 kg
1000	75	25	2½	<b>gantang</b>		2.419 160 kg
2000	150	50	5	2	<b>bedur</b>	1.209 580 kg

British Imperial-linked lower scale

						Metric
<b>bedur</b>						1.209 580 kg
2	<b>kati</b> (= 1⅓ lbs av)					604.789 9 g
32	16	<b>tahil or bonghal<sup>a</sup></b>				37.799 4 g
320	160	10	<b>chee, chi, mace, or emas<sup>a</sup></b>			3.779 94 g
3200	1600	100	10		<b>hoon or condorim<sup>a</sup></b>	377.993 7 mg

<sup>a</sup>Usually used for opium

262 The Sudan [Formerly: Anglo-Egyptian Sudan]

See also *Darfur*, *Egypt*, and *South Sudan*.

This area was the site of the Nubian kingdom in ancient times. From the fourteenth century until the early nineteenth century, many small independent states ruled the area. The small states were united in 1822 by Mohammed Ali, Pasha of

Egypt. Egypt was driven from the area during the Mahdist revolt from 1881 to 1898. An Anglo-Egyptian Condominium was established in 1899. The Sudan achieved independence in 1956, with the consent of the British and Egyptian governments.

As in many African countries, with a history that is largely shrouded in mystery, there are very few data on the measurement system that was prevalent prior to colonization. In excavations, some weights from ancient cultures have been found. During the early nineteenth century, many units of measurement were adopted from the Egyptian system for weights and measures. Some of those measures were redefined during Anglo-Egyptian Condominium. The metric system was formally adopted in 1955.

*Main sources:* [AMER], [BALF2], [EUR2], [FENN], [GRAS2], [HATC], [KUNZ], [MANG], [MART10], [NAVA], [REEV2], [ROTH2], [SUDA], [TOTH], [TULL], [UN66], and [WILL6]

## 262.1 Currency

2007–:	1 Sudanese pound = 100 qirsh or piastres
1992–2007:	1 Sudanese dinar = 100 qirsh or piastres
1957–1999:	1 Sudanese pound = 100 qirsh or piastres = 1000 millimes
c.1890–1957:	1 Egyptian pound = 100 qirsh or piastres = 1000 millimes
nineteenth century:	1 Maria Theresa Thaler
eighteenth century:	1 Medjidi dollar = 8 Omla
fifteenth to eighteenth century:	Gedida dollars 1 koroni (shell)

## 262.2 Units of Quantity

1 **kalleiga** or **warataba** = some bundles of dura straw offered for sale, weighing 4–10 rotls in total;

1 **kalleiga** or **kullega** = a bundle of dura straws;  
1 **koom** = a pile of vegetables or fruit; the number differs according to the type of commodity.

## 262.3 Units of Length

For agricultural land on Nile banks

				Metric
<b>habl<sup>a</sup></b> or <b>haul</b>				~4.64 m
2	<b>ûd<sup>b</sup></b>			~2.32 m
8	4	<b>adria, dhra, dira, diraa baladi, or bakadi pik</b>		~580 mm
196	96	24	<b>kirat</b>	~24.2 mm

<sup>a</sup>(= “rope”). It varied between 2 and 10 diraa (= ~1.143–5.715 m).

<sup>b</sup>The river land was measured lineally (not superficially) along the river by the *ûd*

In the Masterai area, based on [TULL, p. 272]

		Metric
<b>habl</b>		~3.06–3.12 m
6	<b>dira</b>	~510–520 mm

Other measures reported during the early nineteenth century:

- 1 **farsakh** = ~4.83 km;
- 1 **sa’a** or **saâ** = one hour’s travelling time = between 2½ and 4 miles, depending on means of transport = ~4–6½ km;
- 1 **kassaba** or **qasaba** = 3.55 m;
- 1 **ragil Bergedawi** (for depth of wells only) = 8 ft = ~2.438 m;
- 1 **ragil** or **rageil** (for depth of wells only) = in concept, equal to the distance from finger tip to finger tip with the arms held out horizontally = ~1½ yards = ~1.676 m;
- 1 **kutla** = a stick of timber for taxation purposes measuring about 1.07 m in mid-girth;
- 1 **pik mehmari** (for architectural use) = 750 mm;
- 1 **hindaza** (for cloth at Jebel Zabid el Woga) = ¾ yard = 685.8 mm;
- 1 **hindassa, hindaza, or pik Stambuli** (for cloth) = 660.4 mm;
- 1 **hindaia** (for cloth) = 658.2 mm;

1 **diraa baladi** = 580 mm;

1 **diraa** = the length from the elbow to the middle finger tip of the left arm plus the breadth of the right hand =  $\sim 22\frac{1}{2}$  in. =  $\sim 571.5$  mm.

Anglo-Egyptian system

ميل		قدم			بوصة		Metric
<b>mile</b>							1609.344 m
960	<b>bâa</b>						1.676 4 m
5280	$5\frac{1}{2}$	<b>qadam or kadam</b>					304.8 mm
9051 $\frac{3}{7}$	$9\frac{3}{7}$	$1\frac{3}{7}$	<b>shibr or shibiri</b>				177.80 mm
10,560	11	2	$1\frac{1}{6}$	<b>fitr<sup>a</sup></b>			152.40 mm
63,360	66	12	7	6	<b>busa</b>		25.40 mm
506,880	528	96	56	48	8	<b>linia</b>	3.175 mm

<sup>a</sup>In concept, the span between the extremity of the thumb and the index finger

## 262.4 Units of Area

Egyptian-linked system after 1830

		فدان		قيراط					Metric
<b>murabba<sup>a</sup></b>									672,133.280 m <sup>2</sup>
16	<b>qit'a<sup>b</sup></b>								42,008.330 m <sup>2</sup>
160	10	<b>feddan<sup>c</sup></b>							4200.833 m <sup>2</sup>
256	16	1⅕	<b>angaia<sup>d</sup></b>						2625.521 m <sup>2</sup>
3840	240	24	15	<b>kirat or kirat kamel<sup>c</sup></b>					173.035 m <sup>2</sup>
11,520	720	72	45	3	<b>habbah</b>				58.345 m <sup>2</sup>
23,040	1440	144	90	6	2	<b>danek</b>			29.172 m <sup>2</sup>
92,160	5760	576	360	24	8	4	<b>sahm</b>		7.293 m <sup>2</sup>
2,211,840	138,240	13,824	8640	576	192	96	24	<b>soht or sahtout</b>	30.388 dm <sup>2</sup>

<sup>a</sup>In the Tokar Delta, a murabba measures about 800 × 840 m, and in the Gash Delta, only about 820 × 820 m

<sup>b</sup>Mainly used in the Gash Delta

<sup>c</sup>Also called **feddan masri**. [Sudan Notes and Records, vol. 3–4, Middle East Press, 1920, p. 226] reported that it was the extent of a day's ploughing, but also [p.66] that it was, during the early twentieth century, an area sufficient to be sown by 1½ lbs of seed

<sup>d</sup>One of 16 parallel strips into which a 10-feddan holding was divided in Al Jazirah

<sup>e</sup>Also reported as 209.35 sq yds = 175.043 m<sup>2</sup>

River land areas were generally categorized as sakia land or seluka land.

*Sakia* land was irrigated by means of sakias or shadufs, whether on the mainland or an island.

*Seluka* land, or *garf* land, was irrigated by the natural flood of the Nile, hence also known as river bugar land.

These land areas were measured in different ways, depending on how they were irrigated.

In most districts, river bugar land were measured lineally, by the **ḥabl** and **ûd**, instead of by the square.

For rain bugar land (*hadab*) = cultivated land behind the river bugar land

		Metric
<b>kordofan mukhammas<sup>a</sup></b>		7266.2 m <sup>2</sup>
$2\frac{1}{4}$	<b>makhammas, makhammus or makhamus<sup>b</sup></b>	3228.9 m <sup>2</sup>

<sup>a</sup>1 **kordofan mukhammas** was also reported for rain land as 20 ûds × 60 qadams = 127.284 m<sup>2</sup>

<sup>b</sup>[REEV2] reported that 1 **makhammas** = 1.73 feddans. [TULL, p. 272] reported it as 20 × 30 habls

For rain land (*dahara*)

				Metric
<b>gada'</b> or <b>gadaa'</b> <sup>a</sup>				22,054.375 m <sup>2</sup>
5¼	<b>feddan</b> or <b>faddan</b> <sup>b</sup>			4200.833 m <sup>2</sup>
126	24	<b>kirat</b> or <b>qirat</b>		175.035 m <sup>2</sup>
1750	333⅓	13%	<b>kassaba</b> or <b>qasaba</b>	12.602 5 m <sup>2</sup>

<sup>a</sup>Each side measured 64 ûd

<sup>b</sup>In concept, a day's work

Other reported measures:

1 **kifāyat yed** = an area of land in a Kurdufan village allotted to an individual for working by hand;

There were also, during the twentieth century, some measures for arable land based on the amount of seed one could sow, e.g., "**ouiba land**."

## 262.5 Units of Volume

The average measurement of 50 kantars of wood was reported, [NAVA, p. 308], as varying by location.

South of Khartoum, it was reported as 8 ft 6 in. × 4 ft 6 in. × 4 ft 6 in., or 10 kantars = 1 m<sup>3</sup>, but north of Khartoum, 9¼ kantars = 1 m<sup>3</sup>.

## 262.6 Units of Liquid Capacity

Liquids were generally sold by weight. [NAVA] and [SUDA] reported a **girba** as a rough liquid measure of about 64 L. There was also a **qâdûs** (for water in the oases of the Sahara desert) = the capacity of a standard bucket.

## 262.7 Units of Dry Capacity

Upper scale for dura (*Sorghum vulgare*), dukhn (*Pennisetum typhoidum*) and other cereals in Khartoum

								Metric
<b>daribah</b>								1584.192 L
3	<b>cafiz</b> or <b>cafiso</b>							528.064 L
8	2⅔	<b>ardeb</b> , <b>ardabb</b> , or <b>artaba</b> <sup>a</sup>						198.024 L
48	16	6	<b>ouiba</b> or <b>webah</b>					33.004 L
96	32	12	2	<b>kēla</b> or <b>keila</b>				16.502 L
192	64	24	4	2	<b>rouboun</b> or <b>rub</b>			8.251 L
384	128	48	8	4	2	<b>melwa</b>		4.125 L
768	256	96	16	8	4	2	<b>qadah</b>	2.063 L

<sup>a</sup>One ardeb of simsim = 264 rols = 118.6 kg, one ardeb of dura = 336 rotls = 151.0 kg, and one ardeb of dukhn = 360 rotls = 161.7 kg

Lower scale for dura (*Sorghum vulgare*), dukhn (*Pennisetum typhoidum*) and other cereals in Khartoum

								Metric
<b>melwa</b> <sup>a</sup>								4.125 L
2	<b>qadah</b> or <b>kadah</b>							2.063 L
3 $\frac{1}{3}$	1 $\frac{1}{3}$	<b>ugga</b>						1.238 L
4	2	1 $\frac{1}{5}$	<b>nisf qadah</b> or <b>nus qadah</b>					1.031 4 L
8	4	2 $\frac{2}{5}$	2	<b>robbah</b> or <b>rub qadah</b>				515.69 mL
16	8	4 $\frac{4}{5}$	4	2	<b>toumna</b>			257.84 mL
32	16	9 $\frac{3}{5}$	8	4	2	<b>kharrouba</b> <sup>b</sup>		128.92 mL
64	32	19 $\frac{1}{5}$	16	8	4	2	<b>qirat</b>	64.46 mL

<sup>a</sup>Also romanized as **malwa** or **midd**

<sup>b</sup>Also romanized as **kharrouba** (= “bean pod”)

Other measures reported during the nineteenth and twentieth centuries:

- 1 **midd** (used by the Lafota people) = about 5 L;
- 1 **ratel** (for beer) = 1 pint = 568.3 mL;
- 1 **gugu** (for storing grain in the Equatoria Province) = a cylindrical bin about 4 ft in diameter set on wooden posts about 3 ft above the ground;
- 1 **abu arba** (for cereal) = a small bowl for cereal;
- 1 **safiha** (used by the Lafota people) = an oil tin bucket used for measuring various commodities.

## 262.8 Units of Weight

Various traditional Units of Weight:

- 1 grain from Bwana (*Acaia Adansonii*) = 25 mg;
- 1 grain from Rhynchoisa Calysia = 110 mg;
- 1 grain from Tamarindus Indica = 550 mg;
- 1 round weight of copper with striated border = 13.75 g;
- 1 round weight of lead or copper = 13.77 g;
- 1 round weight of copper with striated border = 13.85 g;
- 1 round weight of lead = 19.95 g;
- 1 round weight of iron = 25.13 g;
- 1 round weight of lead = 27.38 g;
- 1 **real** (for silver) = 28.0 g;
- 1 cylindrical weight decorated with 6 circles = 38.92 g;

- 1 cylindrical weight of iron = 53.19 g;
- 1 round weight of copper = 56.47 g;
- 1 round weight of copper = 108.43 g.
- 1 **retal** = 1.5 kg.

Traditional upper scale in Djenne (signs carved on the weights shown in parentheses)

	Metric
<b>karui des dioula</b>	180 g
<b>karui</b> (with five circles)	167.5 g
<b>karui</b> (with six circles)	161 g
<b>karui des dioula</b> (with three circles)	133.5 g
<b>karui</b> (three circles with two central)	81.5 g

Traditional upper middle scale in Djenne (signs carved on the weights shown in parentheses)

					Metric
<b>karui</b> (three circles with two central)					81.5 g
$1^{26/137}$	<b>karui</b> (two circles)				68.5 g
$1^{55/108}$	$1^{29/108}$	<b>karui</b> (one point and one central circle with a point)			54 g
$1^{78/85}$	$1^{52/85}$	$1^{23/85}$	<b>karui</b> (one circle)		42.5 g
$2^{53/55}$	$2^{27/55}$	$1^{53/55}$	$1^{6/11}$	<b>wakie</b> (one circle)	27.5 g

Traditional lower middle scale in Djenne (signs carved on the weights shown in parentheses)

						Metric
<b>wakie</b> (one circle)						27.5 g
$1^{13/42}$	<b>wakie</b> (one circle)					21 g
$1^{3/6}$	$1^{7/5}$	<b>wakie</b> (one circle)				15 g
$3^{1/18}$	$2^{1/3}$	$1^{2/3}$	<b>wakie</b> (one circle)			9 g
$3^{49/57}$	$2^{54/57}$	$2^{6/57}$	$1^{5/57}$	<b>arubo</b> (one circle)		7.125 g
$5^{1/2}$	$4^{1/5}$	3	$1^{4/5}$	$1^{17/40}$	<b>atumu</b> (one circle)	5 g

Traditional lower scale in Djenne (signs carved on the weights shown in parentheses)

							Metric
atumu (one circle)							5 g
1⅓	mustukal (one circle)						4.5 g
1⅔	1⅔	mustumu					3.5 g
1⅓	1½	1⅓	mustukal (two circles)				3 g
2	1⅔	1⅔	1⅓	mustukal (one point)			2.5 g
4	3⅔	2⅔	2⅔	2	tali (one point)		1.25 g
71⅔	64⅔	50	42⅔	35⅔	17⅔	dyote (one point)	70 mg

## Traditional Bedouin scale

				Metric
<b>hemla</b>				312 kg
$4\frac{1}{6}$	<b>Bedouin heml</b>			74.88 kg
275	66	<b>Ugia</b>		1.13 kg
600	144	$1\frac{7}{11}$	<b>ratl</b>	520 g

## Egyptian-linked system during the early nineteenth century

									Metric
(large) <b>kantar</b>									141.523 kg
$3\frac{3}{20}$	<b>kantar<sup>a</sup></b>								44.928 kg
$25\frac{1}{5}$	8	<b>tumna</b>							5.616 kg
$113\frac{7}{5}$	36	$4\frac{1}{2}$	<b>oke or ugga</b>						1.248 kg
315	100	$12\frac{1}{2}$	$2\frac{1}{6}$	<b>rotl</b>					449.279 g
3780	1200	150	$33\frac{1}{3}$	12	<b>ukia, uqiya, or waqia</b>				37.44 g
45,360	14,400	1800	400	144	12	<b>dirhem</b>			3.12 g
725,760	230,400	28,800	6400	2304	192	16	<b>kirat</b>		195 mg
2,903,040	921,600	115,200	25,600	9216	768	64	4	<b>qamhah<sup>b</sup></b>	48.75 mg

<sup>a</sup>One **kantar** of unginned cotton in Al Jazira = 315 rotls = 141.553 kg. There was also one **Alexandrian kantar** = 112 oke = 139.776 kg

<sup>b</sup>Also spelled **kamha** or **bugday**

## During the early nineteenth century, based on [AMER, p. 430]

		Imperial	Metric
<b>haml</b> or <b>heml</b> (camel load)		~300 lbs <sup>a</sup>	~1360 kg
30	<b>ruba<sup>b</sup></b>	~10 lbs	~4.5 kg

<sup>a</sup>According to [NAVA, p. 307], this value was for Western or Bedouin camels

<sup>b</sup>Usually reported as used for dates

## During the early twentieth century, based on [NAVA, p. 307] and [UN55]

		Metric
<b>haml<sup>a</sup></b> or <b>heml</b> (camel load)		249.60 kg
200	<b>oke</b>	1.248 kg

<sup>a</sup>[AMER, p. 430] reported 249.55 kg

## Abyssinian-linked system during the early twentieth century, based on [NAVA]

			Metric
<b>rotl</b>			308.4 g
10	<b>mokha</b>		30.84 g
120	12	<b>dirhem</b>	2.57 g

System based on [MART10, p. 549] and [KUNZ, p. 420]

						Metric
<b>farasula</b> <sup>a</sup>						17.971 kg
1 $\frac{1}{15}$	<b>farasula</b> <sup>b</sup>					16.848 kg
1 $\frac{1}{3}$	1 $\frac{1}{4}$	<b>farasula</b> <sup>c</sup>				13.478 kg
53 $\frac{1}{3}$	50	40	<b>natr</b>			336.96 g
640	600	480	12	Maria Theresa Thaler weight		28.08 g
5760	5 400	4 320	108	9	<b>dirhem</b>	3.12 g

<sup>a</sup>For rubber

<sup>b</sup>For coffee and wax

<sup>c</sup>For ivory

For market cotton:

- 1 **kantar** (for inginned cotton) = 100 or 105 rotls = 44.93 kg or 47.17 kg;
- 1 **kantar** (for cotton at Tokar) = 100 rotls = 44.93 kg;
- 1 **kantar** (for ginned or pressed cotton) = 99 rotls = 44.48 kg.

Some other reported measures:

- 1 **tonolata Inglisi** (English tonne) = 814 okes = 1016.06 kg;
- 1 **tonolata** (French tonne) = 800 okes = 1000 kg;
- 1 **bale** = 400 lbs = 181.44 kg.

In Berber

					Metric
<b>midd</b>					4.792 kg
2 $\frac{2}{3}$	<b>tumna</b>				1.797 kg
8	3	<b>tasa</b>			599.039 g
10 $\frac{2}{3}$	4	1 $\frac{1}{3}$	<b>rotl</b>		449.279 g

In Suakin

						Metric
<b>robta</b>						364.868 50 kg
5	<b>kantar</b>					72.973 7 kg
9	1 $\frac{1}{5}$	(small) <b>kantar</b>				40.540 944 kg
15	3	1 $\frac{1}{3}$	<b>cossera</b>			24.324 567 kg
450	90	50	30	<b>men</b>		810.819 g
900	180	100	60	2	<b>rotolo</b>	405.409 g

Traditional system for gold and silver

		Metric
<b>usanno</b>		20.4 g
16	<b>akey</b>	1.275 g

Anglo-Egyptian system for gold and precious metals

					Metric
<b>ukla</b>					37.44 g
8	<b>mithkal</b>				4.68 g
12	1½	<b>dirhem</b>			3.12 g
192	24	16	<b>kirat</b>		195 mg
320	40	26⅔	1⅓	<b>hebba or habba</b> <sup>a</sup>	117 mg

<sup>a</sup>During the early twentieth century, reported, by [AMER], as 122 mg

Metric-linked system for gold

		Metric
<b>wagia dehabia</b>		32 g
320	<b>hebba or habba</b>	100 mg

## 263 Sudanese Republic

See *Mali*.

## 264 Sukhothai

See also *Thailand*.

In the area around the city of Sukhothai in present-day Thailand, Sukhothai was a kingdom that existed from 1238 to 1438.

### 264.1 Units of Weight

1 ball money = 13–15 g.

I have not found any data directly related to this state.

## 265 Sulu State

See also *Philippines*.

The Sulu State was a sultanate that ruled many of the islands of the Sulu Sea and several places in northern Borneo. It was founded in 1457 by Say-yid Abu Bakr Abirin. In 1851, the island of Sulu and its dependencies were annexed by Spain. In 1888, North Borneo became a protectorate of Great Britain.

*Main sources:* [DOUR] and [MART3]

### 265.1 Currency

1851-1888: 1 Spanish piastra = 8 causong

### 265.2 Units of Length

				Metric
<b>picol</b>				75.065 m
2½	<b>raga</b>			30.026 m
25	10	<b>gantang</b>		3.002 6 m
200	80	8	<b>pantching</b>	375.325 mm

### 265.3 Units of Dry Capacity

Dry commodities were generally measured by weight.

For cereal

				Metric	Metric
<b>pecul</b>				80 L	60.478 kg
2½	<b>raga</b>			32 L	24.19 kg
25	10	<b>gantang</b>		3.20 L	2.419 kg
200	80	8	<b>panching</b>	400 mL	302.4 g

### 265.4 Units of Weight

Traditional system, based on [DOUR] and [MART3]

									Metric	Metric
<b>bahar</b>									181.416 kg	181.437 06 kg
3	<b>picol</b>								60.472 kg	60.479 02 kg
6	2	<b>laksa</b>							30.236 kg	30.239 51 kg
60	20	10	<b>booboot</b>						3.023 6 kg	3.023 951 kg
300	100	50	5	<b>catty</b>					604.72 g	604.790 2 g
4800	1600	800	80	16	<b>tehl or tale</b>				37.795 g	37.799 4 g
48,000	16,000	8000	800	160	10	<b>mas or ammas</b>			3.779 5 g	3.779 9 g
480,000	160,000	80,000	8000	1600	100	10	<b>ulandong or choosock<sup>a</sup></b>		377.95 mg	377.99 mg
4,800,000	1,600,000	800,000	80,000	16,000	1000	100	10	<b>muhuk</b>	37.795 mg	37.799 mg

<sup>a</sup>Also reported as **condorine**

British Imperial-linked system during the mid-nineteenth century

						Imperial	Metric
<b>koyan</b>						5333⅓ lbs av	2419.147 kg
13⅓	<b>bahar</b>					400 lbs av	181.436 kg
40	3	<b>picul</b>				133⅓ lbs av	60.478 7 kg
53⅓	4	1⅓	<b>quintal</b>			100 lbs av	45.359 2 kg
4000	300	100	75	<b>kati</b>		1⅓ lbs av	604.786 7 g
64,000	4800	1600	1200	16	<b>tahil</b>	–	37.799 387 g

For rice

					Metric
<b>picul</b>					60.472 kg
1⅓	<b>cavan</b>				45.304 kg
2	1⅓	<b>laksa</b>			30.236 kg
20	14	10	<b>gantang or booboot</b>		3.023 6 kg
100	70	50	5	<b>catty</b>	604.72 g

Other measures reported during the nineteenth century:

1 **arroba** = 11.503 kg.

1 tael = 4 soocoos = 16 sattalies or satallers (île Sinkell)

1 Spanish piaster = 24 fanams = 400 kepins (Tappanooly)

## 266 Sumatra

See also *Aceh Sultanate and Indonesia*.

Many kingdoms have ruled over various parts of this island over the centuries. The Empire of Srivijaya and the Kingdom of Samudra are among the most well-known. Samudra was succeeded by the powerful Aceh Sultanate, which survived until 1903. After the Dutch

## 266.2 Units of Quantity

Some measures reported during the nineteenth century:

1 **coodee** or **courge** (for tobacco in Fort-Marlborough) = 40 baskets;

1 **coodee** or **courge** (for other commodities in Fort-Marlborough) = 20 pieces.

## 266.3 Units of Length

British Imperial-linked system in Fort-Marlborough

					Metric
<b>tung</b>					3.657 56 m
2	<b>gocheoh</b> or <b>pointing</b> (= 2 yd)				1.828 78 m
10	5	<b>cheoh, ché, or tché</b>			365.756 mm
100	50	10	<b>choon</b>		36.575 6 mm
1000	500	100	10	<b>hoon</b>	3.657 56 mm

British Imperial-linked system in Bencoolen (present-day Bengkulu), Fort-Marlborough and Palembang

					Metric	Metric
<b>dipoh</b> or <b>depoh</b>					1.828 767 m	1.828 784 m
2	<b>heloh</b> or <b>hailoh</b> (= 1 yd)				914.383 mm	914.392 mm
4	2	<b>esto, etto, or covid</b>			457.192 mm	457.196 mm
8	4	2	<b>jankal</b> or <b>ancal</b>		228.596 mm	228.598 mm
16	8	4	2	<b>tempoh</b>	114.298 mm	114.299 mm

arrived, the many princely states within Sumatra gradually came under their control.

*Main sources:* [DOUR] and [MART3]

## 266.1 Currency

1827–: 1 Dutch guilder = 100 cents

–1827: 1 dollar or rial = 4 soocoos = 8 sattalies or satallers (Bencoolen (present Bengkulu))

1 Dutch Rijksdaalder = 48 stuivers (Padang and Palémbang)

Other measures reported during the nineteenth century:

1 **Sumatra paal** = 1851.852 m ;

1 **condorine** (in Bencoolen (present Bengkulu)) = 413.4 mm;

1 **condorine** (in Padang) = 412.1 mm;

1 **condorine** (in Natal) = 378.4 mm.

## 266.4 Units of Area

1 **bahoe, backu, bahu**, or **bouw** = 7096.49 m<sup>2</sup>.

1 **jalur** (in the eastern part of Sumatra) = about 400 m<sup>2</sup>.

## 266.5 Units of Capacity

Most goods were measured by weight.

Traditional system

							Metric
<b>coiang, copang,</b> or <b>coyang</b>							1333.33 L
10	<b>gunca</b> or <b>guncha</b>						133.33 L
32	3½	<b>parah</b> <sup>a</sup>					41.67 L
100	10	3⅛	<b>nelli</b> or <b>nelly</b>				13.33 L
800	80	25	8	<b>bamboo</b>			1.67 L
1600	160	50	16	2	<b>quarter</b>		833.33 mL
3200	320	100	32	4	2	<b>copa</b> or <b>caul</b>	416.67 mL

<sup>a</sup>For salt

For cereal and liquids in Ayer-Bonghye, Natal and Tappanooly

				Metric
<b>coyang</b>				5281.6 L
80	<b>tub</b>			66.02 L
800	10	<b>sukat</b>		6.602 L
9600	120	12	<b>pakha</b>	550.17 mL

English scale for dry goods in Bencoolen, present-day Bengkulu

				English Wine Gallons	Metric
<b>coyang</b> or <b>coyan</b> <sup>a</sup>				800	3303.365 763 L
80	<b>bali</b> or <b>bally</b>			10	41.292 072 L
800	10	<b>bamboo, culah,</b> or <b>koolah</b>		1	4.129 207 L
3200	40	4	<b>choopah, chupo,</b> or <b>chupah</b>	¼	1.032 302 L

<sup>a</sup>[KAHN] also reported 1 **coyang** = 344 koolah = 1420.376 L. [BAUE] reported it as 201,600 English cu in. = 3303.54 L

For rice and peas in Fort-Marlborough

			Metric
<b>coyang</b>			3,345 L
810	<b>bamboo</b> or <b>koolah</b>		4.129 3 L
3240	4	<b>chupah</b>	1.032 3 L

For grain in Fort-Marlborough

			Metric
<b>coyang</b>			3300 L
800	<b>bamboo or koolah</b>		4.125 L
5200	6½	<b>chupah</b>	634.6 mL

For cereal and liquids in Padang and at Palémbang

					Metric	Metric
<b>coiang, copang, or coyang</b>					2960 kg	3920 L
1⅓	<b>coiang, copang, or coyang</b> <sup>a</sup>				1850 kg	2450 L
80	50	<b>bally</b>			37 kg	49.0 L
800	500	10	<b>gantang</b>		3.7 kg	4.90 L
4800	3000	60	6	<b>catty</b>	616.7 g	816.7 mL

<sup>a</sup>For trading

For pepper in Palémbang

		Metric
<b>gulae</b>		755.988 g
1¼	<b>catje</b>	604.790 g

## 266.6 Units of Weight

Upper scale in Padang

							Metric
<b>bahar</b>							203.019 176 kg
1 <sup>3</sup> / <sub>20</sub>	<b>amat</b>						123.041 925 kg
2⅓	1⅓	<b>picol or pecul</b>					92.281 443 kg
3⅔ <sub>10</sub>	2	1½	<b>picol or pecul</b> (small)				61.520 962 kg
220	133⅓	100	66⅔ <sub>3</sub>	<b>catty or kati</b> <sup>a</sup>			922.814 436 g
330	200	150	100	1½	<b>catty or kati</b> (small)		615.209 624 g
5280		2400	1600	24	16	<b>tehl or tail</b>	38.450 601 g

<sup>a</sup>Also reported as 957 g

Lower scale in Padang

			Metric
<b>tehl or tail</b>			38.450 601 g
10	<b>maas</b>		3.845 060 g
100	10	<b>candarin</b>	384.506 01 mg

During the late twentieth century in Padang

								Metric
<b>bahar</b> <sup>a</sup>								192.060 kg
200	<b>catty</b>							960.300 g
4000	20	<b>buncal</b>						48.015 g
12,800	64	$3\frac{3}{5}$	<b>coyang</b>					15.005 g
20,000	100	5	$1\frac{1}{16}$	<b>tael</b>				9.603 g
40,000	200	10	$3\frac{3}{8}$	2	<b>pagode</b>			4.801 g
320,000	1600	80	25	16	8	<b>meh</b>		600.19 mg
1,280,000	6400	320	100	64	32	4	<b>copang</b>	150.05 mg

<sup>a</sup>[DOUR] reported 1 **candil** or **bahar** (at Aceh) = 192.040 kg

In Bencoolen (present-day Bengkulu), Fort-Marlborough, and Mocamoco

										Metric
<b>bahar</b>										253.98 kg
384	<b>catty</b>									661.40 g
6144	16	<b>tael</b>								41.338 g
9216	24	1½	<b>ringit</b>							27.558 g
24,576	64	4	2⅔	<b>pauh</b>						10.334 g
73,728	192	12	8	3	<b>keping</b>					3.444 8 g
98,304	256	16	10⅔	4	1⅓	<b>mas or mace</b>				2.583 6 g
393,216	1024	64	42⅔	16	5⅓	4	<b>koopang or soocoo</b>			645.9 mg
614,400	1600	100	66⅔	25	8⅓	6¼	1⅙	<b>condorine</b>		413.4 mg
2,211,840	5760	360	240	90	30	22½	5⅝	3⅝	<b>coondee</b>	114.83 mg

Chinese scale used in Fort-Marlborough

							Metric
<b>catty</b>							604.8 g
16	<b>tael</b>						37.80 g
160	10	<b>cheh</b>					3.780 g
1600	100	10	<b>hoon</b>				378.0 mg
16,000	1000	100	10	<b>lee or le</b>			37.8 mg
160,000	10,000	1000	100	10	<b>see</b>		3.78 mg
1,600,000	100,000	10,000	1000	100	10	<b>hoot</b>	378 µg

For general use in Ayer-Bonghye, Natal and Tappanooly

				Metric
<b>tael</b>				37.84 g
16	<b>ammas</b>			2.365 g
100	$6\frac{1}{4}$	<b>condorine</b>		378.4 mg
384	24	$3\frac{21}{25}$	<b>rackay</b>	98.54 mg

For benzoin in Ayer-Bonghye, Natal and Tappanooly

				Metric
<b>tompong<sup>a</sup></b>				36.28 kg
20	<b>ootan</b> or <b>catty-ootan</b>			1.814 kg
60	3	(chinese) <b>catty</b>		604.67 g
960	48	16	<b>tael</b>	37.79 g

<sup>a</sup>For camphor, = 20 catty = 34.83 kg, and for cakes of benzoin, = 20 catty = 31.75 kg

At Palémbang

					Metric
<b>pecul</b>					60.479 020 kg
100	<b>catje</b>				604.790 g
1600	16	<b>tail</b>			37.799 g
16,000	160	10	<b>maas</b>		3.780 g
160,000	1600	100	10	<b>candarin</b>	378 mg

For rice in Padang

					Metric
<b>coyang</b>					2953.006 32 kg
80	<b>bali</b> or <b>bally</b>				36.912 579 kg
800	10	<b>bamboo</b> or <b>koolah</b>			3.691 258 kg
4800	60	6	<b>catty</b>		615.209 65 g
6000	75	7½	1¼	<b>pond</b>	492.167 72 g

For salt in Padang

			Metric
<b>coyang</b>			1845.628 95 kg
50	<b>maat</b>		36.912 579 kg
3750	75	<b>pond</b>	492.167 72 g

For gold and silver in Aceh, based on [DOUR]

						Metric
<b>buncal</b> or <b>boncal</b>						48.01 g
5	<b>tale</b>					9.602 g
14	2⅔	<b>pagode</b>				3.429 g
16	3⅓	1⅓	<b>miam</b> or <b>mayon</b>			3.001 g
80	16	5⅓	5	<b>mace</b>		600 mg
320	64	22⅔	20	4	<b>copang</b>	150 mg

For gold and silver in Bencoolen, present-day Bengkulu

						Metric
<b>catty</b>						661.468 g
16	<b>tael, tehl or tail</b>					41.341 75 g
24	1½	<b>ringit or real</b>				27.561 167 g
192	12	8	<b>kiping or keping</b>			3.445 146 g
1600	100	66⅔	8½	<b>condorine</b>		413.417 5 mg
5760	360	240	30	3⅓	<b>coondee</b>	114.838 2 mg

For gold and silver in Ayer-Bonghye, Natal and Tappanooly

				Metric
<b>tael</b>				37.838 4 g
16	<b>ammas or mace</b>			2.364 9 g
100	6¼	<b>condorine, candareen, or candarin</b>		378.384 mg
384	24	3⅔ <sub>25</sub>	<b>rackay</b>	98.54 mg

For gold and silver in Padang

				Metric
<b>tael</b>				41.208 g
16	<b>mace</b>			2.575 5 g
100	6¼	<b>condorine, candareen, or candarin</b>		412.08 mg
700	43¾	7	<b>rachim</b>	58.87 mg

For gold in Padang, based on [BAUE]

		Metric
<b>tael</b>		41.014 0 g
16	<b>mace</b>	2.563 375 g

Alternative scale for gold in Padang, based on [BAUE]

			Metric
<b>tael</b>			41.014 0 g
108	<b>candarin</b>		379.759 mg
700	27/175	<b>rachim</b>	58.591 mg

For gold and silver in Palémbang

				Metric
<b>goelach</b>				769.012 031 g
1¼	<b>catje</b>			615.209 625 g
12½	10	<b>tale, tehl, or tail</b>		61.520 962 5 g
28⅞	22½	2¼	<b>real or réaux</b>	27.342 650 g

Other measures reported during the nineteenth to twentieth centuries:

- 1 **bale** (for tobacco in Padang) = 77.56 kg;
- 1 **tompong** (for benzoin in Natal) = 60 chinese catties = 36.070 1 kg;
- 1 **catty** (for camphor in Natal) = 3 Chinese catties = 1.803 5 kg;
- 1 **catty** (for camphor in île Sinkell) = 1.741 6 kg;
- 1 **catty** (for benzoin in île Sinkell) = 1.587 4 kg;
- 1 **salup** (for salt in Tappanooly) = 907 g;
- 1 **kulack** or **goelack** (for pepper in Palémbang) = 1¼ Chinese catties = 751.46 g, also reported as 756 g;
- 1 **catty** (Chinese scale for general use in île Sinkell) = 604.7 g;
- 1 **tael** (in Jamba) = 16 mas = 39.78 g.

## 267 Suriname [Formerly: Netherlands Guiana, Dutch Guiana]

This area was discovered in 1499 by Alonso de Ojeda and Amerigo Vespucci, but settled by the British in 1652. The area was ceded to the Dutch by the Treaty of Breda in 1667, as Netherlands Guiana, after the British transferred sovereignty to them in exchange for New Amsterdam (present-day New York). It was occupied by the British from 1781 to 1784 and from 1796 to 1815, when the Treaty of Paris reestablished the area as a Dutch colony. Dutch Guiana was temporarily united with the Netherlands Antilles as part of the Dutch West Indies from 1828 to 1848. The area was integrated into the Netherlands in 1948, and achieved independence, as Suriname, in 1975.

The system of weights and measures used in Amsterdam became official in 1816 and compulsory in 1821. The metric system has been official since 1871 and compulsory since 1916.

*Main sources:* [BAUE], [DOUR], [MART3], [SUCH], and [UN66]

267.1 Currency

2004–: 1 Surinamese dollar = 100 cents  
1962–2003: 1 Surinamese guilder = 100 cents  
1827–1962: 1 Dutch guilder = 100 cents  
–1827: 1 Dutch guilder =  
20 stuivers = 160 duiten = 320 penninge

267.2 Units of Length

		Metric
<b>keten</b>		20.791 m
66	<b>voet</b>	315.02 mm

At Paramaribo

				Metric
<b>roede</b>				10.720 469 m
66	<b>voet</b>			313.946 mm
792	12	<b>duim</b>		26.162 mm
9504	144	12	<b>streep</b>	2.180 mm

Other measures reported during the nineteenth century:

1 Brabante **el** = 694.380 mm;  
1 Amsterdam **el** = 687.810 mm.

267.3 Units of Area

At Paramaribo

			Metric
<b>acker</b>			429,336.072 m <sup>2</sup>
10	<b>vier rand roede</b>		42,933.607 2 m <sup>2</sup>
43,560	4356	<b>vier rand voet</b>	9.856 2 m <sup>2</sup>

Other reported measures:

1 **acker** = 10 square ketens = 4322.79 m<sup>2</sup>;  
1 **Rhineland acre** or **Rhyndland acre** = 4260 m<sup>2</sup>.

267.4 Units of Dry Capacity

For grain

						Metric
<b>graanlast</b>						3003.910 L
27	<b>mud</b>					111.256 L
36	1 1/3	<b>zak</b>				83.442 L
108	4	3	<b>schepel</b>			27.814 L
459	17	12 3/4	4 1/4	<b>vierde vat</b>		6.544 L
3456	128	96	32	7 9/17	<b>kop</b>	869.2 mL

267.5 Units of Liquid Capacity

Amsterdam system for wine

									Metric
<b>vat</b>									931.34 L
4	<b>oxhoofd</b>								232.83 L
6	1½	<b>aam</b>							155.22 L
24	6	4	<b>anker</b>						38.81 L
48	12	8	2	<b>steekan</b>					19.40 L
384	96	64	16	8	<b>stoop</b>				2.425 L
768	192	128	32	16	2	<b>kruik</b>			1.213 L
1536	384	256	64	32	4	2	<b>pint</b>		606.3 mL
6144	1536	1024	256	128	16	8	4	<b>mutsje</b>	151.6 mL

British-linked measures:  
  
1 **gallon** = 3.785 310 L.

267.6 Units of Weight

French scale

		Metric
<b>Livre</b>		494.1 g
16	<b>ounce</b>	30.88 g

Metric-linked system

		Metric
<b>pond</b>		500 g
5	<b>ons</b>	100 g

268 Svalbard

See *Norway*.  
The Spitsbergen Treaty of 1920 recognised Norwegian sovereignty over Svalbard, and the 1925 Svalbard Act made Svalbard a full part of the Kingdom of Norway.

269 Swaziland

The Swazi people established themselves in this area in the early 1800s. The British and the Transvaal governments agreed to guarantee the

independence of Swaziland in 1881, after the Swazi leader Mswati asked for aid against Zulu raids into the area. Swaziland became a British protectorate in 1902, and gained its independence in 1968.

The metric system has been official since 1969, and compulsory since 1973. For premetric units, see *South Africa*.

269.1 Currency

1974–: 1 Swazi lilangeni = 100 cents  
1961–1974: 1 South African rand = 100 cents  
1920–1961: 1 South African pound = 20 shillings = 240 pence = 960 farthings  
1835–1920: 1 pound sterling = 20 shillings = 240 pence = 960 farthings

269.2 Units of Weight

1 **pocket** (for milled rice) = 2 lbs = 0.907 kg.

270 Sweden

See also *Denmark*, *Finland*, *Norway*, *Pomeriana*, *Saint Bartholomew*, *Sápmi*, and *Swedish Gold Coast*.

Sweden achieved unity when the Götarike and the Svearike were combined by Olof Skötkonung c. 995. After conquering Finland in the late thirteenth century, Sweden and Norway came under the rule of Denmark from 1397 until 1523, in an association known as the Union of Kalmar. In 1523, Gustaf Vasa drove the Danes out of Sweden and made himself the chosen king. Sweden became one of the great powers in Europe under the rule of Gustaf Adolphus II and Charles XII, until Charles XII was defeated at the Battle of Poltowa in 1709. Early in the eighteenth century, a coalition of Russia, Poland and Denmark took away Sweden's Baltic empire, and in 1809, Sweden was forced to cede Finland to Russia. The Treaty of Kiel ceded Norway to Sweden in 1814. Sweden was in personal union with Norway from 1814 to 1905, when Norway became independent.

The absence of a strong central government in medieval Sweden meant that there was no statute for uniform units of measurement. Consequently, most provinces, towns, castles and estates had their own measures. The need for a uniform measurement system arose gradually during the Vasa family's reign. In 1540, 1555 and 1583, Royal decrees tried to instate some uniformity.

Even if the measures for cereal were among the most important in regard to taxation and trading, there was no nationwide system or scale. Since the late Middle Ages, there had been four major systems in use.

In the provinces of Småland, Värmland and Västergötland: 1 *tunneläst* = 12 *tunnor* = 72 *spänner* = 288 *fjärdingar*.

In the province of Östergötland and some parts of the province of Södermanland: 1 *läst* = 16 *thön* = 96 *spänner* = 384 *fjärdingar*.

In the provinces of Hälsingland, Medelpad and southern Ångermanland: 1 *pundeläst* = 12 *pund* = 144 *spänner* = 576 *fjärdingar*.

In the provinces of Jämtland, Södermanland, Uppland and northern Ångermanland: 1 *pundeläst* = 12 *pund* = 96 *spänner* = 384 *fjärdingar*.

In 1605, the *tunna*, as it was defined in Örebro, became the volume measure for the entire country. This decision was revised in 1638 to the

so-called *Stockholmtunna*, which contained about 143 L. By a Royal decree of 1665, the tunna was subdivided into 2 *spänner* = 32 *kappar* = 56 *kannor* = about 146.5 L. The *tunna* used for liquids, salt, fish and meat was reported to hold about 125.8 L, and was subdivided into 4 *fjärdingar* = 8 *åtingar* = 48 *kannor* = 96 *stop* = 384 *kvarter*.

When it comes to systems of units of weight, the dimensions varied according to the type of commodity well into the 1800s. Since the Viking age, the coinage weight *mark* was used for weighing precious metals. It was always subdivided into 8 *öre* = 24 *örtugar*, but the value of the mark varied by location, e.g., 204.62 g in Stockholm and 210.47 g in Skara.

In 1665, the *lödig mark* was stated as 222.8 g for gold and 210.6 g for silver. Both were then subdivided into 8 *uns* = 16 *lod* = 64 *kvintin*.

The cartographer Anders Bure (1571–1646) tried to introduce a measuring system based on 10 during the early seventeenth century. The royal decrees of 1605, 1638 and 1665 gradually established a uniform system for weights and measures. The connection between length, volume and weight by means of water, as suggested by Stiernhielm, was confirmed by the Royal Ordinance of March 10, 1665. In 1664, Stierhielm was asked to reform the system of weights and measures, and three years later, he was made Director General of Weights and Measures. He tried to introduce a systematic decimal division of the system, but this was only adopted in 1733 to be used alongside the traditional duodecimal divisions. In 1735, the *skäppa* was abolished. The decimal divisions were finally introduced by law on January 31, 1855. This became the only system allowed for use in trade from 1863. The metric system was finally introduced by law on November 22, 1878, and has been compulsory since January 1, 1889.

*Main sources:* [BRUZ], [CARL], [ENGS], [FALK1], [FALK2], [FORN], [FORS], [HANN], [HECK], [JANS2], [JANS3], [JANS4], [JERN], [LIND], [MART3], [MORE], [OHLO], [PIPP], [PIPP2], [PIPP3], [SAHL], [STIE2], [TAND], [TING], and [WALL2]

## 270.1 Currency

1873–:	1 Swedish krona = 100 öre
1855–1873:	1 Swedish riksdaler riksmünt = 1 Swedish riksdaler riksgäld = 100 öre
1777–1855:	1 riksdaler = 48 skilling = 192 öre = 576 runstycken
1609–1776:	1 riksdaler = 6 mark = 48 öre
1604–1608:	1 riksdaler = 4 mark = 32 öre = 192 penningar
1534–1604:	1 daler = 4 mark = 32 öre = 192 penningar

## 270.2 Units of Quantity

Usually, a slash or stroke (called a **fana**, **grind**, **kam**, or **ruta**) was used for counting. Four was written as four slashes in a row. To write five, the fifth slash was written almost horizontally across the four slashes. In the north of Sweden, ten was written as three times three slashes and a tenth stroke horizontally across the nine slashes.

Some measures reported until the early twentieth century:

- 1 **last** (for herring (seldom used)) = 12,000;
- 1 **stort gross** (seldom used) = a dozen gross = 1728;
- 1 **strå** = 1000; later also reported as 125;
- 1 **brev** (for straps and needles) = 576;
- 1 **duk** or **dok** (for sewing needles during the sixteenth to seventeenth centuries) = 500;
- 1 **ring** = 240;
- 1 **rerig** or **ririg** = 4 skockar = 240;
- 1 **gång** (for ribs used for Windsor-style chairs) = 168;
- 1 **gross**, **grot**, **groot**, **grott**, or **grotke** (during the fifteenth to twentieth centuries) = 12 dussin = 144;
- 1 **hundrade** = 6 tjog = 120, but sometimes it was reported as 122 or even 130 (probably depending on the quality of the commodities);
- 1 **hytthundrade** (used in the glassworks) = about 100–120 (depending on how difficult and time-consuming the work was);

- 1 **litet hundrade** = 100;
- 1 **bundt** (for buckling) = 100;
- 1 **brev** (for needles during the late nineteenth century) = 100;
- 1 **bund** (in the district of Värmland during the nineteenth century) = 100 threads;
- 1 **cento** (for barrel bottoms, casks, hop-holes and troughs during the seventeenth century) = 100;
- 1 **klove** (for sun-dried fish and birch-bark) = usually 120, but varied between 100 and 240; in Åland, part of present-day Finland, reported as 100;
- 1 **knäpp** (for yarn) = usually 60 twines, but after 1739, = ½ bund = 100 twines;
- 1 **val** (for fish) = 20 kast = 80, but one or two fish were often used to count the heaps and sometimes the buyer got those fish as well;
- 1 **bund** (in the district of Värmland during the eighteenth century) = 30 threads (for single weave) or 60 threads (for full weave);
- 1 **bundt** (for window-panes at Eda Glasbruk in 1849) = 1/5 kvartkista = 4–70, depending on the size of the window-pane;
- 1 **mes** (for birch-bark in the province of Ångermanland during the eighteenth century) = 70;
- 1 **skock** or **schock** (for onions, cabbage, nuts, plates, gingerbread and glasses) = 60;
- 1 **soffa** (for beer bottles during the nineteenth century) = 50;
- 1 **klove** (for sheet-iron, 59.4 × 118.8 cm, during the sixteenth to twentieth centuries) = 48;
- 1 **gång** (for wheel spokes) = 44;
- 1 **timmer** (for furs) = 40;
- 1 **gång** (for horseshoe-nails) = 32 or 24;
- 1 **stock** (for pikes) = 30;
- 1 **brev** (for needles in the 1850s) = 25;
- 1 **bast** (for smoked lampreys) = 24;
- 1 **bundt** or **bunt** (for pens) = 24;
- 1 **börda** (for poles in the district of Gotland) = 24 poles;
- 1 **tjog** (for eggs) = 20; in the province of Gotland, it was sometimes referred to as a **stig**;
- 1 **snes** (for eels and fish) = 20;
- 1 **bundt** or **bunt** (for birch-bark) = varying between 16 and 20;

- 1 **mansbörda** (for cornshocks in the districts of Södermanland and Västmanland; as great a load as a man was able to carry) = 18 shoks;
- 1 **börda** (for rough lumber at Köla, in the district of Värmland; as great a load as a full-grown man was able to carry) = 18 poles;
- 1 **härva** or **garnhärva** (as reported after 1739) = 16 **knäpp** (for linen yarn), and = 12 **knäpp** (for other yarn), each **knäpp** would contain 100 twins and have a circumference of 1½ **aln**;
- 1 **kyrve**, **kirwe**, or **kyrffue** (for fish in the provinces of Värmland and Västergötland during the fifteenth to sixteenth centuries) = 16;
- 1 **stock** (for buttons) = 8 **par** = 16;
- 1 **mandel** (during the seventeenth to twentieth centuries) = 15;
- 1 **krukmakardussin** (used instead of the **dussin**, when the quality wasn't that good) = 13 or 14;
- 1 **centen**, **centener**, **quinten**, **sinten**, **sintener**, or **zynnten** (for window-panes during the fifteenth to seventeenth centuries) = between 1 and 5 **skov** = 12–60, varying by the dimension of the window-pane;
- 1 **kvinnobörda** (for cornshocks in the districts of Södermanland and Västmanland; as great a load as a woman was able to carry) = 12 shoks;
- 1 **bal** (for buckram, cloth and linen) = 12 pieces;
- 1 **börda** (for fence poles in the district of Gotland) = 12 poles;
- 1 **daiker** (for hides) = 12;
- 1 **dussin** (for gingerbread biscuits, groceries, knives, lambskins, pins, scythes, Spanish sewing needles, spoons, etc., during the sixteenth to twentieth centuries; sometimes spelled **dutzend** in southern Sweden) = 12, see also *krukmakardussin* above;
- 1 **knippa** or **kärve** (for fish) = 12;
- 1 **kull** (for eggs in the province of Småland during the sixteenth to nineteenth centuries) = 12;
- 1 **fläck** (for pins in the province of Västergötland) = 10;
- 1 **däcker**, **dacker**, **decker**, **deker**, **deger**, or **diker** (for vellum, Russian leather, skins and hides during the eighteenth to nineteenth centuries) = 10;
- 1 **tilt** (for boards in the provinces of Halland and Småland) = 10;
- 1 **brev** (for needles) = 6 needles;
- 1 **bundt** (for panes of glass at Eda Glasbruk in 1849, used for wall clocks) = 5–9, depending on the diameter;
- 1 **sätt** or **sats** (for goldsmith's crucibles) = usually 5;
- 1 **gång** (for knitting needles) = 5;
- 1 **kast** (for nails in the province of Jämtland) = 5;
- 1 **brev** (for nails used for hand embroidery work on Chenille fabrics) = 4 needles;
- 1 **gång** (for carriage wheels, horseshoes and oars) = 4;
- 1 **kast** (for herring, osmundar (small iron pieces) and nails) = 4;
- 1 **gång** (for axles of carriages and hinges) = 2;
- 1 **kast** (in the province of Skåne) = 2 sheaves;
- 1 **klev** or **klöv** (for pretzels during the sixteenth century) = 2;
- 1 **par** = 2;
- 1 **fall** (during the sixteenth to seventeenth centuries) = one carcass of a cattle;
- 1 **bok** (for gold-foil and silver-foil) = a varied number of leaves;
- 1 **farm**, **färm**, **skev**, or **sköv** = the amount of bread that could be put in a baking oven at the same time;
- 1 **farm** = a bunch of coats or cloths;
- 1 **docka** (for embroidery cotton and silk yarn = a skein of yarn that has been unwound off its reel during the fourteenth to sixteenth centuries) = the amount of yarn in each **docka**, varying from one manufacturer to another;
- 1 **bult** (for union and buckram) = a roll;
- 1 **bunke** (during the twelfth to nineteenth centuries) = an unspecified heap of birch-barks or reindeer skins;
- 1 **fjärding** (during the sixteenth to nineteenth centuries) = name for a fourth part of an animal;
- 1 **knippe** (for vegetables, hay, hemp and birch-bark) = a bundle of no specific quantity;
- 1 **rev** (for onions, pearls, horseshoes and buttons) = no known quantity;
- 1 **brev** (for rings for laced shoes, rings for curtains, pins, eyes for stays, etc., during the seventeenth century) = no known quantity;

- 1 **klev** or **klöv** (for firewood and birch-bark in the province of Dalarna) = no known quantity;  
1 **snöre** (for smaller objects, like dried apple slices, that could be carried on a string) = no specific quantity.

For window panes

<b>centen, centener, sintener, sinten, quinten, or zynnten</b>		60
5	<b>skov</b>	12

For writing-paper

				Sheets of paper
<b>bal</b>				5000
10	<b>ris</b>			500
208⅓	125/6	<b>bok</b>		24
5000	500	24	<b>ark</b>	1

For printing-paper

				Sheets of paper
<b>bal</b>				5000
10	<b>ris</b>			500
200	20	<b>bok</b>		25
5000	500	25	<b>ark</b>	1

Below, I have tried to set up a likely consistent system for the period around the late Middle Ages.

											Metric
<b>rast</b> or <b>rost</b> <sup>a</sup>											~5.2 km
90	<b>repæ</b> <sup>b</sup>										~57.6 m
3000	33⅓	<b>fampn</b>									~1.73 m
6000	66⅔	2	<b>steg</b>								~864 mm
9000	100	3	1½	<b>alin</b> <sup>c</sup>							~576 mm
18,000	200	6	3	2	<b>foter</b> <sup>d</sup>						~288 mm
36,000	400	12	6	4	2	<b>qvarter</b>					~144 mm
54,000	600	18	9	6	3	1½	<b>thwær hand</b>				~96 mm
72,000	800	24	12	8	4	2	1⅓	<b>halft qvarter</b>			~72 mm
216,000	2400	72	36	24	12	6	4	3	<b>thum bredh</b>		~24 mm
288,000	3200	96	48	32	16	8	5⅓	4	1⅓	<b>thvärfinger</b>	~18 mm

<sup>a</sup>The distance a grown man was able to walk before he needed a break. In the province of Småland, also called **rasthåll**, **pustehåll** and **rastehåll**

<sup>b</sup>The length of a rope used for measuring the length of various shorter distances, probably 50 or 100 alinar

<sup>c</sup>Soon, the **alin**, **alen**, **aln** or **eln** became the base unit for measuring length in everyday life

<sup>d</sup>Sometimes also called **fiæt**, **fjät**, and **sko**

### 270.3 Units of Length

As in most parts of the world, body measurements provided the most convenient bases for linear measurements.

Below, I have compiled some measures probably used during the late Viking Age:

- 1 **daghsfærd** or **dagsleið** = a suitable distance to travel, during a day, when walking;  
1 **styltingx rast** = as far as a grown man could travel, during the winter solstice, from the morning before sunrise until evening, and still have had time to chop a load of poles;  
1 **fampn** = the distance between the fingertips of outstretched arms;  
1 **alin** = the distance between the elbow and the tip of the middle finger;  
1 **fiæt** = the length of a human foot;  
1 **spann** = the distance between the tip of the thumb and the tip of the first finger;  
1 **mund**, **munt**, **handabreth**, or **thwær hand** = the breadth of a hand;  
1 **finger bredh**, **fingersmon**, or **munder** = the breadth of a finger.

Researchers have been able to identify several local systems used during the sixteenth and seventeenth centuries, by studying census rolls, accounting books, protocols, letters, etc. In the provinces of Hälsingland and Västergötland, and in Norrland (the northern part of Sweden), there was a consistent system as laid out below in use until the mid-seventeenth century. The *famn* was used for measuring the length of reins, hawsers, fences and cargo, as well as for measuring the circumference of charcoal stacks.

				Metric
<b>famn</b>				2.078.3 m
3½	<b>aln</b>			593.8 m
5¼	1½	<b>fot</b>		395.9 mm
14	4	2⅔	<b>kvarter</b>	148.4 mm

In 1604, it was determined that the legal *aln* would be like the one used at Rydaholm, in the district of Småland, that was reported at the time to be about 594 mm. Below, I have compiled some other local *aln*-measures reported to have been in use:

- 1 **skräddaraln** or **skräddarealn** (used for cloth during the eighteenth century) = about 891 mm;
- 1 **skinnaraln** (used by leather makers at Malung in the province of Dalarna) = 6 kvarter = 1½ aln = about 891 mm;
- 1 **brabantisk aln** (a commercial unit for cloth during the seventeenth to eighteenth centuries) = 694.4 mm;
- 1 **boråseraln** (used by travelling salesmen in the province of Halland during the eighteenth century) = about 650 mm;
- 1 **krympaln** (used in foundries and waving mills for textile fabrics with allowance for shrinkage after washing and castings when the fabric gets cold during the eighteenth to nineteenth centuries) = about 610–640 mm;
- 1 **Riholms aln** or **Rydaholmsaln** (between 1621 and 1664) = about 593.82 mm;
- 1 **eln** (at Havgdhem in the province of Gotland during the seventeenth to eighteenth centuries) = about 554 mm;

- 1 **eln** (at Hems in the province of Gotland during the seventeenth to eighteenth centuries) = about 553.6 mm;
- 1 **aln** (in the province of Östergötland during the fifteenth to sixteenth centuries) = about 539 mm;
- 1 **Stockholmsaln** (in Stockholm between 1605 and 1621) = about 525 mm;
- 1 **alen** (in the province of Öland during the fourteenth to sixteenth centuries) = about 470 mm.

From the late fifteenth century until the mid-seventeenth century, the unit used for longer distances, the *rast*, was in some places replaced by the *mil*, also spelled *mila*, *mihl mijl*, and *mile*. This measure was probably derived from the Roman measure *millia* or *milliarium* (“a thousand steps”). Here are some examples:

- 1 **västgötamil** (in the province of Västergötland) = about 13 km;
- 1 **uppsalamil** (in the province of Uppsala) = about 10.7 km;
- 1 **hälsingemil** (in the province of Hälsingland) = about 7.7 km;
- 1 **ölandsmil** (at Öland in the province of Småland) = about 7.6 km;
- 1 **smålandsmil** (in the province of Småland) = about 7.5 km;
- 1 **finsk mil** (Finnish mil, used in eastern Sweden) = about 6 km.
- 1 **dalamil** (in northern parts of the province of Dalarna) = about 5 km.

In 1649, a nationwide *mil*-measure was established in regulation in regard to inns, in which it was stated that it should be equal to the one used in Uppsala = 6000 famnar, = about 10,688 m, between the inns.

As in many other countries, there were a very large number of informal units of distance among the peasantry and bourgeoisie. Some of these are described below in descending order:

- 1 **dagsled** (used by Swedish pilgrims who went to Rome in the 1100s) = a day’s journey = about 25–40 km if they were walking and 50–60 km if they were traveling on horseback;

- 1 **näverskomil** = the distance one could travel by walking in a pair of birch bark shoes = about 16 km;
- 1 **rop** or **rophåll** = the maximum distance at which one could hear a person holler;
- 1 **kyndelmil** (in the area of Klarälvsdalen in the province of Värmland) = the distance one could walk with a burning stick;
- 1 **kålffskott** = the maximum distance at which one could kill an animal with a gunshot;
- 1 **bösskott** or **bysseskott** (at Ribbingsborg in the provinces of Östergötland) = the maximum distance at which one could kill an animal with a gunshot = about 300 m;
- 1 **pilskott** (during the sixteenth to eighteenth centuries) = as far as one could shoot an arrow with a bow = about 150 famnar = about 267 m;
- 1 **musköthåll** (during the seventeenth to eighteenth centuries) = the maximum distance at which one could kill an animal with a musket-gun = about 225 m;
- 1 **riphåll** (in the province of Lappland during the eighteenth century) = the approximate maximum distance at which a ptarmigan could be shot with a lodbössa (= a form of muzzle-loading small-bore gun, shooting lead balls) = ~50–60 m;
- 1 **bösshåll** (in the provinces of Halland and Småland) = the maximum distance at which one could kill an animal with a gunshot = 40–50 steg = 40–50 steps;
- 1 **bösskott** (in the provinces of Härjedalen) = the maximum distance at which one could kill an animal with a gunshot = about 50 m;
- 1 **yxkast** (during the sixteenth to nineteenth centuries) = the distance that a strong man was able to throw an axe or a hatchet;
- 1 **stenkast** = the distance a full-grown man was able to throw a medium-sized stone = varying between 35 and 75 m, but normally said to equal 50 steg = about 40–50 m. Today, *stenkast* is used to describe something that is located quite nearby.
- 1 **spjutkasthåll** (during the fourteenth to eighteenth centuries) = the distance a full-grown man was able to throw a spear = about 30–40 m;
- 1 **bult** or **bolt** (for plain weave or linen cloth at Stockholm in 1543) = 40 alnar = about 23 m;
- 1 **stang** = the length of a measuring rod for agricultural use and surveying = 5, 6, 7, 8, 9, or 10 alnar;
- 1 **lås** or **låskätting** (primarily used in agriculture in the northwestern parts Sweden) = 15 famnar = about 28.2 m;
- 1 **råmål** (in the province of Östergötland during the eighteenth century) = 20 steg = about 18 m;
- 1 **warp** (in the province of Gotland) = 12 alnar = about 6.6 m;
- 1 **kavle** (in the province of Dalarna during the eighteenth to nineteenth centuries) = a rod used for surveying. It was usually 6 alnar, and was divided into nine sections, called *kavlar*. Hence, each kavle was about about 396 mm. Later, the rod was also divided into 10 kavlar. See also *karne* below.
- 1 **fjäre, färje, or fjärje** (during the sixteenth century) = the width of an area that a sower was able to sow = about 4–9 alnar;
- 1 **binning** = the length between two props in walls of a half-timbered house;
- 1 **karna** (at Ore and Rättvik in the province of Dalarna during the eighteenth century) =  $2/3$  aln = about 396 mm, but after metrification =  $6/10$  aln = about 356 mm;
- 1 **fransk fot** or **meterfot** (for timber during the early nineteenth century) =  $1/3$  m;
- 1 **bärre** (at Orsa in the province of Dalarna during the sixteenth to eighteenth centuries) = the distance between the tip of the thumb and the tip of the outstretched little finger = about 17–21 cm;
- 1 **tvärfot** = the breadth of a foot = about 8–10 cm;
- 1 **karne** (at Boda in the province of Dalarna during the eighteenth century) = a quadrilateral wooden rod. On this rod, one marked, for example, every hundredth measure double step;

1 **knogmål** (mainly used when knitting during the eighteenth to twentieth centuries) = the width of the hand, measured over the knuckles = the length of the middle finger.

On a copperplate printing from 1664, *Mensuræ Regni Svethiæ*, Stiernhielm suggests a system for measurement. There was a measuring scale Stiernhielm called the *Linea Carolina*.

System, presumed approximate values during the late sixteenth century

									Metric
<b>fjerding</b> or <b>fjerdingsväg<sup>a</sup></b>									~2673 m
900	<b>stång</b> or <b>mätstång</b>								~2.970 m
1500	1⅓	<b>famn</b>							~1.782 m
4500	5	3	<b>aln</b>						~594 mm
9000	10	6	2	<b>fot</b>					~297 mm
18,000	20	12	4	2	<b>qvarter</b>				~148.5 mm
48,000	53⅓	32	10⅔	5⅓	2⅔	<b>handsbredd</b>			~55.7 mm
108,000	120	72	24	12	6	2¼	<b>toll</b>		~24.7 mm
192,000	213⅓	128	32	21⅓	10⅔	4	1⅞	<b>finger</b>	~13.9 mm

<sup>a</sup>In Norrland (the northern part of Sweden), later also called **fjärndel**, **fjårding**, **fjäring**, and **fjärdings väg**

In 1657, Georg Stiernhielm (1598–1672), a civil servant, constructed a measuring rule made of brass, which he called a *Carl Staf* after King Carl X Gustaf. Picture below from Wiki Commons.

The *Carl Staf* was a 91-inch-long rod that had a square cross-section of 8 mm per side. One side of the rod had dimension scales that compared the lengths of the fot unit as used in different parts of the country. Below, I list the various scales, as estimated by [TAND].

	Inscription	Metric
First side of the rod	Linea Arith. Pes Stockholm	296.79 mm
	Pes Roman	296.72 mm
	Linea Chordarum	296.70 mm
Second side of the rod	Linea Probatoria	296.73 mm
	Karatorum	296.75 mm
	Æstimatoria	296.70 mm
	Calibra Stockholm (A)	296.78 mm
	Calibra Stockholm (B)	296.86 mm
	Calibra Stockholm (C)	296.78 mm
Third side of the rod	Latera Figurar. Regularium	296.77 mm
	Linea Reduct. Planor	296.71 mm
	Corpor	296.71 mm
	Linea Partium (A)	296.83 mm
	Linea Partium (B)	296.72 mm
	Linea Partium (C)	296.74 mm
Fourth side of the rod	Latera Mens: . . . Amphora	296.76 mm
	½ · 8 Amphoræ = ½ aln	296.73 mm

Stiernhielm decided that 1000 drops of water would weigh 1000 *gran* (or *ass*). (Note that Stiernhielm did not realize that the density of water varies with the temperature of the water.) He also designed a cube that, filled with water, would weigh 1,000,000 gran. Actually, it held about 48 L of water. This cube’s edge length was approximately 361.67 mm, which was the length Stiernhielm called a Linea Carolina.

Estimated Mensuræ Regni Svethiæ-system

							Metric
<b>mil</b>							10,688.544 m
6000	<b>famn</b>						1.781 424 m
18,000	3	<b>aln</b>					593.808 mm
36,000	6	2	<b>fot</b>				296.904 mm
72,000	12	4	2	<b>qvarter</b>			148.452 mm
432,000	72	24	12	6	<b>tum</b>		24.742 mm

This measurement system became the starting point for the first standardized system for weights and measures. The system presented by Stiernhielm was essentially vindicated in a royal decree in 1665, usually called *1665 års plakat*, and became the main legal system until 1863. In fact, it was permitted for use until 1878.

Legal system, according to *1665 års plakat*, based on [JANS4]

						Metric
<b>mil</b>						10,689 m
6000	<b>famn</b>					1.781 m
18,000	3	<b>aln</b>				594 mm
36,000	6	2	<b>fot</b>			297 mm
72,000	12	4	2	<b>qvarter</b>		148 mm
432,000	72	24	12	6	<b>tum</b>	24.7 mm

During the 1730s, a decimal subdivision of the *fot* was gradually introduced by decrees of 1733, 1737 and 1739. It was to be used in parallel with the traditional duo-decimal system, *verkmåttsystemet*, now mainly for construction engineering and craftsmanship.

*Decimalsystemet* after 1739, based on [JANS4] and [OHLO]

							Metric
<b>famn</b>							1.781 424 m
3	<b>aln</b>						593.808 mm
6	2	<b>fot</b>					296.904 mm
72	24	10	<b>decimaltum</b>				29.690 mm
720	240	100	10	<b>decimallinje</b>			2.969 mm
7200	2400	1000	100	10	<b>gran</b>		297 µm
72,000	24,000	10,000	1000	100	10	<b>scrupel</b>	30 µm

*Verkmåttsystemet* after 1739, based on [JANS4] and [OHLO]

							Metric
<b>famn</b>							1.781 424 m
3	<b>aln</b>						593.808 mm
6	2	<b>fot</b>					296.904 mm
12	4	2	<b>qvarter</b>				148.452 mm
24	8	4	2	<b>half qvarter</b>			74.226 mm
72	24	12	6	3	<b>verktum</b> <sup>a</sup>		24.742 mm
864	288	144	72	36	12	<b>verklinje</b>	2.062 mm

<sup>a</sup>The verktum was also divided into ½ (= 12.371 mm), ¼ (= 6.185 mm), 1/8 (= 3.093 mm) and 1/16 (= 1.546 mm)

Hereby, at least theoretically, the units for longer distances became slightly adjusted

			Metric
<b>mil</b>			10,688.544 m
3600	<b>stång</b>		2.969 040 m
6000	1⅓	<b>famn</b>	1.781 424 m

By a royal statute of January 31, 1855, the decimal system was almost fully adopted by law. This system was officially in use until 1878, but was permitted until 1889.

Decimalsystemet after 1855

								Metric
<b>mil</b>								10,688.616 m
360	<b>ref or rev</b> <sup>a</sup>							29.690 6 m
3600	10	<b>stång</b> <sup>b</sup>						2.969 06 m
36,000	100	10	<b>decimalfot</b> <sup>c</sup>					296.906 mm
360,000	1000	100	10	<b>decimaltum</b> <sup>d</sup>				29.690 6 mm
3,600,000	10,000	1000	100	10	<b>decimallinje</b>			2.969 06 mm
36,000,000	100,000	10,000	1000	100	10	<b>gran</b>		0.296 906 mm
360,000,000	1,000,000	100,000	10,000	1000	100	10	<b>scrupel</b>	29.690 6 µm

<sup>a</sup>After 1906, it was spelled *rev*  
<sup>b</sup>The *stång* was added to this system in 1855  
<sup>c</sup>It was stated that “a pendulum, at the same latitude as the Observatory in Stockholm, at the water surface, at a temperature of 15°C and that makes one cycle per second, has the length of 3.350 64 fot.” Sometimes also called **Stockholmsfot**  
<sup>d</sup>Sometime during the late nineteenth century, also called **nytum**. Since the early twenty-first century, one **tum** normally means one English inch = 25.4 mm

Metric system after 1878

								Metric
<b>myriameter</b> <sup>a</sup>								10,000 m
10	<b>kilometer</b>							1000 m
100	10	<b>hektometer</b>						100 m
1000	100	10	<b>dekameter</b>					10 m
10,000	1000	100	10	<b>meter</b>				1 m
100,000	10,000	1000	100	10	<b>decimeter</b>			100 mm
1,000,000	100,000	10,000	1000	100	10	<b>centimeter</b>		10 mm
10,000,000	1,000,000	100,000	10,000	1000	100	10	<b>millimeter</b>	1 mm

<sup>a</sup>In 1879, the **nymil**, equal to 10,000 m, was introduced

Maritime measures:

- 1 **ekvatorsgrad** = 111,306.58 m;
- 1 **vecka** or **veku sjö** (the distance one was able to row a boat before it was time to change rowers until the seventeenth century) = about 8.3 km;
- 1 **kvartmil** = 100 kabellängder = 1 781.4 m, but later equal to 1852 m;
- 1 **sjömil** (literal translation = “sea mile”, used since the late twentieth century) = the international nautical mile = 1852 m;
- 1 **kabellängd** = 100 famnar = about 178.14 m, but later also defined as 120 famnar = about 213.72 m. Since the late twentieth century, = 1/10 sjömil (international nautical mile) = 185.2 m.

270.4 Units of Area

During the Middle Ages, land was taxed in Sweden. As the basis for the calculations, it was ruled as to the approximate area a barrel of cereal would be sufficient to seed. This method of calculating square measures resulted in the *spannland*, *tunnland*, *halvspannland*, *fjärdingsland*, *kappeland*, *skäppeland*, *kannland*, etc. Another way to calculate the land area was to proceed from the earth values, so that the area corresponds to the value of a specific coin. This method resulted in such units as the *dalerland*, *markland*, *örtugaland*, *öresland*, *åttungsland*, *sjettungsland*, *tolftungsland*, and *penningland*. For both these methods, the tax was usually set at 1/24 of the value of the land area.

Among farmers, there were traditionally two other ways to define an amount of land area. A certain area of land could be described by the time it took to plough the field (hence, as part of a day's work), as plogland, or by the harvest quantity, as snesland.

Traditional measures:

- 1 **rök jord, röker, or raukr** (in the province of Gotland) = the amount of arable land required to supply enough food for a family;
- 1 **plogland, krokland** (mainly used in Finland), or **hakland** (mainly used in the southern parts of Finland) = the amount of arable land that could be ploughed by one farmer in a day.

Upper seed scale (scale formally defined in 1665)

						kvadratfot	Metric
<b>lästerland</b>						2,688,000	236,955.264 m <sup>2</sup>
12	<b>pundland</b>					224,000	19,746.272 m <sup>2</sup>
48	4	<b>tunnland<sup>a</sup></b> or <b>tunland</b>				56,000	4936.568 m <sup>2</sup>
96	8	2	<b>spannland<sup>b</sup></b>			28,000	2468.284 m <sup>2</sup>
192	16	4	2	<b>halvspannland</b>		14,000	1234.142 m <sup>2</sup>
288	24	6	3	1½	<b>skäppeland</b>	9333⅓	822.761 m <sup>2</sup>

<sup>a</sup>Traditionally defined as the amount of land that would be sown with one tunna of seed

<sup>b</sup>Traditionally defined as the amount of land that would be sown with one span of seed

Lower seed scale (scale formally defined in 1665)

						kvadratfot	Metric
<b>skäppeland</b>						9333⅓	822.762 946 m <sup>2</sup>
1⅓	<b>fjärdingsland<sup>a</sup></b>					7000	617.072 210 m <sup>2</sup>
5⅓	4	<b>kappland</b> or <b>käppeland<sup>b</sup></b>				1750	154.268 052 m <sup>2</sup>
6⅓	5	1¼	<b>snesland</b>			1400	123.414 442 m <sup>2</sup>
9⅓	7	1¾	1⅓	<b>kannland<sup>c</sup></b>		1000	88.153 173 m <sup>2</sup>
66⅓	50	12½	10	7⅓	<b>bandland</b>	140	12.341 444 m <sup>2</sup>

<sup>a</sup>Traditionally defined as the amount of land that would be sown with a fjärding of seed

<sup>b</sup>Traditionally defined as the amount of land that would be sown with one kappe of seed. Also spelled **käppeland**. In the province of Dalarna, also called **kapplot**

<sup>c</sup>Traditionally defined as the amount of land that would be sown with one kanne of lin seed. Also called **kannas jord**, **kannors jord** and **linland**

Scale based on the royal ordinance of March 10, 1655 and the 1665 års plakat

				Metric
<b>tunnland</b>				4936.577 679 m <sup>2</sup>
32	<b>kappland</b>			154.268 052 m <sup>2</sup>
1555⅓	48⅓	<b>qwadratfamn<sup>a</sup></b> or <b>kvadratfamn</b>		3.173 514 m <sup>2</sup>
56,000	1750	36	<b>qwadratfot</b> or <b>kvadratfot</b>	8.815 317 dm <sup>2</sup>

<sup>a</sup>Also sometimes called **stump**

Upper coinage scale during the seventeenth to nineteenth centuries

					öresland	Metric
<b>lästerland</b>					48	236 955.264 m <sup>2</sup>
1½	<b>dalerland</b> <sup>a</sup>				32	157 970.176 m <sup>2</sup>
4	2⅔	<b>tolftungsland</b>			12	59 238.816 m <sup>2</sup>
6	4	1½	<b>markland</b> or <b>åttungsland</b> <sup>b</sup>		8	39 492.544 m <sup>2</sup>
8	5⅓	2	1⅓	<b>sjettungsland</b> <sup>c</sup>	6	29 619.408 m <sup>2</sup>

<sup>a</sup>The amount of land that grows grain worth 1 daler for taxation

<sup>b</sup>Also called **markalandh**. The amount of area that grows grain worth 8 öre for taxation

<sup>c</sup>In the provinces of Jämtland and Ångermanland, it was called **sættungxland**, **settongaland**, **settongs land**, **sjättungsland**, or **siættungaland**

Lower coinage scale during the seventeenth to nineteenth centuries

							öresland	Metric
<b>sjettungsland</b>							6	29,619.408 m²
1½	<b>pundland</b>						4	19,746.272 m²
6	4	<b>öresland</b> <sup>a</sup>					1	4936.568 m²
18	12	3	<b>örtugland</b> <sup>b</sup>				1/3	1645.523 m²
36	24	6	2	<b>skåppeland</b>			1/6	822.761 m²
144	96	24	8	4	<b>penningland</b> <sup>c</sup>		1/24	205.690 m²
240	160	40	13⅓	6⅔	1⅔	<b>snesland</b>	1/40	123.414 m²

<sup>a</sup>Also called **öræs land**, **öræs land** and **öris land**. In the province of Österbotten, in present-day Finland, it was called **karpeland**. The amount of land that grows grain worth one öre for taxation

<sup>b</sup>Also called **örtugh land**, **ortugs land**, **yrtugh land**, and **örtoghæ land**. The amount of land that grows grain worth one örtug for taxation

<sup>c</sup>Also called **pænnings landh** and **pæninxs boel**

System based on the *verktum* as defined during the early eighteenth century

					Metric
<b>qwadratfamn</b>					3.173 471 468 m <sup>2</sup>
9	<b>qwadrataln</b>				35.260 794 dm <sup>2</sup>
36	4	<b>qwadratfot</b>			8.815 198 dm <sup>2</sup>
144	16	4	<b>qwadratkvarter</b>		2.203 800 dm <sup>2</sup>
5184	576	144	36	<b>qwadrattum</b>	6.121 166 cm <sup>2</sup>

Other measures reported during the fifteenth to seventeenth centuries:

- 1 **mælisboel** or **marckeboel** (in the eastern parts of present-day Norway) = 8 örisboel = the amount of land that could be sown with one tunna of seed = about 8 öresland = about 39,500 m<sup>2</sup>;
- 1 **seland** (in the provinces of Ångermanland and Jämtland) = 14 alnar × 7 alnar × 98 alnar = 9604 kvadratalnar = 784 kvadratfamnar = about 3386.9 m<sup>2</sup>;

- 1 **kistland** or **kippa** (in the province of Dalarna) = 10 snesland = about 1269 m<sup>2</sup>;
- 1 **lopsland** or **laupsland** (in the province of Gotland during the seventeenth to eighteenth centuries) = the amount of land that could be sown with one lop of seed = about ¼ tunnland = about 1234 m<sup>2</sup>;
- 1 **spannelandh**, **melislandh**, or **måål** (in the province of Helsingland) = the amount of land area that could be sown with one span of seed = about ¼ tunnland = about 1234 m<sup>2</sup>;

- 1 **askaland** or **askanlån** (at Värend and Älmeboda in the province of Småland) = in concept, equal to the amount of land that could be sown with one ask of linseed = about ¼ skäppeland;
- 1 **måling** (in the province of Jämtland) = 9216 kvadratfot = about 811 m<sup>2</sup>;
- 1 **famn** (in the province of Hälsingland during the seventeenth to eighteenth centuries) = 1 famn × 16 famnar = 3½ alnar × 56 alnar = about 69.1 m<sup>2</sup>;
- 1 **bandland** or **grad** (in the province of Dalarna) = the amount of land needed to get one band of seed; = 36 kvadratalnar = about 12.69 m<sup>2</sup>, but in some areas, reported as 1/10 snesland = about 31 m<sup>2</sup>;
- 1 **bundansland** (in the province of Dalarna during the eighteenth century) = 1 stång × 1 kavle = 6 alnar × 2/3 alnar = about 5.645 m<sup>2</sup>;
- 1 **kavleland** or **kavelland** (for surveying in the province of Dalarna) = 1/3 kvadrataln = about 13 m<sup>3</sup>;

- 1 **flodeland, flodland, hopeland, or hopland** (in the province of Dalarna during the seventeenth century) = an amount of land wide enough to give a harvest that one person was able to sledge;
- 1 **hässieland, hässiegolv, or golv** = the meadow area required to make a *höhässja* (= a stack of hay);
- 1 **bredesrum** or **bredrum** (in the province of Gotland during the seventeenth to eighteenth centuries) = the meadow area required to make a windrow of hay;
- 1 **bet** (in the province of Gotland during the seventeenth to nineteenth centuries) = the amount of pasture needed for a sheep.

In the province of Västerbotten during the seventeenth century

			Metric
<b>markland</b> or <b>tunneland</b>			3499.55 m <sup>2</sup>
8	<b>skälsland</b>		437.44 m <sup>2</sup>
9800	1225	<b>qvadrataln</b>	35.71 dm <sup>2</sup>

In the province of Dalarna during the eighteenth to nineteenth centuries<sup>14</sup>

					Metric
<b>spannland</b>					2539.0 m <sup>2</sup>
2	<b>kistland</b> or <b>kippa</b>				1269.5 m <sup>2</sup>
20	10	<b>snesland</b>			126.95 m <sup>2</sup>
200	100	10	<b>bandland</b>		12.695 m <sup>2</sup>
20,000	10,000	1000	100	<b>kafvelland</b> or <b>kavelland</b>	126.95 dm <sup>2</sup>

*Decimalsystemet*, adopted in 1855<sup>a</sup> and legal until 1889

					Metric
<b>qvadratref</b> or <b>kvadratrev</b>					881.531 728 m <sup>2</sup>
100	<b>qvadratstång</b> or <b>kvadratstång</b>				8.815 317 m <sup>2</sup>
10,000	100	<b>qvadratfot</b> or <b>kvadratfot</b>			8.815 317 dm <sup>2</sup>
1,000,000	10,000	100	<b>qvadrattum</b> or <b>kvadrattum</b>		8.815 317 cm <sup>2</sup>
100,000,000	1,000,000	10,000	100	<b>qvadratlinje</b> or <b>kvadratlinje</b>	8.815 317 mm <sup>2</sup>

<sup>a</sup>There was also, even if seldom used, 1 **qvadrat mil** = 129,600 qvadratref = 114,246,511.995 456 m<sup>2</sup>

<sup>14</sup>Based on Juhlin-Dannfelt, Herman. ed. *Lantmannens uppslagsbok*. Stockholm: Norstedt, 1923, p. 1031.

Metric scale after 1878

								Metric
<b>myriar</b>								1,000,000 m <sup>2</sup>
10	<b>kiloar</b>							100,000 m <sup>2</sup>
100	10	<b>hektar</b>						10,000 m <sup>2</sup>
1000	100	10	<b>decar</b>					1000 m <sup>2</sup>
10,000	1000	100	10	<b>ar</b>				100 m <sup>2</sup>
100,000	10,000	1000	100	10	<b>deciar</b>			10 m <sup>2</sup>
1,000,000	100,000	10,000	1000	100	10	<b>centiar</b>		1 m <sup>2</sup>
10,000,000	1,000,000	100,000	10,000	1000	100	10	<b>milliar</b>	10 dm <sup>2</sup>

## 270.5 Units of Volume

The *famn*, as a measure for wood, was abolished by an Act of July 1, 1927. For wood from conifers, the *famn* was slightly larger than if it were for hardwood, such as birch or beech. Various *famn*-measures for wood (also known as *vedfamn*<sup>15</sup>) during the fifteenth to twentieth centuries:

- 1 **famn** (at Viborg, present-day Leningrad Oblast, Russia) =  $6 \times 6 \times 4$  alnar (for wood during the late sixteenth century) = about 30.16 m<sup>3</sup>;
- 1 **famn** (during the mid-sixteenth century at Raseborg in the province of Nyland in present-day Finland) =  $5 \times 5 \times 3$  alnar = about 15.7 m<sup>3</sup>;
- 1 **famn** (at Salberget in the province of Västerbotten) =  $6 \times 6 \times 5$  fot (for firewood used to crack rocks in mines, as reported in 1512) = about 4.71 m<sup>3</sup>,  $6 \times 6 \times 6$  fot (for wood used for roasting and for paper wood, as reported in 1512) = about 5.65 m<sup>3</sup>, and  $6 \times 6 \times 8$  fot (for wood used for charring in heaps, as reported in 1512) = about 7.54 m<sup>3</sup>;
- 1 **famn**, **häradsfamn**, **köttfamn**, or **mansfamn** (at Viborg, present-day Leningrad Oblast, Russia) =  $3 \times 3 \times 4$  alnar (for wood during the early sixteenth century) = about 7.54 m<sup>3</sup>;
- 1 **stafrum** (for lumber) = 270 kubikfot = about 7.067 m<sup>3</sup>;
- 1 **kubikfamn** or **stafrum** (for paper wood) =  $6 \times 6 \times 6$  fot = 216 kubikfot = about 5.65 m<sup>3</sup>;
- 1 **famn** (for beechwood in the provinces of Skåne and Blekinge) =  $6 \times 6 \times 6$  famnar = about 5.65 m<sup>3</sup>;
- 1 **famn** (for mining wood in 1687 at Sala in the province of Västmanland) =  $6 \times 6 \times 5$  fot = about 4.71 m<sup>3</sup>;
- 1 **järnvägsfamn** (for wood when transported by railway) =  $7 \times 7 \times 3$  fot = 147 kubikfot = about 3.85 m<sup>3</sup>;
- 1 **sexkvartersfamn** or **storfamn 6 kvarters** =  $6 \times 8 \times 3$  fot = 144 kubikfot = about 3.77 m<sup>3</sup>;
- 1 **famn** or **vedfamn** (for firewood in the province of Gotland) =  $3\frac{1}{2} \times 3\frac{1}{2} \times 1\frac{1}{4}$  alnar = about 3.21 m<sup>3</sup>;
- 1 **famn** (for shingles in the province of Småland) = varying between 3 and 4 m<sup>3</sup>;
- 1 **nyfamn** or **meterfamn** (for forest wood; according to an Act of 1885, SFS 1885:62, §19) =  $1.8 \text{ m} \times 2.5 \text{ m} \times$  the length of a log = about 3.56 m<sup>3</sup>;
- 1 **femkvartersfamn** or **storfamn 5 kvarters** =  $6 \times 8 \times 2\frac{1}{2}$  fot = 120 kubikfot = about 3.14 m<sup>3</sup>;
- 1 **stadsfamn**, **storfamn**, or **Stockholms brofamn** (in Stockholm, Karlskrona, Gothenburg and Umeå) =  $8 \text{ fot} \times 6 \text{ fot} \times 6 \text{ qvarter}$  (for softwood and brewery wood) = about 3.77 m<sup>3</sup>, or  $8 \text{ fot} \times 6 \text{ fot} \times 5 \text{ qvarter}$  (for firewood, block wood and hardwood pulp) = about 3.14 m<sup>3</sup>;
- 1 **trealnarsfamn** or **skogsfamn 6 kvarters** (for forest wood in the province of

<sup>15</sup> During the fifteenth century, also reported as **fämning** in the province of Närke and in the western parts of the province of Västmanland.

- Blekinge) =  $6 \times 6 \times 3$  fot = 108 kubikfot = about 2.827 m<sup>3</sup>;
- 1 **famn** (for mining wood in 1687 at Falun in the province of Dalarna) =  $6 \times 6 \times 2\frac{1}{2}$  fot = 90 kubikfot = about 2.36 m<sup>3</sup>;
- 1 **skogsfamn 5 kvarters** (for forest wood) =  $6 \times 6 \times 2\frac{1}{2}$  fot = 90 kubikfot = about 2.36 m<sup>3</sup>;
- 1 **kas 6 kvarters** (for forest wood) =  $6 \times 4 \times 3$  fot = 72 kvadratfor = about 1.88 m<sup>3</sup>;
- 1 **bosse** or **båås** (for wood during the sixteenth century in the province of Västergötland) = 2 famnar  $\times$  1 famn  $\times$  1 famn.

Other reported measures before the late nineteenth century:

- 1 **Stockholmsparm** (for hay, according to a royal decree of January 16, 1728) = 678.8 kubikfot = about 17.72 m<sup>3</sup>;
- 1 **parm, skattehöparm, or höåm** (for hay during the seventeenth to nineteenth centuries) = the amount of packed hay that fits in a dimension of  $3\frac{1}{4}$  aln  $\times$   $3\frac{1}{4}$  aln  $\times$   $3\frac{1}{4}$  aln, but varied by location and over the years. It was usually reported as 2 fång of hay = 48 lispund.
- 1 **kronoparm** or **kronparm** (for hay, according to a decree of May 19, 1688) = 1 kubikfamn = 216 kubikfot = about 5.65 m<sup>3</sup>;
- 1 **Göteborgs standard** (for pit prop) = 180 English cu ft = about 5.097 m<sup>3</sup>;
- 1 **standard** or **Petersburg standard** = 165 English cu ft (for sawn wood) = about 4.672 m<sup>3</sup>, 120 Englisg cu ft (for round

- loga) = 120 English cu ft = about 3.397 m<sup>3</sup>, and 150 English cu ft (for square beam) = about 4.247 m<sup>3</sup>;
- 1 **malmtunna** (for iron ore) = 1 kubikaln = about 247.1 L;
- 1 **gilling** (for hay in northern Sweden during the sixteenth to nineteenth centuries) = 30–50 kubikaln = about 6.28–10.5 m<sup>3</sup> or 30–50 lispund = about 225–375 kg;
- 1 **skakt** (for soil) = 6 alnar  $\times$  6 alnar  $\times$   $\frac{1}{2}$  alen = 18 kubikalnar;
- 1 **storstig** = 2 stigar = 24 tunnor = about 3.96 m<sup>3</sup>;
- 1 **skogstig, stig, or last** (for charcoal) = 12 tunnor = 75.6 kubikfot = about 1.979 m<sup>3</sup>;
- 1 **hummerträ** (a container used for various commodities during the nineteenth century) = 24 kannor = about 62 L;
- 1 **kas** or **kase** (for firewood at Falun in the province of Dalarna) =  $6 \times 4 \times 2\frac{1}{2}$  fot (for 5-kvartersträn = when each piece of wood was 5 kvarter ( $2\frac{1}{2}$  fot)) = about 1.57 m<sup>3</sup>, and  $6 \times 4 \times 3$  fot (for 6-kvartersträn = when each piece of wood was 6 kvarter (3 fot)) = about 1.88 m<sup>3</sup>;
- 1 **bal** (for almonds during the eighteenth century) = ?;
- 1 **bal** (for peat during the eighteenth century) = 35 dm<sup>3</sup>;
- 1 **holk** (a small container for tar during the eighteenth to nineteenth centuries) = 25 dm<sup>3</sup>;
- 1 **skrinda** (a name for containers that were used in Stockholm for charcoal, firewood and hay during the eighteenth to nineteenth centuries) = unspecified size.

*Decimalsystemet*, legally adopted in 1855 and allowed for use until 1889

					Metric
<b>kubikrev</b>					26,173.205 934 m <sup>3</sup>
1000	<b>kubikstång</b>				26,173.205 934 L
1,000,000	1000	<b>kubikfot</b>			26.173 206 L
1,000,000,000	1,000,000	1000	<b>kubiktum</b>		26.173 mL
100,000,000,000	100,000,000	100,000	100	<b>kubiklinje</b>	0.262 mL

Metric scale after 1878 (used for both dry commodities and liquids)

								Metric
<b>myrialiter</b>								10,000 L
10	<b>kiloliter</b>							1000 L
100	10	<b>hektoliter</b>						100 L
1000	100	10	<b>decaliter</b>					10 L
10,000	1000	100	10	<b>liter</b>				1 L
100,000	10,000	1000	100	10	<b>deciliter</b>			100 mL
1,000,000	100,000	10,000	1000	100	10	<b>centiliter</b>		10 mL
10,000,000	1,000,000	100,000	10,000	1000	100	10	<b>milliliter</b>	1 mL

270.6 Units of Dry Capacity

For coal during the mid-sixteenth century

					Metric
<b>stig</b>					~7920 L
6	<b>fora</b>				~1320 L
24	4	<b>korg</b>			~330 L
48	8	2	<b>tunna</b>		~165 L
72	12	3	1½	<b>fat</b>	~110 L

Units used in Stockholm after c. 1550:

- 1 **pundläst** or **pundeläst** (for cereal during the sixteenth century) = 48 tunnor = about 5633 L;

- 1 **skeppsläst** (for malt) = 34 tunnor = about 3990 L;  
1 **skeppsläst** (for oats) = 32 tunnor = about 3755 L;  
1 **skeppsläst** (for barley) = 27 tunnor = about 3169 L;  
1 **skeppsläst** (for rye, wheat and peas) = 24 tunnor = about 2817 L;  
1 **skeppsläst** (for salt meat and red paint) = 17–18 tunnor = about 1995–2112 L;  
1 **skeppsläst** (for salt, with size varying by country of origin) = 15–17 tunnor = about 1760–1995 L;  
1 **skeppsläst** (for tar) = 13 tunnor = about 1526 L;  
1 **skeppsläst** (for butter, whale-oil, fish, eel and pitch) = 12 tunnor = about 1408 L.

In Stockholm before 1604

					Metric
<b>Rostocktunna</b>					117.36 L
2½	<b>spann</b>				46.94 L
4	1⅔	<b>fjärding</b>			29.34 L
48	19⅕	12	<b>Rostockkanna</b>		2.445 L
50	20	12½	1⅓ <sub>24</sub>	<b>kappe</b>	2.347 L

In Stockholm after 1604

				Metric
<b>stockholmstunna</b>				146.70 L
2½	<b>spann</b>			58.68 L
50	20	<b>kappe</b>		2.934 L
60	24	1⅕	<b>Rostockkanna</b>	2.445 L

Some other measures reported during the seventeenth century:

- 1 **fat**<sup>16</sup> (during the sixteenth to seventeenth centuries) = 1/16 spann = about 4–5 L;
- 1 **fat** (in 1638) = 1/32 måltunna = 4.47 L, (after 1665) = 1 kappe = 4.580 L.

Mensuræ Aridorum Svethiæ-system, proposed by Georg Stiernhielm in 1664

<b>måhltunna</b>							
2	<b>spann</b>						
4	2	<b>halfspann</b>					
8	4	2	<b>fierding</b>				
32	16	8	4	<b>cappa</b>			
56	28	14	7	1¾	<b>cantarus or kanna</b>		
1120	560	280	140	35	20	<b>kosa</b>	
2240	1120	560	280	70	40	2	<b>bäker</b>

Decimal system, Mensuræ Canthari Minores, proposed by Georg Stiernhielm in 1664

<b>amphora or ämbar</b>				
10	<b>cantarus or kanna</b>			
100	10	<b>quintarius or römer</b>		
1000	100	10	<b>modiolus or motle</b>	
10,000	1000	100	10	<b>minut or örtlin</b>

Values for units in the Mensuræ Regni Svethiæ-system, based on estimations made by [TAND]

	Metric <sup>a</sup>	Metric <sup>b</sup>	Metric <sup>c</sup>	Volume of water in gran	Length on the linear scale
<b>måhltunna</b>	147.5 L	146.7 L	147.5 L	3,096,576	528.39 mm
<b>spann</b>	73.75 L	73.36 L	73.15 L	1,548,288	418.22 mm
<b>halfspann</b>	36.875 L	36.680 L	36.75 L	774,144	332.46 mm
<b>amphora or ämbar</b>	26.340 L	26.200 L	26.20 L	552,960	296.76 mm
<b>fierding</b>	18.437 L	18.340 L	18.41 L	387,072	264.05 mm
<b>cappa</b>	4.609 L	4.585 L	4.556 L	96,768	165.78 mm
<b>cantarus or kanna</b>	2.634 L	2.620 L	2.620 L	55,296	137.86 mm
<b>quintarius or römer</b>	263.4 mL	262.0 mL	263.4 mL	5529.6	64.10 mm
<b>kosa</b>	131.7 mL	131.0 mL	129.9 mL	2764.8	50.64 mm
<b>bäker</b>	65.85 mL	65.50 mL	65.65 mL	1382.4	40.34 mm
<b>modiolus or motle</b>	26.34 mL	26.20 mL	25.70 mL	552.96	29.51 mm
<b>minut or örtlin</b>	2.634 mL	2.620 mL	2.570 mL	55.296	–

<sup>a</sup>Magnitudes based on value for the *måhltunna*, as estimated by [TAND]  
<sup>b</sup>Magnitudes based on value for the *kanna*, as estimated by [TAND]  
<sup>c</sup>Magnitudes based on values for each unit, as estimated by [TAND]

<sup>16</sup>During the sixteenth century, also known as **stockholmskappe** in present-day Finland.

For cereal and other dry commodities, based on the *1665 års plakat*

							struket mått or löst mått = stricken measure	fast mått = heaped measure
<b>tunna<sup>a</sup></b>							146.564 L	164.884 L
2	<b>spann<sup>b</sup> or halvtunna</b>						73.282 L	82.442 L
4	2	<b>halvspann<sup>c</sup></b>					36.641 L	41.221 L
8	4	2	<b>fjärding or spannfjärding<sup>d</sup></b>				18.320 L	20.611 L
16	8	4	2	<b>åtting<sup>e</sup></b>			9.160 L	10.305 L
32	16	8	4	2	<b>kappa<sup>f</sup></b>		4.580 L	5.153 L
56	28	14	7	2½	1¼	<b>kanna<sup>g</sup></b>	2.617 L	2.944 L

<sup>a</sup>Also called **pyn** or **thynna**. When the use of heaped measures in the sale of grain was forbidden, to compensate the buyers, it was decided that an additional fjerding (= 700 kubiktum) would be allowed for each måltunna purchased. 1 **måltunna** was exactly 5600 kubiktum (as introduced in 1855) = 146.564 L, making 1 **spannmålstunna** = 6300 kubiktum = 164.884 L

<sup>b</sup>This unified measure, as a ½ tunna, was introduced in 1638. In the provinces of Dalarna, Gästrikland, Uppland, and the eastern part of Västmanland, since the sixteenth century, used for cereal, flaxseed and peas, as about 80 L. In the province of Halland, reported as ¼ tunna = about 40 L. This measure is not to be confused with an oval food basket of wood with dome lids, used during the seventeenth to nineteenth centuries in the provinces of Lappland, Norrbotten, Västerbotten, Jämtland, Ångermanland, Medelpad, Hälsingland, Gästrikland and Dalarna. This container was never used as a unit of capacity

<sup>c</sup>In the district of Närke and in the western parts of the district of Västmanland, during the sixteenth to eighteenth centuries, also called **fjärding** (= ¼ tunna) when used for grain

<sup>d</sup>Also reported as **kvarter** and **fyrkappa** (in the provinces of Skåne and Småland). In the province of Gotland, sometimes called **halvlop**

<sup>e</sup>Only reported as having been used in the province of Uppland

<sup>f</sup>Usually used for cereal, fruit, salt and root vegetables. Also reported as **kappe**, **skæppe**, **skäppa**, and **tolfmyning**. In the province of Småland, also reported as **fyrkappa**, when measured by a cubic container instead of a round one. In 1515, reported as equal to 1/20 spann. During the seventeenth to early eighteenth centuries, it was mostly used in present-day Finland. After 1638, it was reported that 1 tunna = 36 kappar. According to some sources, it was linked, during late twentieth century, to the metric system as 5 L

<sup>g</sup>Sometimes also referred to as **kanneskål** or **skål**

For cereal in general

					kannor	Metric
<b>tunna<sup>a</sup></b>					56	146.569 953 6 L
2	<b>spann</b>				28	73.284 977 L
4	2	<b>halvspann</b>			14	36.642 488 L
8	4	2	<b>fjerding</b>		7	18.321 244 L
32	16	8	4	<b>kappa</b>	1¼	4.580 311 L

<sup>a</sup>This was sold as a stricken measure (*löst mål* or *struket mått*), and generally considered to be equal to 5¾ kubikfot. It was also used for charcoal from Stora Kopparberg in the province of Dalarna

For malted barley

		Metric
<b>tunna</b>		174.051 820 L
38	<b>kappa</b>	4.580 311 L

For barley, oats, wheat, rye, peas and coal

		Metric
<b>tunna</b> <sup>a</sup>		164.891 197 8 L
36	<b>kappa</b>	4.580 311 L

<sup>a</sup>This was, in general, sold in a heaped measure (*fast mål* or *rågat mått*)

For salt, limestone, calcined lime and gypsum

		Metric
<b>tunna</b> <sup>a</sup>		155.730 576 L
34	<b>kappa</b>	4.580 311 L

<sup>a</sup>This measure was sold, in general, as heaped as possible

For cereal at Ekeberg, Långasjö, Sjösås, and Varend in the province of Småland

			Metric
<b>skäppa</b>			27.52 L
4	<b>ask</b>		6.88 L
6	1½	<b>kappe</b> or <b>köpə</b>	4.59 L

For cereal at Mora in the province of Dalarna

		Metric
<b>trö</b>		12.0 L
4	<b>ask</b>	3.0 L

For cereal in the province of Skåne during the eighteenth to nineteenth centuries

			Metric
<b>tuna</b>			146.6 L
2	<b>sextonkappa</b>		73.3 L
32	16	<b>kanna</b>	4.58 L

For barley, wheat, rye, oats and peas in the province of Gotland

<b>tunna</b>		
4	<b>löb</b>	
64	16	<b>kanna</b>

For groats in the province of Gotland

<b>tunna</b>		
4	<b>löb</b>	
60	15	<b>kanna</b>

For cereal in the province of Bohuslän

<b>tunna</b>				
6	<b>skäppa</b>			
8	1⅓	<b>sätting</b>		
12	2	1½	<b>fjerdning</b>	
48	8	6	4	<b>skrull</b>

For cereal in the province of Halland

<b>tunna</b>		
6	<b>stor skäppa</b>	
8	1⅓	<b>liten skäppa</b>

For charcoal before 1889

			Metric
<b>kolläst</b> or <b>tolftunnesteig</b>			1978.8 L
12	<b>koltunna</b>		164.9 L
756	63	<b>kanna</b>	2.617 L

For charcoal after 1889

		Metric
<b>Meterläst</b>		2000 L
20	<b>hektoliter</b>	100 L

Some measures used after the thirteenth century (skäppa was banned in 1735, but in some provinces, used until the early nineteenth century):

- 1 **pundläst** or **pundeläst** (for cereal) = 12 pund = 48 tunnor = about 7920 L;
- 1 **skrinda** (a container for coal, defined in a royal decree of March 31, 1627) = 18 tunnor = about 2970 L;
- 1 **läst** (for Spanish and French salt) = 18 tunnor = about 2970 L, but when sold in Sweden, = 16 tunnor = about 2640 L;
- 1 **handelsläst** or **commerkläst** (for cereal) = 1134 kannor = about 2968 L;
- 1 **läst** (for tar and train oil) = 13 tunnor = about 2145 L;
- 1 **kolstig** or **ryss** (for charcoal) = 12 tunnor = about 1980 L;
- 1 **läst** (for fish, honey, pitch, pot-ash, butter, Luneburg salt and beer) = 12 tunnor = about 1980 L;

- 1 **tunneläst** (for malt and cereal) = 12 tunnor = about 1980 L;
- 1 **flak, flaka, or flake** (for Atlantic herring, potatoes and other dry commodities during the seventeenth to nineteenth centuries) = a barrow-load, before 1773, = 48 kannor = about 125 L, between 1773 and 1786, = 63 kannor = about 165 L, and after 1783, = 1 fot  $\times$  1 aln  $\times$  2 alnar = 80 kannor = about 209 L;
- 1 **sillkärra** (for Atlantic herring during the eighteenth century) = 63 kannor (before 1786) = about 165 L, and = 80 kannor (after 1786) = about 209 L;
- 1 **fat** (for anchovies, meal, and raisins) = about 150–160 L;
- 1 **bränttunna** (a barrel for rye intended for production of aquavit after 1794) = about 165 L;
- 1 **lakegodstunna or packtunna** (a barrel for Atlantic herring and salted meat) = 48 kannor = about 125.6 L;
- 1 **sillträ or spilträ** (a container for Atlantic herring) = 48 kannor = about 125.6 L, or 12–13 lispund = about 110 kg;
- 1 **bränttunna** (for rye intended for production of aquavit before 1794) = 4/5 tunna = about 117 L;
- 1 **korntönde** (for barley) = about 138.97 L;
- 1 **saltköttkar** (for salted meat) = 30 kannor = about 78.5 L;
- 1 **kalkså** (for chalk during the eighteenth century) = 28 kannor = about 73.3 L;
- 1 **hummerträ** (a cask for lobster) = 24 kannor = about 62 L, or 70–80 lobsters;
- 1 **läst** (for limestones) = 12 kappar = about 55 L;
- 1 **så** (a cask for cereal) = 16 kannor = about 41.8 L;
- 1 **ostronträ** (for oysters during the eighteenth to nineteenth centuries) = 16 kannor = about 41.8 L, said to equal 11–12 dussin = 132–144, but later reported as 200 oysters;
- 1 **bränttunna** (for malt intended for production of aquavit between 1794 and 1798) = 1/4 tunna = about 41 L;
- 1 **bränttunna** (for grain intended for production of aquavit after 1798) = 1/4 tunna = about 41 L;
- 1 **laup, löp, lop, or loup** (a basket made of birch-bark that was mainly used for cereal at Orsa in the province of Dalarna and in the province of Gotland during the seventeenth to eighteenth centuries) = 1/4 tunna = about 40 L;
- 1 **skäppa or skeppa** (in the provinces of Bohuslän and Dalsland) = 1 halvspann = 1/4 tunna = about 36.6 L;
- 1 **fjärding or spannfjärding** (for grain in the province of Närke, in the eastern parts of Västmanland, at Fjällsjö, Nederluleå and Åsele, and in the province of Norrland during the sixteenth to seventeenth centuries) = 1/4 (sädes) tunna = 8 kappar = about 36.6 L;
- 1 **kagge** (for herring, pickled cucumbers, etc.) = 12 kannor = about 30 L, in 1665, reported as 31.4 L;
- 1 **skäppa** (in the province of Västergötland) = 1/5 tunna = about 29.3 L;
- 1 **bränttunna** (for grain intended for production of aquavit before 1794) = 1/5 tunna = about 29 L;
- 1 **smålandsskäppa** (in the present-day provinces of Skåne, Halland, and Blekinge) = about 27.5 L;
- 1 **skäppa** (in the provinces of Småland and Öland) = 1/6 tunna = about 27.2 L;
- 1 **själlandsskäppa** (in the present-day provinces of Skåne, Halland and Blekinge) = about 23.2 L;
- 1 **sätting, sättong, sättung, or settung** (for cereal during the seventeenth to nineteenth centuries) = 1/12 tunna (in the province of Bohuslän during the seventeenth century) = about 13 L, and = 1/8 tunna (in the the provinces of Bohuslän and Dalsland during the eighteenth century) = about 20 L;
- 1 **fjärding, fjerding, or spannfjärding** (for beans, peas, Baltic herring, eel, lavaret, roach, and cereal in the provinces of Dalarna, Uppland, Värmland, Ångermanland, and in some parts of Västergötland, Södermanland and Östergötland during the sixteenth to seventeenth centuries) = 1/8 tunna = 1/4 spann = 4 kappar = about 18.3 L;
- 1 **kagge** (for soft soap, gunpowder and snuff during the nineteenth century) = about 10–15 L;
- 1 **hink** (usually for fresh water or soft soap) = about 10–12 L;

- 1 **fjärding** or **fjerdning** (for grain in the province of Uppland and in Stockholm, as reported in 1638) =  $\frac{1}{4}$  span =  $\frac{1}{2}$  halvspann = 4 uppländska fat or finska kappar =  $6\frac{3}{4}$  stockholmska kannor;
- 1 **halvskäppa** (usually reported as used in the western parts of Sweden) =  $\frac{1}{2}$  skäppa =  $\frac{1}{4}$  tuna;
- 1 **fjärding**, **skäppefjerdning**, or **skäppefjärding** (for grain and other dry commodities at Vallda in the province of Västergötland) =  $\frac{1}{4}$  västgötaskäppa =  $\frac{1}{16}$  tunna = about 10 L;
- 1 **fjärding**, **skäppefjerdning**, or **skäppefjärding** (for grain and other dry commodities in the provinces of Blekinge, Småland, Öland and Värmland) =  $\frac{1}{4}$  skäppa = about 7.487 L;
- 1 **ask** or **skäppefjerdning** (in the present-day provinces of Skåne, Halland, Blekinge, and Dalarna) =  $\frac{1}{4}$  skäppa = about 6.875 L;
- 1 **kruka** or **kruge** (usually for milk) = varying between 3 and 8 L;
- 1 **bunke** (during the twelfth to nineteenth centuries) = a container used for baking, seldom more than 3 L;
- 1 **halvkappe** (for malt) =  $1\frac{7}{128}$  kannor = about 2.7 L;
- 1 **halvkappe** (for solid commodities) =  $\frac{63}{64}$  kanna = about 2.6 L;
- 1 **halvkappe** (for salt) =  $\frac{119}{128}$  kanna = about 2.4 L;
- 1 **halvkappe** (for powdered commodities) =  $\frac{7}{8}$  kanna = about 2.3 L;

- 1 **tekopp** (a stoup of uncertain size) = usually about 250 mL;
- 1 **kaffekopp** (a stoup of uncertain size) = usually about 150 mL;
- 1 **fittja** or **fittje** (in the provinces of Dalarna, Gästrikland and Hälsingland during the eighteenth century) = the amount of flax or hemp that could be held in two hands cupped together;
- 1 **göpe**, **göpen**, **göping**, or **göpna** (during the thirteenth to nineteenth centuries) = the amount of cereal that could be held in two hands cupped together;
- 1 **grepp** (usually for flour, seed and salt) = a handful;
- 1 **handfull** (usually for flour, sugar, salt) = a handful, often reported as a slightly smaller measure than the *grepp*;
- 1 **fingerborg** (a thimbleful, for meal, seed, sugar, spices, etc., during the sixteenth to nineteenth centuries) =  $\frac{1}{8}$  jumfru = about 10.25 mL;
- 1 **band** (for fish and cereal during the seventeenth century) = uncertain size;
- 1 **karp** (for soap from Reval and Riga, and for ginger bread from Åbo in present-day Finland during the sixteenth to seventeenth centuries) = uncertain size;
- 1 **kista** (for glass and nails) = a pack of uncertain size;
- 1 **cirkelhop** (for iron ore rocks during the seventeenth to eighteenth centuries) = uncertain size.

*Decimalsystemet*, legally adopted in 1855 and allowed for use until 1889

				Metric
<b>kubikfot</b>				26.172 676 L
10	<b>kanna</b> <sup>a</sup>			2.617 267 6 L
1000	100	<b>kubiktum</b>		26.172 676 mL
100,000	10,000	100	<b>kubiklinje</b>	0.261 727 mL

<sup>a</sup>Among Swedish-speaking Finns, also reported as **kaima**

## 270.7 Units of Liquid Capacity

Some reported measures:

- 1 **fateken** (for rhine wine during the sixteenth century) = a small container, weighing about 100 skålpund.

Mensuræ Liquidorum Sveithæ-system, proposed by Georg Stiernhielm in 1664

öhl tonna <sup>a</sup>	öhl fierding <sup>a</sup>									
4	2	öhl otting <sup>a</sup>								
8	6									
48	12	kanna								
96	24	2	stoop <sup>a</sup>							
384	96	8	4	quarter						
1536	384	192	32	16	4	quartula or ort				
2304	576	288	48	24	6	1½	sextula			
3072	768	384	64	32	8	2	1½	octula		
4608	1152	576	96	48	12	3	2	1½	chyathus	
9216	2304	1152	192	96	24	6	4	3	2	ligula or sked

<sup>a</sup>Mainly for beer

Mensuræ Liquidorum Sveithæ-system, proposed by Georg Stiernhielm in 1664

	Metric <sup>a</sup>		Metric <sup>b</sup>		Metric <sup>c</sup>		Volume of water in gran		Length on the linear scale
öhl tonna	126.0 L		117,965 L		126.0 L		2,654,208		501.23 mm
öhl fierding	31.5 L		29,491 L		31.08 L		663,552		314.42 mm
öhl otting	15.75 L		14,746 L		15.75 L		331,776		250.66 mm
kanna	2.625 L		2.458 L		2.620 L		55,296		137.86 mm
stoop	1.312 L		1.229 L		1.295 L		27,648		109.01 mm
quarter	328.1 mL		307.2 mL		326.4 mL		6912		68.85 mm
quartula or ort	82.0 mL		76.8 mL		84.37 mL		1728		43.86 mm
sextula	54.9 mL		51.2 mL		56.85 mL		1152		38.45 mm
octula	41.0 mL		38.4 mL		40.46 mL		864		34.33 mm
chyathus <sup>d</sup>	27.3 mL		25.6 mL		25.60 mL		576		?
ligula or sked	13.7 mL		12.8 mL		12.80 mL		288		23.39 mm

<sup>a</sup>Magnitudes based on the largest unit, the *tonna*, as estimated by [TAND]

<sup>b</sup>Magnitudes based on the smallest unit, the *sked*, as estimated by [TAND]

<sup>c</sup>Magnitudes based on values for each unit, as estimated by [TAND]

<sup>d</sup>Said to equal the weight of one Roman uncia

System based on the 1665 års plakat

								Metric
<b>foder<sup>a</sup> or fuder</b>								942.235 416 L
2	<b>pipa<sup>b</sup></b>							471.117 708 L
4	2	<b>oxhufvud<sup>c</sup></b>						235.558 854 L
6	3	1½	<b>åm<sup>d</sup></b>					157.039 236 L
12	6	3	2	<b>halvåm<sup>e</sup></b>				78.519 618 L
24	12	6	4	2	<b>ankare<sup>f</sup></b>			39.259 809 L
48	24	12	8	4	2	<b>halvankare<sup>g</sup></b>		19.629 904 L
360	180	90	60	30	15	7½	<b>kanna<sup>h</sup></b>	2.617 321 L

<sup>a</sup>Sometimes reported as only about 930 L

<sup>b</sup>From the fifteenth until the eighteenth century, reported as **båt, bata, båth, bota, botha, or botta**, when used for wine from Spain or Portugal

<sup>c</sup>Usually used for wine. Also spelled **oxhuvud, oxehofft, oxhoe, oxhuffvudh, oxhuffvud, oxhufvudh, and oxhufwud**

<sup>d</sup>Usually used for beer, brandy, wine, and seal-oil. It was also spelled **aam, åhm, åmm, ame, om, or ohm**. Later also called **fat** or **helfat**. During the twenty-first century, **fat** usually refers to a US oil barrel, equal to 42 US gal = about 159 L of some petroleum product

<sup>e</sup>Also called **halvfat, eimer, or embar**

<sup>f</sup>During the late seventeenth century, it was sometimes referred to as **kagge** or **brennewijnskagge** when used for brandy, near-beer and vinegar. When used for liquor distilled from potatoes or grain, it was sometimes called **kutting**. During the eighteenth century, **kagge** and **kutting** came to refer to somewhat smaller firkins, about 12–19 L

<sup>g</sup>For arrack, beer, ale, oil, rum, vinegar, and wine. Sometimes also used for dry commodities, such as white salt

<sup>h</sup>Usually used for beer, and occasionally for wine

Subdivision of *kanna*, based on the 1665 års plakat

							Metric
<b>kanna</b>							2.617 321 L
2	<b>stop<sup>a</sup></b>						1.308 660 L
4	2	<b>halvstop<sup>b</sup></b>					654.330 mL
8	4	2	<b>qvarter or kvarter<sup>c</sup></b>				327.165 mL
16	8	4	2	<b>halfqvarter or halvkvarter</b>			163.582 mL
32	16	8	4	2	<b>ort; informally jumfru, or jungfru<sup>d</sup></b>		81.791 mL

<sup>a</sup>Also called **stopakanna**

<sup>b</sup>For beer, also called **butelj, butelje, or helbutelj**

<sup>c</sup>Usually for liquor distilled from potatoes or grain. When used for beer, also called **halvbutelj**

<sup>d</sup>The name, =“maid,” was an informal name taken from the similarity of the shape to that of a woman in an ankle-length dress. The name was also spelled **iunfru, jåmfru, jumfrue, junfru** and **junkfru**. During the eighteenth century, in the province of Uppsala, the jumfru unit was also, humorously, called a **bytta**. It was generally used for beverages distilled from potatoes, grain and, formerly, wood cellulose. Sometimes, a measure was also reported called a **halvjumfru** or **halvjumfru** = ½ ort = 1/64 kann = about 40.896 mL

Subdivision of *tunna*, based on the 1665 års plakat

							Metric
<b>tunna<sup>a</sup></b>							125.631 389 L
2	<b>halvtunna</b>						62.815 694 L
4	2	<b>fjärding</b>					31.407 847 L
8	4	2	<b>åtting</b>				15.703 924 L
16	8	4	2	<b>sextondel</b>			7.851 962 L
48	24	12	6	3	<b>kanna</b>		2.617 321 L

<sup>a</sup>For salted meat, salted fish, butter, flour, beer, pitch, red coloring and tar. In the province of Gotland, also known as **fylling** when used for tar

For honey and probably butter in the province of Småland during the sixteenth century

		Metric
<b>ask</b>		~21.0 L
8	<b>kanna</b>	~2.625 L

For honey in the province of Östergötland during the sixteenth century

		Metric
<b>ask</b>		~6.5 L
5	<b>stop</b>	~1.3 L

For various liquids in the province of Skåne

			Metric
<b>kittel</b>			125.616 L
3	<b>så</b>		41.872 L
48	16	<b>kanna</b>	2.617 L

Some other measures reported before late nineteenth century:

- 1 **dygnskol** (in the province of Västmanland) = the daily requirement of coal in a smelting-house = 168 tunnor = about 21,103.5 L;
- 1 **bryggspann** (sometimes used in breweries) = 288 kannor = about 735 L;
- 1 **kardel** (for train oil and blubber during the eighteenth century) = about 343 L;
- 1 **balja** = 50–150 L;
- 1 **så** (in the province of Dalarna) = 4 byttor = about 41.92 L;
- 1 **fjårding** (during the sixteenth to nineteenth centuries) = 12 kannor (as reported in 1739) = about 31.4 L;
- 1 **ask** (for tar in the province of Dalsland during the fifteenth to sixteenth centuries) = about 5–20 L;
- 1 **ask** (for tar in the province of Jämtland during the seventeenth century) = about 10.5 L;
- 1 **bytta** (in the province of Dalarna) = ¼ så = about 10.48 L;
- 1 **bytta** (for various liquids during the sixteenth to twentieth centuries) = varying between 10 and 20 L;
- 1 **bunke** (for various liquids, but mainly milk) = an oval cask that held a few litres;

- 1 **bolle** (in the province of Hälsingland) = 2.7 L;
- 1 **bägare**, **bicarium**, or **bikare** (during the twelfth to nineteenth centuries) = about 2 L;
- 1 **mugg** (for beer and other beverages during the eighteenth to nineteenth centuries) = 1 stop = about 1.3 L;
- 1 **fingerborg** (a thimbleful, used for medicine) = 1/8 jungfru = about 10.25 mL.

*Decimalsystemet*, legally adopted in 1855 and allowed for use until 1889

				Metric
<b>kubikfot</b>				26.172 676 L
10	<b>kanna</b> <sup>a</sup>			2.617 267 6 L
1000	100	<b>kubiktum</b>		26.172 676 mL
100,000	10,000	100	<b>kubiklinje</b>	0.261 727 mL

<sup>a</sup>Among Swedish-speaking Finns, also reported as **kaima**

270.8 Units of Weight

Presumed Viking system, linked to the Islamic system of weights, used during the seventh to tenth centuries at Bandlunde and Birka

						Metric
?						~101.6 g
8	?					~12.70 g
16	2	?				~6.35 g
32	4	2	?			~3.17 g
64	8	4	2	?		~1.59 g
128	16	8	4	2	?	~0.80 g

Some other measures reported as used during the eighth to eleventh centuries:

- 1 **Birkapund**, **Bircapund**, or **björköapund** (in the region of Mälaren and along the fairway to Velikiy Novgorod in Russia) = about 150–200 kg;
- 1 **skålpund** (in Stockholm during the eleventh to thirteenth centuries) = about 414.4 g.

From the Middle Ages until the mid-1500s, there were two different commercial systems of weights in use, the *besmanvigtsystem* and the *virtualievigtsystem*. The first system used steelyard balances (besman) and homemade weights, while the other system used weighing scales with two pans.

*Besmanvigtsystem* for butter, fish and meat at Skara during the late sixteenth century

		Metric
<b>besmanspund</b>		7.179 36 kg
24	<b>besmansmark</b>	299.14 g

*Besmanvigtsystem* for butter, fish and meat at Främby; at Gripsholm; at Jönköping; at Uppsala and Västerås during the late sixteenth century

		Metric	Metric	Metric	Metric
<b>besmanspund</b>		7.186 51 kg	6.817 95 kg	9.938 04 kg	6.997 39 kg
20	<b>besmansmark</b>	359.33 g	340.90 g	496.90 g	349.87 g

*Besmanvigtsystem* for butter, fish and meat at Åbo before 1602 and after 1602

		Metric	Metric
<b>besmanspund</b>		9.064 8 kg	9.971 28 kg
24	<b>besmansmark</b>	377.70 g	415.47 g

*Besmanvigtsystem* for butter, fish and meat at Örebro before 1602 and after 1602

		Metric	Metric
<b>besmanspund</b>		7.821 kg <sup>a</sup>	8.309 4 kg
20	<b>besmansmark</b>	391.03 g	415.47 g

<sup>a</sup>[FORS] estimated it as 8.078 kg

*Besmanvigtsystem* for butter, fish and meat at Stockholm during the late sixteenth century

			Metric
<b>lispund</b>			6.647 52 kg
$1\frac{1}{10}$	<b>besmanspund<sup>a</sup></b>		6.043 20 kg
22	20	<b>besmansmark<sup>b</sup></b>	302.16 g

<sup>a</sup>[FORS] estimated it as 6.242 kg

<sup>b</sup>At two places, called “gamla ladugård” and “nya ladugård”, reported as 332.38 g

*Besmanvigtsystem*,<sup>a</sup> national system used from 1605 to 1634

			Metric
<b>besmanspund</b>			8.309 4 kg
20	<b>besmansmark</b>		415.47 g
640	32	<b>lod</b>	12.983 4 g

<sup>a</sup>The system used in Örebro in the province of Närke became the national prototype in 1605

*Besmanvigtsystem*, national system used from 1634 to 1665

					Metric
<b>wage or waag<sup>a</sup></b>					69.503 346 kg
$8\frac{1}{4}$	<b>besmanspund</b>				8.424 648 kg
165	20	<b>besmansmark</b>			421.232 4 g
330	40	2	<b>lödig mark</b>		210.616 2 g
5280	640	32	16	<b>lod</b>	13.163 5 g

<sup>a</sup>Used for iron and lead

*Viktualievigtssystem* in Stockholm until the late sixteenth century

			Metric
<b>skeppund</b> <sup>a</sup>			137.321 640 kg
20	<b>lispund</b>		6.866 082 kg
400	20	<b>markpund</b>	343.304 g

<sup>a</sup>Also called **navitalentum** and **talentum navale** during the late fourteenth century

*Viktualievigtssystem*,<sup>a</sup> proposed national system before 1665, partly based on *Archimedes reformatus*, by Georg Stiernhielm in 1644

								Metric
<b>skeppund</b>								199.392 kg
3	<b>våg or waag</b> <sup>b</sup>							66.464 kg
4 $\frac{4}{5}$	1 $\frac{1}{5}$	<b>centner</b>						41.540 kg
15	5	3 $\frac{1}{8}$	<b>sten</b>					13.293 kg
24	8 $\frac{1}{4}$	5	1 $\frac{1}{5}$	<b>lispund</b>				8.308 kg
480	165	100	32	20	<b>skaalpund or skålpund</b>			415.4 g
960	330	200	64	40	2	<b>mark or markpund</b>		207.7 g
7680	2640	1600	512	320	16	8	<b>uns</b>	25.962 5 g

<sup>a</sup>Also spelled *wictualje wigt* system

<sup>b</sup>Usually used for iron

*Viktualievigtssystem*, subdivisions of the *uns*

					Metric
<b>uns</b>					25.962 5 g
2	<b>lod</b>				12.981 2 g
6 $\frac{1}{4}$	3 $\frac{1}{8}$	<b>ort</b>			4.154 0 g
8	4	1 $\frac{1}{25}$	<b>qvintin</b>		3.322 3 g
540	270	86 $\frac{2}{5}$	67 $\frac{1}{2}$	<b>troyskt ass</b> <sup>a</sup>	48.063 mg

<sup>a</sup>Later, between 1667 and 1737, reported as **ass trios** or **aes** for precious metals

By decree of 1665, one uniform system for weights and measures would apply throughout the country. The weight system, the viktualievikt-systemet, was intended for retailers.

*Viktualievigtssystem*, mainly based on decrees of 1665 and 1667

										Metric
<b>skäppläst</b>										4250.761 60 kg
25	<b>skeppund</b>									170.030 464 kg
60 <sup>29/33</sup>	2 <sup>19/33</sup>	<b>våg or waag</b>								70.137 566 kg
100	4	1 <sup>13/20</sup>	<b>centner<sup>a</sup></b>							42.507 616 kg
500	20	8 <sup>1/4</sup>	5	<b>lispund</b>						8.501 523 2 kg
1000	40	16 <sup>1/2</sup>	10	2	<b>bunt<sup>b</sup></b>					4.250 761 6 kg
10,000	400	165	100	20	10	<b>skålpund<sup>c</sup></b>				425.076 16 g
320,000	12,800	5280	3200	640	320	32	<b>lod</b>			13.283 63 g
1,280,000	51,200	21,120	12,800	2560	1280	128	4	<b>qvintin<sup>d</sup></b>		3.320 907 5 g
88,480,000	3,539,200	1,459,920	884,800	176,960	88,480	8848	276 <sup>1/2</sup>	69%	<b>svenskt ass</b>	48.042 06 mg

<sup>a</sup>Before 1855, the **centner** or **qwintal** varied according to the commodity. For bar steel, = 6 lispund 12 skålpund = about 56.1 kg, for branding-iron, wool, carburized steel and iron wires, = 6 lispund = about 51.009 kg, and for steel, = 8 lispund = about 60 kg. By a law of 1855, the centner was defined as 100 skålpund

<sup>b</sup>For yarn

<sup>c</sup>During the nineteenth century, the *skålpund* was often called a **mark**, even if there actually was another measure also called a mark. According to [CARD], reported as 425.079 702 4 g

<sup>d</sup>After the 1906 spelling reforms, qvintin was spelled **kvintin**

According to an Act of 1739, there were six different weight systems in use: viktualievigt (= commercial weight system), myntvigt (= coinage weight system), guld- och silvrevigt (= gold- and silver weight system), probervigt (= system for fine use), medicinalvigt (= apothecaries' weight system), and grov metallvigt (= metal weight system).

*Viktualievigtssystem*

										Metric
<b>skeppund</b>										170.030 320 kg
2 <sup>19/33</sup>	<b>skalstam<sup>a</sup></b>									70.137 507 kg
4	1 <sup>13/20</sup>	<b>centner</b>								42.507 616 kg
12 <sup>1/2</sup>	5 <sup>3/32</sup>	3 <sup>1/8</sup>	<b>sten</b>							13.602 426 kg
20	8 <sup>1/4</sup>	5	1 <sup>1/5</sup>	<b>lispund</b>						8.501 516 kg
400	165	100	32	20	<b>skålpund or viktualiepund</b>					425.075 800 g
6400	2640	1600	512	320	16		<b>uns</b>			26.567 237 g
12,800	5280	3200	1024	640	32		2	<b>lod</b>		13.283 619 g
51,200	21,120	12,800	4096	2560	128		8	4	<b>qvintin</b>	3.320 905 g
3,539,200	1,459,920	884,800	283,136	176,960	8848		553	276 <sup>1/2</sup>	69%	<b>ass</b> 48.042 mg

<sup>a</sup>For tin

*grov metallvigt* (= metal weight system)

This system differed between different parts of the country, to compensate for the increased shipping costs.

*Stapelstadsvigt* (exportations weight, Stockholm system), adopted 1605

				Metric
<b>svår läst</b> or <b>skeppläst</b>				2448.437 76 kg
18	<b>skeppund</b>			136.024 32 kg
360	20	<b>markpund</b>		6.801 216 kg
7200	400	20	<b>mark</b>	340.060 8 g

*Upstadsvigt* (inland weight), adopted 1605

			Metric	Metric
<b>skeppund</b>			142.825 6 kg	143.165 520 kg
20	<b>markpund</b>		7.141 28 kg	7.158 276 kg
400	20	<b>Mark</b>	357.064 g	357.914 g

*Bergsvigt*<sup>a</sup> (miners' weight), adopted 1605, and used until 1863

			Metric	Metric
<b>skeppund</b>			149.626 8 kg	150.306 800 kg
20	<b>markpund</b>		7.481 34 kg	7.515 340 kg
400	20	<b>mark</b>	374.067 g	375.767 g

<sup>a</sup>Also spelled **bergsvikt**, **berghammarwigt**, **bergshammarwigt**, **bergslagsvigt**, or **hammarwigt**. This system was used for weighing iron after it has been forged into iron bars. In *Geologiska föreningens i Stockholm förhandlingar*. Geologiska föreningen, 1922, footnote at p. 23, reported as 149.6–150.3 kg. At Falun in the province of Dalarna, it was reported as 149.6 kg, according to [TING, p. 14]

There were also, since the late seventeenth century, specific systems for pig iron, osmund iron, and raw copper.

*Tackjärnsvigt*<sup>a</sup> (pig iron weight, used for weighing pig iron before it was forged into iron bars) system used until 1863

			Metric	Metric
<b>skeppund</b> <sup>b</sup>			194.514 76 kg	195.398 800 kg
20	<b>markpund</b>		9.725 738 kg	9.769 940 kg
400	20	<b>mark</b>	486.286 9 g	488.497 g

<sup>a</sup>The symbol used for the tackjärnsvigt: Δ

<sup>b</sup>1 skeppund tackjärnsvigt = 1 skeppund bergsvigt + 30%

*Osmundjärnsvigt* (osmund iron weight) 1340 – c. 1400; c. 1400 – c. 1500; c. 1500 – 1529; 1529 – c. 1580; c. 1580 – c. 1650

			Metric	Metric	Metric	Metric	Metric
<b>osmundfat</b>			137.321 76 kg	136.024 32 kg	126.758 44 kg	122.063 68 kg	109.857 31 kg
12	<b>läst</b>		11.443 48 kg	11.335 36 kg	10.563 20 kg	10.171 97 kg	9.154 78 kg
480	40	<b>osmund</b>	286.087 g	283.384 g	264.080 g	254.993 g	228.869 g

*Råkopparvigt* (raw copper weight) system used until 1770

			Metric
<b>skeppund</b>			150.909 560 kg
20	<b>markpund</b>		7.545 478 kg
400	20	<b>mark</b>	377.274 g

*Råkopparvigt* (raw copper weight) system used after 1770

			Metric
<b>skeppund</b>			151.6 kg
20	<b>markpund</b>		7.58 kg
400	20	<b>mark</b>	379 g

For precious metals and pharmaceuticals before 1668

		Metric
<b>Nürnberg pund</b>		467.968 g
128	<b>qvintin</b> or <b>qwintin</b>	3.656 g

*Guld- och silvervigt* for gold and silver

					Metric
<b>mark</b>					222.800 606 g
8	<b>uns</b>				27.850 076 g
16	2	<b>lod</b>			13.925 038 g
64	8	4	<b>qvintin</b> or <b>kvintin</b> <sup>a</sup>		3.481 259 g
4 637 <sup>75</sup> / <sub>121</sub>	579 <sup>85</sup> / <sub>121</sub>	289 <sup>103</sup> / <sub>121</sub>	72 <sup>86</sup> / <sub>121</sub>	<b>ass</b>	48.042 016 mg

<sup>a</sup>When used for gold, also called **dukat**. *Kvintin* was used after the spelling reforms in 1906

*Medicinalvikt* or *apoteksvikt* (Apothecaries' weight system) used between 1668 and 1862

					Metric
<b>midicinalskålpund</b> or <b>libra medicinalis</b>					356.279 630 g
12	<b>unce</b> or <b>uns</b>				29.689 969 g
96	8	<b>drachma</b> or <b>drakma</b>			3.711 246 g
288	24	3	<b>scrupel</b> or <b>skrupel</b>		1.237 082 g
5760	480	60	20	<b>gran</b>	61.854 mg

*Myntvikt* (monetary weight scale) after the fourteenth century

		Metric
<b>skålpund</b>		420.94 g
2	<b>Skaramark</b>	210.47 g

*Myntvikt* (monetary weight scale) from the 1540s until 1634

			Metric
<b>lödig skålpund</b>			421.232 4 g
2	<b>lödig mark</b>		210.616 2 g
32	16	<b>lödig lod</b>	13.163 5 g

*Myntvikt* (monetary weight scale), also used for silver coins, from 1634 to 1830

							Metric
<b>lödig skålpund</b>							421.232 4 g
2	<b>lödig mark</b>						210.616 2 g
16	8	<b>lödig uns</b>					26.327 0 g
32	16	2	<b>lödig lod</b>				13.163 5 g
128	64	8	4	<b>qvintin, qwintin, or krona</b>			3.290 88 g
274	137	17 $\frac{7}{8}$	8 $\frac{7}{16}$	–	<b>engels</b>		1.537 34 g
8768	4384	548	274	68 $\frac{1}{2}$	32	<b>ass</b>	48.042 016 mg

<sup>a</sup>It had the French *écu à la couronne* as a model

Fuel trade scale (during the nineteenth century):<sup>17</sup>

- 1 m<sup>3</sup> bokved (beechwood) = about 530 kg;
- 1 m<sup>3</sup> björkved (birchwood) = about 425 kg;
- 1 m<sup>3</sup> barrved (softwood) = about 345 kg;
- 1 hL anthracite = about 75–80 kg;
- 1 hL Westphalian coke = about 55–56 kg;
- 1 hL English coke = about 50–55 kg.

Some other local measures and expressions reported before the late nineteenth century:

- 1 **commersläst** or **kommersläst** (used in the shipping industry after 1866) = about 4261 kg;
- 1 **kanalläst**, **skeppsläst**, **skeppläst**, **svår läst**, or **canal-läst** = a unit used in the oldest tariffs for cargo traffic on the Göta kanal. In 1822, the fee for shipping various types of good along the canal was given as one läst (= about 2488 kg) to ship 1000 alnar (= about 593.8 m); on November 7, 1822, this value was reduced to 12 skeppund (= about 2040.4 kg) to ship 1000 alnar; in the late nineteenth century, [MART3] reported it as 1951.200 kg;
- 1 **gilling**, **gill-lass**, or **gillingslass** (for hay, mainly in the provinces of Hälsingland, Härjedalen, Medelpad and Ångermanland). It varied by location and over time; in the province of Hälsingland before 1589, =  $\frac{3}{4}$  sommarlass =  $4 \times 2 \times 2$  alnar = 16 kubikalnar, between the 1590s and 1640s, = 20 kubikalnar, and during the mid-nineteenth century, =  $2\frac{1}{2} \times 2\frac{1}{2} \times 5$  alnar =  $31\frac{3}{4}$  kubikalnar; in the

provinces of Medelpad and Ångermanland during the late eighteenth century, = 3 vinterlass = 45 kubikalnar;

- 1 **vinterlass**, (for hay) = 30 lispund = about 255 kg;
- 1 **sommarlass** or **anlass** (for hay) = 25 lispund = about 212.5 kg;
- 1 **fat** (during the fourteenth to eighteenth centuries) = about 170 kg (for iron) and about 51 kg (for steel);
- 1 **matta** or **ryssmatta** (an emballage used during transportation, to carry flour from Russia during the sixteenth to seventeenth centuries) = about 163.7 kg;
- 1 **smörtunna** (for butter) = 16 lispund = about 136 kg;
- 1 **drömt** or **drömpt** (for grain and hops during the fourteenth to seventeenth centuries in southern Sweden) = 5 lispund (about 39.6 kg, when trading with Rostock),  $4\frac{1}{2}$  lispund (about 35.7 kg, when trading with Wismar), and 4 lispund (about 31.7 kg, when trading with Lübeck);
- 1 **bunkolass** (in the provinces of Dalarna and Uppkand) = a double load;
- 1 **börda** (for hay and firewood in the district of Västergötland) = about 10 lispund = about 85 kg;
- 1 **börda** (for hay at Stöde in the district of Medelpad) =  $\frac{1}{6}$  vinterlass = about 70 kg;
- 1 **kap** or **cap** (for wax during the thirteenth to fourteenth centuries) = 8 lispund (at Visby in the province of Gotland) = about 54 kg; in the province of Gästrikland, it was called a **kappe**;
- 1 **drittel** (commercial unit for butter during the nineteenth century) = 1 British Cwt = about 50.8 kg;

<sup>17</sup> Svenska Mosskulturöreningens tidskrift. 1902: 16, 96.

- 1 **fatgen** or **fatken** (for anchovies, oyster, clams, capers, carbon black and olives) = 100 skålpund = 42.6 kg;
- 1 **bytta** (for butter at Ydre in the province of Östergötland) = 5 lispund = about 42.5 kg;
- 1 **ferto**, **fiærhu(n)g**, **fjärdingspund**, or **verding** (for butter) = 4 lispund (during the late fifteenth century) = about 34 kg, and = 5 lispund (during the sixteenth century) = about 42.5 kg;
- 1 **boga** or **buga** (for birch-bark, hay and straw in the province of Öland during the sixteenth to seventeenth centuries) = about 25 kg;
- 1 **matta** (an emballage used during transportation, to carry tobacco from Brazil, during the sixteenth to seventeenth centuries) = 25–75 kg;
- 1 **kagge** (for char and trout in northern Sweden during the early twentieth century) = 23 kg;
- 1 **löp** or **loft** (a basket made of birch-bark that was used for butter during the fifteenth to eighteenth centuries) = 2 pund (in the provinces of Dalsland, Värmland and Västergötland) = about 10 kg, and 3 besmanpund (in the provinces of Skåne, Halland and Blekinge) = about 25 kg;
- 1 **melling** or **mæling** (for honey in the province of Skåne during the sixteenth to seventeenth centuries) = about 7.94 kg;
- 1 **bunt** (for wool at Kristianstad in the province of Skåne in 1755) = 1¼ skålpund = about 532.5 g;
- 1 **bismermark** (in the province of Gotland during the seventeenth to eighteenth centuries) = about 425 g;
- 1 **fjårding skålpund** (during the seventeenth century) = about 106 g;
- 1 **gyllen** (a monetary weight during the fifteenth to seventeenth centuries) = the weight of a Rhineland gyllen = about 3.28–3.52 g, or of a Hungarian gyllen = 3.48 g, but in 1621, reported as 1⅙ kvintin = about 3.53 g;
- 1 **nypa** (a pinch of salt, sugar, or spice) or **pris** (also used for snuff) = the amount that can be taken between the thumb and forefinger = about 0.5–1 mg;
- 1 **bodmål** (during the eighteenth century) = expression for various heaped measures used in booths, storehouses and markets;

- 1 **botten** or **båtten** (for soap, tallow and wax) = differing in magnitude according to location;

- 1 **bullermål** (for apples, pears and root vegetables in the province of Småland) = alternative name for “rågat mål” = heaped;

For cordage, flax, hemp, hops, and tallow

			Metric
<b>last</b>			1020.182 4 kg
6	<b>skeppund</b>		170.030 4 kg
120	20	<b>lispund</b>	8.501 52 kg

In the province of Halland

		Metric
<b>bismermark</b>		413.4 g
26⅔	<b>lod</b>	15.5 g

For honey at Faurås and Viske in the province of Halland

<b>ask<sup>a</sup></b>	
3½	<b>pund</b>

<sup>a</sup>At Fjäre, reported as 3 pund

For hay in the provinces of Dalarna and Småland during the seventeenth to nineteenth centuries

			Metric
<b>lass<sup>a</sup></b>			300–360 kg
2	<b>draga, dragan, dragande, dragu, or dragun</b>		150–180 kg
4	2	<b>parma</b>	75–90 kg

<sup>a</sup>Usually reported as 40 lispund = about 340 kg

Maritime scale used between 1726 and 1863

		Metric
<b>skeppsläst</b> or <b>svår läst</b>		2448.7 kg
18	<b>skeppund stapelstadsvigt</b>	136.04 kg

*Decimalsystemet*, legally adopted in 1855 and allowed for use until 1889

					Metric
<b>nyläst<sup>a</sup></b>					4250.758 kg
100	<b>centner</b>				42.507 58 kg
10,000	100	<b>skålpund</b>			425.075 8 g
1,000,000	10,000	100	<b>ort</b>		4.250 758 g
100,000,000	1,000,000	10,000	100	<b>korn</b>	42.507 58 mg

<sup>a</sup>Measure used as a reference for a vessel's tonnage between 1864 and 1875, replacing the previous skeppsläst, and that would itself be replaced by the registerton

Metric scale after 1878

								Metric
<b>myriagram</b>								10 kg
10	<b>kilogram</b>							1 kg
100	10	<b>hektogram</b>						100 g
1000	100	10	<b>decagram</b>					10 g
10,000	1000	100	10	<b>gram<sup>a</sup></b>				1 g
100,000	10,000	1000	100	10	<b>decigram</b>			100 mg
1,000,000	100,000	10,000	1000	100	10	<b>centigram</b>		10 mg
10,000,000	1,000,000	100,000	10,000	1000	100	10	<b>milligram</b>	1 mg

<sup>a</sup>Defined as the weight of 1 kubikcentimeter of pure water

## 270.9 Scandoromani

This is a recognised minority language in Sweden and Norway, spoken by a Romani minority community.

*Main sources:* [FRFR] and [KARL]

### 270.9.1 Units of Length

				Metric
(jik) <b>milljan</b>				10,000 m
10,000	(jik) <b>mijan</b>			1 m
20,000	2	(jik) <b>ale</b>		500 mm
~30,303	~3.03	~1.515	(jik) <b>piro</b>	~330 mm

### 270.9.2 Units of Dry Capacity

1 gono or goning = a sack.

### 270.9.3 Units of Liquid Capacity

				Metric
(jik) <b>koros</b>				~360 L
10	(jik) <b>bat</b>			~36 L
30	3	(jik) <b>kippan</b>		~12 L
~41½	~4 <sup>3</sup> / <sub>20</sub>	~1 <sup>23</sup> / <sub>60</sub>	(jik) <b>kori</b>	~8.7 L

270.9.4 Units of Weight

						Metric
baro barolil staur						1000 kg
10	barolil staur					100 kg
100	10	desch staur				10 kg
166⅔	16⅔	1⅔	sinkus staur			6 kg
666⅔	66⅔	6⅔	4	jik aur pars		1.5 kg
1000	100	10	6	1½	(jik) staur	1 kg

271 Swedish Gold Coast

See also *Danish Gold Coast, Denmark, Ghana, Sweden, and Togo.*

This Swedish colony was founded in 1650 by Hendrik Carloff. A timber fortification, named Cape Coast Castle, was built in 1653. In 1663, the whole area was integrated into the Danish Gold Coast.

272 Switzerland

Switzerland originates from the League formed in 1291, when the districts of Shwyz, Unterwalden and Uri were united to defeat Austria and attain independence as the Helvetic Confederation. The sovereignty of the Confederation was recognised internationally by the Peace of Westphalia in 1648. Napoleonic France occupied Switzerland and set up the Helvetian Republic, which lasted from 1798 to 1803. The Congress of Vienna in 1815 recognized the independence of Switzerland and guaranteed its neutrality. Each canton retained considerable powers, and an effective central government was not definitively formed until 1848. Today, the Swiss Confederation consists of 26 cantons.

Before 1836, measures varied from one Canton to another. The metric system was adopted, with the *Konkordat über eine gemeinsame schweizerische Mass- und Gewichtsordnung* of August 17, 1835, as a reference for units of length, area, and capacity. The Concordate became valid in Aargau, Basel, Bern, Freiburg,

Luzern, St. Gallen, Schaffhausen, Solothurn, Thurgau, Zug, and Zurich, from January 1, 1838. In January 1, 1839, the Concordate also became valid in Glarus. With the Federal Law of March 13, 1851, it was extended to the whole of Switzerland. The Latin cantons of Geneva, Ticino, Vaud and Valais, however, were reluctant to give up some of their traditional weights. The Canton of Uri continued to use the pre-revolutionary weights until 1877. The final introduction of the metric system was established by the Federal Law of July 3, 1875, and the metric system has been compulsory since January 1, 1877.

*Main sources:* [DOUR], [DUBL], [GUTB], [KAHN], [KELL], [KRÜG], [LUDO], [NIEM], [NOBA], [ROTT2], [TUOR], [UN55], and [WASH]

272.1 Currency

- 1803–: 1 Swiss Franken = 10 Batzen = 100 centimes, centesimos or Rappen
- 1798–1803: 1 Helvetica Republic franc = 10 Batzen = 100 Rappen (in the Helvetic Republic)

Before 1798, many cantons, half-cantons, cities and abbeys were making their own different coins, resulting in many monetary systems. In 1825, Aargau, Basel, Bern, Fribourg, Solothurn, Vaud and Wallis combined together to adopt a uniform currency: 1 Swiss Gulden = 15 Batzen = 60 Kreuzer (according to [MURR2, p. xi]).

## 272.2 Units of Length

Metric-linked upper scale used between 1836 and 1877

				Metric
<b>lieue</b> or <b>Wegstunde</b>				4800 m
1600	<b>perche</b> or <b>Ruthe</b>			3m
$2666\frac{2}{3}$	$1\frac{2}{3}$	<b>toise</b> or <b>Klafter</b>		1.8 m
4000	$2\frac{1}{2}$	$1\frac{1}{2}$	<b>aune</b> or <b>Elle</b>	1.2 m

Metric-linked lower scale used between 1836 and 1877

						Metric
<b>aune</b> or <b>Stab</b>						1.20 m
2	<b>brasse, demi-aune, Elle, or Brache</b>					600 mm
4	2	<b>pied</b> or <b>Fuß</b>				300 mm
40	20	10	<b>pouce</b> or <b>Zoll</b>			30 mm
400	200	100	10	<b>ligne</b> or <b>Linie</b>		3 mm
4000	2000	1000	100	10	<b>trait</b> or <b>Striche</b>	300 µm

In French-speaking areas

		Metric
<b>lieue itinéraire</b>		4800 m
16,000	<b>pied</b>	300 mm

Metric scale after 1875

							Metric
<b>Kilometer</b>							1000 m
10	<b>Hektometer</b>						100 m
100	10	<b>Dekameter</b>					10 m
1000	100	10	<b>Meter</b>				1 m
10,000	1000	100	10	<b>Decimeter</b>			100 mm
100,000	10,000	1000	100	10	<b>Centimeter</b>		10 mm
1,000,000	100,000	10,000	1000	100	10	<b>Millimeter</b>	1 mm

### 272.3 Units of Area

Metric-linked upper scale used between 1836 and 1877, and in Lausanne after 1823

					Metric
<b>lieue carrée</b> or <b>Quadrat Wegstunde</b>					23.04 km <sup>2</sup>
5120	<b>pose</b> or <b>Juchart</b>				4500 m <sup>2</sup>
6400	1¼	<b>arpent</b> or <b>Juchart</b>			3600 m <sup>2</sup>
51,200	10	8	<b>fossorier</b>		450 m <sup>2</sup>
2,560,000	500	400	50	<b>perche carrée</b> or <b>Quadrat Ruthe</b>	9 m <sup>2</sup>

Metric-linked lower scale used between 1836 and 1877, and in Lausanne after 1823

				Metric
<b>perche carrée</b> or <b>Quadrat Ruthe</b>				9 m <sup>2</sup>
100	<b>Quadrat Klafter</b>			3.24 m <sup>2</sup>
3600	36	<b>Quadrat Fuß</b>		9 dm <sup>2</sup>
360,000	3600	100	<b>Quadrat Zoll</b>	9 cm <sup>2</sup>

Other measures reported during the nineteenth century:

$$1 \text{ fossoyée} = 337.663 \text{ m}^2.$$

Metric scale after 1875

						Metric
<b>Quadrat Kilometer</b>						100 ha
100	<b>Hektar</b>					100 a
10,000	100	<b>Ar</b>				100 m <sup>2</sup>
1,000,000	10,000	100	<b>Quadrat Meter</b>			1 m <sup>2</sup>
100,000,000	1,000,000	10,000	100	<b>Quadrat Decimeter</b>		1 dm <sup>2</sup>
10,000,000,000	100,000,000	1,000,000	10,000	100	<b>Quadrat Centimeter</b>	1 cm <sup>2</sup>
1,000,000,000,000	10,000,000,000	100,000,000	1,000,000	10,000	100	<b>Quadrat Millimeter</b> 1 mm <sup>2</sup>

## 272.4 Units of Dry Capacity

Metric-linked system used before 1836, and scale used between 1836 and 1877

						Metric	Metric
<b>sac, Sack, or Malter</b>						135 L	150 L
10	<b>quarteron, boisseau, Sester, or Viertel</b>					13.5 L	15 L
40	4	<b>Vierling</b>				3.375 L	3.75 L
100	10	2½	<b>setier, Immi, or Émine</b>			1.35 L	1.5 L
160	16	4	1⅓	<b>Mässlein</b>		843.75 mL	937.5 mL
1000	100	250	10	6¼	<b>copet</b>	135 mL	150 mL

Metric scale after 1875

				Metric
<b>Stere or Kubik Meter</b>				1 m <sup>3</sup>
1000	<b>Kubik Decimeter</b>			1 dm <sup>3</sup> or 1 L
1,000,000	1000	<b>Kubik Centimeter</b>		1 cm <sup>3</sup>
1,000,000,000	1,000,000	1000	<b>Kubik Millimeter</b>	1 mm <sup>3</sup>

## 272.5 Units of Liquid Capacity

Metric-linked system scale before 1836

					Metric
<b>char or Fuder</b>					648 L
16	<b>setier or Eimer</b>				40.5 L
48	3	<b>broc or Gelte</b>			13.5 L
480	30	10	<b>pot, Immi, or Maß</b>		1.35 L
4800	300	100	10	<b>verre, Becherlein, or Glas</b>	135 mL

Metric-linked system used between 1836 and 1877

						Metric
<b>muid, Ohm, or Saum</b>						150 L
4	<b>setier, Brente, Viertelsaum, or Eimer</b>					37.5 L
100	25	<b>pot or Maass</b>				1.5 L
200	50	2	<b>Halbe Maass</b>			750 mL
400	100	4	2	<b>Viertelmaass or Schoppen</b>		375 mL
800	200	8	<b>4</b>	2	<b>Halbe Schoppe</b>	187.5 mL

Metric scale after 1875

						Metric
<b>Hektoliter</b>						100 L
10	<b>Dekaliter</b>					10 L
100	10	<b>Liter</b>				1 L
1000	100	10	<b>Deciliter</b>			100 mL
10,000	1000	100	10	<b>Centiliter</b>		10 mL
100,000	10,000	1000	100	10	<b>Milliliter</b>	1 mL

272.6 Units of Weight

Metric-linked system used between 1836 and 1877

					Metric
<b>quintal or Zentner</b>					50 kg
100	<b>livre or Pfund</b>				500 g
1600	16	<b>once or Unze</b>			31.25 g
3200	32	2		<b>loth or Lot<sup>a</sup></b>	15.625 g

<sup>a</sup>Subdivided into 1/2, 1/4, 1/8, etc.



272.7 Aargau

This area was ruled by the Habsburgs from 1254 to 1415, when the southwest portion (Aarau, Aarburg, Brugg, Lenzburg, and Zofingen) became part of Bern and some districts (Brerngarten, Mellingen, Murin, and Villmergen) were governed by all of the Confederates. The Bernese portion became the canton of Aargau in the Helvetic Republic. The remainder formed the Canton of Baden. In 1803, the two halves were united as the Canton of Aargau and admitted as a member of the Swiss Confederation.

272.7.1 Currency

- 1850–: 1 Schweizer Frank = 10 Batzen = 100 Rappen
- 1825–1850 1 Schweizer Gulden = 15 Batzen = 60 Kreuzer; 2 Gulden = 3 Schweizer Franken
- 1798–1850: 1 Aargau Frank = 10 Batzen = 40 Kreuzer = 100 Rappen or  
1 Aargau Frank = 20 Sous = 240 Deniers  
1 Kreuzer = 4 Pfennigen = 8 Hellern

272.7.2 Units of Length

In Aarau

					Metric
<b>Ruthe</b>					2.983 m
1¼	<b>Klafter</b>				2.386 m
10	8	<b>Fuss</b>			298.26 mm
120	96	12	<b>Zoll</b>		24.855 mm
1140	1 152	144	12	<b>Linie</b>	2.071 mm

In Zurzach

			Metric
<b>Fuss</b>			300.025 mm
12	<b>Zoll</b>		25.002 mm
144	12	<b>Linie</b>	2.083 5 mm

Other measures reported during the nineteenth century:

- 1 **Elle** (in Zurzach) = 602.67 mm;
- 1 **Elle** (in Aarau) = 593.87 mm.

272.7.3 Units of Area

In Zurzach

		Metric
<b>Juchart</b>		3600.60 m <sup>2</sup>
40,000	<b>Quadratfuss</b>	9.001 5 dm <sup>2</sup>

272.7.4 Units of Volume

- 1 **Klafter** (at Aarau) = 6 × 6 × 4 Fuss = 144 Kubukfuss = 3.651 710 m<sup>3</sup>;
- 1 **Klafter** (at Aarau) = 6 × 6 × 3½ Fuss = 126 Kubukfuss = 3.177 746 m<sup>3</sup>.

272.7.5 Units of Dry Capacity

In Aarau

					Metric
<b>Malter</b>					360.296 8 L
4	<b>Mütt</b>				90.074 2 L
16	4	<b>Viertel</b>			22.518 55 L
64	16	4	<b>Vierling</b>		5.629 64 L
256	64	16	4	<b>Massli</b>	1.407 41 L

In Zurzach

			Metric
<b>Getreide-Mütt</b>			89.08 L
4	<b>Viertel</b>		22.27 L
45	9	<b>Immi</b>	2.474 L

272.7.6 Units of Liquid Capacity

In Aarau

					Metric
<b>Saum</b>					144.055 7 L
4	<b>Eimer</b>				36.013 925 L
100	25	<b>Lautermaass</b>			1.440 557 L
108	27	$1\frac{7}{25}$	<b>Schenkmaass</b>		1.333 849 L
400	100	4	$3\frac{19}{27}$	<b>Schoppen</b>	360.139 mL

In Zurzach, based on [ROTT2]

					Metric
<b>Saum</b>					158.89 L
4	<b>Quart</b>				39.72 L
100	25	<b>Trübmaass</b>			1.588 9 L
$103\frac{19}{27}$	$25\frac{29}{27}$	$1\frac{1}{27}$	<b>Lautermaass</b>		1.532 2 L
$414\frac{22}{27}$	$103\frac{19}{27}$	$4\frac{4}{27}$	4	<b>Schoppen</b>	383.05 mL

In Zurzach, based on [NIEM]

			Metric
<b>Saum</b>			155.25 L
4	<b>Quart</b>		38.81 L
100	25	<b>Trübmaass</b>	1.552 5 L

For medical use at Baden

			Metric
<b>Drachme</b>			3.906 25 g
3	<b>Scrupule</b>		1.302 08 g
60	20	<b>Grain</b>	65.104 mg

272.7.7 Units of Weight

In Aarau

				Metric
<b>Centner</b>				47.659 kg
100	<b>Handelspfund</b>			476.586 g
3200	32	<b>Loth</b>		14.893 g
12,800	128	4	<b>Quintli</b>	3.723 g

Metric-linked system at Baden

		Metric
<b>Pfund</b>		500 g
100	<b>Centass</b>	5 g

In Zurzach

				Metric
<b>Centner</b>				52.845 89 kg
100	<b>Pfund</b>			528.458 9 g
3600	36	<b>Loth</b>		14.679 g
14,400	144	4	<b>Quintli</b>	3.670 g

272.8 Appenzell

272.8.1 Currency

1798–1850: 1 Appenzell Franken = 10 Batzen  
= 40 Kreuzer = 160 Pfennig  
1 Appenzell Gulden = 60  
Kreutzer = 240 Angster  
1 Schilling =  $1\frac{1}{5}$  Kreuzer;

272.8.2 Units of Length

			Metric
<b>Fuss<sup>a</sup></b>			306.7 mm
12	<b>Zoll</b>		25.558 mm
144	12	<b>Linie</b>	2.130 mm

<sup>a</sup>According to [MART3], it was 314.69 mm

Other measures reported during the nineteenth century:

1 **Stab** (for muslin) = 1.211 9 m;

1 **Stab** (for cotton) = 1.194 1 m;

1 **lange Elle** or **Leinwand-Elle** (for canvas) = 733.619 mm or 801.700 mm;

1 **Elle** (for wool) = 616.070 mm;

1 **kurze Elle** or **Wollen-Elle** (for cloth) = 609.615 mm.

### 272.8.3 Units of Dry Capacity

Two reported scales

			Metric	Metric
<b>Malter</b>			147.726 4 L	182.732 L
2	<b>Mütt</b>		73.863 2 L	91.366 L
8	4	<b>Viertel</b>	18.465 8 L	22.841 5 L

### 272.8.4 Units of Liquid Capacity

Two reported scales

			Metric	Metric
<b>Eimer</b>			42.906 88 L	41.894 4 L
4	<b>Viertel</b>		10.726 72 L	10.473 6 L
32	8	<b>Maass</b>	1.340 84 L	1.309 2 L

### 272.8.5 Units of Weight

					Metric
<b>Zentner</b>					46.533 2 kg
80	<b>schwere Pfund</b>				581.665 g
100	1¼	<b>leichte Pfund</b>			465.332 g
3200	40	32	<b>Loth</b>		14.542 g
12,800	160	128	4	<b>Quintli</b>	3.635 g

For butter

		Metric
<b>Schaff</b>		10.470 kg
18	<b>schwere Pfund</b>	581.665 g

For fat cheese

		Metric
<b>Lägel</b>		29.083 kg
50	<b>schwere Pfund</b>	581.665 g

For low-fat cheese

		Metric
<b>Lägel</b>		18.613 kg
32	<b>schwere Pfund</b>	581.665 g

For gold and silver

			Metric
<b>Mark</b>			233.75 g
16	<b>Loth</b>		14.609 g
288	18	<b>Grän</b>	811.63 mg

For medical use

					Metric
<b>Pfund</b>					357.853 8 g
12	<b>Unze</b>				29.821 g
96	8	<b>Drachme</b>			3.728 g
288	24	3	<b>Skrupel</b>		1.242 g
5760	480	60	20	<b>Gran</b>	62.13 mg

Other measures reported during the mid-nineteenth century:

1 **Schaff** (for butter) = 10.53 kg.

## 272.9 Basel

### 272.9.1 Currency

1803–1850: 1 Schweizer Frank = 10 Batzen = 100 Rappen

–1798: 1 Basel Thaler = 30 Batzen = 120 Kreuzer = 240 Rappen

1 Basel Gulden = 60 Kreutzer = 480 Heller or

1 Basel Gulden = 15 Batzen = 60 Kreutzer

1 Kreuzer = 4 Pfennigen = 8 Heller

1 Basel Thaler = 3 Livres = 27 gute Batzen = 36 Grosschen or Swiss Batzen = 45 Schillings, Escalins, or Plapperts = 60 Sols = 108 Kreutzer = 270 Rap-pen = 540 Pfennig = 720 Deniers

## 272.9.2 Units of Length

Before 1839

					Metric
<b>Ruthe</b>					4.872 590 4 m
1 $\frac{3}{8}$	<b>Ruthe<sup>a</sup></b>				3.045 369 m
16	10	<b>Fuss<sup>b</sup></b>			304.536 9 mm
192	120	12	<b>Zoll</b>		25.378 1 mm
2304	1440	144	12	<b>Linie</b>	2.114 8 mm

<sup>a</sup>For agricultural use only

<sup>b</sup>[KELL] reported 1 **Fuss** = 298 mm

Other reported measures:

1 **grosse Elle**, **Aune**, or **Stab** = 1.178 896 m;

1 **kleine Elle** or **Braccio** (for ribbons manufactured in Basel) = 539.800 mm.

## 272.9.3 Units of Area

Before 1839

			Metric
<b>Juchart<sup>a</sup></b>			3338.738 m <sup>2</sup>
360	<b>Quadratruthe</b>		9.274 27 m <sup>2</sup>
36,000	100	<b>Quadratfuss</b>	9.274 27 dm <sup>2</sup>

<sup>a</sup>[KELL] reported 1 **Juchart** = 140 Quadratruthen = 256 Quadratfuss = 3186.7 m<sup>2</sup>

## 272.9.4 Units of Dry Capacity

Traditional system

						Metric
Vierzel						273.312 L
2	Sack <sup>a</sup> or sac					136.656 L
8	4	gross Sester				34.164 L
16	8	2	Müdde, Scheffel, klein Sester, or petite steier <sup>b</sup>			17.082 L
64	32	8	4	Küpflein <sup>b</sup>		4.270 5 L
128	64	16	8	2	Becher <sup>b</sup> , Goblet, or verre	2.135 25 L

<sup>a</sup>[KELL] reported 1 **Sack** (for corn) = 129 L

<sup>b</sup>[KAHN] reported 1 **Becher** = 2.021 L; 1 **Küpfli** = 4.042 L and 1 **Müdde** = 16.168 L

## 272.9.5 Units of Liquid Capacity

Old scale for wine

					Metric
<b>Saum</b>					136.521 L
3	<b>Ohm</b>				45.507 L
24	8	<b>Viertel</b>			5.688 376 L
96	32	4	<b>Maass</b>		1.422 094 L
384	128	16	4	<b>Schoppen</b>	355.523 mL

New scale for wine

			Metric
<b>Saum</b>			136.521 L
3	<b>Ohm</b>		45.507 L
120	40	<b>Maass</b>	1.137 675 L

For beer

			Metric
<b>Saum</b>			148.68 L
3	<b>Ohm<sup>a</sup></b>		49.56 L
96	32	<b>Pot</b> or <b>Maass</b>	1.549 L

<sup>a</sup>[KELL] reported 1 **Ohm** = 49.56 L for wine

## 272.9.6 Units of Weight

For mercantile use

		Metric
<b>Centner</b>		49.324 kg
100	<b>Pfund</b>	493.24 g

For small trade

				Metric
<b>Eisenpfund</b>				486.199 g
4	<b>Vierling</b>			121.550 g
32	8	<b>Loth</b>		15.194 g
128	32	4	<b>Quintli</b>	3.798 g

Commercial scale (French Poids de Marc) during the mid-nineteenth century

				Metric
<b>Pfund</b>				489.50 g
16	<b>Unze</b>			30.59 g
128	8	<b>Gros</b>		3.82 g
9216	576	72	<b>Grain</b>	531 mg

For brass, groceries and silk

				Metric
<b>Messingspfund</b>				480.235 g
4	<b>Vierling</b>			120.059 g
32	8	<b>Quintli</b>		15.007 g

For gold and silver

				Metric
<b>Pfund</b>				467.711 g
2	<b>Vereinsmark</b>			233.855 g
16	8	<b>Unze</b>		29.232 g
32	16	2	<b>Loth</b>	14.616 g

For medical use

					Metric
<b>Pfund</b>					357.780 g
12	<b>Unze</b>				29.815 g
96	8	<b>Drachme</b>			3.727 g
288	24	3	<b>Skrupel</b>		1.242 g
5760	480	60	20	<b>Grän</b>	62.11 g

Other measures reported during the nineteenth century:

1 **Krone** (for gold) = 3.371 g.

## 272.10 Bern

### 272.10.1 Currency

1803–1852: 1 Berne Frank = 10 Batzen = 100 Rappen

–1798: 1 Berne Thaler = 40 Batzen = 160 Kreuzer

1 Kreuzer = 4 Pfennigen = 8 Hellern

1 Berne Krone = 2½ Livres = 25 Batzen = 50 Sous = 100 Kreutzer = 600 Deniers

### 272.10.2 Units of Length

										Metric
<b>Wegstunde</b>										5278.644 m
–	<b>Ruthe</b>									2.932 58 m
–	–	<b>Klafter</b>								2.346 06 m
–	–	–	<b>Waldschritt</b>							879.774 mm
–	–	–	1½	<b>Feldschritt</b>						586.516 mm
16, 615 <sup>7</sup> / <sub>13</sub>	9 <sup>7</sup> / <sub>13</sub>	7 <sup>7</sup> / <sub>13</sub>	2 <sup>9</sup> / <sub>13</sub>	1 <sup>1</sup> / <sub>13</sub>	<b>Steinbrecherfuss</b>					317.696 mm
18,000	10	8	3	2	1 <sup>1</sup> / <sub>12</sub>	<b>Schuh or Fuss</b>				293.258 mm
216,000	120	96	36	24	13	12	<b>Zoll</b>			24.438 mm
2,592,000	1440	1152	432	288	156	144	12	<b>Linie</b>		2.036 mm
25,920,000	14,400	11,520	4320	2880	1560	1440	120	10	<b>Secunde</b>	203.6 µm

For cloth

				Metric
<b>Elle</b>				541.715 mm
2	<b>Metá</b>			270.857 5 mm
4	2	<b>Quarti</b>		135.428 75 mm
8	4	2	<b>Ottavi</b>	67.714 375 mm

Other reported measures during the nineteenth century:

1 **Meile** = 8355.900 m;

1 **Stab** (old Paris aune) = 1.188 448 m;

1 **Langenthaler Elle** (for canvas) = 623.17 mm;

1 **Elle** = 541.715 mm.

### 272.10.3 Units of Area

1 **Juchart** (for groves) = 45,000 Quadratfuss  
= 3870 m<sup>2</sup>;

1 **Juchart** (for land) = 40,000 Quadratfuss  
= 3440 m<sup>2</sup>;

1 **Juchart** (for assigned land) = 35,000  
Quadratfuss = 3010 m<sup>2</sup>.

### 272.10.4 Units of Volume

1 **Faden** (for firewood) =  $6 \times 3 \times 3\frac{1}{2}$  Fuss = 105  
Kubikfuss = 2.648 122 m<sup>3</sup>.

### 272.10.5 Units of Dry Capacity

						Metric
<b>Mütt</b>						168.132 L
12	<b>Mass</b>					14.011 L
24	2	<b>Mässli</b>				7.005 5 L
48	4	2	<b>Imi or Immi</b>			3.502 75 L
96	8	4	2	<b>Achterli</b>		1.751 375 L
192	16	8	4	2	<b>Sechszehnerli</b>	875.7 mL

### 272.10.6 Units of Liquid Capacity

				Metric
<b>Saum</b>				167.12 L
4	<b>Brente</b>			41.78 L
100	25	<b>Maass or Pinte</b>		1.671 2 L
400	100	4	<b>Viertel</b>	417.8 mL

For wine at Glarona before 1839, based on [MART3]

					Metric
<b>Eimer</b>					106.759 200 L
4	<b>Viertel</b>				26.689 800 L
30	7½	<b>Kopf</b>			3.558 640 L
60	15	2	<b>Maass</b>		1.779 320 L
240	60	8	4	<b>Stotzen</b>	444.830 mL

272.10.7 Units of Weight

					Metric
Centner					52.003 5 kg
100	Handelspfund				520.035 L
3200	32	Loth			16.251 L
12 800	128	4	Quintli		4.063 L
51,200	512	16	4	Pfennig	1.016 L

For medical use

					Metric
Medicinal Pfund					357.621 838 65 g
12	Unze				28.801 819 887 g
96	8	Drachme			3.725 227 485 g
288	24	3	Skrupel		1.241 742 495 g
5760	480	60	20	Grän	62.087 mg

For gold and silver

					Metric
Mark					244.752 923 g
16	Loth				15.297 058 g
64	4	Quintlin			3.824 264 g
256	16	4	Pfennig		956.066 mg
4608	288	72	18	Grän	53.115 mg

Other reported measures:

1 Stab or Aune = 1.069 6 m.

272.11.3 Units of Area

1 Juchart = 50,000 Quadratschuh = 4300.07 m<sup>2</sup>.

272.11 Fribourg

272.11.1 Currency

1800–1851: 1 Fribourg Frank = 10 Batzen  
= 100 Rappen  
1 Fribourg Gulden = 15 Batzen  
= 69 Kreuzer

272.11.2 Units of Length

				Metric
Werkklafter or toise				2.932 6 m
10	Schuh or pied			293.26 mm
120	12	Zoll or pouce		24.438 mm
1440	144	12	Linie	2.036 5 mm

272.11.4 Units of Dry Capacity

					Metric
Getreide- Sack or sac					127.746 L
4	Kopf				31.936 L
8	2	Mäss			15.968 L
16	4	2	Viertel or quarteron		7.984 L
96	24	12	6	Immi or emine	1.331 L

Alternative scale

				Metric
Mütt				47.905 L
3	Sack			15.968 L
6	2	Bichet or Mäss		7.984 L
12	4	2	Coupé	3.992 L

272.11.5 Units of Liquid Capacity

Two reported scales

				Metric	Metric
<b>Fass or tonneau</b>				624.800 L	798.4 L
16	<b>Eimer or brente</b>			39.050 L	49.9 L
400	25	<b>Mass or pot</b>		1.562 L	1.996 L
1600	100	4	<b>Schoppen or chopine</b>	390.50 mL	499 mL

For cloudy wine and cider

			Metric
<b>Fahrt</b>			?
2½	<b>Saum</b>		
400	160	<b>Mass</b>	

- 1798–1813: 1 French Franc = 100 centimes  
1795–1798: 1 Geneva Thaler = 12¾ Florins  
= 150 Sols = 1800 Deniers  
1794–1795: 1 Geneva Genevoise = 10  
Decimes  
–1794: 1 Geneva Thaler = 12¾ Florins  
= 150 Sols = 1800 Deniers

272.11.6 Units of Weight

Mercantile scale

					Metric
<b>Centner or quintal</b>					52.881 100 kg
100	<b>Handelspfund or livre</b>				528.811 000 g
1600	16	<b>Unze or once</b>			33.050 7 g
3200	32	2	<b>Loth</b>		16.525 g
12,800	128	8	4	<b>Quentche</b>	4.131 g

For gold and silver

					Metric
<b>Mark</b>					244.752 9 g
16	<b>Loth</b>				15.297 g
64	4	<b>Quentche</b>			3.824 g
256	16	4	<b>Pfennig</b>		950.66 mg
4608	288	72	18	<b>Gran</b>	53.11 mg

272.12.2 Units of Length

		Metric
<b>Ruthe or toise</b>		2.598 715 m
8	<b>pariser Fuss or piede de Paris</b>	324.839 4 mm

Other reported measures:

272.12 Geneva

272.12.1 Currency

- 1839–1850: 1 Geneva Franc = 100 centimes  
1814–1838 1 Geneva Pistole = 35 Florins  
1 Geneva Thaler = 12 Florins and  
9 Sols  
1 Geneva Florin = 12 Sols = 48  
Quarts = 144 Deniers

- 1 aune de Paris = 1.188 446 m;  
1 Stab = 1.143 7 m;  
1 Fuss = 487.936 mm.

272.12.3 Units of Area

						Metric
Journée						5166.290 3 m <sup>2</sup>
1 <sup>53</sup> / <sub>100</sub>	Setine					3376.660 4 m <sup>2</sup>
1 <sup>73</sup> / <sub>80</sub>	1¼	Pose, Journal, or Juchart				2701.328 3 m <sup>2</sup>
15 <sup>3</sup> / <sub>10</sub>	10	8	Ouvrée			337.666 m <sup>2</sup>
765	500	400	50	Quadratruthe or toise carrée		6.753 21 m <sup>2</sup>
48,960	32,000	25,600	3200	64	pied carré	10.552 1 dm <sup>2</sup>

272.12.4 Units of Volume

1 coupé or Sac (for coal) = 298.338 dm<sup>3</sup>.

272.12.5 Units of Dry Capacity

According to [NOBA], [GUTB] and [MART3]

				Metric	Metric	Metric
coupé or Sack				78.949 L	77.659 L	77.653 000 L
2	bichet			39.474 L	38.830 L	38.826 500 L
4	2	quart		19.737 L	19.415 L	19.413 250 L
8	4	2	petit quart	9.868 L	9.707 L	9.706 625 L

272.12.6 Units of Liquid Capacity

Scale used before 1853, based on [DOUR] and on [MART3], and after 1853

					Metric	Metric	Metric
char or Fuder					548.44 L	542.688 000 L	648 L
12	setier or Eimer				45.70 L	45.224 000 L	54 L
288	24	quarteron			1.904 3 L	1.884 333 L	2.25 L
576	48	2	pot or Maass		952.1 mL	942.167 mL	1.125 L
4608	384	16	8	cuiller	119.0 mL	117.771 mL	140.625 mL

272.12.7 Units of Weight

Mercantile scale, based on [NOBA] and [MART3]

				Metric
Quintal				55.069 41 kg
100	livre gros poids or Pfund Schwergewicht			550.694 1 g
1800	18	once		30.594 1 g
43,200	432	24	denier	1.274 7 g

For silk, based on [NOBA] and [MART3]

			Metric
livre petit poids or Pfund leichtgewicht			458.911 7 g
12	once		38.242 64 g
288	24	denier	1.593 44 g

Poids de marc or Markgewicht, based on [NOBA]

				Metric
<b>livre</b>				489.505 8 g
16	<b>once</b>			30.594 1 g
384	24	<b>denier</b>		1.274 7 g
9216	576	24	<b>grain</b>	53.115 mg

For gold, silver and money

					Metric
<b>marc</b>					244.752 923 g
8	<b>once</b>				30.594 115 g
64	8	<b>gros</b>			3.824 3 g
192	24	3	<b>denier</b>		1.274 777 g
4608	576	72	24	<b>grain</b>	53.115 mg

Metric-linked system for medical use

					Metric
<b>livre</b>					500.000 000 g
16	<b>once</b>				31.250 000 g
128	8	<b>drachme</b>			3.906 250 g
384	24	3	<b>scrupule</b>		1.302 083 g
9216	576	72	24	<b>grain</b>	54.252 mg

Other reported measures:

1 **charge** (for oil) = 126.659 643 kg (based on [MART3]);

1 **coupé** (for wheat) = 110 Pfund (based on [LUDO]);

1 **coupé** (for rye) = 103 Pfund (based on [LUDO]);

1 **quintaux** (for oil) = 100 livres = 55.069 410 kg (based on [MART3]).

## 272.13 Glarus

### 272.13.1 Currency

1803–1850: 1 Glarus Frank = 100 Rappen  
1 Glarus Schilling = 3 Rappen  
?: 1 Glarus Florin or Gulden = 40 Schilling = 120 Rappen

### 272.13.2 Units of Length

1 **Elle** = 602.76 mm.

						Metric
<b>Wegstunde</b>						4520.7 m
1500	<b>Ruthe</b>					3.013 8 m
2500	1 $\frac{2}{3}$	<b>Klafter</b>				1.808 28 m
15,000	10	6	<b>Fuss</b>			301.38 mm
180,000	120	72	12	<b>Zoll</b>		25.115 mm
2,160,000	1440	864	144	12	<b>Linie</b>	2.093 mm

### 272.13.3 Units of Area

1 **Juchart** = 280, 320, 360 or 400 Quadratruthen = 2543.2 m<sup>2</sup>, 2906.6 m<sup>2</sup>, 3269.9 m<sup>2</sup> or 3633.1 m<sup>2</sup>.

### 272.13.4 Units of Dry Capacity

For smooth fruit

					Metric
<b>Getreide-Mütt</b>					82.8 L
4	<b>Viertel</b>				20.7 L
16	4	<b>Vierling</b>			5.175 L
64	16	4	<b>Mässli</b>		1.294 L
144	36	9	2¼	<b>Immi</b>	575 mL

For rough fruit

		Metric
<b>Malter</b>		333.6 L
4	<b>Viertel</b>	83.4 L

### 272.13.5 Units of Liquid Capacity

				Metric
<b>Eimer</b>				106.758 L
30	<b>Kopf</b>			3.558 6 L
60	2	<b>Mass</b>		1.779 3 L
240	8	4	<b>Schoppen</b>	444.825 mL

### 272.13.6 Units of Weight

For general use

				Metric
<b>Centner</b>				52.84 kg
100	<b>Handelspfund Schwergewicht</b>			528.457 g
3600	36	<b>Loth</b>		14.679 g
14,400	144	4	<b>Quintli</b>	3.670 g

For silk

			Metric
<b>Seidenpfund</b>			469.739 6 g
32	<b>Loth</b>		14.679 4 g
128	4	<b>Quintli</b>	3.669 8 g

For gold and silver

					Metric
Mark					234.869 8 g
16	Loth				14.679 4 g
64	4	Quintli			3.669 8 g
256	16	4	Pfennig		917.46 mg
1024	64	16	4	Sechszehntel	229.36 mg

For medical use

					Metric
<b>Medicinalpfund</b>					357.853 8 g
12	<b>Unze</b>				29.821 1 g
96	8	<b>Drachme</b>			3.727 6 g
288	24	3	<b>Skrupel</b>		1.242 5 g
5760	480	60	20	<b>Gran</b>	62.13 mg

## 272.14 Graubünden

After January 1, 1853, the weights and measures used in Bern were adopted.

### 272.14.1 Currency

1850–1852: 1 Graubünden Florin or Gulden = 15 Batzen = 60 Kreutzer = 70 Bluzger

1803–1850: 1 Graubünden Duplone = 16 Franken  
1 Graubünden Frank = 10 Schweizer Batzen = 60 Bluzger = 150 Rappen

### 272.14.2 Units of Length

1 Elle = 663.2 mm.

Scale used in Chur

		Metric
<b>Klafter</b>		2.1 m
7	<b>Fuss</b>	300 mm

### 272.14.3 Units of Dry Capacity

						Metric
<b>Malter</b>						2371.3 L
14 $\frac{3}{8}$	<b>Läd or Laad</b>					164.96 L
115	8	<b>Mütt</b>				20.62 L
632 $\frac{1}{2}$	44	5 $\frac{1}{2}$	<b>Viertel</b>			3.75 L
2530	176	22	4	<b>Quartane</b>		937.5 mL
10,120	704	88	16	4	<b>Mässlein</b>	234.375 mL

### 272.14.4 Units of Liquid Capacity

						Metric
<b>Fuder</b>						850.56 L
7 $\frac{1}{8}$	<b>Saum</b>					119.61 L
8	1 $\frac{1}{8}$	<b>Zuber</b>				106.32 L
80	11 $\frac{1}{4}$	10	<b>Viertel</b>			10.632 L
640	90	80	8	<b>Mass</b>		1.329 L
2560	360	320	32	4	<b>Quartlein</b>	332.25 mL

For milk

						Metric
<b>Bener</b>						1.333 L
2	<b>Mass</b>					666.7 mL
4	2	<b>Quartlein</b>				333.3 mL
8	4	2	<b>grosse Löffel</b>			166.7 mL
16	8	4	2	<b>kleine Löffel</b>		83.3 mL

272.14.5 Units of Weight

For general use before 1853

						Metric
Centner						52.042 900 kg
6	Rupp					8.673 817 kg
18¾	3⅛	Stein Hanf or Bener				2.775 621 kg
75	12½	4	grosse Krinne			693.905 g
100	16⅔	5⅓	1⅓	Handelspfund Schwergewicht (kleine Krinne)		520.429 g
3600	600	192	48	36	Loth	14.456 g

For small trade before 1853

						Metric
Centner						46.260 300 kg
100	Pfund Leichtgewicht, Ladenpfund, or Gewürzpfund					462.603 g
3200	32	Loth				14.456 g
12,800	128	4	Quentche			3.614 g
51,200	512	16	4	Drachme		903.52 mg
102,400	1024	32	8	2	Heller	451.76 mg

272.15 Lucerne

272.15.1 Currency

1798–1850: 1 Luzern Frank = 10 Batzen = 40 Kreuzer = 100 Rappen = 200 Angster  
–1798: 1 Luzern Gulden = 40 Schillinge = 120 Rappen = 240 Angster = 480 Heller  
?: 1 Luzern Florin = 15 Batzen = 40 Schilling = 60 Kreutzer

Scale based on [MART3]

		Metric
Elle		627.708 mm
2	Fuss	313.854 mm

272.15.3 Units of Area

			Metric
Juchart			3635.40 m <sup>2</sup>
450	Quadratruthe		8.078 7 m <sup>2</sup>
45,000	100	Quadratfuss	8.078 7 dm <sup>2</sup>

272.15.2 Units of Length

					Metric
Ruthe					2.842 3 m
1⅓	Klafter				1.705 4 m
10	6	Fuss			284.23 mm
120	72	12	Zoll		23.686 mm
1440	864	144	12	Linie	1.973 mm

## 272.15.4 Units of Dry Capacity

Scale reported by [WASH]

						Metric
<b>Getreide-Malter</b>						554.169 L
4	<b>Mütt</b>					138.542 L
16	4	<b>Viertel</b>				34.636 L
160	40	10	<b>Immi</b>			3.464 L
256	64	16	1½	<b>Becher</b>		2.165 L
2560	640	160	16	10	<b>Primen</b>	216.47 mL

Scale based on [MART3]

				Metric
<b>Malter</b>				556.053 440 L
4	<b>Mütt</b>			139.013 360 L
16	4	<b>Viertel</b>		34.753 340 L
160	40	10	<b>Immi</b>	3.475 334 L

Scale reported by [KAHN]

			Metric
<b>Mütt</b>			347.52 L
10	<b>Viertel</b>		34.752 L
25	2½	<b>Immi</b>	13.901 L

Other reported measures:

1 **Kohle-Zuber** (for coal) = 150 L.

## 272.15.5 Units of Liquid Capacity

1 **Maass** (for milk) = 1.162 5 L.

For wine, based on [MART3]

				Metric	Metric
<b>Saum</b>				76.830 L	172.815 000 L
3⅓	<b>Ohm</b>			23.049 L	51.844 500 L
100	30	<b>Maass</b>		768.3 mL	1.728 150 L
400	120	4	<b>Schoppen</b>	192.07 mL	432.037 mL

## 272.15.6 Units of Weight

For general use before 1838

				Metric
<b>Centner</b>				52.89 800 kg
100	<b>Pfund</b>			528.898 g
3600	36	<b>Loth</b>		14.692 g
14,400	144	4	<b>Quentchen</b>	3.673 g

For gold, silver and money

					Metric
<b>Pfund Markgewicht</b>					489.505 847 g
2	<b>Mark</b>				244.752 923 g
16	8	<b>Unze</b>			30.594 115 g
384	192	24	<b>Pfennig</b>		1.274 755 g
9216	4608	576	24	<b>Grän</b>	53.115 mg

For medical use

					Metric
<b>Medicinalpfund</b>					357.951 g
12	<b>Unze</b>				29.829 g
96	8	<b>Drachme</b>			3.729 g
288	24	3	<b>Skrupel</b>		1.243 g
5760	480	60	20	<b>Gran</b>	62.14 mg

272.16 Neuchâtel

272.16.1 Currency

- 1851–: 1 Schweizer Franken = 100 Rap-  
pen or centimes
- 1798–1851: 1 Neuchâtel Thaler = 2 Gulden  
1 Neuchâtel Gulden = 12 Piecette  
= 21 Batzen = 84 Kreuzer
- ?: 1 Neuchâtel Guilden = 15  
Batzen = 60 Kreuzer
- ?: 1 Neuchâteler Livre = 20 Sous =  
240 Deniers or  
1 Neuchâteler Livre = 10  
Batzen = 40 Kreutzer

In Naples between 1804 and 1857

		Metric
<b>minute</b>		17.947 mm
16	<b>obole</b>	1.122 mm

Other reported measures during the nineteenth century:

- 1 **perche de vigne** (for vineyards) = 16 pieds du  
pays = 4.692 13 m;
- 1 **perche de champ** or **Feldruthe** = 16 pieds de  
champ = 4.594 4 m;
- 1 **pune** or **Stab** = 1.111 m or 1.124 m;
- 1 **pied de champ** = 287.15 mm.

272.16.2 Units of Length

Between 1804 and 1857

					Metric
<b>toise</b> or <b>Klafter</b>					2.932 580 m
10	<b>pied du pays</b> or <b>Landfuss</b>				293.258 mm
120	12	<b>pouce</b>			24.438 mm
1440	144	12	<b>ligne</b>		2.036 mm
17,280	1728	144	12	<b>point</b>	169.7 µm

### 272.16.3 Units of Area

					Metric
<b>faux or faux</b>					5403.778 9 m <sup>2</sup>
2	<b>Pose</b>				2701.889 5 m <sup>2</sup>
16	8	<b>Perche</b>			337.736 2 m <sup>2</sup>
256	128	16	<b>Qudratfeldruth</b>		21.108 5 m <sup>2</sup>
4096	2048	256	16	<b>Quadratfeldfuss</b>	1.319 3 m <sup>2</sup>

Other reported measures:

- 1 **ouvrier** (for vineyards) = 352.257 m<sup>2</sup>;  
 1 **perche de vigne carrée** = 22.016 065 m<sup>2</sup>;  
 1 **perche de champ carrée** = 21.108 511 m<sup>2</sup>;  
 1 **pied du pays carré** = 8.600 dm<sup>2</sup>;  
 1 **pied de champ carré** = 8.245 5 dm<sup>2</sup>.

Other measures reported during the nineteenth century:

- 1 **Bosse** (for lime) = 380 L. Also reported as  
 20 boissaux = 300 L.

### 272.16.4 Units of Volume

		Metric
<b>toise de bois</b>		3.783 039 m <sup>3</sup>
150	<b>pied cube</b>	25.220 dm <sup>3</sup>

Other reported measures:

- 1 **Bauche** (for turf and firewood, used between  
 1858 and 1877) = 120 pieds cubes = 3.24 m<sup>3</sup>.

### 272.16.5 Units of Dry Capacity

Traditional system before 1877

					Metric
<b>Getreide-Muid</b>					365.624 064 L
3	<b>sac or Sack</b>				121.874 688 L
24	8	<b>setier or Emine</b>			15.234 336 L
192	64	8	<b>pot or Eimer</b>		1.904 292 L
576	192	24	3	<b>copet</b>	634.764 mL

For oat

					Metric
<b>Muid</b>					380.858 400 L
3	<b>sac or Sack</b>				129.952 800 L
24	8	<b>Emine</b>			15.869 100 L
192	64	8	<b>picotin</b>		1.983 637 L
200	66⅔	8⅓	1⅓	<b>pot or Eimer</b>	1.904 292 L
576	192	24	3	2⅔	<b>copet</b> 661.212 mL

## 272.16.6 Units of Liquid Capacity

Traditional system before 1877

						Metric
<b>bosse or Stückle</b>						914.060 160 L
2½	<b>muid, Führling, or Saum</b>					365.624 064 L
24	9⅓	<b>brande or Bücke</b>				38.085 840 L
30	12	1¼	<b>setier, Brente, Viertelsaum, or Eimer</b>			30.468 672 L
60	24	2½	2	<b>brochet or Stütze</b>		15.234 336 L
480	192	20	16	8	<b>pot or Mass</b>	1.904 292 L

Alternative scale, according to [KRÜG, p. 24]

					Metric
<b>Bosse</b>					914.457 L
30	<b>Eimer</b>				30.482 L
60	2	<b>Brochet</b>			15.241 L
678	22⅔	11⅔ <sub>10</sub>	<b>Pot</b>		1.348 8 L

For wine before 1858

					Metric
<b>Muid</b>					365.625 L
5	<b>Gerle or Karrenbütte</b>				73.125 L
12	2⅔	<b>Setier or Eimer</b>			30.469 L
24	4⅔	2	<b>Brochet or Stütze</b>		15.234 L
192	38⅔	16	8	<b>Pot or Mass</b>	1.904 L

For wine between 1858 and 1877

				Metric
<b>Muid</b>				495 L
5	<b>Gerle</b>			99.0 L
330	66	<b>Pot</b>		1.414 L

Mostly for dark pomace

		Metric
<b>Gerle</b>		99.023 L
52	<b>Pot</b>	1.904 L

Mostly for light pomace

		Metric
<b>Gerle</b>		73.125 L
38⅔	<b>Pot</b>	1.891 L

272.16.7 Units of Weight

Mercantile scale before 1858

							Metric
<b>Quintal</b>							52.009 996 6 kg
100	<b>Livre</b>						520.100 g
200	2	<b>Marc</b>					260.050 g
1600	16	8	<b>Once</b>				32.506 g
12,800	128	64	8	<b>Gros</b>			4.063 g
38,400	384	192	24	3	<b>Denier</b>		1.354 g
921,600	9216	4608	576	72	24	<b>Grain</b>	56.43 mg

For gold and silver

							Metric
<b>Livre</b>							489.507 8 g
2	<b>Marc</b>						244.753 9 g
16	8	<b>Once</b>					30.594 3 g
128	64	8	<b>Gros</b>				3.824 3 g
384	192	24	3	<b>Denier</b>			1.274 8 g
9216	4608	576	72	24	<b>Grain</b>		53.1 mg

272.17 St. Gallen

272.17.1 Currency

1798–1850: 1 St. Gallen Frank = 10  
Batzen = 40 Kreuzer = 160 Pfennig = 1280 Häller  
1798: 1 Helvetica Republic Frank = 10  
Batzen = 100 Rappen  
–1798: 1 St. Gallen Thaler = 2 Gulden = 120 Kreuzer = 240 Pfennig

Other reported measures:

1 **Stab** (for fabric) = 1.179 m;  
1 **Leinenelle** (for canvas) = 735.400 mm;  
1 **Wollenelle** (for wool) = 610.900 mm;  
1 **Fuss** = 313.854 mm.

272.17.3 Units of Area

		Metric
<b>Juchart</b> <sup>a</sup>		3404.025 m <sup>2</sup>
36,000	<b>Quadratfuss</b>	94.556 dm <sup>2</sup>

<sup>a</sup>For some areas reported as 4005 m<sup>2</sup>

272.17.2 Units of Length

Traditional system

					Metric
<b>Ruthe</b>					3.075 m
1 $\frac{2}{3}$	<b>Klafter</b>				1.845 m
10	6	<b>Feldschuh</b>			307.50 mm
120	72	12	<b>Zoll</b>		25.625 mm
1440	864	144	12	<b>Linie</b>	2.135 mm

## 272.17.4 Units of Dry Capacity

Mercantile system in St. Gallen

			Metric
<b>Mütt</b>			77.758 800 L
4	<b>Viertel</b>		19.439 700 L
16	4	<b>Mässlein</b>	4.859 925 L

For cereal in St. Gallen and Rapperswil

				Metric	Metric
<b>Getreide-Malter</b>				165.197 600 L	168.368 L
2	<b>Mütt</b>			82.598 800 L	84.184 L
8	4	<b>Viertel</b>		20.649 700 L	21.046 L
32	16	4	<b>Mässlein</b>	5.162 425 L	5.261 L

Other reported measures:

1 **Last** (for wheat in St. Gallen) = 72.790 000 L;

1 **Kornhaus-Viertel** (in St. Gallen) = 20.649 700 L;

1 alte **Markt-Viertel** (in St. Gallen) = 19.439 700 L;

1 **Markt-Viertel** (in Rorschach) = 19.12 L.

## 272.17.5 Units of Liquid Capacity

For wine

							Metric
<b>Fuder</b>							1,259.691 000 L
7½	<b>Saum</b>						167.958 800 L
30	4	<b>Eimer</b>					41.989 700 L
120	16	4	<b>Viertel</b>				10.497 425 L
960	128	32	8	<b>Maass</b>			1.312 178 L
1080	144	36	9	1⅙	<b>Schenkmaass</b>		1.166 381 L
3840	512	128	32	4	3%	<b>Schoppen</b>	328.044 mL

For must

		Metric
<b>Most-Eimer</b>		47.238 75 L
36	<b>Maass</b>	1.312 22 L

Other reported measures:

1 **Maass** (for oil) = 1.356 800 L.

## 272.17.6 Units of Weight

*Schwergewicht system*

				Metric
<b>Centner</b>				57.770 200 kg
100	<b>Pfund Schergewicht</b>			577.702 g
2000	20	<b>Unze</b>		28.885 g
4000	40	2	<b>Loth</b>	14.443 g

*Leichtgewicht system*

				Metric
<b>Centner</b>				46.512 700 kg
100	<b>Pfund Leichtgewicht</b>			465.127 g
1600	16	<b>Unze</b>		29.070 g
3200	32	2	<b>Loth</b>	14.535 g

## 272.18 Schaffhausen

### 272.18.1 Currency

1798–1850: 1 Schaffhausen Frank = 10 Batzen  
= 40 Kreuzer

### 272.18.2 Units of Length

Before 1840

						Metric
<b>Ruthe</b>						3.574 m
2	<b>Klafter</b>					1.787 m
6	3	<b>Elle</b>				595.6 mm
12	6	2	<b>Werschuh</b>			297.8 mm
144	72	24	12	<b>Zoll</b>		24.82 mm
1728	864	288	144	12	<b>Linie</b>	2.068 mm

### 272.18.3 Units of Area

				Metric
<b>Juchart</b>				3218.2 m <sup>2</sup>
252	<b>Quadratruthe</b>			12.770 6 m <sup>2</sup>
36,288	144	<b>Quadratfuss</b>		8.868 5 dm <sup>2</sup>

### 272.18.4 Units of Dry Capacity

For smooth fruit

					Metric
<b>Getreide-Malter</b>					180.824 L
2	<b>Mütt</b>				90.412 L
8	4	<b>Viertel</b>			22.603 L
32	16	4	<b>Vierling</b>		5.650 8 L
128	64	16	4	<b>Mässlein</b>	1.412 7 L

For rough fruit

					Metric
<b>Getreide-Malter</b>					407.584 L
4	<b>Mütt</b>				101.896 L
16	4	<b>Viertel</b>			25.474 L
64	16	4	<b>Vierling</b>		6.368 L
256	64	16	4	<b>Mässlein</b>	1.592 L

### 272.18.5 Units of Liquid Capacity

						Metric
<b>Fuder</b>						1346.11 L
8	<b>Saum</b>					168.264 L
32	4	<b>Eimer</b>				42.066 L
128	16	4	<b>Viertel</b>			10.516 5 L
1024	128	32	8	<b>Maass</b>		1.314 56 L
4096	512	128	32	4	<b>Schoppen</b>	328.64 mL

### 272.18.6 Units of Weight

					Metric
<b>Centner</b>					46.00 kg
100	<b>leichte Pfund</b>				459.972 g
400	4		<b>Vierling</b>		114.993 g
3200	32		8	<b>Loth</b>	14.374 g

					Metric
<b>Centner</b>					57.50 kg
100	<b>schwere Pfund</b>				574.965 g
400	4		<b>Vierling</b>		143.741 g
4000	40		10	<b>Loth</b>	14.374 g

## 272.19 Schwyz

### 272.19.1 Currency

1798–1850: 1 Schwyz Thaler = 4 Franken  
 1 Schwyz Frank = 10 Batzen = 100  
 Rappen or Rapen = 200 Angster  
 –1798: 1 Schwyz Gulden = 40 Shil-  
 ling = 120 Rappen = 240 Angster  
 ?: 1 Schwyz Florin = 15 Batzen = 40  
 Schilling = 60 Kreutzer

### 272.19.2 Units of Length

						Metric
<b>Ruthe</b>						3.013 8 m
$1\frac{2}{3}$	<b>Klafter</b>					1.808 3 m
5	3	<b>Elle</b>				602.76 mm
10	6	2	<b>Fuss</b>			301.38 mm
120	72	24	12	<b>Zoll</b>		25.115 mm
1440	864	288	144	12	<b>Linie</b>	2.093 mm

### 272.19.3 Units of Area

1 **Juchart** = 360 Quadratruthen = 3269.88 m<sup>2</sup>.

### 272.19.4 Units of Dry Capacity

				Metric
<b>Getreide-Malter</b>				168.368 L
2	<b>Mütt</b>			84.184 L
8	4	<b>Viertel</b>		21.046 L
24	16	4	<b>Mässlein</b>	5.261 5 L

For smooth fruit

				Metric
<b>Mütt</b>				82.8 L
4	<b>Viertel</b>			20.7 L
16	4	<b>Vierling</b>		5.175 L
64	16	4	<b>Mässli</b>	1.294 L

For rough fruit

				Metric
<b>Malter</b>				333.6 L
16	<b>Viertel</b>			20.85 L
64	4	<b>Vierling</b>		5.212 L
256	16	4	<b>Mässli</b>	1.301 L

### 272.19.5 Units of Liquid Capacity

			Metric
<b>Saum</b>			180.65 L
100	<b>Maass</b>		1.806 5 L
400	4	<b>Schoppen</b>	451.625 mL

## 272.19.6 Units of Weight

				Metric
<b>schwere Handelspfund</b>				528.457 g
$1\frac{1}{8}$	<b>leichte Pfund</b>			469.780 g
36	32	<b>Loth</b>		14.679 g
144	128	4	<b>Quintli</b>	3.670 g

For gold and silver

					Metric
<b>Mark</b>					234.87 g
16	<b>Loth</b>				14.679 g
64	4	<b>Quintli</b>			3.670 g
256	16	4	<b>Pfennig</b>		917.46 mg
4608	288	72	18	<b>Grän</b>	50.97 mg

For medical use

					Metric
<b>Medicinalpfund</b>					357.853 g
12	<b>Unz</b>				29.821 g
96	8	<b>Drachme</b>			3.727 g
288	24	3	<b>Skrupel</b>		1.242 g
5760	480	60	20	<b>Gran</b>	62.13 mg

## 272.20 Solothurn

### 272.20.1 Currency

1798–1850: 1 Solothurn Frank = 10 Batzen =  
40 Kreuzer = 100 Rappen

–1798: 1 Solothurn Thaler = 40 Batzen  
= 160 Kreuzer = 320 Vierer

### 272.20.2 Units of Length

1 **Stab** = 1.182 05 m;

1 **Elle** = 545.91 mm.

					Metric
<b>Ruthe</b>					2.933 m
$1\frac{1}{4}$	<b>Klafter</b>				2.346 m
10	8	<b>Schuh</b>			293.26 mm
120	96	12	<b>Zoll</b>		24.44 mm
1440	1152	144	12	<b>Linie</b>	2.036 mm

### 272.20.3 Units of Area

1 **Juchart** = 40,000 Quadratfuss = 3440.06 m<sup>2</sup>.

### 272.20.4 Units of Dry Capacity

For grain

							Metric
<b>Mütt</b>							158.927 L
1½	<b>Viertel</b>						105.951 L
6	4	<b>Doppelmass</b>					26.488 L
12	8	2	<b>Mass<sup>a</sup></b>				13.244 L
48	32	8	4	<b>Immi</b>			3.311 L
96	64	16	8	2	<b>Achtel</b>		1.656 L
192	128	32	16	4	2	<b>Batzendingle or Batzendigle</b>	827.75 mL

<sup>a</sup>Also reported as 13.283 94 L, and as **Rittermass** = 18.149 7 L

### 272.20.5 Units of Liquid Capacity

Two reported scales

				Metric
<b>Saum</b>				159.418 L
4	<b>Brent or Brenton<sup>a</sup></b>			39.854 5 L
20	5	<b>Stütz</b>		7.970 9 L
100	25	5	<b>Maass</b>	1.594 18 L

<sup>a</sup>[KAHN] reported 1 **Brenton** = 8 Saum = 19.919 L

In Berneck and Thierstein

			Metric
<b>Saum</b>			136.512 L
3	<b>Ohm</b>		45.504 L
96	32	<b>Maass</b>	1.422 L

### 272.20.6 Units of Weight

				Metric
<b>Centner</b>				51.84 kg
10	<b>Stein</b>			5.184 kg
100	10	<b>Handelspfund</b>		518.4 g
3200	320	32	<b>Loth</b>	16.2 g

For gold and silver

						Metric
<b>Mark</b>						244.752 9 g
8	<b>Unze</b>					30.594 g
16	2	<b>Loth</b>				15.297 g
64	8	4	<b>Quentchen</b>			3.824 3 g
256	32	16	4	<b>Pfennig</b>		956.07 mg
4608	576	288	72	18	<b>Gran</b>	53.11 mg

For medical use

					Metric
<b>Medicinalpfund</b>					357.853 8 g
12	<b>Unze</b>				29.821 15 g
96	8	<b>Drachm</b>			3.727 64 g
288	24	3	<b>Skrupel</b>		1.242 55 g
5760	480	60	20	<b>Gran</b>	62.13 mg

272.21 Thurgau

272.21.1 Currency

1798–1850: 1 Gulden = 10 Schillinge = 15 Batzen = 60 Kreuzer = 240 Angster or Pfennige = 480 Heller  
1 Thurgau Frank = 10 Schweizer Batzen = 100 Rappen

272.21.2 Units of Length

See Appenzell.

272.21.3 Units of Dry Capacity

1 Viertel (for rough fruit in Frauenfeld) = 28.912 5 L;  
1 Viertel (for smooth fruit in Frauenfeld) = 16 Mässlein = 24.721 L;  
1 Viertel (in Bischoffszell) = 21.654 L;  
1 Viertel (in Diessenhofen) = 18.285 L.

272.21.4 Units of Liquid Capacity

		Metric
<b>Eimer</b>		51.097 6 L
32	<b>Maass</b>	1.596 8 L

272.21.5 Units of Weight

Before 1840, see Appenzell.  
After 1877, see Bern.

272.22 Ticino

272.22.1 Currency

1813–1850: 1 Ticino Franco = 20 Soldi = 240 Denari  
?: 1 Ticino Lira = 20 Soldi = 80 Quatrini

272.22.2 Units of Length

General scale before 1853

					Metric
<b>trabucco</b>					2.500 m
5	<b>braccio</b>				625.000 mm
60	12	<b>onzia</b>			53.083 mm
720	144	12	<b>punto</b>		4.340 mm
8640	1728	144	12	<b>atomo</b>	362 µm

In Locarno, based on [MART3]

				Metric
<b>braccio</b>				677.500 mm
12	<b>onzia</b>			56.458 mm
144	12	<b>punto</b>		4.705 mm
1728	144	12	<b>atomo</b>	392 µm

Metric-linked federal scale in Lugano after 1870, based on [MART3]

									Metric
<b>lega itinerar</b>									4800 m
1600	<b>trabucco</b>								3.000 m
2666⅔	1⅔	<b>tesa</b>							1.800 m
4000	2½	1½	<b>auna</b>						1.200 m
8000	5	3	2	<b>braccio</b>					600 mm
16,000	10	6	4	2	<b>piede federale</b>				300 mm
160,000	100	60	40	20	10	<b>pollice</b>			30 mm
1,600,000	1000	600	400	200	100	10	<b>linea</b>		3 mm
16,000,000	10,000	6000	4000	2000	1000	100	10	<b>punto</b>	300 µm

For tissue in Lugano

				Metric
<b>braccio</b>				625 mm
12	<b>once</b>			52.083 mm
144	12	<b>punto</b>		4.340 mm
1728	144	12	<b>atomo</b>	361.7 µm

Other units reported during the nineteenth century:

- 1 **braccio lungo** (for cloth at Bellinzona and in Lugano before 1852) = 677.5 mm;
- 1 **braccio corto** (at Bellinzona before 1852) = 524.00 mm;
- 1 **braccio corto** (for silk in Lugano before 1852) = 451.38 mm.

272.22.3 Units of Area

General scale before 1853

		Metric
<b>pertica</b>		2250.00 m <sup>2</sup>
360	<b>trabucco quadro</b>	6.250 m <sup>2</sup>

At Bellinzona

			Metric
<b>pertica</b>			703.630 m <sup>2</sup>
96	<b>gittata</b>		7.329 479 m <sup>2</sup>
576	6	<b>piede</b>	1.221 580 m <sup>2</sup>

In Locarno, based on [MART3]

		Metric
<b>pertica</b>		848.240 0 m <sup>2</sup>
1848	<b>quadretto</b>	45.900 4 m <sup>2</sup>

In Lugano, based on [MART3]

			Metric
<b>pertica</b>			7036.370 0 m <sup>2</sup>
24	<b>tavola</b>		2931.820 8 m <sup>2</sup>
288	12	<b>piede quadro</b>	244.319 4 m <sup>2</sup>

Metric-linked federal scale in Lugano after 1870, based on [MART3]

					Metric
<b>lega quadra</b>					23,040,000.000 m <sup>2</sup>
6400	<b>iugero or giornata</b>				3600.000 m <sup>2</sup>
2,560,000	400	<b>trabucco quadro</b>			9.000 m <sup>2</sup>
7, 111, 111⅓	1111⅓	2⅔	<b>tesa quadra</b>		3.240 m <sup>2</sup>
256,000,000	40,000	100	36	<b>piede quadro</b>	9.000 dm <sup>2</sup>

Other reported measures:

1 **piccolo spazzo** (in Locarno) = 35.4 dm<sup>2</sup>.

272.22.4 Units of Volume

Metric-linked system for firewood in Lugano, based on [MART3]

			Metric
<b>trabucco quadro</b>			27.000 m <sup>3</sup>
4 <sup>136</sup> / <sub>216</sub>	<b>tesa quadra</b>		5.832 m <sup>3</sup>
1000	216	<b>piede quadro</b>	27.00 dm <sup>3</sup>

272.22.5 Units of Dry Capacity

General scale before 1853

						Metric
<b>soma</b>						207.567 600 L
1½	<b>moggio</b>					138.378 400 L
2	1⅓	<b>sacco</b>				103.783 800 L
12	8	6	<b>staio<sup>a</sup></b>			17.297 300 L
48	32	24	4	<b>quarto</b>		4.324 325 L
192	128	96	16	4	<b>quartina</b>	1.081 081 L

<sup>a</sup>For tissues

At Bellinzona

				Metric
<b>moggio</b>				150.860 L
8	<b>staio</b>			18.857 5 L
128	16	<b>quartina</b>		1.178 594 L
2048	256	16	<b>sedicesimo</b>	73.662 mL

In Locarno, based on [MART3]

				Metric
<b>moggio</b>				239.000 000 L
8	<b>staio</b>			29.875 000 L
144	18	<b>ottenna</b>		1.659 722 L
2304	288	16	<b>sedicesimo</b>	103.733 mL

For oats in Lugano

					Metric
<b>soma</b>					207.567 6 L
1⅓	<b>carga</b>				155.675 7 L
1½	1⅔	<b>moggio</b>			138.378 4 L
2	1½	1⅓	<b>sacco</b>		103.783 8 L
12	9	8	6	<b>staio</b>	17.297 3 L

In Lugano, based on [MART3]

				Metric
<b>moggio</b>				153.510 000 L
8	<b>staio</b>			19.188 750 L
128	16	<b>quartina</b>		1.199 297 L

Metric-linked federal scale in Lugano after 1870, based on [MART3]

					Metric
<b>moggio or sacco</b>					150.000 L
10	<b>staio</b>				15.000 L
40	4	<b>quarto</b>			3.750 L
100	10	2½	<b>mina</b>		1.500 L
160	16	4	1⅓	<b>quartina</b>	937.500 mL

272.22.6 Units of Liquid Capacity

General scale before 1853

						Metric
<b>brenta</b>						72.308 900 L
1⅓	<b>baile</b>					45.196 800 L
6	3¾	<b>staio</b>				12.051 483 L
48	30	8	<b>pinta</b>			1.506 483 L
96	60	16	2	<b>boccale</b>		753.280 mL
384	240	64	8	4	<b>quartino</b>	188.320 mL

Traditional system

					Metric
<b>brenta</b>					82.638 72 L
6	<b>staio</b>				13.773 12 L
48	8	<b>pinta</b>			1.721 64 L
96	16	2	<b>boccalo</b>		860.82 mL

For wine

		Metric
<b>laegel</b>		45.193 L
30	<b>pinta</b>	1.506 L

## At Bellinzona

						Metric
<b>brenta</b>						89.800 L
6	<b>staio</b>					14.966 667 L
48	8	<b>pinta</b>				1.870 833 L
96	16	2	<b>boccale</b>			935.417 mL
192	32	4	2	<b>mezzo</b>		467.708 mL
384	64	8	4	2	<b>quartino</b>	233.854 mL

## In Locarno, based on [MART3]

						Metric
<b>brenta</b>						60.470 000 L
6	<b>mina</b>					10.078 333 L
66	11	<b>boccale</b>				916.212 mL
132	22	2	<b>mezzo</b>			458.106 mL
264	44	4	2	<b>quartino</b>		229.053 mL

## In Lugano, based on [MART3]

						Metric
<b>brenta</b>						87.158 000 L
6	<b>staio</b>					14.526 333 L
48	8	<b>pinta</b>				1.815 792 L
96	16	2	<b>boccale</b>			907.896 mL
384	64	8	4	<b>quartino</b>		226.974 mL

## Metric-linked federal scale in Lugano after 1870, based on [MART3]

						Metric
<b>soma</b>						150.000 L
4	<b>brenta</b>					37.500 L
100	25	<b>pinta</b>				1.500 L
200	50	2	<b>boccale</b>			750.000 mL
400	100	4	2	<b>mezzo</b>		375.000 mL
800	200	8	4	2	<b>quartino</b>	187.500 mL

## 272.22.7 Units of Weight

## General scale before 1853

							Metric
<b>centinaio</b>							86.081 800 kg
10	<b>rubbio</b>						8.608 180 kg
100	10	<b>libbra grossa</b>					860.818 g
233⅓	23⅓	2⅔	<b>libretta</b> <sup>a</sup>				322.807 g
3200	320	32	12	<b>oncia</b>			26.901 g
76,800	7680	768	288	24	<b>denaro</b>		1.121 g
1,843,200	184,320	18,432	6912	576	24	<b>grano</b>	46.70 mg

<sup>a</sup>For silk and drugs

In Locarno, based on [MART3]

				Metric
<b>libbra</b>				870.000 g
32	<b>oncia</b>			27.187 g
768	24	<b>denaro</b>		1.132 g
18,432	576	24	<b>grano</b>	47 mg

In Lugano (three different libbras were in use) and at Bellinzona

				Metric	Metric	Metric	Metric
<b>libbra</b>				763.287 g	787.782 g	839.422 g	779.189 g
30	<b>once</b>			25.443 g	26.259 g	27.981 g	25.973 g
720	24	<b>denaro</b>		1.060 g	1.094 g	1.166 g	1.082 g
17,280	576	24	<b>grano</b>	44.17 mg	45.59 mg	48.58 mg	45.09 mg

Metric-linked federal scale in Lugano after 1870, based on [MART3]

							Metric
<b>centinaio</b>							50 kg
100	<b>libbra</b>						500 g
1600	16	<b>oncia</b>					31.250 g
50,000	500	31¼	<b>grammo</b>				1 g
500,000	5000	312½	10	<b>decigrammo</b>			100 mg
5,000,000	50,000	3125	100	10	<b>centigrammo</b>		10 mg
50,000,000	500,000	31,250	1000	100	10	<b>milligrammo</b>	1 mg

At Bellinzona, based on [MART3]

				Metric
<b>libbra</b>				949.680 g
36	<b>oncia</b>			26.380 g
864	24	<b>denaro</b>		1.099 2 g
20,736	576	24	<b>grano</b>	45.8 mg

For silk

		Metric
<b>liretta</b> or <b>Seidenpfund</b>		322.807 g
12	<b>Once</b>	26.901 g

1 Unterwalden Gulden = 40  
Schillinge = 240 Angster = 480  
Heller  
1 Unterwalden Florin = 15  
Batzen = 40 Schilling = 60  
Kreutzer

–1798:

**272.23 Unterwalden**  
**(Now Two Half-Cantons:**  
**Obwalden and Nidwalden)**

**272.23.1 Currency**

1798–1852: 1 Unterwalden Franken = 10  
Batzen = 30 Schillinge = 40  
Kreuzer = 100 Rappen

## 272.23.2 Units of Length

At Sarnen before 1857

				Metric
<b>Ruthe</b>				2.842 3 m
10	<b>Fuss</b>			284.23 mm
120	12	<b>Zoll</b>		23.686 mm
1440	144	12	<b>Linie</b>	1.974 mm

For fabric at Sarnen before 1857

		Metric
<b>Elle</b>		570.440 mm
2	<b>Schuh</b>	285.220 mm

Other reported measures:

1 **Klafter** (at Sarnen) = 3.140 77 m.

## 272.23.3 Units of Area

At Sarnen before 1857

			Metric
<b>Juchart</b>			3635.40 m <sup>2</sup>
450	<b>Quadratruthe</b>		8.078 67 m <sup>2</sup>
45,000	100	<b>Quadratfuss</b>	8.078 67 dm <sup>2</sup>

## 272.23.4 Units of Dry Capacity

At Sarnen before 1857

				Metric
<b>Malter</b>				554.169 L
4	<b>Mütt</b>			138.542 L
16	4	<b>Viertel</b>		34.636 L
160	40	10	<b>Immi</b>	3.464 L

## 272.23.5 Units of Liquid Capacity

For wine at Sarnen before 1857

				Metric
<b>Saum</b>				76.83 L
3 $\frac{1}{3}$	<b>Ohm</b>			23.05 L
100	30	<b>Maass</b>		768.3 mL
400	120	4	<b>Schoppen</b>	192.1 mL

For milk at Sarnen before 1857

		Metric
<b>Saum</b>		116.25 L
100	<b>Maass</b>	1.162 5 L

Traditional system at Sarnen before 1857

		Metric
<b>Centner</b>		52.845 890 kg
100	<b>Pfund</b>	528.459 g

272.23.6 Units of Weight

Commercial scale at Sarnen before 1857

			Metric
<b>Handelspfund</b>			528.898 g
36	<b>Loth</b>		14.692 g
144	4	<b>Quintli</b>	3.673 g

For gold and silver at Sarnen before 1857

				Metric
<b>Mark</b>				244.752 9 g
8	<b>Unze</b>			30.594 g
192	24	<b>Pfennig</b>		1.275 g
4608	576	24	<b>Grän</b>	53.11 mg

For medical use at Sarnen before 1857

					Metric
<b>Medicinalpfund</b>					357.951 g
12	<b>Unze</b>				29.829 g
96	8	<b>Drachme</b>			3.729 g
288	24	3	<b>Skrupel</b>		1.243 g
5760	480	60	20	<b>Gran</b>	62.14 mg

272.24 Uri

272.24.1 Currency

1798–1850: 1 Uri Frank = 10 Batzen = 100 Rappen  
?: 1 Uri Florin = 15 Batzen = 40 Schilling = 60 Kreutzer

272.24.2 Units of Length

Traditional system in Altdorf

							Metric
<b>Wegstunde</b>							4520.68 m
1500	<b>Ruthe</b>						3.013 8 m
2500	1⅔	<b>Klafter</b>					1.808 3 m
7500	5	3	<b>Elle<sup>a</sup></b>				602.76 mm
15,000	10	6	2	<b>Fuss<sup>a</sup></b>			301.38 mm
180,000	120	72	24	12	<b>Zoll</b>		25.115 mm
2,160,000	1440	864	288	144	12	<b>Linie</b>	2.093 mm

<sup>a</sup>According to [MART3], there was also 1 **Elle** = 2 **Fuss** = 666.667 mm

272.24.3 Units of Area

Traditional system in Altdorf

		Metric
<b>Junchart</b>		3269.9 m <sup>2</sup>
360	<b>Quadratruthe</b>	9.083 m <sup>2</sup>

272.24.4 Units of Dry Capacity

For “glatte Frucht” (smooth fruit)

				Metric
<b>Mütt</b>				82.8 L
4	<b>Viertel</b>			20.7 L
16	4	<b>Vierling</b>		5.175 L
64	16	4	<b>Massli</b>	1.294 L

For “rauhe Frucht” (rough fruit)

				Metric
<b>Malter</b>				333.6 L
16	<b>Viertel</b>			20.85 L
64	4	<b>Vierling</b>		5.212 L
256	16	4	<b>Massli</b>	1.303 L

For gold and silver

					Metric
<b>Mark</b>					234.87 g
16	<b>Loth</b>				14.679 g
64	4	<b>Quintli</b>			3.670 g
256	16	4	<b>Pfennig</b>		917.46 mg
4608	288	72	18	<b>Grän</b>	50.97 mg

For medical use

					Metric
<b>Medicinalpfund</b>					357.853 8 g
12	<b>Unz</b>				29.821 1 g
96	8	<b>Drachme</b>			3.727 6 g
288	24	3	<b>Skrupel</b>		1.242 5 g
5760	480	60	20	<b>Gran</b>	62.13 mg

272.24.5 Units of Dry Capacity

			Metric
<b>Eimer</b>			48.402 L
60	<b>Maass</b>		806.7 mL
240	4	<b>Schoppen</b>	201.688 mL

272.24.6 Units of Weight

For general use

				Metric
<b>schwere Pfund</b>				528.457 g
1 1/8	<b>leichte Pfund<sup>a</sup></b>			469.740 g
36	32	<b>Loth</b>		14.679 g
144	128	4	<b>Quintli</b>	3.670 g

<sup>a</sup>Mainly used for cereal

Upper scale, based on [MART3]

		Metric
<b>Centner</b>		52.845 89 kg
100	<b>Pfund</b>	528.458 9 g

## 272.25 Vaud

### 272.25.1 Currency

1798–1850: 1 Vaud Thaler = 4 Francs  
 1 Vaud Franc = 10 Batz = 100 Rappen  
 ?: 1 Kreuzer = 4 Pfennigen = 8 Hellern

### 272.25.2 Units of Length

Metric-linked upper scale in Lausanne between 1823 and 1836

				Metric
<b>lieue</b> or <b>Wegstunde</b>				4800 m
1000	<b>perche</b> or <b>Ruthe</b>			4.80 m
3200	3½	<b>toise</b> or <b>Klafter</b> <sup>a</sup>		1.50 m
4000	4	1¼	<b>aune, Stab</b> or <b>Elle</b>	1.20 m

<sup>a</sup>Also reported as 10 Fuss = 3 m

Metric-linked lower scale in Lausanne between 1823 and 1836

						Metric
<b>aune, Stab</b> or <b>Elle</b>						1.20 m
2	<b>brasse</b> or <b>Brache</b>					600 mm
4	2	<b>pied</b> or <b>Fuß</b>				300 mm
48	24	12	<b>pouce</b> or <b>Zoll</b>			25 mm
576	288	144	12	<b>ligne</b> or <b>Linie</b>		2.083 mm
5760	2880	1440	120	10	<b>trait</b> or <b>Strich</b>	208.33 µm

### 272.25.3 Units of Area

Metric-linked system in Lausanne between 1823 and 1836

						Metric
<b>lieue carrée</b> or <b>Quadrat Wegstunde</b>						23.04 km <sup>2</sup>
5120	<b>pose</b> or <b>Juchart</b>					4500 m <sup>2</sup>
6400	1¼	<b>arpent</b> or <b>Juchart</b>				3600 m <sup>2</sup>
51,200	10	8	<b>fossorier</b>			450 m <sup>2</sup>
2,560,000	500	400	50	<b>toise carrée</b> or <b>Quadrat-Ruthe</b>		9 m <sup>2</sup>
256,000,000	50,000	40,000	5000	100	<b>pied carrée</b>	9 dm <sup>2</sup>

### 272.25.4 Units of Volume

For firewood

		Metric
<b>moule</b>		3.375 m <sup>3</sup>
125	<b>pied cube</b>	27.0 dm <sup>3</sup>

### 272.25.5 Units of Dry Capacity

Metric-linked system in Lausanne between 1823 and 1836

					Metric
<b>muid or Zuber</b>					1350 L
10	<b>sac or Sack</b>				135 L
100	10	<b>quarteron, boisseau, or Viertel</b>			13.5 L
1000	100	10	<b>setier, Immi, or Emine</b>		1.35 L
10,000	1000	100	10	<b>copet or Becher</b>	135 mL

### 272.25.6 Units of Liquid Capacity

In Lausanne between 1823 and 1836

				Metric
<b>char</b>				860.918 L
18	<b>setier</b>			47.829 L
432	24	<b>quarteron</b>		1.992 9 L
864	48	2	<b>pot</b>	996.4 mL

In Lausanne between 1836 and 1852

					Paris pieds cubes	Metric
<b>char or Fuder</b>					32,640	648 L
16	<b>setier or Eimer</b>				2040	40.5 L
48	3	<b>broc or Gelte</b>			680	13.5 L
480	30	10	<b>pot, Immi, or Maß</b>		68	1.35 L
4800	300	100	10	<b>verre, Becherlein, or Glas</b>	6 <sup>2</sup> / <sub>5</sub>	135 mL

## 272.25.7 Units of Weight

In Lausanne before 1823

			Metric
<b>Livre</b>			505.902 g
128	<b>quart<sup>a</sup></b>		3.952 g
512	4	<b>denier</b>	988 mg

<sup>a</sup>Also reported as 3.972 g

Metric-linked system in Lausanne between 1823 and 1836

					Metric
<b>Quintal</b>					50 kg
10	<b>Pfund</b>				500 g
160	16	<b>Once</b>			31.25 g
1280	128	8	<b>Gros</b>		3.906 25 g
92,160	9216	576	72	<b>Grain</b>	54.25 mg

For medical use in Lausanne

					Metric
<b>Pfund</b>					357.853 8 g
12	<b>Unze</b>				29.821 1 g
96	8	<b>Drachme</b>			3.727 6 g
288	24	3	<b>Skrupel</b>		1.242 5 g
5760	480	60	20	<b>Gran</b>	62.13 mg

## 272.26 Wallis

### 272.26.1 Currency

1798–1803: 1 Helvetica Republic Frank = 10 Batzen = 100 Rappen

–1798: 1 Wallis Thaler = 40 Batz = 160 Kreuzer

1 Kreuzer = 4 Pfennigen = 8 Hellern

### 272.26.2 Units of Length

1 Klafter = 10 Fuss = 3 m.

### 272.26.3 Units of Area

			Metric
<b>pose</b> or <b>Juchart</b>			4500 m <sup>2</sup>
10	<b>fossorier</b>		450 m <sup>2</sup>
500	50	<b>toise<sup>2</sup></b>	9 m <sup>2</sup>

### 272.26.4 Units of Dry Capacity

Metric-linked system until 1838

					Metric
<b>Muid, Malter, or Zuber</b>					1348.87 L
10	<b>Sack</b>				134.887 L
100	10	<b>Quarteron or Gelte</b>			13.488 7 L
1000	100	10	<b>Emine, Mässlein, or Mine</b>		1.348 9 L
10,000	1000	100	10	<b>Copet</b>	134.887 mL

### 272.26.5 Units of Liquid Capacity

					Metric
<b>char</b> or <b>Fuder</b>					648 L
16	<b>setier</b> or <b>Eimer</b>				40.5 L
48	3	<b>broc</b> or <b>Gelte</b>			13.5 L
480	30	10	<b>pot, Immi</b> or <b>Maß</b>		1.35 L
4800	300	100	10	<b>verre, Becherlein, or Glas</b>	135 mL

## 272.26.6 Units of Weight

Metric-linked system

				Metric
<b>Handelspfund</b>				500 g
16	<b>Once</b>			31.25 g
128	8	<b>Gros</b>		3.906 25 g
9216	576	72	<b>Grain</b>	54.25 mg

For medical use

					Metric
<b>Pfund</b>					357.853 8 g
12	<b>Unz</b>				29.821 g
96	8	<b>Drachme</b>			3.728 g
288	24	3	<b>Skrupel</b>		1.242 g
5760	480	60	20	<b>Gran</b>	62.13 mg

For smooth fruit

				Metric
<b>Kernenmaass</b>				89.79 L
4	<b>Viertel</b>			22.447 L
16	4	<b>Vierling</b>		5.612 L
64	16	4	<b>Mässli</b>	1.403 L

For fresh fruit

					Metric
<b>Hafermaass</b>					360.88 L
4	<b>Mütt</b>				90.22 L
16	4	<b>Viertel</b>			22.555 L
64	16	4	<b>Vierling</b>		5.638 8 L
256	64	16	4	<b>Mässli</b>	1.409 7 L

## 272.27 Zug

### 272.27.1 Currency

1805–1852: 1 Zug Gulden = 15 Batzen = 60 Schillinge = 180 Rappen = 360 Angster = 720 Heller

1564–1805: 1 Zug Assis or Schilling = 3 Rappen = 6 Angster

### 272.27.2 Units of Length, Area and Weight

Until January 1, 1840, the measures were the same as those in Zurich. See *Zürich* below.

### 272.27.3 Units of Dry Capacity

## 272.28 Zürich

### 272.28.1 Currency

1803–1852: 1 Zürich Gulden = 16 Batzen = 40 Schilling = 60 Kreutzen = 240 Angster = 480 Haller

1798–1803: 10 Zürich Gulden = 16 Swiss franc  
1 Swiss franc = 10 Batzen = 100 Rappen

–1798: 1 Zürich Thaler = 2 Gulden = 72 Schilling = 144 Rappen = 864 Haller

272.28.2 Units of Length

							Metric
<b>Wegstunde</b>							4520.68 m
1500	<b>Ruthe</b>						3.013 790 m
2500	1 $\frac{2}{3}$	<b>Klafter</b>					1.808 28 m
7500	5	3	<b>Elle</b>				602.758 mm
15,000	10	6	2	<b>Fuss</b>			301.379 mm
180,000	120	72	24	12	<b>Zoll</b>		25.115 mm
2,160,000	1 440	864	288	144	12	<b>Linie</b>	2.093 mm

272.28.3 Units of Area

For land

				Metric
<b>Juchart</b>				3269.855 m <sup>2</sup>
4	<b>Vierling</b>			817.464 m <sup>2</sup>
360	90	<b>Quadratruthe</b>		9.082 930 m <sup>2</sup>
36,000	9000	100	<b>Quadratfuss</b>	9.082 930 dm <sup>2</sup>

For forests

		Metric
<b>Juchart</b>		3633.196 m <sup>2</sup>
400	<b>Quadratruthe</b>	9.082 930 m <sup>2</sup>

For other purposes

		Metric
<b>Juchart</b>		2543.237 m <sup>2</sup>
280	<b>Quadratruthe</b>	9.082 930 m <sup>2</sup>

For vineyards

		Metric
<b>Juchart</b>		2906.557 m <sup>2</sup>
320	<b>Quadratruthe</b>	9.082 930 m <sup>2</sup>

272.28.4 Units of Dry Capacity

For general use

					Metric
<b>Malter</b>					328.492 000 L
4	<b>Mütt</b>				82.123 000 L
16	4	<b>Viertel</b>			20.530 750 L
64	16	4	<b>Vierling</b>		5.132 687 L
256	64	16	4	<b>Mässli</b>	1.283 172 L

For smooth fruit

				Metric
<b>Mütt</b>				82.80 L
4	<b>Viertel</b>			20.70 L
16	4	<b>Vierling</b>		5.175 L
64	16	4	<b>Mässli</b>	1.293 75 L

For rough fruit

				Metric
<b>Malter</b>				333.60 L
16	<b>Viertel</b>			20.85 L
64	4	<b>Vierling</b>		5.212 5L
256	16	4	<b>Mässli</b>	1.303 125 L

For oats and legumes

					Metric
<b>Malter</b>					333.124 800 L
4	<b>Mütt</b>				82.281 200 L
16	4	<b>Viertel</b>			20.820 300 L
64	16	4	<b>Vierling</b>		5.205 075 L
256	64	16	4	<b>Mässli</b>	1.301 269 L

## 272.28.5 Units of Liquid Capacity

Traditional system for general use

					Metric
<b>Eimer</b>					110.035 7 L
4	<b>Viertel</b>				27.508 92 L
30	7½	<b>Kopf</b>			3.667 856 L
60	15	2	<b>Maass or Landmaass</b>		1.833 928 L
240	60	8	4	<b>Schoppen</b>	458.482 mL

Traditional system for “lautere” mass = clear wine, etc., according to [ROTT2], [MART3] and [NIEM]

							Metric	Metric	Metric
<b>Saum</b>							164.25 L	164.241 000 L	164.077 L
1½	<b>Eimer</b>						109.50 L	109.494 000 L	109.385 L
6	4	<b>Viertel</b>					27.375 L	27.373 500 L	27.346 L
45	30	7½	<b>Kopf</b>				3.650 L	3.649 800 L	3.646 L
90	60	15	2	<b>Maass or pot</b>			1.825 L	1.824 900 L	1.823 L
180	120	30	4	2	<b>Quartli</b>		912.50 mL	912.450 mL	911.54 mL
360	240	60	8	4	2	<b>Stotze</b>	456.25 mL	456.225 mL	455.77 mL

Traditional system for “trübes” mass = unclarified wine, etc.

							Metric
<b>Saum</b>							175.190 400 L
1½	<b>Eimer</b>						116.793 600 L
6	4	<b>Viertel</b>					29.198 400 L
48	32	8	<b>Kopf</b>				3.649 800 L
96	64	16	2	<b>Mass or pot</b>			1.824 900 L
192	128	32	4	2	<b>Quartli</b>		912.450 mL
384	256	64	8	4	2	<b>Stotze</b>	456.225 mL

Two reported scales (“stadtmass” = “townscale”)

							Metric	Metric
<b>Saum</b>							147.825 L	147.780 L
1½	<b>Eimer</b>						98.55 L	98.520 L
6	4	<b>Viertel</b>					24.638 L	24.630 L
45	30	7½	<b>Kopf</b>				3.285 L	3.284 L
90	60	15	2	<b>Mass or pot</b>			1.642 5 L	1.642 L
180	120	30	4	2	<b>Quartli</b>		821.25 mL	821.00 mL
360	240	60	8	4	2	<b>Stotze</b>	410.625 mL	410.50 mL

For honey

		Metric
<b>Maass</b>		1.375 L
2	<b>Becker</b>	687.500 mL

Other reported measures:

1 **Schenkmaass** = 4 Schoppen = 1.570 15 L;

1 **Oelmaass** (for oil) = 1.381 281 L;

1 **Milchmaass** (for milk) = 1.304 99 L.

## 272.28.6 Units of Weight

					Metric
<b>Centner</b>					52.845 700 kg
100	<b>schwere Pfund</b>				528.457 000 g
112½	1⅞	<b>Seidenpfund</b>			469.739 555 g
3600	36	32	<b>Loth</b>		14.679 361 g
14,400	144	128	4	<b>Quintli</b>	3.669 840 g

For gold, silver, silk and money

							Metric
<b>leicht Pfund</b>							469.739 560 g
2	<b>Mark</b>						234.869 780 g
16	8	<b>Unze</b>					29.358 722 g
32	16	2	<b>Loth</b>				14.679 361 g
128	64	8	4	<b>Quintli</b>			3.669 840 g
512	256	32	16	4	<b>Pfennig</b>		917.460 mg
2048	1024	128	64	16	4	<b>Sechszehntel</b>	229.365 mg
36,864	18,432	2304	1152	288	72	18	<b>Gran</b> 12.742 mg

For medical use

					Metric
<b>Medicinalpfund</b>					357.853 8 g
12	<b>Unze</b>				29.821 15 g
96	8	<b>Drachm</b>			3.727 644 g
288	24	3	<b>Skrupel</b>		1.242 48 g
5760	480	60	20	<b>Gran</b>	62.13 mg

273 Syria [Formerly: United Arab Republic (with Egypt)]

See also *Ottoman Empire*.

Syria’s subjugation by Egypt around 1500 BCE was followed by successive conquests by the Hebrews, Phoenicians, Babylonians, Assyrians, Persians, Macedonians, Romans, Byzantines and finally the lands of the Caliphate in 636 CE. In 1516, Syria became part of the Ottoman Empire. In 1918, British troops conquered Syria with Arab help. In 1920, an independent kingdom of Syria was established under King Faysal. The French ended his rule after a few months, and Syria became a mandate of the League of Nations under French control. During World War II, German-allied Vichy France controlled Syria and Lebanon. In 1941, British and Free French forces occupied the country, and declared Syria and Lebanon independent. The president was deposed in a military coup d’état in 1949. After another coup in 1854, Syria united with Egypt as the United Arab Republic. A military coup in 1961 ended the union, and Syria reestablished itself as the Syrian Arab Republic.

The metric system first became official, during Ottoman rule, in 1874. It was once again officially adopted in 1933, and has been compulsory since Aug. 22, 1935 and Aug. 22, 1955.

*Main sources:* [MART3], [UN55], [UN66], and [ZIMM]

273.1 Currency

- 1958–: 1 Syrian pound = 100 qirsh or piasters  
1919–1957: 1 Syrian livre = 100 qirsh or piasters

- 1919–1919: 1 Egyptian pound = 100 qirush = 1000 milliemes  
1844–1918: 1 Turkish lira = 100 kuruş = 4000 paras

piastre		
40	para	
120	3	aspre

At Aleppo during the early nineteenth century

piastre			
40	para		
100	2½	old aspre	
120	3	1⅓	new aspre

At Aleppo during the late eighteenth century

piastre			
24	siani		
80	2½		aspre

273.2 Units of Length

Road measures were estimated by the number of days or hours it would take a camel, at ordinary pace, to travel a certain distance.

Units for shorter measures before 1874:

- 1 **dra maghmari** (for surveying at Aleppo and Homs) = 758 mm;  
1 **draâ, dra, dhira, pik, or pic** (for fabric at Damascus) = 700 mm;  
1 **pik hâlebi** (at Aleppo) = 685.8 mm.  
1 **draâ, dra, dhira, pik, or pic** (for fabric at Aleppo and Homs) = 680 mm;  
1 **draâ, dra, dhira, pik, or pic** (for surveying at Damascus) = 677.5 mm;

- 1 **draâ, dra, dhira, pik**, or **pic** (old) = 582 mm;  
 1 **draâ, dra, dhira, pik**, or **pic** (metric-linked for surveying) = 500 mm.

### 273.3 Units of Area

At Damascus before 1874; at Aleppo and Homs before 1874; metric-linked at Latakia and Mohazafat between 1869 and 1874

فدان	دونم		Metric	Metric	Metric
<b>faddān</b> or <b>feddan</b> <sup>a</sup>			2295.031 25 m <sup>2</sup>	2872.820 m <sup>2</sup>	2500 m <sup>2</sup>
3/8	<b>dūnam</b>		734.410 000 m <sup>2</sup>	919.300 m <sup>2</sup>	800 m <sup>2</sup>
5000	1 600	<b>dra maghmārī murebba</b>	45.900 625 dm <sup>2</sup>	57.456 4 dm <sup>2</sup>	50 dm <sup>2</sup>

<sup>a</sup>At Aleppo, reported, by [ZIMM], as varying between 2295 and 3443 m<sup>2</sup>

Other reported measures:

1 **kassabé** = 23.814 m<sup>2</sup>.

### 273.4 Units of Dry Capacity

Before 1931 and metric-linked system after 1931

			Metric	Metric
<b>garava</b>			1359 L	1440 L
1/5	<b>makuk</b>		755 L	800 L
450	250	<b>rotl</b>	3.02 L	3.2 L

In Aleppo

		Metric
<b>makuk</b>		144.32 L
22	<b>kail</b>	6.56 L

At Chakba; at Soueida and Salkhad

			Metric	Metric
<b>mudd</b>			26 L	27.5 L
2	<b>saba</b>		13 L	13.75 L
4	2	<b>khoubhie</b>	6.5 L	6.875 L

At Damascus

		Metric
<b>girara</b> or <b>dirara</b>		264.96 L
12	<b>kail</b>	22.08 L

### 273.5 Units of Liquid Capacity

Liquids were traditionally sold by weight.

At Damascus

			Metric
<b>terminye</b>			9.730 L
2 1/20	<b>rabée</b>		4.746 L
4 1/25	–	<b>saagh</b>	2.408 L

For castor oil at Damascus, based on [MART3]

		Metric
<b>cifk</b> or <b>chiló</b>		36.093 L
2	<b>mud</b> or <b>med</b>	18.046 5 L

## 273.6 Units of Weight

For general use at Aleppo during the late eighteenth century, mainly based on [NIEM, p. 378], [DUBO, p. 323], [JACK, p. 231], and [TATE, p. 217]

										Metric
<b>cantaro</b>										227.975 kg
$2\frac{2}{7}$	<b>cola</b>									79.791 kg
$3^{250/847}$	$1^{19/121}$	<b>cantaro zurbo<sup>a</sup></b>								69.532 kg
$3\frac{7}{11}$	$1\frac{3}{11}$	$1\frac{1}{10}$	<b>zurbo</b>							62.693 kg
20	7	$6\frac{3}{10}$	$5\frac{1}{2}$	<b>vesno</b>						11.399 kg
30	$10\frac{1}{2}$	$9\frac{3}{20}$	$8\frac{1}{4}$	$1\frac{1}{2}$	<b>batman</b>					7.599 kg
100	35	$30\frac{1}{2}$	$27\frac{1}{2}$	5	$3\frac{1}{3}$	<b>rotolo or rotl<sup>b</sup></b>				2.279 75 kg
180	63	$54\frac{9}{10}$	$49\frac{1}{2}$	9	6	$1\frac{4}{5}$	<b>oka</b>			1.266 53 kg
48,000	16,800	14,640	13,200	2400	1600	480	$266\frac{2}{3}$	<b>metical<sup>c</sup></b>		4.75 g
72,000	25,200	21,960	19,800	3600	2400	720	400	$1\frac{1}{2}$	<b>drachm</b>	3.17 g

<sup>a</sup>Reported by [WINS, p. 33]

<sup>b</sup>According to [DEAR, p. 399]: 1 **rottol** (for weighing silk from Tripoli and Antioch, as well as those denominated Barutinas, Besuinas, Beiledinas, and Payases) = 700 drachms = 2.216 5 kg. 1 **rottol** (for weighing silk from Persia, and those denominated Ardassas, Ardassetas, Burmas, and Cerbaffis) = 680 drachms = 2.153 kg

<sup>c</sup>For diamonds, ambergris and pearls

In Damascus during the eighteenth century

				Metric
<b>rotolo or rotl</b>				7.912 kg
12	<b>uqiya</b>			659.3 g
600	50	<b>dirhem</b>		3.186 g

At Aleppo and Homs during the late nineteenth century

						Metric
<b>cantaro</b>						320.75 kg
5	<b>zurlo</b>					64.15 kg
125	25	<b>rotolo or rotl</b>				2.566 kg
250	50	2	<b>oka</b>			1.283 kg
1000	200	8	4	<b>uqiya</b>		320.75 g
100,000	20,000	800	400	100	<b>dirhem</b>	3.207 5 g

At Damascus during the nineteenth century

						Metric
<b>cantaro</b>						255.028 192 kg
100	<b>rotolo or rotl<sup>a</sup></b>					2.550 282 kg
$133\frac{1}{3}$	$1\frac{1}{3}$	<b>rotolo or rotl<sup>b</sup></b>				1.912 711 kg
200	2	$1\frac{1}{2}$	<b>oka</b>			1.275 141 kg
8000	80	60	40	<b>vochijeh</b>		31.879 g

<sup>a</sup>For most goods, including wool and indigo

<sup>b</sup>For drugs

In Damascus during the twentieth century

					Metric
<b>cantaro</b>					256.5 kg
100	<b>rotolo</b> or <b>rotl</b>				2.565 kg
200	2	<b>oka</b>			1.282 kg
1200	12	6	<b>uqiya</b>		213.7 g
80,000	800	400	$66\frac{2}{3}$	<b>dirhem</b>	3.205 g

Decimalized scale at Aleppo and Homs (dirhem, as in Damascus during the twentieth century)

				Metric
<b>cantaro</b>				320.5 kg
100	<b>rotolo</b> or <b>rotl</b>			3.205 kg
1000	10	<b>uqiya</b>		320.5 g
100,000	1000	100	<b>dirhem</b>	3.205 g

For gold, silver, moss and rose oil at Damascus during the nineteenth century

			Metric
<b>vochijeh</b>			31.878 524 g
$6\frac{2}{3}$	<b>metical</b>		4.781 779 g
10	$1\frac{1}{2}$	<b>dirhem</b>	3.187 852 g

Reported in 1966:

- 1 **rottol** = 3.205 kg (at Aleppo and Homs),  
 2.666 kg (at Chakba), 2.565 kg (at Damascus),  
 2.556 kg (at Salkhad), and 2.5 kg (at Soueida).

# National Systems of Units and Currencies: T–Z

## 1 Taiwan [Formerly: Formosa]

The Portuguese first sighted the main island of Taiwan in 1544, naming it Ilha Formosa. The Dutch East India Company established itself on Taiwan between 1624 and 1662. Spain had a colony, Spanish Formosa, in the northern part of Taiwan from 1626 to 1642. Between 1661 and 1683, a government, often referred to as the Kingdom of Tungning, ruled Taiwan. In 1683, the Ch'ing dynasty took control of Taiwan, attaching it to the Fukien province. Taiwan was then part of the Chinese Empire until the Treaty of Shimonoseki handed the territory over to Japan in 1895. Taiwan was returned to the Republic of China in 1945.

The traditional system for weights and measures was mainly derived from Chinese units of measurement. During the seventeenth century, some Dutch and Spanish units of measurement were adopted, and during the late nine-

teenth century, some Japanese conversions were adopted. The metric system has been compulsory since 1954.

*Main source:* [PSAL]

### 1.1 Currency

1949–:	1 New Taiwan dollar = 100 cents
1897–1949:	1 Chinese dollar (yuan) = 100 cents (fen)
–1897:	1 tael = 10 mace = 100 candareen
1624–1662:	1 Spanish real

### 1.2 Units of Length

Japanese-linked system (in pēh-ōe-j-orthography)

尺	寸	Metric
chhih		303.030 mm
10	chhùn	30.303 mm

Metric-linked system after 1954, with names rendered in English

						Metric
kung li						1000 m
10	kung yin					100 m
100	10	kung chang				10 m
1000	100	10	kung ch'ih			1 m
10,000	1000	100	10	kung t'sun		100 mm
100,000	10,000	1000	100	10	kung fun or kung fen	10 mm
1,000,000	100,000	10,000	1000	100	10	kung lee 1 mm

### 1.3 Units of Area

Dutch- and Japanese-linked system (in p  h-  e-j-orthography)

				Metric
<b>l��</b> <sup>a</sup>				48,496 m <sup>2</sup>
5	<b>kah</b> <sup>b</sup>			9699.2 m <sup>2</sup>
489	97 4/5	<b>b��</b>		99.174 m <sup>2</sup>
14,670	2934	30	<b>ph��ng</b> <sup>c</sup>	3.306 m <sup>2</sup>

<sup>a</sup>The **l  ** traditionally represented the area that could be farmed by one man with one ox and one plough in 1 day

<sup>b</sup>Derived from the Dutch unit morgen. Also reported as **chia** and **ko**.

<sup>c</sup>Derived from the Japanese *tsubo*, representing the floor space of two tatami mats. It has also been reported as **bin**

Metric-linked system, with names rendered in English

			Metric
<b>kung ch'ing</b>			10,000 m <sup>2</sup>
100	<b>kung mou</b>		100 m <sup>2</sup>
10,000	100	<b>bing-fang kung ch'ih</b>	1 m <sup>2</sup>

### 1.4 Units of Capacity

Japanese-linked system (in p  h-  e-j-orthography)

��	��	��	Metric
<b>to</b>			18.039 100 L
10	<b>sh��</b>		1.803 910 L
100	10	<b>g��</b>	180.391 mL

Metric-linked system, with names rendered in English

							Metric
<b>kung ping</b>							1000 L
10	<b>kung tan</b>						100 L
100	10	<b>kung tou</b>					10 L
1000	100	10	<b>kung sheng</b>				1 L
10,000	1000	100	10	<b>kung ho</b>			100 mL
100,000	10,000	1000	100	10	<b>kung so</b>		10 mL
1,000,000	100,000	10,000	1000	100	10	<b>kung ts'o</b>	1 mL

### 1.5 Units of Weight

Before the Portuguese arrived, there was no kind of standardised unit of weight, and therefore, things were bought and sold by view rather than weight, according to [PSAL].

Dutch-linked system during the early eighteenth century

		Metric
<b>Dutch pound</b>		494 g
16	<b>ounce</b>	30.87 g

Chinese-linked system for fruit, spices and general use during the nineteenth century

					Metric	Metric	Metric
<b>ché</b>					120.980 kg	105.840 kg	151.220 kg
2	<b>picul</b>				60.49 kg	52.92 kg	75.61 kg
200	100	<b>catty</b>			604.90 g	529.20 g	756.10 g
3200	1600	16	<b>liang</b>		37.806 g	33.075 g	47.256 g
76,800	38,400	384	24	<b>shu</b>	1.575 g	1.378 g	1.969 g

Other measures reported during the nineteenth century:

1 old **catty** or **tai** (for rice) = 596.8 g;

1 **shih catty** (for rice) = 500 g.

Japanese-linked system (in péh-ōe-j-orthography and by traditional English name)

						Metric
<b>tà<sup>n</sup></b> or <b>picul</b>						60 kg
100	<b>kin, kun, or chin</b>					600 g
1600	16	<b>niú</b> or <b>liang</b>				37.5 g
16,000	160	10	<b>chi<sup>n</sup></b> or <b>mace</b>			3 75 g
160,000	1600	100	10	<b>hun</b> or <b>candareen</b>		375 mg
1,600,000	16,000	1000	100	10	<b>bûn</b> or <b>cash</b>	37.5 mg

Metric-linked upper scale, with names rendered in English

					Metric
<b>kung tun</b>					1000 kg
10	<b>kung tan</b>				100 kg
100	10	<b>kung heng</b>			10 kg
1000	100	10	<b>kung chin</b>		1 kg
10,000	1000	100	10	<b>kung liang</b>	100 g

Metric-linked lower scale, with names rendered in English

					Metric
<b>kung liang</b>					100 g
10	<b>kung ch'ien</b> or <b>kung tsien</b>				10 g
100	10	<b>kung k'o</b> or <b>kung fen</b>			1 g
1000	100	10	<b>kung chu</b> or <b>kung lec</b>		100 mg
10,000	1000	100	10	<b>kung hao</b>	10 mg
100,000	10,000	1000	100	10	<b>kung szu</b> 1 mg

## 2 Tajikistan [Formerly: Tajik Soviet Socialist Republic]

See also *Bukhara*.

The Tajiks were ruled by the Uzbek khanate of Bukhara from the 1400s to the mid-1700s, at which time the Afghans conquered those Tajiks living south of the Amu Darya. Russia took over much of Tajikistan in the 1860s. Tajikistan was part of the Turkestan Soviet Socialist Republic within the Russian SFSR, when the Soviet Union was founded in 1923. Tajikistan was created as the Tajik Autonomous SSR within the Uzbekistan SSR in 1924, and became a separate Soviet Socialist Republic within the Soviet Union in 1929. Tajikistan declared its independence from the USSR in 1991.

*Main source:* [TROT]

### 2.1 Currency

2001–:	1	Tajikistani	somoni	=	100 dirams
1995–2000:	1	Tajikistani	ruble	=	100 tenge or tangas
–1995:	1	Russian/Soviet	ruble	=	100 kopeks

### 2.2 Units of Weight

In Western Turkestan during the mid-nineteenth century

				Metric
<b>charik</b>				73.5–81.6 kg
4	<b>nimcha</b>			18.4–20.4 kg
16	4	<b>sang</b>		4.6–5.1 kg
80	20	5	<b>miskal</b>	0.9–1.02 kg

Bukharan scale during the late nineteenth century

		Metric
(small) <b>batmān</b>		19.656 kg
64	<b>bisch-ar</b>	307.13 g

Bukharan scale during the late nineteenth century

				Metric
(heavy) <b>batmān</b>				131.104 kg
8	<b>seer</b>			16.388 kg
32	4	<b>nimcha</b>		4.097 kg
3424	428	107	<b>miskal</b>	38.29 g

Other reported measures:

1 **shuturwār** = in concept, equal to a camel load  
= 16 pud = ~255.6 kg;

1 **khavvār** = in concept, equal to a donkey load  
= ~86 kg.

## 3 Tanganyika

See also *Tanzania* and *Zanzibar*.

Germany obtained a lease over the coastal part of Tanganyika from the Sultan of Zanzibar in 1888. Tanganyika became the German protectorate of German East Africa in 1891. The British occupied Tanganyika in 1916, and received a League of Nations mandate over the territory in 1922. Tanganyika became a United Nations Trust territory in 1946, and gained its independence in 1961.

*Main sources:* [FARA], [KUNI2], [SACL], [SUND] and [WISS]

### 3.1 Currency

1921–1966:	1	East African	shilling	=	100 cents
1920–1921:	1	British East African	florin	=	2 shillings or 100 cents
1918–1920:	1	British East African	rupee	=	100 cents
1904–1918:	1	German East African	rupie	=	100 heller
1890–1904:	1	German East African	rupie	=	16 anna = 64 pesa

### 3.2 Units of Length

			Metric
<b>pima</b>			~1.8 m
4	<b>mkono<sup>a</sup></b>		~460 mm
8	2	<b>shibiri nne<sup>b</sup></b> or <b>dhíraa moja</b>	~230 mm

<sup>a</sup>For cloth: **mkono mkamili** or **mkono mkonde**

<sup>b</sup>The span from the tip of the thumb to the tip of the little finger

Imperial scale:

1 **wari** or **yadi** = 1 yard = 0.914 4 m.

Other measures reported during the nineteenth century:

1 **doti** (at Tabora) = an arm's length;

1 **doti** (among the Jiji people) = 2 m;

1 **doti** (in the Tanganyika plateau) = 1.8 m.

### 3.3 Units of Capacity

Traditional system, based on [SACL] and [FARA]

									Metric <sup>b</sup>
<b>kikanda</b>									130.56 kg
	<b>gunia<sup>a</sup></b>								74.84 kg
3		<b>jazila, kapu, or mzigo</b>							43.52 kg
6	13¾	2	<b>ngoma</b>						21.76 kg
24	18 1/3	8	4	<b>kimbogo</b>					5.44 kg
32	27½	10 2/3	5 1/3	1 1/3	<b>kata</b>				4.08 kg
48	55	16	8	5	1½	<b>pishi</b>			2.72 kg
96	110	32	16	10	3	2	<b>kisaga</b>		1.36 kg
192	13¾	64	32	20	6	4	2	<b>kibaba</b>	0.68 kg

<sup>a</sup>According to [FARA], also called **kikanda**

<sup>b</sup>These are the values for rice, based on [SACL]. No exact correspondence is possible, as the measures were not weighed, but estimated

German-linked system

								Metric
<b>scheffel</b>								177.224 L
8	<b>simri</b>							22.153 L
32	4	<b>viertel</b>						5.538 L
64	8	2	<b>achtel</b>					2.769 L
128	16	4	2	<b>mässlein</b>				1.385 L
256	32	8	4	2	<b>ecklein</b>			692.3 mL
1024	128	32	16	8	4	<b>viertlein</b>		173.1 mL

British Imperial and metric values

							Imperial	Metric
<b>debe<sup>a</sup></b> or <b>madebe</b>							18.184 L	–
4	<b>galoni</b>						4.546 L	–
8	2	<b>nipishi or pishi<sup>b</sup></b>					2.273 L	4 L
16	4	2	<b>kisaga</b>				1.136 L	2 L
32	8	4	2	<b>kibaba<sup>c</sup></b>			1 pt = 568.261 mL	1 L
64	16	8	4	2	<b>nusu kibaba</b>		284.131 mL	500 mL
128	32	16	8	4	2	<b>robo kibaba</b>	142.065 mL	250 mL

<sup>a</sup>Usually for lubrication oil, gasoline and petroleum

<sup>b</sup>In southern Tanganyika, also reported, by [KUNI2], as about 5 L. The name **nipishi** was used when weighing barley

<sup>c</sup>For *pl.* = vibaba. Also called 1 **painti** when equal to 1 pint

For palm kernels

			Metric
<b>dzisia</b>			192 L
4	<b>farra</b>		48 L
60	15	<b>pischa</b>	3.2 L

### 3.4 Units of Weight

Traditional system along the coast of Zanguebar

				Metric
<b>bahaar</b>				199.328 kg
15	<b>frehsil</b>			13.288 5 kg
150	10	<b>maund</b>		1.328 8 kg
1500	100	10	<b>wakeia</b>	132.88 g

German scale for maize and dry commodities during the late nineteenth century

			Pfund	Metric
<b>munia</b>			200	100 kg
3 1/3	<b>mzigo or mizigo</b>		60	30 kg
5 5/9	1 2/3	<b>frasla moja</b>	36	18 kg

British Imperial scale

				Imperial	Metric
<b>gisla<sup>a</sup></b>				360 lbs	163.3 kg
10	<b>frasila, fraala, frazila, frasla, or farsalah</b>			36 lbs	16.33 kg
60	6	<b>pishi</b>		6 lbs	2.721 kg
360	36	6	<b>ratili or ratli</b>	1 lb	453.592 g

<sup>a</sup>Sometimes reported as 285 lbs = 129.3 kg. For salt = 600 lbs = 272.1 kg

Other measures reported during the mid-nineteenth–twentieth centuries:

1 **mani** or **manni** = 31 lbs = 14.061 kg;  
1 **kilo moja** = 1 kg.

## 4 Tangiers

See also *Morocco*.

This city was the capital of the province of Mauretania Tingitana in the Roman Empire. The

city was captured and held by the Vandals, the Byzantines and the Arabs, before it fell into the hands of the Portuguese in 1471. When the Portuguese Infant Catherine of Braganza married Charles II of England in 1662, the city came under British rule. Britain gave up the city to the Moors in 1684. The Franco-Spanish Treaty of Madrid of 1912, which decided the Spanish protectorate in its northern Moroccan extent, excluded the city of Tangiers. From 1923 to 1956, Tangiers was an international zone, and was administered by France, Spain, Britain and Italy. Tangiers became part of Morocco in 1960.

On July 1, 1663, Teviot, the Governor of Tangiers, proclaimed that the weights, measures and coinage should be the same as those used in London. Since the early twentieth century, the metric system has been reported to be in use.

*Main sources:* [HMSO2] and [ROUT]

### 4.1 Units of Length

Traditional system during the early nineteenth century

		Metric
<b>kama</b>		1.27 m
2½	<b>dia, dra, or dhra</b>	508.0 mm

Other reported measures:

1 **kala** = ~560 mm.

### 4.2 Units of Liquid Capacity

For beer

			Metric
<b>saâ or saah</b>			59.72 L
4	<b>kula, kaila, kolla, or kûlah</b>		14.93 L
40	10	<b>mudd</b>	1.493 L

### 4.3 Units of Weight

Some reported measures:

1 **almond** (for cereals) = about 34 kg;  
1 **almond** (for corn) = about 29 kg.

## 5 Tannu Tuva

Tuva was part of Outer Mongolia of the Chinese Empire, when it fell under Russian rule in 1914. Tannu Tuva declared its independence in 1921 and became the Tuvinian People's Republic in 1926, but only Mongolia and the Soviet Union formally affirmed that independence. It was incorporated into the USSR in 1944.

*Main source:* [OSS]

### 5.1 Currency

1934–1944: 1 Tuvan akşa = 100 köpejek

1922–1934: 1 Soviet ruble = 100 kopeks

Other reported measures during the late twentieth century:

1 **kosovo** (for onions) = 12 debes (as reported in 1984) or 8 debes (as reported in 1995);

1 **debe** (for onions) = about 20 L.

## 6.3 Units of Liquid Capacity

Volume capacity for various types of paint

Type of paint	Metric
Coral paint	3.940 L
Goldstar	3.925 L
Robbilac	3.710 L
Sadolin (tin can)	3.635 L
Sadolin (plastic container)	3.590 L

## 6 Tanzania [Formerly: United Republic of Tanganyika and Zanzibar]

See also *Tanganyika* and *Zanzibar*.

The United Republic of Tanganyika and Zanzibar was established in 1964, and the United Republic of Tanzania in 1964.

The metric system has been official since 1967, and compulsory since 1969.

*Main sources:* [ECIA], [ECON] and [EUR2]

### 6.1 Currency

1966–: 1 Tanzanian shilingi = 100 senti

Other reported measures during the late twentieth century:

1 **debe** (a plastic container for cooking oil) = about 20 L.

## 6.4 Units of Weight

Some measures reported during the late twentieth century:

1 **lumbesa** (a bag that varies in size depending on the commodity stored in it) = 6 or 7 debes;

1 **kosovo** = as much as about 170 kg, for onions = 120 kg (in the Iringa market) and 160 kg (in the Kariakoo market);

For beans, peas, rice, millet, maize and sunflower, according to the 1984 amendments

						Metric
<b>pishi</b> or <b>sado</b>						4 L
4	<b>kibaba</b>					1 L
8	2	<b>nusu kibaba</b>				500 mL
16	4	2	<b>robo kibaba</b>			250 mL
40	10	5	2½	<b>koroboi</b>		100 mL
80	20	10	5	2	<b>nusu koroboi</b>	50 mL

1 **tenga** (a woven reed basket for tomatoes, pears and other perishables) = about 50–65 kg;

1 **frazila** = 35 lbs = 15.875 kg;

1 **wakiah** = 280 g.

## 7 Taprobane

See *Sri Lanka*.

## 8 Tasmania [Formerly: Van Diemen's Land]

See *Australia*.

This island was originally part of the British colony of New South Wales, but became a separate colony in 1825. In 1856, the name was changed to the island colony of Tasmania to pay tribute to Abel Tasman, who was the first European to sight the island, in 1642.

## 9 Tatarstan

See also *Khazar Khagnate* and *Volga-Kama Bulgaria*.

The earliest known state within the boundaries of present-day Tatarstan was the

Volga-Kama Bulgar State (c.700–1238). In 1238, the Mongols conquered the area and established control until the 1430s, when the region, then known as the Tatar Khanate, became independent as the base of the Khanate of Kazan. In 1552, Russia conquered Tatarstan. The Tatar Autonomous Soviet Socialist Republic was established in 1920.

A traditional system for weights and measures, based on the Russian system, was used before metrification.

### 9.1 Currency

1654–1718: 1 altyn = 6 dengas

### 9.2 Units of Length

Some traditional measures:

1 **atnıñ könlek yulı** (in concept, the distance a horse travels in 1 day) = about 40–50 km;

1 **atnı tuqtawsız yurıyu** (in concept, the distance a horse travels without stops) = about 15–25 km.

Traditional upper scale

					Metric
<b>cäyäwleneñ aylıq yulı<sup>a</sup></b>					1120.14 km
30	<b>cäyäwleneñ könlek yulı<sup>b</sup></b>				37,338 m
150	5	<b>mil</b>			7467.6 m
175	5 5/6	1 1/6	<b>färsäx</b>		6,400.8 m
1050	35	7	6	<b>çaqırım</b>	1066.8 m

<sup>a</sup>In concept, equal to a month of riding

<sup>b</sup>In concept, equal to a day of riding

Traditional lower scale

							Metric
çaqırım							1066.8 m
500	sajın						2.133 6 m
1500	3	arşın					711.2 mm
3500	7	2 1/3	fut				304.8 mm
6000	12	4	1 5/7	cirek			177.8 mm
24,000	48	16	6 6/7	4	qarış		44.45 mm
42,000	84	28	3¼	7	1¾	dúym	25.4 mm

9.3 Units of Area

Traditional system

						Metric
çaqırım <sup>2</sup>						1,138,062.2 m <sup>2</sup>
104 1/6	disätinä					10,925.4 m <sup>2</sup>
208 1/3	2	çirek				5462.7 m <sup>2</sup>
625	6	3	cärib			1820.9 m <sup>2</sup>
250,000	2400	1200	400	sajın <sup>2</sup>		4.552 2 m <sup>2</sup>
2,250,000	21,600	10,800	3600	9	arşın <sup>2</sup>	50.580 5 dm <sup>2</sup>

9.4 Units of Capacity

Traditional system

			Metric
çirek			209.904 L
8	çirektän sigez		26.238 L
64	8	garnets	3.279 75 L

Other reported measures:

1 çiläk = 12.299 L.

Metric-linked system during the early twentieth century

			Metric
batman			64 L
2	poçıq		32 L
4	2	podawqa <sup>a</sup>	16 L

<sup>a</sup>Defined as the volume of 16 kg of pure water

9.5 Units of Weight

Traditional system

							Metric
berkovets							163.805 kg
4	qantar						40.951 kg
10	2½	pot					16.380 5 kg
400	100	40	qadaq				409.512 g
12,800	3200	1280	32	lot			12.797 7 g
38,400	9600	3840	96	3	misqal		4.265 7 g
3,686,400	921,600	368,640	9216	288	96	öleş	44.434 mg

Metric-linked system

			Metric
centner			100 kg
2	qantar		50 kg
200	100	qadaq	500 g

10 State of the Teutonic Order

See also *Danzig, Estonia, Germany, Latvia, Poland and Russia.*

This state was formed in 1224 during the Northern Crusades. In 1346, the Duchy of Estonia was bought from Denmark. The western part of Teutonic Prussia became Royal Prussia and part of Poland in 1466, and the eastern part became the Duchy of Prussia, a Polish fief, in 1525.

## 11 Tahiti

See *French Polynesia*.

## 12 Thailand [Formerly: Siam]

The kingdom of Ayutthaya was created in the 1350s. The Burmese ruled the kingdom from 1569 to 1574 and from 1767 to 1768. The Kingdom of Krung Thep was founded in 1782 when the capital was moved from Ayuthia to Bangkok. The area was then known as Siam. In 1909, Siam ceded its suzerain rights over the dependencies of Kedah, Kelatan, Perlis and Trengganu to Britain. In 1939, the country was renamed Thailand. From 1945 until 1948, the country was temporarily called Siam. Thailand was occupied by the Japanese during World War II.

The metric system has been legally optional since 1889 and compulsory since 1936 and December 1, 1947. Siam adopted metric-linked systems by a law passed on December 17, 1923. Previously, scales varied by district.

*Main sources:* [ALEX], [BLOC], [BOWR], [BROW], [FLÜG2], [KELL], [LALO], [UN55], and [UN66]

## 12.1 Currency

- c.1926–: 1 Thai baht = 100 satangs  
 1897– 1 tical or baht = 4 salueng or  
 c.1925: salung = 100 satangs  
 –1897: 1 tical or baht = 8 fuang = 64 ath

## 12.2 Units of Quantity

Cotton and other goods of the kind were commonly sold by the piece.

## 12.3 Units of Length

- 1 **sauk** = the distance from the tip of the extended middle finger to the elbow;  
 1 **keup** or **keub** = the distance between the tip of the thumb and the tip of the middle finger, with fingers extended as far apart as possible;  
 1 **niu** = the length of 8 grains of unhulled rice placed side by side.<sup>1</sup>

Currency scale used before 1897

hap											
80	chang										
1600	20	tamleung									
6400	80	4	baht								
12,800	160	8	2	mayon							
25,600	320	16	4	2	salueng						
51,200	640	32	8	4	2	feuang					
102,400	1280	64	16	8	4	2	sik				
204,800	2560	128	32	16	8	4	2	sio or py			
409,600	5120	256	64	32	16	8	4	2	ath		
819,200	10,240	512	128	64	32	16	8	4	2	solot	
1,638,400	20,480	12,800	6400	3200	1600	800	400	200	100	50	bia

<sup>1</sup> According to [MCFA, p. 460]. [BROW] reported it as husked rice.

## Three reported traditional upper scales

โยด			เส้น	ว		Metric	Metric	Metric
<b>yot, yote, jod, or jot</b>						15,844.48 m	15,375.70 m	15,372.8 m
4	<b>rōē neng</b>					3,961.120 m	3,843.925 m	3,843.2 m
100	25	<b>jod or tod</b>				158.445 m	153.757 m	153.728 m
400	100	4	<b>sen or neng</b>			39.611 20 m	38.439 m	38.432 m
8000	2000	80	20	<b>wah, wa, va, voua, vouā, or vouah</b>		1.980 56 m	1.921 9 m	1.921 6 m
16,000	4000	160	40	2	<b>ken</b>	990.28 mm	961.0 mm	960.8 m

## Three reported traditional lower scales

	ซอก	สิบ	นิ้ว	กระเบื้อง		Metric	Metric	Metric
<b>ken</b>						990.28 mm	961.0 mm	960.8 m
2	<b>sauk, sawk, sock, or sok</b>					495.14 mm	480.50 mm	480.4 mm
4	2	<b>keup, keub, or kab</b>				247.57 mm	240.25 mm	240.2 mm
48	24	12	<b>nieu, niew, niou, or niu</b>			20.631 mm	20.02 mm	20.02 mm
192	96	48	4	<b>krabiet</b>		5.158 mm	5.00 mm	5.00 mm
384	192	96	8	2	<b>amukabiet or anukabiet</b>	2.579 mm	2.503 mm	2.502 mm

## British Imperial-linked upper scale

โยชน				ว		Imperial	Metric
<b>yot, jod or yote</b>							16,256 m
4	<b>roe neng</b>						4064 m
100	25	<b>jod or tod</b>					162.56 m
400	100	4	<b>sen or neng</b>				40.64 m
8000	2000	80	20	<b>wah<sup>a</sup>, wa, or vouah</b>		80 in	2.032 m
16,000	4000	160	40	2	<b>ken<sup>b</sup></b>	40 in	1.016 m

<sup>a</sup>Siamese law specified the silver prototype bar, bearing two scratches with 1 wah between them, measured at 85 °F. In 1876, according to [BROW], this prototype was examined by the Standards Department of the British Board of Trade and the distance of 1 wah was determined to be 79.999 inches

<sup>b</sup>Used for measuring cloth

## British Imperial-linked lower scale

						Imperial	Metric
<b>ken</b>						40 in	1.016 m
2	<b>sauk, sawk or sok</b>					20 in	507.99 mm
4	2	<b>keup, keub or kab</b>				10 in	254.0 mm
48	24	12	<b>nieu, niew, niou or niu</b>				21.2 mm
192	96	48	4	<b>krabiet</b>			5.29 mm
384	192	96	8	2	<b>amukabiet or anukabiet</b>		2.646 mm

Decimally adjusted British Imperial-linked system

					Metric
<b>sauk, sawk, or sok</b>					508 mm
2	<b>kaup, keub, or kab</b>				254 mm
50	10	<b>nieu, niew, niou, or niu</b>			25.4 mm
200	50	5	<b>krabiet</b>		5.08 mm
400	100	8	2	<b>amukabiet or anukabiet</b>	2.54 mm

Metric-linked upper scale after 1923

						Metric
<b>yot, yote, jod, or jôt</b>						16,000 m
4	<b>roe neng</b>					4000 m
400	100	<b>sen or neng</b>				40 m
8000	2000	20	<b>wah, va, or vouah</b>			2 m
16,000	4000	40	2	<b>ken</b>		1 m
32,000	8000	80	4	2	<b>sauk, sawk, or sok</b>	500 mm

Metric-linked lower scale after 1923

ศอก	คืบ	นิ้ว				Metric
<b>sauk, sawk, or sok</b>						500 mm
2	<b>kaup, keub, keup, kab, or empan</b>					250 mm
25	12½	<b>nieu, niew, niou, or niu</b>				20 mm
100	50	4	<b>krabiet</b>			5 mm
200	100	8	2	<b>amukabiet or anukabiet</b>		2.5 mm

12.4 Units of Area

12.5 Units of Volume

Metric-linked system

ไร่	งาน	ตารางวา	Metric
<b>rai<sup>a</sup> or sen<sup>2</sup></b>			1600 m <sup>2</sup>
4	<b>ngan</b>		400 m <sup>2</sup>
400	100	<b>tarangwah, wa<sup>2</sup> or wah<sup>2</sup></b>	4 m <sup>2</sup>

<sup>a</sup>In Lahu: hay or lay

1 johk (for teak wood) = 398.77 dm<sup>3</sup>.

12.6 Units of Capacity

Traditional upper scale

					น้ำ	Metric
<b>koyan<sup>a</sup></b>						3034.56 L
1 3/5	<b>kien or kwien<sup>b</sup></b>					1896.60 L
2	1¼	<b>ban</b>				1517.28 L
8	5	4	<b>talaum</b>			379.32 L
80	50	40	10	<b>tang</b>		37.932 L
160	100	80	20	2	<b>săt</b>	18.966 L

<sup>a</sup>Also reported as 100 tang

<sup>b</sup>A wagon-load. Also reported, by [BROW], as 80 sat

## Traditional lower scale

ถัง		กะลามะพร้าว						Metric
<b>sat<sup>a</sup></b> (standard unit)								18.966 L
1 3/5	<b>sesti</b>							11.854 L
20	12½	<b>kanahn<sup>b</sup></b>						948.3 mL
40	25	2	<b>loang, leeng, or chang awn</b>					474.15 mL
64	40	3 1/5	1 3/5	<b>sat<sup>c</sup></b> (small unit)				295 mL
160	100	8	4	2½	<b>kham meu</b>			118.54 mL
640	400	32	16	10	4	<b>chai meu</b>		29.63 mL
2000	1250	100	50	31¼	12½	3 1/8	<b>nin</b>	9.48 mL

<sup>a</sup>Varying by location between 12.5 and 20.7 L<sup>b</sup>A coconut shell. Also romanized as **fanan**, **kanan**, **tanan**, **thanan**, and **thanan**. It varied by location between 0.9 and 1.4 L, [KRÜG, p. 133] reported the kanahn as 1.4 L, and [BROW] as equal to 80 sat<sup>c</sup>Reported by [ALEX, p. 139] in 1850

## Scale based on [FLÜG2, p. 271]

		Metric
<b>kanahn</b>		2.38 L
4	<b>loang, leeng, or chang awn</b>	595 mL

## Traditional and metric-linked system in Bangkok during the late nineteenth century, based on [MART3]

				Metric	Metric
<b>koyan</b>				1704 L	1000 L
80	<b>sat</b>			21.3 L	12.5 L
100	1¼	<b>tang</b>		17.04 L	10 L
2000	25	20	<b>canang</b>	852 mL	500 mL

## Metric-linked upper scale after 1923

						မူ	Metric
<b>cohi</b>							32,000 L
10	<b>kwien or koyan</b>						3200 L
20	2	<b>ban</b>					1600 L
40	4	2	<b>seste</b>				800 L
80	8	4	2	<b>tamlaum</b>			400 L
800	80	40	20	10	<b>tang</b>		40 L
1600	160	80	40	20	2	<b>săt</b>	20 L

## Metric-linked upper scale after 1936

						ถัง	Metric
<b>cohi</b>							20,000 L
10	<b>kwian or koyan</b>						2000 L
20	2	<b>ban</b>					1000 L
40	4	2	<b>seste</b>				500 L
80	8	4	2	<b>tamlaum</b>			250 L
800	80	40	20	10	<b>tang</b>		25 L
1000	200	50	25	20	2	<b>săt</b>	20 L

Metric-linked lower scale after 1923

มัท	ตัง	ทะนาน							Metric
<b>sat</b>									20 L
1¼	<b>thang</b>								10 L
20	16	<b>tañan, fanan, thanan, kanahm, or kanahn</b>							1 L
25	20	1¼	<b>kanang</b>						800 mL
40	32	2	1 3/5	<b>laang or chang awn</b>					500 mL
160	128	8	6 2/5	4	<b>kam meu</b>				125 mL
640	512	32	25 3/5	16	4	<b>chai meu</b>			31.25 mL
2000	1600	100	80	50	12½	3 1/8	<b>niou</b>		10 mL

12.7 Units of Weight

During the late nineteenth century, based on [MART3]

									Metric
<b>coyan</b>									1,511.979 50 kg
–	<b>coyan</b>								1,360.778 35 kg
–	–	<b>coyan</b>							1,088.622 36 kg
25	22½	18	<b>hap</b>						60.479 02 kg
1250	1125	900	50	<b>xang</b>					1.209 58 kg
2500	2250	1800	100	2	<b>catty</b>				604.790 2 g
25,000	22,500	18,000	1000	20	10	<b>tamlung</b>			60.479 02 g
100,000	90,000	72,000	4000	80	40	4	<b>bat or tical</b>		15.119 75 g

Avoirdupois weights, based on [BOWR]

									Metric
<b>kab</b>									72 kg
50	<b>xang</b>								1.44 kg
10	5	<b>cati</b>							720 g
400	200	40	<b>bat</b>						18 g
1600	800	160	4	<b>salung</b>					4.5 g
3200	1600	320	8	2	<b>fuang</b>				2.25 g
16,000	8000	1600	40	10	5	<b>hùn</b>			450 mg

British Imperial-linked system for heavy goods, based on [KELL]

				Imperial	Metric
<b>pecul</b>				129 lbs	58.513 kg
50	<b>catty</b>			–	1.170 kg
1000	20	<b>tale</b>		–	58.51 g
80,000	1600	80	<b>tical</b>	–	731 mg

British Imperial-linked system for corn, based on [KELL]

				Imperial	Metric
<b>cohi</b>				258 lbs	117.027 kg
40	<b>seste</b>				2.926 kg
1600	40	<b>sat</b>			73.14 g
160,000	4000	100	<b>catty</b>		731.4 mg

Some other measures reported during the fifteenth–nineteenth centuries:

1 **coyan** or **koyan** (for salt) = 25 piculs = 1516.7 kg;

1 **kwian** (for white rice) = 23 piculs = 1395.4 kg;

1 **coyan** or **koyan** (for cargo rice) = 22 piculs = 1334.7 kg;

1 **coyan** or **koyan** (for general use) = 20 piculs = 1213.36 kg;

1 **coyan** or **koyan** (for paddy or rough rice) = 16 6/10 hap (reported by [BLOC, p. 61] as 128 lbs) = ~2,133 1/3 lbs = ~967.66 kg,

but according to the legal value (1 hap = 133¾ lbs), it was equal to ~1007.09 kg;

1 **tchang** (old) = 600 to 1300 g;

1 ball money or **tical**<sup>2</sup> (during the fifteenth–eighteenth century in Ayutthaya Kingdom) = 12.5–15.7 g.

Traditional upper scale during the late nineteenth century, and metric-linked upper scale after 1923

	หาบ		ซึ้ง	ต๋าลึง	บาท	สลึง	Metric	Metric	Metric
<b>p'ahrah</b> or <b>bhara</b> <sup>a</sup>							5859.2 kg	6047.9 kg	6000 kg
100	<b>hap, hab, or picul</b>						58.592 kg	60.479 kg	60 kg
250	2½	<b>doon</b>					23.437 kg	24.192 kg	24 kg
5000	50	20	<b>chang</b>				1.172 kg	1.209 58 kg	1.2 kg
100,000	1000	400	20	<b>tamlung</b> or <b>tael</b>			58.592 g	60.479 g	60 g
400,000	4000	1600	80	4	<b>baht, tical, or kyat</b>		14.648 g	15.120 g	15 g
1,600,000	16,000	6400	320	16	4	<b>salung, miam, or mayon</b>	3.662 g	3.778 g	3.75 g

<sup>a</sup>Also reported as 8 hap

Traditional lower scale during the late nineteenth century, and metric-linked upper scale after 1923

	เฟื้อง						Metric	Metric	Metric
<b>salung, miam, or mayon</b>							3.662 g	3.778 g	3.75 g
2	<b>fuang</b> or <b>fonang</b>						1.831 g	1.890 g	1.875 g
4	2	<b>sompay, grani, seek, or sompi</b>					915.5 mg	945.0 mg	937.5 mg
8	4	2	<b>pai, phai, pic, or paye</b>				457.7 mg	472.5 mg	468.7 mg
10	5	2½	1¼	<b>hun</b> or <b>hoon</b>			366.2 mg	—	—
16	8	4	2	1 3/5	<b>att</b> or <b>klam</b>		228.9 mg	236.2 mg	234.4 mg
32	16	8	4	3 1/5	2	<b>solot</b> or <b>klom</b>	114.4 mg	118.1 mg	117.2 mg
50	25	12½	6¼	5	3 1/8	1.562 5 <b>lee</b>	73.24 mg	75.58 mg	75.01 mg

<sup>2</sup> According to Bernhard Peter in “Opiumgewichte aus Birma” at [www.kultur-in-asien.de](http://www.kultur-in-asien.de).

In the Sulu Archipelago during the early nineteenth century

						Imperial	Metric
<b>koyan</b>						5,333 1/3 lbs	2,419.159 kg
13 1/3	<b>bahar</b>					400 lbs	181.437 kg
40	3	<b>pikul</b>				133 1/3 lbs	60.479 kg
53 1/3	4	1 1/3	<b>quintal</b>			100 lbs	45.359 kg
4000	300	100	75	<b>kati</b>		1 1/3 lbs	604.79 g
64,000	4800	1600	1200	16	<b>tahel or tahil</b>	1 1/3 oz	37.80 g

Traditional system in present-day Phuket

				Metric
<b>bahar</b>				220.12 kg
8	<b>capin</b>			27.515 kg
80	10	<b>vis</b>		2.751 5 kg
320	40	4	<b>poof</b>	687.875 g

Scale used by rice millers during the nineteenth century

			Metric
<b>kwian<sup>a</sup></b>			1488 kg
24	<b>pikul</b>		62 kg
82	3 5/12	basket	18.146 kg

<sup>a</sup>For white rice = 23 pikul = 1391 kg

For rice during the early twentieth century

			Metric
<b>cavan</b>			44 kg
25	<b>gantang</b>		3.1 kg
100	4	<b>kati</b>	775 g

For gold and silver in Bangkok during the late nineteenth century, based on [MART3]

							Metric
<b>bat or tical</b>							15.293 g
4	<b>salung</b>						3.823 25 g
8	2	<b>fuang</b>					1.911 625 g
16	4	2	<b>songpai</b>				955.8 mg
32	8	4	2	<b>painung</b>			477.9 mg
40	10	5	2½	1¼	<b>hun</b>		382.3 mg
1024	256	128	64	32	25 3/5	<b>saga</b>	14.9 mg

## 13 Texas

See also *United States of America*.

Texas was under Spanish rule beginning in 1682, and was made part of the Province of Coahuila and Texas in 1691. The two provinces were separated in 1726. After Mexico gained its independence, Texas once again became part of the Mexican state of Coahuila and Texas. The Republic of Texas was declared in 1836. Texas became a state within the United States in 1846.

*Main source:* [SAYL2]

### 13.1 Currency

1839–1850: 1 Texas dollar

13.2 Units of Length

Spanish-linked system

				Metric
<b>braza</b>				1.693 m
2	<b>vara</b>			846.5 mm
8	4	<b>palma</b>		211.6 mm
32	16	4	<b>quarta</b>	52.9 mm

13.3 Units of Area

For land grants to emigrants, based on [SAYL2, p. 400]

Date of arrival	Head of family	Single
Before March 2, 1836	1 league <sup>a</sup> and 1 labor	1/3 league
Before August 1, 1836, if the person served a tour of duty in the army and was honourably discharged from the service as lieutenant colonel	1 league and 1 labor	1/3 league
July 31, 1836 to July 31, 1837	1280 acres	640 acres
August 1, 1837 to December 31, 1841	640 acres	320 acres

<sup>a</sup>1 league = 4428.402 acres = about 17,921,107.06 m<sup>2</sup>

returned in 1912. In 1913, the Dalai Lama proclaimed Tibet to be an independent state. The region maintained its autonomy until 1951, when, following a military conflict, Tibet was incorporated into the People’s Republic of China. Today, western and central Tibet is governed by China as the Tibet Autonomous Region, while eastern areas are mostly parts of the Sichuan and Qinghai provinces.

Units of measurement were traditionally not standardized throughout Tibet. The local magistrate (*Zongpon*) used to stamp all weights and measures, but once stamped, they were never re-examined again. Larger weights and measures were used while buying, and shorter ones were used during selling. The units below are named according to the Wylie transliteration (see [WYLI]) or as the units are generally pronounced.

*Main sources:* [BELL3], [BELL4], [BOBE], [BRAU2], [CARR3], [CASS2], [DARG], [DAS2], [HUI], [JÄSC], [KAWA], [KHAC], [KORÖ], [MACD], [MAJU], [MCKA], [PETR9], [RAMS], [RIBB], [ROER], [SCHU], [SUBR2], [SURK], [TANZ], [TOUR], [WADD] and [WINN]

14 Tibet

The Tibetan Empire was united during the rule of Songtsän Gampo (604–650). After the assassination of King Langdarma in 842, Tibet became divided between several regional warlords with no centralized authority. In 1261, Tibet was once again reunited, now with the Grand Lama of Sakya as king. Tibet was invaded by Dzungar Mongols during 1717, and in 1721, the Qing emperor declared Tibet a tributary state. In 1905, a revolt broke out and spread through southwestern Szechuan and northwestern Yunnan. Zhao Erfeng (1845–1911), the last amban in Tibet, was appointed to subdue this rebellion and entered Lhasa in 1910 with 2000 troops. The Dalai Lama fled to India, but

14.1 Currency

- 1959–: 1 Tibetan sgor (སྒོར་) = 10 sgor-zur (སྒོར་བུར་) = 100 skar (སྐར་)
- 1909–1959: 1 Tibetan rdo tscad = 50 srang = 333 1/3 tran ka = 500 sho or zho = 5000 kar ma
- 1912–1941: 1 Tibetan thangka (silver soin) = 1½ sho or zho = 15 skar
- 1900–1959: 1 Tibetan sertang (gold coin) = 20 sang gor = 133 1/3 trangkas (silver coins)
- c.1640–1900: 1 Tibetan trangka = 1½ sho or zho = 15 skar
- c.1640: cowries and stone beads

Coins

do-tshe <sup>a</sup>								
50	ngü-sang <sup>a</sup>							
100	2	sho-nga <sup>a</sup>						
333 1/3	6 2/3	3 1/3	trang-ka <sup>a</sup>					
400	8	4	1 1/5	kha-chha <sup>b</sup>				
500	10	5	1½	1¼	sho-ǰang <sup>b</sup>			
666 2/3	13 1/3	6 2/3	2	1 2/3	1 1/3	chhe-gye <sup>b</sup>		
1000	20	10	3	2½	2	1½	kar-ma-nga <sup>b</sup>	
2000	40	20	6	5	4	3	2	kha <sup>b</sup>

<sup>a</sup>Silver coins

<sup>b</sup>Copper coins

14.2 Units of Length

Upper scale, based on Abhidharmakosha (written by Vasubandhu, a monk of the Sarvastivada during the fourth or fifth century)

					Metric
dhag tchad					~8 km
8	‘dom rgyang grags				~1 km
4000	500	‘dom gang			~2 m
16,000	2000	4	khru gang		~500 mm
384,000	48,000	96	24	rang sor	~20.83 mm

Middle scale, based on Abhidharmakosha (written by Vasubandhu, a monk of the Sarvastivada during the fourth or fifth century)

							Metric
rang sor							~20.83 mm
7	zheng bcas						~2.976 mm
49	7	sor mo					~425.10 µm
343	49	7	shig nas				~60.729 µm
2401	343	49	7	sro ma			~8.675 µm
16,807	2401	343	49	7	nyi zer gyi rdul		~1.239 µm
117,649	16,807	2401	343	49	7	glang gi rdul	~0.177 µm

Lower scale, based on Abhidharmakosha (written by Vasubandhu, a monk of the Sarvastivada during the fourth or fifth century)

							Metric
glang gi rdul							~0.177 µm
7	lug rdul						~0.025 3 µm
49	7	ri bong gi rdul					~0.003 6 µm
343	49	7	chu rdul				~0.000 516 µm
2401	343	49	7	lcags rdul			~0.000 073 7 µm
16,807	2401	343	49	7	rdul phran		~0.000 001 05 µm
117,649	16,807	2401	343	49	7	rdul phra rab	~0.000 000 15 µm

Upper scale, based on Kalacakra-tantra (chief text of the Tantric Buddhism since the tenth century)

						Metric
<b>dphag tshad</b>						~16 km
4	<b>rgyang grags</b>					~4 km
8000	2000	<b>'dom or dompa<sup>a</sup></b>				~2 m
32,000	8000	4	<b>khru or kru<sup>b</sup></b>			~500 mm
768,000	192,000	96	24	<b>sor mo</b>		~21 mm
6,144,000	1,536,000	768	192	8	<b>sor mo rnam</b>	~2.6 mm

<sup>a</sup>“The distance from the tip of the middle finger to that of the other, with both arms outstretched”

<sup>b</sup>“The distance from the elbow to the tip of the middle finger”

Lower scale, based on Kalacakra-tantra (chief text of the Tantric Buddhism since the tenth century)

						Metric
<b>sor mo rnam</b>						~2.6 mm
8	<b>shig nas</b>					~0.32 mm
64	8	<b>she tshe</b>				~4.07 μm
512	64	8	<b>skra rtse</b>			~0.512 μm
4096	512	64	8	<b>rdut phra mo</b>		~0.064 μm
32,768	4096	512	64	8	<b>rdut phra rab</b>	~0.008 μm

Old scale for longer distances, based on Majapuria and Trilok Chandra

					Metric
<b>tshasa</b>					~128 km
2 2/3	<b>gyatshu</b>				~48 km
5 1/3	2	<b>satshig</b>			~24 km
40	15	7½	<b>gyantra</b>		~3.2 km
80	30	15	2	<b>pagtshe</b>	~1.6 km

Upper scale during the nineteenth century

ལ་ཚྭ་	ཚ་འཛིན་ or ཚ་ས་					ཁྲི	Metric
<b>sa-tshi<sup>a</sup></b>							29,120 m
2	<b>tsha-pho, tsha-sa, or dpag tshad<sup>b</sup></b>						14,560 m
8	4	<b>rgyang grags<sup>c</sup></b>					3640 m
7,111 1/9	3,555 5/9	888 8/9	<b>dkyus su</b>				4,095 m
16,000	8000	2000	2¼	<b>gzhu<sup>d</sup></b>			1.82 m
21,333 1/3	10,666 2/3	2,666 2/3	3	1 1/3	<b>dpangs su</b>		1.365 m
64,000	32,000	8000	9	4	3	<b>thru or (bskum) khru<sup>e</sup></b>	455 mm

<sup>a</sup>“A full day’s march in easy country.” Was reported to vary between 24 km and 32 km

<sup>b</sup>“A 3 h walk in easy country.” Was reported to vary between 11 km and 16 km

<sup>c</sup>“The distance a voice carries.” Also called **ke ko-sa-tsa** (ཀེ་ཀོ་ས་ཐ་ས་)

<sup>d</sup>“Arc length.” Also called a **dom** = “the distance from the tip of the middle finger to that of the other with both arms outstretched”

<sup>e</sup>“The distance from the elbow to the tip of the middle finger”

Middle scale during the nineteenth century

	མཐོ་				མེར་		Metric
(bskum) khru							455 mm
2	tho or mtho gang <sup>a</sup>						227.5 mm
4	2	mbzub gang <sup>b</sup>					113.75 mm
4 4/5	2 2/5	1 1/5	mchid gang				94.80 mm
6	3	1½	1¼	chag			75.83 mm
24	12	6	5	4	sor or sor mo <sup>c</sup>		18.96 mm
192	96	48	40	32	8	nas <sup>d</sup>	2.369 mm

<sup>a</sup>“The distance from the tip of the thumb to the tip of the middle finger”

<sup>b</sup>“The distance between the tip of the thumb to the tip of the forefinger”

<sup>c</sup>“Breadth of a finger at its thickest point”

<sup>d</sup>“A barley grain”

Lower scale during the nineteenth century

						Metric
nas						2.369 mm
8	shig <sup>a</sup>					296 µm
64	8	ske tshe <sup>b</sup>				36.9 µm
512	64	8	skra yi rtse mo <sup>c</sup>			4.61 µm
4096	512	64	8	phra mo <sup>d</sup>		0.576 µm
32,768	4096	512	64	8	phra rab rdul <sup>e</sup>	0.072 µm

<sup>a</sup>“Louse”

<sup>b</sup>“Mustard seed”

<sup>c</sup>“Hair tip”

<sup>d</sup>“Fine dust”

<sup>e</sup>“Very fine dust”

Other measures reported before the late nineteenth century:

A traditional unit of length was the distance one could travel with a cup of scalding hot tea before it had cooled to a drinkable temperature. This rather non-specific measure of length was measured during a Mount Everest expedition in 1921. They found that it corresponded to about 5 English miles.

1 **mtho gzhäl ba** or **tho** = “the span of the hand with fingers extended” = about 225 mm;

1 **thal mo** or **mthil** = “the span of the palm and fingers”.

Cloth was measured in the unit of **kha**, which was a variable measure.

Metric system

				Metric
ki-lo-mi-tar				1000 m
1000	mi-tar			1 m
100,000	100	sin-ti-mi-tar		10 mm
1,000,000	1000	10	mi-li-mi-tar	1 mm

14.3 Units of Area

Land areas were traditionally described in terms of agriculturally-relevant quantities, such as the amount of seed needed to sow it, or the time taken to plough it. Since these measures were partly a matter of personal judgement and skill and partly dependent on the soil and other

characteristics of each site, they had no fixed relationship to each other or to the actual area of the field.

Some reported measures for land areas:

- 1 **khatre** (for cultivated land) = a piece of cultivated land upon which 60 tenzing kharus of cereal may be sown;
- 1 **khal, khe** or **mu** (for cultivated land) = a piece of cultivated land upon which 14 kg of barley or wheat may be sown;
- 1 **khal-chuk-sum** (for cultivated land) = a piece of land that took a day to plough.

14.4 Units of Dry Capacity

Dry commodities, such as cereal, salt and tea, were not weighed, but rather measured with measurement boxes, usually called ‘*Bo* or *bogs*’ *Bo*,

since the measuring of volume was quicker and less susceptible to cheating than the measurement of similar quantities by weight. Some measures, such as the **bre** and **‘bo-khal**, were measured with the grain heaped high at the top, but for some measures, the grain was scraped off level with a wooden straight-edge, called a *‘Bo-yuk*. According to [CASS2], a Bre of grain filled a man’s cupped hands, and approximated an American pint (see also [MCKA, p. 80] and [DAS2, p. 143]).

The sizes of these measures varied by location, e.g., [DARG] reported values from 550 mL to 5.5 L for the bre. There were also significant differences between varieties of seed, and even between good and poor crops of the same variety. Differences in filling or shaking also affected the weight. In the seventeenth century, the Tibetan government established a calibrated measurement box that set the standard khal at about 13.6 kg.

Traditional upper scale

<i>se-khal</i>							
1½	<b>khal-ri, khal-ru, ‘bo-khal, or bod-khal</b>						
1 4/5	1 1/5	<b>mo</b>					
9	6	5	<b>khal</b>				
30	20	16 2/3	3 1/3	<b>bre or zo-ba</b>			
180	120	100	20	6	<b>phul</b> (“handful”)		
21,600	14,400	12,000	2400	720	120	<b>nang gi rdog ma</b>	
2,592,000	1,728,000	1,440,000	288,000	86,400	14,400	120	<b>phyi ma’i rdog ma</b>

Traditional lower scale

<b>phyi ma’i rdog ma</b>			
120	<b>de’i phyi ma’i rdog ma</b>		
14,400	120	<b>yang phyi rdog ma</b>	
1,728,000	14,400	120	<b>mthil phyi rdog ma</b>

For barley, peas and barley flour, based on [BELL3]

བུ་ཐོན་ཁ་རུ་	བུ་ཐོན་ཁ་རུ་	ཐོན་ཁ་རུ་	ཐོན་ཁ་རུ་	Metric	Metric
<b>‘ten-dzin kha-ru</b>				~15 kg	~7.7 kg
1¼	<b>‘sang-bo</b>			~12 kg	~6.2 kg
16	12 4/5	<b>‘tre-chhe</b>		~0.94 kg	~0.48 kg
20	16	1¼	<b>kha-‘tre</b>	~0.75 kg	~0.38 kg

For dru-‘tang tea (འབྲུ་ཏང་; the best kind of tea) and gye-pa (རྒྱེ་པ་; the worst kind of tea) from China, based on [BELL3]

ལྷ་མོ་	ཁུ་ཏུ་	པ་ཀཤ	Metric	Metric
<b>gam</b>			32.64 kg	16.32 kg
3	<b>khu-‘tru</b> or <b>khatre</b>		10.88 kg	5.44 kg
12	4	<b>‘pa-ka</b> <sup>a</sup>	2.72 kg	1.36 kg

<sup>a</sup>A compressed packet (shaped like a brick) of tea leaves. The weight of each brick varied according to the type of tea

Other reported measures for dry commodities:

- 1 **‘Gag’Don** = the amount of butter, grain, meat, salt, wool, etc., or a fixed amount of money to be given to the government as tax;
- 1 **‘Don** (for seed) = 2 rKang (= the amount of seed needed to provide man and horse service for private and religious estates);
- 1 **rKang** (for seed) = 30 khal (in Central Tibet) and 50 khal (in Tsang).

14.5 Units of Liquid Capacity

Traditional system for wine and ale

		Metric
<b>khal-ban</b> or <b>bchal</b> <sup>a</sup>		~45.5 L
20	<b>bre</b> or <b>bo</b> <sup>b</sup>	~2.275 L

<sup>a</sup>A jug or pitcher that held wine or ale for 20 persons  
<sup>b</sup>A jug or pitcher that held wine or ale for one person; varied by location

Other reported measures:

1 **zowa** = about 3 L.

14.6 Units of Weight

For butter, meat, tea, wood<sup>a</sup>, etc.

ལྷ་མོ་			ཉ་ལ་	ཐོར་	Metric
<b>gyama, khe, khel, KHal, or khal</b> <sup>b</sup>					13.6 kg
2	<b>bo, bho, or kbo</b>				6.8 kg
5	2½	<b>rGya Ma</b>			2.72 kg
20	10	4	<b>nya-ka, nyang, NGag Ga, or bre</b>		680 g
80	40	16	4	<b>por or sPor</b>	170 g

<sup>a</sup>For weighing wood, wool and grass, a steelyard of about 1.2 m in length was used. [MAJU] reported it as about 18 kg  
<sup>b</sup>The weight that a sheep can carry; reported as about 13.6 kg (varied between 12 and 14 kg)

For rice, wheat and barley (in wooden containers), based on [MAJU]

			Metric
<b>tensing kharu</b>			36.32 kg
3	<b>bo, bho, or kbo</b>		12.11 kg
60	20	<b>de</b>	605 g

For other cereals, based on [MAJU]

			Metric
<b>tensing kharu</b>			7.71–12.2 kg
20	<b>khatre</b>		385.5–610 g
120	6	<b>phu</b>	64.25–102 g

For weighing gold, silver, precious stones and small valuable objects, the barley grain and small silver coins from India were used as base units.

System based on the weight of a barley grain for gold and silver, according to [REDW, p. 127]

							Metric
<b>rdo tsad</b> or <b>dotsé<sup>a</sup></b>							~1.8 kg
65	<b>sung</b> or <b>srang</b>						~28 g
650	10	<b>zho<sup>b</sup></b>					~2.8 g
9750	150	15	<b>gser tam</b>				~190 g
19,500	300	30	2	<b>se ba</b>			~95 g
39,000	600	60	4	2	<b>ma nu</b>		~47 g
78,000	1200	120	8	4	2	<b>nas<sup>c</sup></b>	~24 g

<sup>a</sup>Only used for silver in bar form

<sup>b</sup>The zho varied greatly both through time and by area of the country, between 19 se ba and 32 se ba

<sup>c</sup>The weight of a barley grain

Indian silver coin system for weighing gold in Lhasa during the seventeenth century, based on [KHAC]

				Metric
<b>sookam</b>				5.06 g
4	<b>kaka</b>			1.265 g
12	3	<b>kal</b>		421.7 mg
20	5	1 2/3	<b>sewa</b>	253.0 mg

For gold, silver, corals and pearls, based on [BELL3]

<b>ser-sang<sup>a</sup></b>							
2	<b>sho-nga</b>						
6 2/3	3 1/3	<b>trang-ka</b>					
8	4	1 1/5	<b>kha-chha</b>				
10	5	1½	1¼	<b>sho-kang</b>			
13 1/3	6 2/3	2	1 2/3	1 1/3	<b>chhe-gye</b>		
20	10	3	2½	2	1½	<b>kar-ma-nga</b>	
40	20	6	5	4	3	2	<b>kha</b>

<sup>a</sup>When used for silver = **ngü-sang**, and when used for weighing corals and pearls = **sang**

Some other reported measures:

1 **drey** (for gold) = about 13 kg.

## 14.7 Units of Time

				Metric
<b>nyin zhag</b>				1 day
60	<b>chu tshod</b>			1 h
3600	60	<b>chu srang</b>		1 min
21,600	360	6	<b>dbugs</b>	4 s

## 15 Timor Leste

See *East Timor*.

## 16 Togo [Formerly: French Togoland]

See also *Togoland*.

This French colony named French Togoland became an independent state in 1960.

The metric system has been compulsory since 1924.

### 16.1 Currency

1945–: 1 West African CFA franc = 100 centimes

1916–1945: 1 French franc = 100 centimes

1914–1916: 1 West African pound = 20 shillings = 240 pence

## 16.2 Units of Length

Non-metric measures reported:

1 **mille** (for maritime use) = 1852 m.

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## 17 Togoland

See also *Ghana* and *Togo*.

A German protectorate in West Africa from 1884 to 1914, encompassing present-day Togo and most of what is now the Volta Region District in Ghana. The Germans' ultimate boundaries were delimited by treaties with France in 1897 and Britain in 1904. Anglo-French forces occupied the area in 1914, subsequently becoming a League of Nations mandate and a UN trusteeship divided between Britain and France. The British portion was incorporated with Ghana in 1957, and the French portion became the independent Republic of Togo in 1960.

The British weights and measures were standard from the late nineteenth century, and the metric system has been compulsory since 1924.

*Main sources:* [ALIN], [FROE], [GAYI], [MARG], [TECH] and [UNFR]

### 17.1 Currency

1914–1957: 1 West African pound = 20 shillings = 240 pence

1884–1914: 1 German gold Mark = 100 Pfennig

### 17.2 Units of Length

Some reported measures:

1 **mile** = 1,609.344 m;

1 **coudée** = the length of a bent arm measured from the elbow to the tip of the fingers.

### 17.3 Units of Capacity

Traditionally, the calabash served as a unit of capacity.

Some reported measures:

1 **estagnon** (for coconut and palm oil) = 20 L;

1 **kerosene tin** = about 9 L;

1 **cigarette tin** = about 300 mL.

### 17.4 Units of Weight

Some reported measures:

1 **barrique** = the maximum load a marching soldier was able to carry = about 70 kg;

1 **fagota** (for timber) = 30 kg;

1 **fagota** = the load a man was able to carry = about 25–30 kg;

1 **estagnon** = 15 kg (for paddy), 17 kg (for palm oil at Kpalimé, present-day Palimé), 18 kg (for sorghum) and 20 kg (for shelled peanuts);

1 **livre** = 0.45 kg.

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## 18 Tokelau [Formerly: Union Islands and Tokelau Islands]

This group of islands was annexed by Britain in 1889, and added to the Gilbert and Ellice Islands colony in 1916. In 1926, the islands were brought under the jurisdiction of Western Samoa, and in 1948, declared a part of New Zealand.

The British Imperial system was used well into the early twentieth century.

18.1 Currency

1978–: 1 Tokelauan tālā  
1967–1978: 1 New Zealand dollar = 100 cents  
1840–1967: 1 New Zealand pound = 20 shillings = 240 pence

19 Tonga [Formerly: Friendly Islands]

Dutch navigators Willem Schouten and Jacob Lemaire visited these islands in 1616. Captain James Cook visited them in 1773 and named them the Friendly Islands. The Kingdom of Tonga was established in 1875. The islands became a British protectorate in 1900 and gained their independence in 1970.

The metric system has been compulsory since 1975.

19.1 Currency

1967–: 1 Tongan pa‘anga = 100 seniti  
1 hau (seldom used) = 100 pa‘anga  
1962: 1 Tongan koula = 16 pounds  
1936–1967: 1 Tongan pound = 20 shillings = 240 pence  
c.1880–1936: 1 pound Sterling = 20 shillings = 240 pence

20 Tonkin

See also *Annam Protectorate*, *Cambodia*, *Cochinchina*, *French Indochina*, *Laos*, *Paracel Islands*, and *Vietnam*.

France divided Vietnam into three different administrative territories, Tonkin (protectorate in the north), Annam (protectorate in the center), and Cochinchina (colony in the south).

20.1 Currency

–1660s: 1 dong or caixa (Chinese, from Macao)  
–1639: 1 dong or caixa (Japanese)  
–mid-seventeenth century: 1 dong or caixa (Portuguese; of copper)

20.2 Units of Weight

Traditional system

			Metric
<b>picul</b>			59.870 kg
100	<b>catty</b>		598.70 kg
1,565 35/153	15 499/765	<b>taël</b>	38.25 g

21 Totonac Culture

See also *Mexico*.

The Totonac people resided in Mexico at the time of the Spanish arrival during the early sixteenth century, and are often reported as the possible builders of the pre-Columbian city of El Taín.

*Main source:* [TRUE]

21.1 Units of Length

Traditional system

		Metric
<b>garrocha</b>		~2.4 m
12	<b>cuarta</b>	~0.20 m

During the mid-nineteenth century

		Metric
<b>garrocha</b>		~2.0 m
10	<b>cuarta</b>	~0.20 m

## 21.2 Units of Area

- 1 **destajo** (traditional system) =  $50 \times 50$  garrochas = about 1.5 ha;  
 1 **destajo** (during the mid-nineteenth century) = about 1 ha.

## 21.3 Units of Dry Capacity

- 1 **mancuerna** = a parcel containing two cakes of brown sugar.

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## 22 Toucouleur Empire or Segu Tukolor Empire

See also *Bamana Empire*, *French West Africa*, and *Wassoulou Empire*.

This empire was established by the Toucouleur conqueror El Hadj Umar Tall (c.1797–1864) in 1848. In 1890, the French took control of the area, and later incorporated it as a part of the federation of French West Africa.

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## 23 Tranquebar (Present-day Tharangambadi) or Danish India

See also *India*.

This area was a Danish colony, called Danish India or Tranquebar, that was a factory site and seaport operated by the Danish Asiatic Company from 1620 to 1845, when it was sold to the British East India Company.

### 23.1 Currency

- 1816–1845: 1 speciesdaler =  $2\frac{1}{4}$  rupees = 18 royaliner, fanams, or fanos = 1440 kas

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## 24 Transjordan

See *Jordan*.

## 25 Transkei

See *South Africa*.

The Republic of Transkei was a Bantustan in southeastern South Africa between 1976 and 1994. It was never internationally recognized as a state.

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## 26 Transnistria

See also *Moldavia*.

Transnistria became an autonomous political entity in 1924 with the proclamation of the Moldavian ASSR. Transnistrian separatists have been fighting for an autonomous Transnistria since 1990, but they still lack international recognition.

### 26.1 Currency

- 1994–: 1 Transnistrian ruble = 100 kopecks

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## 27 Transpadane Republic

See also *Cisalpine Republic*, *Cispadine Republic*, *Italian Republic* and *Italy*.

A short-lived state, formed in 1796, when Napoleon occupied the Duchy of Milan. In 1797, the area became part of the Cisalpine Republic.

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## 28 Transylvania

See also *Romania*.

Transylvania was once the nucleus of the Kingdom of Dacia (82 BCE–106 CE). From 106 until 271, the area was part of the Roman Empire. After this, the area was under the control of the Carpi, Visigoths, Huns, Gepids, Avars and Bulgars. Between 1003 and 1526, Transylvania

was a voivodship of the Kingdom of Hungary. After the Battle of Mohács in 1526, Transylvania became part of the Eastern Hungarian Kingdom. In 1571, the area became the Principality of Transylvania. The Habsburgs acquired the territory shortly after the Battle of Vienna in 1683. In 1867, the region became a part of the newly established Austro-Hungarian Empire. Following defeat in World War I, Transylvania became part of Romania. In 1940, Hungary regained almost half of Transylvania, with the aid of Germany and Italy. The territory, however, reverted to Romania in 1945.

On November 1, 1854, the weights and measures used in Vienna became compulsory.

## 28.1 Currency

–1747: 1 poltura = 1½ kreuzer = 2 geschl = 6 pfennige

## 28.2 Units of Length

1 stânjen = 1.896 48 m;

1 Elle = 623.37 mm.

In Cluj-Napoca before 1854

				Metric
<b>Meile</b>				9482.421 m
5000	<b>Klafter</b>			1.896 484 m
15,000	3	<b>Elle</b>		632.161 mm
30,000	6	2	<b>Fuss</b>	316.081 mm

## 28.3 Units of Area

1 iugăr = in concept, the area ploughed in 1 day by two oxen = 7166 m<sup>2</sup> (as reported in 1517).

For vineyards

				Metric
<b>iugăr</b>				2877.309 m <sup>2</sup>
2	<b>ciblä</b>			1438.654 m <sup>2</sup>
3 1/3	1 2/3	<b>Achtel</b>		863.193 m <sup>2</sup>
800	400	240	<b>stânjen pătrat</b>	3.596 64 m <sup>2</sup>

## 28.4 Units of Dry Capacity

In Cluj-Napoca before 1854

					Metric
<b>Mirze</b>					185.050 L
2	<b>Kübel</b>				92.525 L
8	4	<b>Viertel</b>			23.131 L
16	8	2	<b>Ur</b>		11.566 L
128	64	16	8	<b>Maass</b>	1.446 L

In northern and southern Transylvania

					Metric	Metric
<b>Mirze</b>					185.114 L	196.782 L
2	<b>Kübel or romp</b>				92.557 L	98.391 L
8	4	<b>Viertel</b>			23.139 L	24.598 L
16	8	2	<b>Ur</b>		11.570 L	12.299 L
128	64	16	8	<b>Maass</b>	1.446 L	1.537 L

In Sibiu

			Metric
<b>Kübel</b>			108.595 2 L
4	<b>Viertel</b>		27.148 8 L
16	4	<b>Achtel</b>	6.787 2 L

Metric-linked for cereal

			Metric
<b>găleată</b>			80 L
4	<b>ferdelă</b>		20 L
64	16	<b>cofe</b>	1.25 L

28.5 Units of Liquid Capacity

Traditional system in Sibiu and Cluj-Napoca before 1854

				Metric	Metric	Metric
Eimer or Ur				12.328 L	11.569 6 L	11.565 625 L
8	Maass			1.541 L	1.446 2 L	1.445 703 L
16	2	Halbe		770.5 mL	723.10 mL	722.852 mL
32	4	2	Seitel	385.25 mL	361.55 mL	361.426 mL

There were three sizes of barrel for wine:  
Before 1823: 1 **kis hordó** = 218 L, 1 **közepes hordó** = 436 L and 1 **nagy hordó** = 872.1 L;  
After 1823: 1 **kis hordó** = 56.6 L, 1 **közepes hordó** = 113.2 L and 1 **nagy hordó** = 452.8 L.

				Metric
găleată				89.941 L
4	merță			22.485 L
6	1½	tină		14.990 L
26½	6 5/8	4 5/12	pintă	3.394 L

28.6 Units of Weight

During the sixteenth century

				Metric
kanthner <sup>a</sup>				76.4 kg
4	ffýrtayl <sup>b</sup>			19.11 kg
120	30	talentum <sup>c</sup>		636.95 g
3600–4800	900–1200	30–40	loto <sup>d</sup>	21.2 g– 15.9 g

<sup>a</sup>For alum, cotton, olive oil, raisans, rice and spices  
<sup>b</sup>For cloves (as reported in 1540) and pepper (as reported in 1543)  
<sup>c</sup>For alum, cotton, cotton threads, dried fruit, rice and spices  
<sup>d</sup>For spices and sugar

For silk during the sixteenth century

		Metric
litter or lidra		320 g
16	loto	20 g

Before 1690

		Metric
majă		56.09 kg
144	funt	389.5 g

After 1690

		Metric
majă		~56 kg
127 3/11	funt	~440 g

In Transylvania, as reported in 1714

				Metric
kantár				55.44 kg
44	oka			1.26 kg
176	4	litra		315 g
17,600	400	100	drám	3.15 g

For mercantile, used after 1721

						Metric
<b>Centner or majă</b>						56.128 8 kg
5644 4/9	<b>okka</b>					1.262 9 kg
100	2¼	<b>Pfund or funt</b>				561.288 g
200	4½	2	<b>Mark</b>			280.644 g
3200	72	32	16	<b>Loth</b>		17.540 g
12,800	288	128	64	4	<b>Quentchen</b>	4.385 g

In Cluj-Napoca before 1854

										Metric
<b>Erzkübel</b>										168.400 800 kg
3	<b>Centner</b>									56.133 600 kg
12	4	<b>Stein</b>								14.033 400 kg
300	100	25	<b>Pfund</b>							561.336 g
600	200	50	2	<b>Mark</b>						280.668 g
9600	3200	800	32	16	<b>Loth</b>					17.542 g
38,400	12,800	3200	128	64	4	<b>Quentchen</b>				4.385 g
153,600	51,200	12,800	512	256	16	4	<b>Pfennig</b>			1.096 g
307,200	102,400	25,600	1024	512	32	8	2	<b>Heller</b>		548.2 mg
39,321,600	13,107,200	3,276,800	131,072	65,536	4096	1024	256	128	<b>Richtpennig</b>	4.3 mg

Other reported measures:

1 **majă** (for wax before 1867) = 127.2 kg;1 **majă** (for wax after 1867) = sometimes referred to as 100 kg;1 **găleată** (for cereal) = 64 kg;1 **másza** = 56.64 kg;1 **merță** (for cereal) = 16 kg;1 **Istanbul okka** = 1.283 kg;1 **okka** = 2¼ Wiener Pfund = 1.260 141 7 kg;1 **nehezig, pizete, or piset** (for wash gold) = 1/50 silver mark = 5.207 262 g.

For gold and silver

						Metric
<b>Mark</b>						280.644 g
16	<b>Loth</b>					17.540 g
64	4	<b>Quentin</b>				4.385 g
256	16	4	<b>Pfennige</b>			1.096 3 g
512	32	8	2	<b>Heller</b>		548.13 mg
65,536	4096	1024	256	128	<b>Richtpfennig</b>	4.28 mg

For medical use

					Metric
<b>Pfund</b>					420.009 g
12	<b>Unze</b>				35.000 75 g
96	8	<b>Drachme</b>			4.375 09 g
288	24	3	<b>Skrupel</b>		1.458 36 g
5760	480	60	20	<b>Gran</b>	72.92 mg

## 29 Empire of Trebizond (c.1204–c.1461)

Trebizond was founded in 1204 as a result of the capture of Constantinople by the Fourth Crusade, and fell to the Ottoman Empire in 1461.

### 29.1 Currency

c.1204–c.1461: 1 Kirmaneoul

## 30 Trengganu

This area emerged as an independent sultanate in 1724, and became a British dependency in 1909. A British advisor was appointed to the sultan in 1919, and Terengganu become one of the Unfederated Malay States. During late 1941, Japan occupied Terengganu. During the Japanese occupation, Terengganu again came, along with Kedah, Kelantan, and Perlis, under control of Siam. After the defeat of Japan in 1945, these Malay states reverted to British rule. Terengganu became a member of the Federation of Malaya in 1948, and a state of independent Malaya in 1957.

### 30.1 Currency

1909–1939: 1 Straits dollar = 100 cents

–1909:

1 kûpang = 5 jôkoh = 120 kêping or or pîtis

1 amas = 4 kûpang = 16 kĕnĕri = 48 kêping  
bharu = 480 kêping or pîtis

1 jembir = 2 keneri = 4 tada besar = 8 lada  
kecil = 40 kêping or pîtis

1 ringgit tua = 8/7 ringgit mûda = 2 amas =  
8 kûpang = 32 kĕnĕri = 480 kêping or pîtis

## 31 Trinidad and Tobago

Trinidad was claimed for Spain by Christopher Columbus in 1498. It was under French rule from 1781 to 1793, but ceded to Britain by the Treaty of Amiens in 1802. Tobago became Dutch in 1632, French in 1677, British in 1763, French again in 1783, and finally a British colony in 1814. Trinidad and Tobago were united in 1899, and were part of the Federation of the West Indies from 1958 to 1962. Trinidad and Tobago achieved independence as a Dominion in 1962.

The metric system has been official since 1970 and compulsory since 1971.

### 31.1 Currency

1964–: 1 Trinidad and Tobago dollar =  
100 cents

1951–1964: 1 British East Caribbean dollar =  
100 cents

1935–1951: 1 Trinidad and Tobago dollar =  
100 cents

1905–1935: 1 Trinidad and Tobago dollar =  
20 shillings = 240 pence

1814–1905: 1 pound sterling = 20 shillings =  
240 pence

–1814: 1 Tobago dollar = 11 bits =  
99 pence (at Tobago)

1811–1814: 1 Trinidad dollar = 9 shillings =  
108 pence (at Trinidad)

–1811: 1 Trinidad dollar = 8 shillings =  
96 pence (at Trinidad)

### 31.2 Units of Length

1 **quarée** (used for surveying) = 15,506.1 m.

### 31.3 Units of Weight

1 **fanega** (for cocoa beans) = 110 lbs = 49.9 kg.

32 Tripolitania

See *Libya*.

33 Tristan da Cunha [Formerly:  
The Islands of Refreshment]

See also *Saint Helena* and *Dependencies*

These islands were first sighted by Portuguese explorer Tristão da Cunha in 1506. Unsuccessful attempts to colonize the islands were made by the Dutch in 1656. The first permanent inhabitant, Jonathan Lambert, settled there in 1810 and named the islands the Islands of Refreshment. The islands were formally annexed to Britain in 1816 and became a dependency of St. Helena in 1938.

34 Tromelin Island

This island was discovered by a French navigator in 1722. In 1954, the island became a French Territory. It is claimed by Mauritius and Seychelles.

35 Trucial Oman

See *United Arab Emirates*.

36 Truk

See *Micronesia*.

37 Tunisia

This area was goverened, in turn, by the Phoenicians (twelfth–seventh centuries BCE), Carthagians (seventh century BCE–146 BCE),

Romans (146 BCE–439), Vandals (439–534), The Byzantine Empire (534–698), Arabs (698–1574) and Turks (1574–1881). Tunisia became a French protectorate by treaty in 1881, and gained its independence in 1956.

The metric system has been compulsory since 1895.

*Main sources:* [CARD], [CHIA], [LEGE], [MART3], [PERR2], [TECH], [UN66], and [WAGN2]

37.1 Currency

1958–: 1 Tunisian dinar = 1000 millimes

1891–1960: 1 Tunisian franc = 100 centimes

–1891

Tunisian rial or piaster				
16	kharub, carrouba, or caroba			
52	3¼	nasri or asper		
104	6½	2	burben, bourbon, or fals	
1248	78	24	12	qafsi or burbia

Gold coin: 1 mahbub or sultanin = 4½ piasters.

## 37.2 Units of Length

Old system and system reported during the late nineteenth century

التونسي ميل	مل من البحر	الصحراء ميل	ذراع أي المالكية	ذراع	Metric	Metric
<b>Tunisian mile</b>					2,838.282 000 m	2,929.800 000 m
1 23/37	<b>Tunisian sea mile</b>				–	1,806.710 000 m
2	1 7/30	<b>Sahara mile</b>			1,419.141 000 m	1,464.900 000 m
1,621 23/37	1000	810 30/37	<b>Maleki draâ</b>		1,750 275 m	1,806 710 m
6000	3700	3000	3 7/10	<b>Arabian draâ</b>	473.047 mm	488.300 mm

Hanbali and Shafi'i system

		Metric
<b>Hanbali mile or Shafi'i mile</b>		3,710.040 000 m
6000	<b>Hanbali draâ or Shafi'i draâ</b>	618.340 mm

Mālik system

		Metric
<b>Mālik mile</b>		1855 m
3500	<b>Mālik draâ</b>	530 mm

Other measures reported during the nineteenth–twentieth centuries:

- 1 **bâa** = 1.92 m;
- 1 **coudée** = varying between 484 mm and 667 mm;
- 1 **Turkish draâ** or **Turkish pik** (Turkish measure for silk) = 645.000 mm or 637.000 mm;
- 1 **Andalusian pik** (Turkish measure for wool) = 649.000 mm or 667.000 mm;
- 1 **draâ endaseh** or **pik endaseh** (Turkish measure for wool) = 672.800 mm;
- 1 **draâ obi** (for canvas) = 484 mm;
- 1 **habba shair** = 2.730 mm.

For linen

	ذراع	Metric
<b>habel eddiouane</b> <sup>a</sup>		24.415 or 24.663 74 m
50	<b>Arabian draâ or Arabian pik</b>	488.300 mm or 493.274 77 mm

<sup>a</sup>In Bizerte and in Zlass, also called 1 **habel el Kiss**

## 37.3 Units of Dry Capacity

Traditional system for cereal

				Metric
<b>cafisso</b> <sup>a</sup> , <b>kafis</b> , <b>kfiz</b> , or <b>cafiso</b>				496 L
7 3/4	<b>millerole</b>			64 L
16	2 2/31	<b>whiba</b> , <b>ueba</b> , <b>ouibe</b> , <b>weba</b> , <b>quiba</b> , or <b>wiba</b>		31 L
192	24 24/31	12	<b>saah</b> , <b>saâ</b> , <b>saw</b> , <b>soos</b> , or <b>zah</b>	2.583 L

<sup>a</sup>During the early fifteenth century, it was reported as  $\frac{6}{14}$  Venetian staio by [CHIA]. This is traditionally reported as about 520.7 L

British Imperial-linked system for cereal, and metric-linked system used after 1882

			Imperial	Metric	Metric
<b>cafisso, kafis, kfiz, or cafiso</b>			16 bu	581.9 L	600 L
16	<b>whiba, ueba, ouibe, weba, quiba, or wiba</b>		1 bu	36.369 L	37.50 L
192	12	<b>saah, sâ, saw, soss, or zah</b>	2/3 bu	3.031 L	3.125 L

British Imperial-linked system for corn at Tunis

			Imperial	Metric
<b>caffise</b>			15 bu	528.4 L
16	<b>whibas or webas</b>			33.025 L
192	12	<b>saw, saha, or zah</b>		2.752 L

Metric-linked system for grain before 1882

			Metric
<b>cafis</b>			533 L
16	<b>weeba</b>		33.312 L
192	12	<b>saa or measure</b>	2.776 L

## 37.4 Units of Liquid Capacity

For wine at Tunis

				Metric
<b>millerole</b>				63.437 L
4	<b>escaneau</b>			15.859 L
60	15	<b>pot</b>		1.057 3 L
240	60	4	<b>pichouna</b>	264.32 mL

For beer at Susa and beer and wine at Tunis

			Metric	Metric	Metric
<b>mettar</b>			25.2 L	20.16 L	40.32 L
2	<b>kolleh</b>		12.6 L	10.08 L	20.16 L
16	8	<b>saâ or saah</b>	1.575 L	1.26 L	2.52 L

Metric-linked system for oil at Susa, according to [PERR2]

				Metric
<b>metal</b>				24 L
2	<b>kolla</b>			12 L
16	8	<b>saâ or saah</b>		1.5 L
64	32	4	<b>rebuia</b>	375 mL

The content of the mettar varied considerably from one territory to another. It was reported that:

100 mettar of oil in Tunis or Porto Farina, made:

91 mettars of Biserta, 83 1/3 mettars of Monastier, 77 mettars of Medina, 72¾ mettars of Sfax, 71 1/3 of Suliman, and 30 mettars of Suse.

## 37.5 Units of Weight

Traditional system, based on [CARD] and [TECH]

								Metric
<b>cantaro khaddari<sup>a</sup></b>								62.990 kg
1 1/9	<b>cantaro sucki<sup>b</sup></b>							56.691 kg
1¼	1 1/8	<b>cantaro attari</b>						50.392 kg
100	90	80	<b>rottolo khaddari<sup>a</sup></b>					629.900 g
111 1/9	100	88 8/9	1 1/9	<b>rottolo sucki<sup>b</sup></b>				566.910 g
125	112½	100	1¼	1 1/8	<b>rottolo attari</b>			503.920 g
1,166 2/3	1050	93 1/3	11 6/9	10 1/5	9 1/3	<b>rottell attari</b>		53.995 g
2000	1800	1600	20	18	16		<b>uckir</b>	31.495 g

<sup>a</sup>For vegetables

<sup>b</sup>For oil and some other articles

Traditional mercantile scale, according to [WAGN2]

						Metric
<b>cantar</b>						50.688, 55.757 or 76.032 kg
100, 110 or 150	<b>rotl attari</b>					506.88 g
1600, 1760 or 2400	16	<b>uckia attari<sup>a</sup></b>				31.68 g
16,000, 17,600 or 24,000	160	10	<b>derhem</b>			3.168 g
256,000, 281,600 or 384,000	2560	160	16	<b>kharub</b>		198 mg

<sup>a</sup>Also used for gold, silver and gemstones

For general use

		Metric
<b>rotl soucky</b>		568.445 g
18	<b>oukia</b>	31.58 g

For general use, as stated by decree in 1895

							Metric
<b>cantar</b>							50.37 kg
16	<b>cantaro</b>						3.148 kg
100	6¼	<b>rtal</b>					503.793 g
1600	100	16	<b>oukia, uckir or uzan</b>				31.481 g
10,666 2/3	666 2/3	106 2/3	6 2/3	<b>mesqal or metical</b>			4.722 g
12,800	800	128	8	1 1/5	<b>derham, then, or termini</b>		3.935 g
256,000	16,000	2560	160	24	20	<b>nouayo, nouia, or tessoudj</b>	196.8 mg

Other reported measures:

1 **caffis** (for olives) = about 430–450 kg  
(according to [TECH, p. 325])

For vegetables

		Metric
<b>rotl khaddari</b>		639.453 g
20	<b>oukia</b>	31.973 g

For apothecaries, spices and metals

		Metric
<b>rottolo attari or rottel attari</b>		506.88 g
16	<b>oukia attari</b>	31.68 g

For oil, butter, honey, olives, flour, wood, charcoal and dried fruit

		Metric
<b>rottolo sucki or rottel souky</b>		566.91 g
18	<b>oukia sucki or oukia souky</b>	31.495 g

For vegetables

		Metric
<b>rottolo khaddari or rottel kaddari</b>		639.453 g
20	<b>oukia khaddari or oukia kaddari</b>	31.973 g

For groceries, according to [PERR2]

			Metric
<b>goutar aateri</b>			45.359 kg
100	<b>artat aateri</b>		453.59 g
1600	16	<b>ounce</b>	28.35 g

For oil, vegetables and fruit for the table, according to [PERR2]

			Metric
<b>goutar soukhi</b>			51.029 kg
100	<b>artat soukhi</b>		510.29 g
1800	18	<b>ounce</b>	28.35 g

For all vegetables and coarse articles sold by the quantity, according to [PERR2]

			Metric
<b>goutar kadari</b>			56.699 kg
100	<b>artat kadari</b>		566.99 g
2000	20	<b>ounce</b>	28.35 g

For gold, silver and pearls

		Metric
<b>oukia</b>		31.479 g
8	<b>metical</b>	3.935 g

Scale used for vegetables at Gabés

		Metric
<b>rotolo</b>		1.007 6 kg
32	<b>oukia</b>	31.49 g

Scale used by butchers at Gabés

		Metric
<b>rotolo</b>		754.9 g
24	<b>oukia</b>	31.45 g

Scale used for vegetables at Nabeul

		Metric
<b>rtol bakali or bach kahli</b>		535 g
17	<b>oukia</b>	31.5 g

Scale used by butchers of Tozeur

		Metric
<b>rotolo</b>		1.332 4 kg
42	<b>oukia</b>	31.7 g

Other local values during the mid-nineteenth–twentieth centuries:

1 **rtal** (for cloth) = 750 g (at Ksour Essaf), 700 g (at Bizerete and Dar Chabane), 570 g (at Mokine), 540 g (at Msake), and 400 g (at Djerba and Zarzis);

1 **rtal** (for silver bracelets at Redeyef) = 625 g.

## 38 Turkestan

Turkestan was a region in Central Asia that is now subdivided into Afghan Turkestan, Russian Turkestan and the Xinjiang Uyghur Autonomous Region.

*Main sources:* [MART3], [MATS] and [PURI]

### 38.1 Currency

1 **tilla** = 14 **abassi** = 28 **tianie** = 1120 **pulli**

Other coinage denominations: **kampo**, **ghare**, **mamaka**, **masa**, **muli**, **sadera-stater**, and **trasya**.

In ancient times, productive animals like cows, sheep, horses and camels were used in trade transactions or in tax.

### 38.2 Units of Length

Height was traditionally measured in **dithi**, a unit of unknown size today.

In Bochara

			Metric
<b>car</b>			3.200 371 m
3	<b>hazeh</b>		1.066 79 m
4½	1½	<b>hasch, altschin, or archine</b>	711.19 mm

In the principality of Chiva

		Metric
<b>culatch</b>		2.133 581 m
3	<b>archine</b>	711.194 mm

### 38.3 Units of Area

1 **batman** (in Xinjiang) = the area that could be sown with one batman (in mass) of seed.

[PURI, p. 250] refers to a record that prescribes 30 khi of seed in a plot of land for sowing purposes.

The **kuthala** and **misi** units were also used in land transactions.

### 38.4 Units of Dry Capacity

Usually, different dry commodities were sold by weight.

Scale based on [PURI, pp. 249–250]

		Metric
<b>milima</b>		
20	<b>khi</b>	

### 38.5 Units of Liquid Capacity

[PURI, p. 250] mentions **casaga**, **prasta** (equated with the Sanskrit **prastha**), **sparṇa** (for suki wine; smaller than 1 khi) and **vacari**, all of unknown size. Usually, liquids were sold by weight.

Uyghur scale, based on [MATS]

			Metric
<b>qap</b>			~8.4 L
10	<b>saba</b>		~840 mL
30	3	<b>tämbin</b>	~280 mL

## 38.6 Units of Weight

In Bochara

							Metric
<b>batmann</b>							127.767 606 kg
2	<b>nemman</b>						63.883 803 kg
8	4	<b>ser, sir, or sihr</b>					15.970 950 kg
16	8	2	<b>du</b>				7.985 475 kg
64	32	8	4	<b>tschiaric, tscharik, or tscharik</b>			1.996 369 kg
256	128	32	16	4	<b>nemetsce, mimitscha, or nimtschia</b>		499.092 21 g
27,392	13,696	3424	1712	428	107	<b>miscal</b>	4.664 413 g

In the principality of Chiva

								Metric
A camel load <sup>a</sup>								314.504 880 kg
16	<b>durt-un-ser</b>							19.656 555 kg
64	4	<b>un-ser</b>						4.914 138 75 kg
128	8	2	<b>kirk-ar</b>					2.457 069 37 kg
512	32	8	4	<b>un-ar</b>				614.267 34 g
640	40	10	5	1¼	<b>ser</b>			491.413 87 g
5120	320	80	40	10	8	<b>ar</b>		61.426 73 g
73,728	4608	1152	576	144	115 1/5	14 2/5	<b>solotnik<sup>b</sup></b>	4.265 74 g

<sup>a</sup>[PURI, p. 250] refers to a record that prescribes the load to be carried by a camel as 3 milima

<sup>b</sup>Usually used for tea and silk

Other reported measures:

1 **batmann** = in general, between 125 and 128 kg, but there was also a **batmann** reported as 19.65 kg.

1 **batmann** (in Kokand) = 10½ pud = 171.994 855 kg.

The metric system has been used since 1869. On March 26, 1931, by Act No. 1782, metric units became compulsory and the traditional units were banned from use starting on January 1, 1933.<sup>3</sup>

## 39.1 Currency

## 39 Turkey

See also *Ottoman Empire*.

A new Turkish government ruled in Anatolia between 1920 and 1922 under Mustafa Kemal, while the Ottoman ruler maintained a small territory around Constantinople. After the collapse of the Ottoman Empire in 1922, the Turkish state was founded by the Treaty of Lausanne, and became a republic in 1923.

2005–: 1 new Turkish lira = 100 kuruş  
 1926–2005: 1 Turkish kuruş or piastre = 40 para = 120 akçe  
 1923–1926: 1 Turkish gold lira = 100 kuruş or piastres

<sup>3</sup>*Türkiye'nin 75 Yılı 1923–1998 Gün Gün Cumhuriyet Tarihi*. Istanbul: Tempo, 1998, p. 53.

## 39.2 Units of Length

Upper metric-linked system after 1931

			Metric
<b>fersah-ı a'şâri</b>			10,000 m
10	<b>mil-ı a'şâri</b>		1000 m
10,000	1000	<b>zirâ-ı a'şâri</b>	1 m

Lower metric-linked system after 1931

				Metric
<b>zirâ-ı a'şâri</b>				1 m
10	<b>öşr-i zirâ'</b>			100 mm
100	10	<b>aşîr-i zirâ'</b>		10 mm
1000	100	10	<b>mi'şâr-i zirâ'</b>	1 mm

Metric scale after 1933

<b>kilometre</b>							
10	<b>hektometre</b>						
100	10	<b>dekametre</b>					
1000	100	10	<b>metre</b>				
10,000	1000	100	10	<b>desimetre</b>			
100,000	10,000	1000	100	10	<b>santimetre</b>		
1,000,000	100,000	10,000	1000	100	10	<b>milimetre</b>	
10,000,000,000	100,000,000	10,000,000	1,000,000	100,000	10,000	1000	<b>mikrometre</b>

## 39.3 Units of Area

Upper scale before 1923

					Metric
<b>cerip, girib, or djerib</b>					2,067.011 667 m <sup>2</sup>
2¼	<b>atik dönüm</b> (40 × 40 arşın)				918.671 852 m <sup>2</sup>
9	4	<b>atik evlek</b>			229.667 963 m <sup>2</sup>
3600	1600	400	<b>mimar arsini murabbâi, kare zirai or kare arşın</b>		574.169 91 m <sup>2</sup>
14,400	6400	1600	4	<b>kare ayak</b>	14.354 25 dm <sup>2</sup>

Value according to Haack, Hermann. *Geographisches Jahrbuch, Band 1*. Geographisch-Kartographische Anstalt Gotha, Gotha: Justus Perthes, 1866, p. XXVII

Lower scale before 1923

					Metric
<b>kare ayak</b>					14.354 25 dm <sup>2</sup>
6	<b>sag parmak</b>				2.392 4 dm <sup>2</sup>
144	24	<b>çürük parmak</b>			9.968 cm <sup>2</sup>
20,736	3456	144	<b>kare hat</b>		6.922 mm <sup>2</sup>
2,985,984	497,664	20,736	144	<b>kare nokta</b>	0.048 mm <sup>2</sup>

Other measures in use during the early twentieth century:

1 **kare çarşı arşın** = 46.24 dm<sup>2</sup>;

1 **kare endaze** = 42.25 dm<sup>2</sup>;

1 **kare urup** = 66.015 cm<sup>2</sup>;

1 **kare kirah** = 18.062 cm<sup>2</sup> or 16.504 cm<sup>2</sup>.

Metric-linked system used during the Republican period

						Metric
<b>girib</b> or <b>djerib</b>						2250 m <sup>2</sup>
2¼	<b>dönüm</b>					1000 m <sup>2</sup>
9	4	<b>evlek</b>				250 m <sup>2</sup>
22½	10	2½	<b>murabbâi-a chary</b>			100 m <sup>2</sup>
225	100	25	10	<b>nishan</b>		10 m <sup>2</sup>
2250	1000	250	100	10	<b>çubuk</b>	1 m <sup>2</sup>

Metric-linked system after 1929

						Metric
<b>cerib</b>						10,000 m <sup>2</sup>
10	<b>dönüm</b>					1000 m <sup>2</sup>
100	10	<b>kare</b>				100 m <sup>2</sup>
1000	100	10	<b>nishan</b>			10 m <sup>2</sup>
10,000	1000	100	10	<b>çubuk</b>		1 m <sup>2</sup>

Metric system after 1933

						Metric
<b>ar</b>						100 m <sup>2</sup>
100	<b>metrekare</b>					1 m <sup>2</sup>
10,000	100	<b>desimetrekaré</b>				1 dm <sup>2</sup>
1,000,000	10,000	100	<b>santimetrekaré</b>			1 cm <sup>2</sup>
100,000,000	1,000,000	100	100	<b>milimetrekaré</b>		1 mm <sup>2</sup>

## 39.4 Units of Capacity

			Metric
<b>keyl-i a'sâri</b>			100 L
100	<b>ölçek<sup>a</sup></b>		1 L
1000	10	<b>zarf</b>	100 mL

<sup>a</sup>This is a basic unit for measuring liquids and dry commodities, equivalent to a container holding one kilogram of water

Metric system after 1933

						Metric
<b>dekalitre</b>						10 L
10	<b>litre</b>					1 L
100	10	<b>desilitre</b>				100 mL
1000	100	10	<b>santilitre</b>			10 mL
10,000	1000	100	10	<b>mililitre</b>		1 mL

## 39.5 Units of Weight

Mercantile scale during the early twentieth century

								Metric
<b>mudd</b>								513.178 kg
5	<b>quintal</b>							102.636 kg
5 5/39	1 1/39	<b>quintal<sup>a</sup></b>						100.070 kg
10 10/39	2 2/39	2	<b>quintal<sup>b</sup></b>					50.035 kg
20	4	3 9/10	1 19/20	<b>kile</b>				25.659 kg
400	80	78	39	20	<b>okka</b>			1.282 945 kg
1000	200	195	97½	50	2½	<b>kāse</b>		513.178 g
100,000	20,000	1950	975	5 000	250	100	<b>habbe</b>	5.138 g

<sup>a</sup>For goods from Europe

<sup>b</sup>For goods from England

Upper scale for general use before 1929

							Metric
<b>çeki<sup>a</sup></b>							225.798 32 kg
4	<b>kantar<sup>b</sup></b>						56.449 58 kg
8 4/5	2 1/5	<b>kilé</b>					25.658 9 kg
11	2 3/4	1¼	<b>kental<sup>c</sup></b>				20.527 12 kg
29 1/3	7 1/3	3 1/3	2 2/3	<b>batman<sup>d</sup></b>			7.697 67 kg
176	44	20	16	6	<b>kıyye, okka, or oka</b>		1.282 945 kg

<sup>a</sup>k1 **çeki** = varying between 176 and 195 okka by location

<sup>b</sup>Also reported as 56.320 kg

<sup>c</sup>Also reported as 112 tuhts = 17.96 kg

<sup>d</sup>Also reported as 7.544 kg

Middle scale for general use before 1929

							Metric
<b>kıyye, okka, or oka</b>							1.282 945 kg
2 3/11	<b>ludre or rotl</b>						564.496 g
4	44/25	<b>yusdrum</b>					320.736 g
8	88/25	2	<b>tuht</b>				160.368 g
266 2/3	117 1/3	66 2/3	33 1/3	<b>miskal or mitkal</b>			4.811 g
400	176	100	50	1½	<b>dirhem or drachme</b>		3.207 4 g

Lower scale for general use before 1929

					Metric
<b>dirhem or drachme</b>					3.207 4 g
4	<b>dünük, denk, denke, or daneq</b>				801.84 mg
8	2		<b>çekir decik or çekirdek</b>		400.92 mg
16	4		2	<b>kırat</b>	200.46 mg

For fine use before 1929

							Metric
<b>kırat</b>							200.46 mg
4	<b>bakray, kamha, grain, or buğday</b>						50.11 mg
16	4	<b>fitil</b>					12.53 mg
32	8	2	<b>nekir or nakır</b>				6.26 mg
64	16	4	2	<b>kıtmir</b>			3.13 mg
96	24	6	3	1½	<b>zerre<sup>a</sup> or zevre</b>		2.09 mg
256	64	16	8	4	2 2/3	<b>habbe</b>	783 µg

<sup>a</sup>Also reported as ½ **kıtmir** = 1.56 mg<sup>b</sup>Most sources say 1 **nekir** = 2 **zevres**

Scale for retail (legal before 1929)

			Metric
<b>kantar</b>			56.365 76 kg
44	<b>kıyye, okka, or oka</b>		1.281 04 kg
17,600	400	<b>drachme</b>	3.202 6 g

Scale for wholesale (legal before 1929)

			Metric
<b>kantar</b>			56.115 4 kg
44	<b>kıyye, okka, or oka</b>		1.275 35 kg
17,600	400	<b>drachme</b>	3.188 3 g

Metric-linked upper scale after 1929

					Metric
<b>tûla</b>					1000 kg
4	<b>çeki</b>				250 kg
10	2½	<b>kantar-ı a'sârî</b>			100 kg
100	25	10	<b>batman</b>		10 kg
1000	250	100	10	<b>okka or vukiyy-i a'sârî</b>	1 kg

Metric-linked lower scale after 1929

						Metric
<b>okka or vukiyy-i a'şâri</b>						1 kg
100	<b>dirhem</b>					10 g
1000	10	<b>dirhem-i a'şâri<sup>a</sup></b>				1 g
10,000	100	10	<b>öşr-i dirhem</b>			100 mg
100,000	1000	100	10	<b>aşîr-i dirhem</b>		10 mg
1,000,000	10,000	1000	100	10	<b>mi'şâr-ı dirhem</b>	1 mg

<sup>a</sup>The basic unit for weighing, equivalent to the weight of 1 cm<sup>3</sup> of distilled water at a temperature of 4 °C

Metric system after 1933

						Metric
<b>kilogram</b>						1 kg
100	<b>dekagram</b>					10 g
1000	10	<b>gram</b>				1 g
10,000	100	10	<b>desigram</b>			100 mg
100,000	1000	100	10	<b>santigram</b>		10 mg
1,000,000	10,000	1000	100	10	<b>miligram</b>	1 mg

Below I have compiled some local measures:

### 39.6 Afyon Province

1 dönüm = 2000 m<sup>2</sup>.

### 39.7 Ankara Province

1 mucur = 32.354 4 m<sup>2</sup>.

### 39.8 Arhavi Province

1 kıye = 150 m<sup>2</sup>.

### 39.9 Aydın Province

1 satraç = 57.417 dm<sup>2</sup>.

### 39.10 Bursa Province

1 muzur = 4643.36 m<sup>2</sup>.

### 39.11 Elazığ Province

1 evlek = 229.75 m<sup>2</sup>.

		Metric
<b>ölçek</b>		229.668 m <sup>2</sup>
4	<b>kot</b>	57.417 m <sup>2</sup>

### 39.12 Erzerum Province

		Metric
<b>kantar</b>		231.4 kg
180	<b>oka</b>	1.285 kg

### 39.13 Eskişehir Province

1 araba ot (for grass) = 4–6 dönüm.

### 39.14 Gaziantep Province

			Metric
<b>kile<sup>a</sup></b>			12,861.408 m <sup>2</sup>
8	<b>timin</b>		1,607.676 m <sup>2</sup>
56	7	<b>evlek</b>	229.668 m <sup>2</sup>

<sup>a</sup>1 kile was also reported as 160–170 kg for grain

### 39.15 Giresun Province

1 kod = 1500 m<sup>2</sup>.

### 39.16 Gümüşhane Province

1 kile (at Kelkit) = 918,672 m<sup>2</sup>.

### 39.17 İstanbul Province

#### Units of Length

1 **pik halebi stambuli** or **arsheen** (for silk and wool at Constantinople, present-day Istanbul) = 708.65 mm;

1 **draa stambuli** or **pik endézah** (for cotton and carpets at Constantinople, present-day Istanbul) = 687.3 mm.

In Istanbul in 1864

						Metric
<b>bag</b>						1.516 m
2	<b>zira</b>					758 mm
4	2	<b>kadern</b>				379 mm
48	24	12	<b>usbu</b>			31.58 mm
576	288	24	12	<b>hat</b>		2.63 mm
6912	3456	288	24	12	<b>nokta</b>	219 µm

### Units of Area

1 **çerik** = 150 m<sup>2</sup>.

		Metric
<b>müd</b>		36,746.88 m <sup>2</sup>
20	<b>kile</b>	1,837.344 m <sup>2</sup>

### Units of Dry Capacity

At Constantinople, present-day Istanbul

		Metric
<b>fortin</b>		141.08 L
4	<b>kilo</b>	35.27 L

### Units of Weight

		Metric
<b>barre</b>		153.953 kg
6	<b>kile</b>	25.659 kg

### 39.18 İzmir Province

#### Units of Area

1 **satraç** = 57.417 dm<sup>2</sup>.

#### Units of Dry Capacity

1 **kilo** = 52.9 L.

### 39.19 Kahramanmaraş Province

1 **çiftlik** = 3000 m<sup>2</sup>.

### 39.20 Karaman Province

1 **kutu** (at Ermenek) = 4½–5 kg of grain.

### 39.21 Konya Province

#### Units of Area

1 **kile** (at Hadim) = 14,698.752 m<sup>2</sup>;

1 **dönüm** or **çiftçi dönümü** (at Çumra and Karapınar) = 2500 m<sup>2</sup>;

1 **yeni dönüm** (new scale at Karapınar) = 2025 m<sup>2</sup>;

1 **dönüm** (at Hadim) = 1,435.424 7 m<sup>2</sup>;

1 **hükümet dönümü** (according to the government scale at Karapınar) = 1000 m<sup>2</sup>;

1 **ölçek** (at Hadim) = 918.672 m<sup>2</sup>;

1 **evlek** (at Hadim) = 250 m<sup>2</sup>;

1 **mandal** (at Hadim) = 30–40 m<sup>2</sup>.

Old scale at Karapınar

			Metric
<b>ölçek</b>			1,033.506 m
2	<b>yarım</b>		516.753 m
8	4	<b>şinik</b>	129.188 3 m

### 39.22 Malatya Province

#### Units of Weight

		Metric
<b>çap</b>		307.68 kg
12	<b>kile</b>	25.64 kg

### 39.23 Osmaniye Province

1 **kıyye** = 1.279 kg.

### 39.24 Samsun Province

#### Units of Area

1 **kabak** (at Alaçam) = 8000 m<sup>2</sup>;

1 **kil** (at Çarşamba) = 3674.688 m<sup>2</sup>;

1 **kesim** (at Terme) = 3600 m<sup>2</sup>;

1 **kesim** (at Çarşamba) = 2765 m<sup>2</sup> or 2025 m<sup>2</sup>;

1 **kil**, **rubu**, or **urub** (at Samsun) = 918.672 m<sup>2</sup>.

### 39.25 Şanlıurfa Province

1 **timin** = 1,837.344 m<sup>2</sup>.

### 39.26 Sivas Province

1 **ölçek** = 918.672 m<sup>2</sup>.

### 39.27 Tokat Province

#### Units of Area

1 **teneke buğday** ('a tin of grain,' at Niksar) = 2600 m<sup>2</sup>;

1 **kiye** (at Tokat) = 2500 m<sup>2</sup>;

1 **kil** (at Reşadiye) = 2067.75 m<sup>2</sup>;

1 **rublağ** (at Tokat) = 1837.344 m<sup>2</sup>

1 **kot** (at Reşadiye) = 450 m<sup>2</sup>.

#### Units of Dry Capacity

1 **havayi** (for grain at Reşadiye) = 17 L.

### 39.28 Trabzon Province

#### Units of Area

		Metric
<b>kot</b>		1200 m <sup>2</sup>
600,000	<b>karış</b>	20 cm <sup>2</sup>

#### Units of Weight

		Metric
<b>kantar</b>		231.4 kg
180	<b>oka</b>	1.285 kg

### 39.29 Van Province

#### Units of Weight

		Metric
<b>çap</b>		46–57.5 kg
36–45	<b>okka</b>	1.278 kg

### 39.30 Yozgat Province

1 **kile** = 918.672 m<sup>2</sup>.

## 40 Turkmenistan [Formerly: Turkmen Soviet Socialist Republic]

The Turkomans arrived in Transcaspia as nomadic Seluk Turks in the eleventh century. In 1869, the Russians took control of the region. The Turkestan SSR was part of the Russian SFSR when the Soviet Union was founded in 1923. The Turkmen SSR was proclaimed in 1924, and acceded to the Soviet Union in 1925. Turkmenistan declared its independence in 1991.

*Main sources:* [CARD], [CLAR4], and [GUIL]

### 40.1 Currency

1993–: 1 Turkmenistan manat = 100 tennesi

1923–1993: 1 Soviet ruble = 100 kopeks

–1922: 1 Russian ruble = 100 kopeks

### 40.2 Units of Length

Measures reported during the nineteenth century:

1 **altschin** or **hasch** = 711.12 mm.

Metric scale

километр	метр	рецимер	сантиметр	миллиметр	Metric
<b>kilometir</b>					1000 m
1000	<b>metir</b>				1 m
10,000	10	<b>deometir</b>			100 mm
100,000	100	10	<b>əantimetir</b>		10 mm
1,000,000	1000	100	10	<b>millimetir</b>	1 mm

### 40.3 Units of Liquid Capacity

Metric scale used for gasoline, vegetable oil, milk, etc.

литр	ярым литр	чэрьек	Metric
<b>litir</b>			1 L
2	<b>yarim litir</b>		500 mL
4	2	<b>čäryek</b>	250 mL

40.4 Units of Weight

During the late nineteenth century and metric-linked system

				Metric	Metric
batman or batpan <sup>a</sup>				125 kg	128 kg
8	sir			15.625 kg	16 kg
64	8	tscharik		1.953 kg	2 kg
256	32	4	mimtscha	488.25 g	500 g

<sup>a</sup>During the early nineteenth century, reported as 57.3 kg

Metric scale, used for dry goods like flour, rice, sugar, tea, and meat

тонна	цөнтнөр	килограм	ярым кило	грам	Metric
tonno					1000 kg
10	өентнер				100 kg
1000	100	kilogiram			1 kg
2000	200	2	yarim kilo		500 g
1,000,000	100,000	1000	500	giram	1 g

41 Turks and Caicos Islands

The Turks and Caicos Islands were discovered by Juan Ponce de Leon in 1512, but were not settled until 1678. The islands were part of Bermuda from 1799 to 1848, when they were made a separate colony. They became part of Jamaica in 1874, and were part of the Federation of the West Indies from 1958 to 1962, when the Turks and Caicos became a separate Crown Colony.

In 2005, both the metric system and the British Imperial system were reported to be in use.

Main source: [MILL4]

41.1 Currency

- 1969–: 1 US dollar = 100 cents
- 1951–1971: 1 British West Indies dollar = 100 cents
- 1920–1969: 1 Jamaican pound = 20 shillings = 240 pence = 960 farthings
- c.1850–1919: 1 pound sterling = 20 shillings = 240 pence = 960 farthings

42 Tuscany

See also *Etruria*, *Italy* and *Lucca*.

The Grand Duchy of Tuscany existed between 1569 and 1859, with an interruption between 1801 and 1815, when the Grand Duchy was dissolved and replaced by the Kingdom of Etruria.

42.1 Currency

- 1826–1859: 1 Tuscan florino = 100 quattrini  
1 Tuscan paolo = 40 quattrini
- ?–1826: 1 Tuscan lira = 12 crazie = 20 soldi = 60 quattrini = 240 denari  
1 francescone = 10 paoli = 400 quattrini
- 1252–1533: 1 Florin

43 Tuvalu [Formerly: Ellice Islands]

These islands (Funafuti, Nanumaga, Nanumea, Niutao, Nui, Nukufetau, Nukulaelae and

Vaitapu) were previously part of the Gilbert and Ellice Islands. In 1568, the Spanish navigator Álvaro de Mendaña de Neira sighted the islands, but was unable to land. The Ellice Islands were discovered in 1764 by the British navigator John Byron. The first contact between the Tuvalu people and Spaniards took place in 1787. Gilbert and Ellice Islands became a British Protectorate in 1892 and a British colony in 1916. The Japanese occupied the Gilbert and Ellice Islands from 1941 to 1943. In, 1975, the Ellice Islands separated from the Gilbert Islands, became a separate dependency, and were renamed Tuvalu. Tuvalu gained its independence in 1978. The Gilbert Islands gained their independence as the Republic of Kiribati in 1979.

The coconut oil trade began in the early 1860s and the copra trade a decade later. Until the late twentieth century, the British Imperial system for weights and measures was in use. The metric system is now reported to be in use.

*Main source:* [FAAN]

### 43.1 Currency

1976–: 1 Tuvaluan dollar (= 1 Australian dollar) = 100 cents  
 1966–1976: 1 Australian dollar = 100 cents  
 1945–1966: 1 pound sterling = 20 shillings = 240 pence  
 1942–1945: 1 Oceanian pound = 20 shillings  
 1892–1942: 1 pound sterling = 20 shillings = 240 pence

## 44 Two Sicilies

See also *Italy, Naples, Kingdom of Sardinia and Sicily*.

The Kingdom of the Two Sicilies was formed in 1816, by a union of the Kingdom of Sicily and the Kingdom of Naples. In 1860, it was annexed by the Kingdom of Sardinia, which became the Kingdom of Italy in 1861.

### 44.1 Currency

1816–1860: 1 Two Sicilies ducat = 100 grana  
 = 200 tornesel

### 44.2 Units of Length

Upper scale for general use in Naples after 1840

					Metric
<b>miglio mar</b>					1,851.851 9 m
6	<b>catena</b>				308.642 m
700	116 2/3	<b>canna</b>			2.645 5 m
2625	22½	¾	<b>passo or braccio</b>		705.47 mm
7000	60	10	2 2/3	<b>palmo</b>	264.55 mm

Lower scale for general use in Naples after 1840

					Metric
<b>palmo</b>					264.55 mm
12	<b>oncia</b>				22.05 mm
60	5	<b>minuto</b>			4.41 mm
120	10	2	<b>decimo</b>		2.205 mm
1200	100	20	10	<b>centesimo</b>	220.5 µm
12,000	1000	200	100	10	<b>millesimo</b> 22.05 µm

### 44.3 Units of Area

In Naples before 1840

			Metric
<b>moggio</b>			3,364.860 m <sup>2</sup>
10	<b>quarta</b>		226.486 m <sup>2</sup>
90	9	<b>nona</b>	37.387 3 m <sup>2</sup>

In Naples after 1840

			Metric
<b>moggio legale</b>			699.868 4 m <sup>2</sup>
10	<b>decima</b>		69.986 84 m <sup>2</sup>
100	10	<b>canna quadra</b>	6.998 684 m <sup>2</sup>
10,000	1000	100	<b>palmo quadrato</b> 6.998 684 dm <sup>2</sup>

In the Province of Avellino

					Metric
<b>sacco</b>					12012 m <sup>2</sup>
3	<b>tomolo or moggio</b>				4004 m <sup>2</sup>
6	2	<b>mezzetto</b>			2002 m <sup>2</sup>
12	4	2	<b>quarta</b>		1001 m <sup>2</sup>
72	24	12	6	<b>misura</b>	166.8 m <sup>2</sup>

In the Province of Benevento (near Benevento and in the valley of Caudina)

					Metric	Metric
<b>sacco</b>					9197.73 m <sup>2</sup>	10,000 m <sup>2</sup>
3	<b>tomolo or moggio</b>				3065.91 m <sup>2</sup>	3333.33 m <sup>2</sup>
6	2	<b>mezzetto</b>			1532.95 m <sup>2</sup>	1666.66 m <sup>2</sup>
12	4	2	<b>quarto</b>		766.48 m <sup>2</sup>	833.33 m <sup>2</sup>
72	24	12	6	<b>misura</b>	127.75 m <sup>2</sup>	138.89 m <sup>2</sup>

In Benevento

				Metric
<b>tomolo</b>				3,065.920 2 m <sup>2</sup>
900	<b>passo quadro</b>			3.406 578 m <sup>2</sup>
44,100	49		<b>palmo quadro</b>	6.952 2 dm <sup>2</sup>

In the Province of Caserta (in Caserta, at Roccamonfina and at some other municipalities)

			Metric	Metric	Metric
<b>moggio or tomolo</b>			3,387.363 2 m <sup>2</sup>	1608 m <sup>2</sup>	4287 m <sup>2</sup>
30	<b>passo</b>		112.912 1 m <sup>2</sup>	53.6 m <sup>2</sup>	142.9 m <sup>2</sup>
900	30	<b>passitello</b>	3.763 7 m <sup>2</sup>	1.79 m <sup>2</sup>	4.76 m <sup>2</sup>

## 44.4 Units of Volume

In Naples

		Metric
<b>canna cuba</b>		18.515 m <sup>3</sup>
1000	<b>palmo cubo</b>	18.515 dm <sup>3</sup>

## 44.5 Units of Dry Capacity

New scale at Benevento

					Metric
<b>soma</b>					165.702 L
3	<b>tomolo grosso</b>				55.234 L
6	2	<b>mezzetto</b>			27.617 L
12	4	2	<b>quarto</b>		13.808 5 L
72	24	12	6	<b>misura</b>	2.301 417 L

Old scale at Benevento

					Metric
<b>soma or salma</b>					168.606 3 L
4	<b>tomolo piccolo</b>				42.151 575 L L
8	2	<b>mezzetto</b>			21.075 787 L
16	4	2	<b>quarto</b>		10.537 894 L
96	24	12	6	<b>misura</b>	1.756 316 L

For corn in Naples before 1840

		Metric
<b>carro</b>		1.84 m <sup>3</sup>
36	<b>tomolo<sup>a</sup></b>	51.1 dm <sup>3</sup>

<sup>a</sup>1 **tomolo** (for wheat) = 45 to 48 rotoli

For general use and cereal in Naples after 1840

							Metric	Metric
<b>carro</b>							1,999.624 068 L	1,987.9 L
36	<b>tomolo</b>						55.545 113 L	55.22 L
72	2	<b>mezzetta</b>					27.772 556 L	27.61 L
144	4	2	<b>quarta</b>				13.886 278 L	13.80 L
288	8	4	2	<b>stopello</b>			6.943 139 L	6.90 L
864	24	12	6	3	<b>misura</b>		2.314 380 L	2.30 L
3456	96	48	24	12	4	<b>quartarola</b>	578.595 mL	575.21 mL

For grain in Sicily during the early nineteenth century

		Metric
<b>salma generale</b>		275 L
16	<b>tomolo</b>	17.2 L

For hazelnuts, nuts, and oilseeds in Sicily during the early nineteenth century

			Metric
<b>salma grossa</b>			342.57 L
16	<b>tomolo grossa</b>		21.41 L
20	1¼	<b>tomolo</b>	17.13 L

## 44.6 Units of Liquid Capacity

For wine at Benevento

					Metric
<b>soma<sup>a</sup></b>					163.587 6 L
–	<b>soma<sup>b</sup></b>				144.342 L
12	–	<b>langella<sup>a</sup></b>			13.632 3 L
102	90	8½	<b>ambola</b>		1.603 8 L
204	180	17	2	<b>caraffa</b>	801.9 mL

<sup>a</sup>For unclear wine

<sup>b</sup>For pure wine

For oil at Benevento

			Metric
<b>piede da olio</b>			7.300 5 L
4	<b>ambola</b>		1.825 125 L
16	4	<b>quartuccia</b>	456.281 25 mL

For wine in Naples

							Metric
<b>botte</b>							523.500 36 L
12	<b>barile</b>						43.625 03 L
720	60	<b>caraffa</b>					727.084 mL
800	66 2/3	1 1/9	<b>caraffa de la champagna</b>				654.375 mL
2160	180	3	2 7/10	<b>bicchiere</b>			242.361 mL
7200	600	10	9	3 1/3	<b>decimo</b>		72.708 mL
21,600	1800	30	27	10	3	<b>bicchierino</b>	24.236 mL

For oil (... da olio) in Naples before 1840

						Metric
<b>salma</b>						161.297 6 L
16	<b>staio</b>					10.081 1 L
256	16	<b>quarta</b>				630.069 mL
320	20	1¼	<b>pignatta</b>			504.055 mL
1536	96	6	4 4/5	<b>misurella</b>		105.011 mL

For wine in Messina

			Metric
<b>salma<sup>a</sup></b>			87.60 L
8	<b>barilo</b>		10.95 L
16	2	<b>quartaro</b>	5.475 L

<sup>a</sup>Also traded at 83.3 L. In Syracuse, = 77.84 L

## 44.7 Units of Weight

Upper scale for general use in Naples

					Metric
<b>tonnelata</b>					101.573 7 kg
1 7/50	<b>quintale grosso</b>				89.099 7 kg
2 1/9	1 23/27	<b>quintale sottile</b>			48.113 8 kg
3 3/18	2 7/9	1½	<b>quintale or cantaro piccolo</b>		32.075 9 kg
12 7/39	10 80/117	5 10/13	3 11/13	<b>rubbio</b>	8.339 7 kg

Lower scale for general use in Naples

					Metric
<b>rubbio</b>					8.339 7 kg
9 9/25	<b>rotolo</b>				890.997 g
26	2 7/9	<b>Libbra</b>			320.759 g
312	33 1/3	12	<b>oncia</b>		26.730 g
9360	1000	360	30	<b>trappeso</b>	891 mg

For fine use in Naples

							Metric
<b>libbra</b>							320.759 g
12	<b>oncia</b>						26.730 g
360	30	<b>trappeso<sup>a</sup></b> or <b>millesimo</b>					891.0 mg
1560	130	4 1/3	<b>carato<sup>b</sup></b>				205.615 mg
6240	520	17 1/3	–	<b>grano<sup>b</sup></b>			51.404 mg
7200	600	20	4 8/13	–	<b>acino<sup>a</sup></b> or <b>coccio</b>		44.55 mg
99,840	8320	277 1/3	64	16	13 13/15	<b>sedicesimo<sup>b</sup></b>	3.213 mg

<sup>a</sup>For gold and silver. [KISC] reported that 6000 acini = 1 Neapolitan ounce

<sup>b</sup>For diamonds

For medical use in Naples

						Metric
<b>oncia</b>						26.723 g
10	<b>dramma</b>					2.672 3 g
30	3	<b>scrupolo</b>				890.997 mg
60	6	2	<b>obolo</b>			445.5 mg
600	60	20	10	<b>acino</b> or <b>coccio</b>		44.55 mg

## 45 Tyrol

See also *Italy* and *Austria*.

This area, once a state of the Holy Roman Empire, became a County in 1140 and a Princely County from 1504. In 1814, it became a province

of the Austrian Empire, and from 1867, part of Austria-Hungary. In 1919, the territory was divided between Italy and Austria.

*Main sources:* [MART3] and [ROTT2]

### 45.1 Units of Length

Based on [ROTT2] and [MART3]

								Metric	Metric
<b>Meile</b>								10,692.16 m	10,691.111 m
3200	<b>Ruthe</b>							3.341 3 m	3.340 972 m
3,333 1/3	1 1/24	<b>Gemünd</b>						3.207 65 m	3.216 440 m
5,333 1/3	1 2/3	1 3/5	<b>Klafter</b>					2.004 78 m	2.004 583 m
13,333 1/3	4 1/6	4	2½	<b>Elle</b>				801.912 mm	804.110 mm
32,000	10	9 3/5	6	2 2/5	<b>Fuss</b>			334.413 mm	334.097 mm
384,000	120	115 1/5	72	28 4/5	12	<b>Zoll</b>		27.844 mm	27.841 mm
4,608,000	1,440	1,382 2/5	864	345 3/5	144	12	<b>Linie</b>	2.32 mm	2.32 mm

At Ampezzo; at Castel Telvana, Carzano, Telve di Sopra, Telve di Sotto, Torcegno and Ronchi Valsugana; at Trient

			Metric	Metric	Metric
<b>braccio</b>			1.964 040 m	2.140 098 m	2.167 554 m
1 1/5	<b>passo</b>		1.636 700 m	1.783 415 m	1.659 537 m
6	5	<b>piede</b>	327.340 mm	356.683 mm	361.259 mm

At Belluno, now part of Italy

					Metric
<b>miglio veneto</b>					1,738.675 m
1000	<b>passo</b>				1.738 675 m
5000	5	<b>piede</b>			347.735 mm
60,000	60	12	<b>oncia</b>		28.977 9 mm
720,000	720	144	12	<b>linea</b>	2.414 8 mm

In Bolzano, now part of Italy, after 1578 and after 1768

						Metric	Metric
<b>grosser Rute</b>						5.373 340 m	5.373 680 m
1 1/3	<b>kleiner Rute</b>					4.030 005 m	4.030 260 m
2	1½	<b>grosser Klafter</b>				2.686 670 m	2.686 840 m
2 2/3	2	1 1/3	<b>kleiner Klafter</b>			2.015 002 m	2.015 130 m
16	12	8	6	<b>Fuss</b>		335.834 mm	335.855 mm
192	144	96	72	12	<b>Zoll</b>	27.986 mm	27.988 mm
2304	1728	1152	864	144	12	<b>Linie</b>	2.332 mm

In Bolzano, now part of Italy, before 1853, based on [MART3]

				Metric
<b>miglio tirolese or Meile</b>				10,691 1/9 m
3200	<b>pertica tirolese or Rute</b>			3.340 972 m
5,333 1/3	1 2/3	<b>tesa or Klafter</b>		2.004 583 m
32,000	10	6	<b>piede tirolese</b>	334.097 mm

At Molina, Riva del Garda and Tenno; at Arco and Drena; at Aldeno, Calliano, Rovereto and Villa

		Metric	Metric	Metric
<b>braccio</b>		2.080 806 m	2.080 866 m	2.092 596 m
6	<b>piede</b>	346.801 mm	346.811 mm	348.766 mm

At Brentonico; at Ala and Pilcante; at Giudicarie and Magasa

		Metric	Metric	Metric
<b>braccio</b>		2.096 898 m	2.107 116 m	2.827 698 m
6	<b>piede</b>	349.483 mm	351.186 mm	471.283 mm

At Brescia, now part of Italy

					Metric
<b>cavezza</b>					2.852 803 m
6	<b>piede</b>				475.467 16 mm
72	12	<b>oncia</b>			39.622 26 mm
864	144	12	<b>punto</b>		3.301 85 mm
10,368	1728	144	12	<b>atomo</b>	275 µm

At Colle Santa Lucia; at Cavalese

		Metric	Metric
<b>passo</b>		1.774 950 m	1.815 489 m
5	<b>piede</b>	354.990 mm	363.098 mm

At Roveredo, now part of Italy

				Metric
<b>pertica agrimensoria</b>				1.896 484 m
6	<b>piede</b>			316.081 mm
36	12	<b>pollice</b>		26.340 mm
432	144	12	<b>linea</b>	2.195 mm

Other reported measures:

- 1 **Elle** (at Kitzbühel, Kufstein and Rattenberg, now parts of Austria) = 833.015 mm, but for silk, = 643.365 mm;
- 1 **Elle** (at Innsbruck, now part of Austria) = 804.200 mm (after 1526) and 802.477 5 mm (after 1532);
- 1 **Elle** (in Inntal Valley, now part of Austria) = 804.154 mm;
- 1 **Elle** (for linen at Taufers im Münstertal, now part of Italy) = 946.594 mm;
- 1 **Elle** (at Brixen, now part of Italy) = 833.101 mm;
- 1 **Elle** (at Merano, Schlanders and in Vinschgau Valley, now parts of Italy) = 816.436 mm;
- 1 **Elle** (at Bolzano, now part of Italy) = 802.477 mm (before 1769), 802.350 mm (after 1769), 790.200 mm (early nineteenth century), and 548.640 mm (for silk);
- 1 **Elle** (in Val di Fiemme, now part of Italy) = 784.00 mm;
- 1 **Elle** (in Valsugana Valley, now part of Italy) = 777.558 mm;
- 1 **Elle** (at Borgo Valsugana, Caldano, Castel Toblino, Neumarkt and Lavis, now parts of Italy) = 777.558 mm (for linen and wool);
- 1 **Elle** (at Etschland, now part of Trentino-Alto Adige in Italy) = 794.221 mm, but for silk, = 713.233 mm;
- 1 **Elle** (at Condino, Creto, Stenico, Storo and Tione di Trento, now parts of Italy) = 744.750 mm (for linen and wool);

- 1 **Elle** (at Carzano, Ronchi Valsugana and Castel Telvana, now parts of Italy) = 713.900 mm (for linen and wool) and 672.100 mm (for silk);
- 1 **Elle** (at Telve di Sopra, Telve di Sotto and Torcegno, now parts of Italy) = 713.900 mm (for linen and wool) and 672.100 mm (for silk);
- 1 **Elle** (at Ala, Pilcante and Verona, now parts of Italy) = 702.877 mm (for linen) and 642.449 mm (for silk);
- 1 **braccio da panno** (for cloth at Roveredo, now part of Italy) = 699.000 mm;
- 1 **Elle** (at Aldeno and Calliano, now parts of Italy) = 698.640 mm (for linen);
- 1 **braccio da panno** (for cloth at Belluno, now part of Italy) = 680.981 mm;
- 1 **Elle** (for linen at Magasa, now part of Italy) = 672.550 mm;
- 1 **Elle** (at Tiarno di Sopra and Molina) = 671.900 mm (for silk) and 695.900 mm (for linen);
- 1 **Elle** (at Arco, Dro and Nago-Torbole, now parts of Italy) = 658.947 mm (for silk) and 702.877 mm (for linen);
- 1 **Elle** (at Mori, now part of Italy) = 653.365 mm (for silk);
- 1 **Elle** (for silk at Bretonico and Villa, now parts of Italy) = 643.300 mm;
- 1 **braccio da seta** (for silk at Roveredo, now part of Italy) = 642.900 mm;
- 1 **braccio da seta** (for silk at Belluno, now part of Italy) = 642.449 mm;
- 1 **Elle** (at Rovereto, now part of Italy) = 622.046 mm or 642.900 mm (for silk), and 681.000 mm or 684.251 mm (for semi-silk);
- 1 **Elle** (for tuche at Rovereto, now part of Italy) = 694.900 mm (after 1769), 699.000 mm (after 1811) and 698.701 mm (after 1850);
- 1 **Elle** (at Riva del Garda, now part of Italy) = 671.900 mm (for silk) and 695.900 mm (for linen);
- 1 **Elle** (for silk at Trento, now part of Italy) = 630.750 mm, 633.582 mm or 633.650 mm;
- 1 **Elle** (for wool at Trento, now part of Italy) = 702.533 mm (after 1811) and 702.373 mm (after 1817).

## 45.2 Units of Area

At Berwang and Lechtal, now parts of Austria

		Metric
<b>Metz-Land</b>		629.414 8 m <sup>2</sup>
1 2/5	<b>Futterboden</b>	449.582 m <sup>2</sup>

At Innsbruck, now part of Austria, based on [MART3]

								Metric
<b>Stochiacah</b>								8,929.676 3 m <sup>2</sup>
2	<b>Tagmat</b>							4,464.838 2 m <sup>2</sup>
2 2/9	1 1/9	<b>Jauch</b>						4,018.354 3 m <sup>2</sup>
8	4	3 3/5	<b>Starland</b>					1,116.209 5 m <sup>2</sup>
10	5	4½	1¼	<b>Grabe</b>				892.967 6 m <sup>2</sup>
24	12	10 4/5	3	2 2/5	<b>Staiolo</b>			372.069 0 m <sup>2</sup>
800	400	360	100	80	33 1/3	<b>Quadrat Ruthe</b>		11.162 095 m <sup>2</sup>
80,000	40,000	36,000	10,000	8000	333 1/3	100	<b>Quadrat Fuss</b>	11.162 095 dm <sup>2</sup>

At Längenfeld, Sautens and Umhausen, now parts of Austria

		Metric
<b>Quadrat-Latte</b>		41.360 989 m <sup>2</sup>
64	<b>Quadrat-Elle</b>	64.626 54 dm <sup>2</sup>

In Belluno, now part of Italy

		Metric
<b>passo quadro</b>		3.022 988 m <sup>2</sup>
25	<b>piede quadro</b>	12.091 9 dm <sup>2</sup>

At Pfunds, Ried and in Inntal Valley, now parts of Austria

		Metric
<b>Mannsmahd</b>		2,157.991 2 m <sup>2</sup>
2	<b>Fudermahd or Mippel</b>	1,078.995 6 m <sup>2</sup>

At Zillertal, now part of Austria

		Metric
<b>Tagbau</b>		5,394.978 m <sup>2</sup>
10	<b>Stundbau</b>	539.497 8 m <sup>2</sup>

In Belluno, now part of Italy

			Metric
<b>campo</b>			3,778.735 1 m <sup>2</sup>
8	<b>calvia</b>		472.341 89 m <sup>2</sup>
32	4	<b>quartarola</b>	118.085 47 m <sup>2</sup>

## At Bolzano, now part of Italy

						Metric
<b>Strochiat</b>						5,772.622 m <sup>2</sup>
2	<b>Tagmahd</b>					2,886.311 m <sup>2</sup>
3 1/5	1 3/5	<b>Jauch</b>				1,803.946 8 m <sup>2</sup>
8	4	2½	<b>Starland</b>			721.578 74 m <sup>2</sup>
800	400	250	100	<b>Quadrat Klafter</b>		7.215 787 4 m <sup>2</sup>
6400	3200	2000	800	8	<b>Quadrat Fuss</b>	90.197 342 dm <sup>2</sup>

## In Bolzano, now part of Italy

					Metric
<b>alte Tagmahd</b>					2,880.975 m <sup>2</sup>
4 16/1 601		<b>Starland</b>			718.45 m <sup>2</sup>
5 7/20		1 401/1 200	<b>neuer Graber</b>		538.50 m <sup>2</sup>
802½		200 1/8	150	<b>Klafter</b>	3.59 m <sup>2</sup>

## At Bolzano, Brixen, Bruneck and Meran, now parts of Italy

		Metric
<b>Jauch</b>		3,596.652 m <sup>2</sup>
2	<b>Tagmahd or Mannsmahd</b>	1,798.326 m <sup>2</sup>

## At Brescia, now part of Italy

			Metric
<b>pió</b>			3,255.393 8 m <sup>2</sup>
100	<b>tavole</b>		32.553 938 m <sup>2</sup>
400	4	<b>cavezza or pertica quadra</b>	8.138 484 m <sup>2</sup>

## At Glurns, now part of Italy

		Metric
<b>Quadrat-Latte</b>		32.661 819 m <sup>2</sup>
49	<b>Quadrat Elle</b>	66.656 775 dm <sup>2</sup>

## At Roveredo, now part of Italy

		Metric
<b>perica quadra</b>		3.596 652 m <sup>3</sup>
36	<b>piede quadro</b>	99.907 dm <sup>3</sup>

## Other reported measures:

- 1 **Tagbau** (at Hopfgarten, now part of Austria) = 7,193.304 m<sup>2</sup>;
- 1 **Joch** (for wood at Imst, Innsbruck and Schwaz, now parts of Austria) = 5,754.642 m<sup>2</sup>;
- 1 **Joch** (for agricultural areas at Imst, Innsbruck, Kitzbühel, Kufstein, Landbeck, Reutte and Schwaz, now parts of Austria) = 3,596.652 m<sup>2</sup>;
- 1 **Morgen** (for woods and meadows at Lienz, now part of Austria) = 1,798.326 m<sup>2</sup>;
- 1 **Morgen** (for woods and meadows at Imst, Innsbruck, Kitzbühel, Kufstein, Landbeck, Reutte and Schwaz, now parts of Austria) = 1,798.326 m<sup>2</sup>;
- 1 **Anbau-Acker** or **Aeche** (at Lienz, now part of Austria) = 1,438.660 8 m<sup>2</sup>;
- 1 **Futterboden** (at Tannheim, now part of Austria) = 719.330 m<sup>2</sup>;
- 1 **Muttmal-Acker** (at Nauders, now part of Austria) = 431.598 m<sup>2</sup>;
- 1 **Joch** (for wood at Bolzano, Brixen, Bruneck and Meran, now parts of Italy) = 5,754.642 m<sup>2</sup>;
- 1 **Morgen** (at Pustertal, now part of Italy) = 2,877.321 6 m<sup>2</sup>;
- 1 **Mannmahd** (at Glurns, now part of Italy) = 70–80 Quadrat Latten = 2,286.327 3–2,612.945 5 m<sup>2</sup>;

- 1 **braccio quadro** (for fabric at Brescia, now part of Italy) = 2.226 069 m<sup>2</sup>;
- 1 **Morgen** (for agricultural areas at Brixen, Bruneck, Bolzano and Meran, now parts of Italy) = 2,009.216 m<sup>2</sup>;
- 1 **Muttmahd** (at Glurns, now part of Italy) = 33–36 Quadrat Latten = 1,077.84–1,175.825 4 m<sup>2</sup>;
- 1 **Muttmahl** (at Glurns, now part of Italy) = 1,078.995 6 m<sup>2</sup>;
- 1 **Schleif** or **Schettgeld** (for meadows at Prad and Stilfs, now parts of Italy) = 467.565 m<sup>2</sup>, and sometimes 611.431 m<sup>2</sup>;
- 1 **Graber** (for vineyards at Bolzano, now part of Italy) = 577.263 m<sup>2</sup>, later reported as 539.498 m<sup>2</sup>;
- 1 **braccio** (at Brescia, now part of Italy) = 1.356 414 m<sup>2</sup>.

### 45.3 Units of Volume

For straw and hay in the southern parts of Tyrol, now part of Italy

		Metric
<b>Kubikklafter</b>		6.820 992 m <sup>3</sup>
216	<b>Quadrelli</b>	31.578 7 dm <sup>3</sup>

At Bellun, now part of Italy

		Metric
<b>passo cubo</b>		5.256 m <sup>3</sup>
125	<b>piede cubo</b>	42.048 dm <sup>3</sup>

Other measures reported during the nineteenth century:

- 1 **carro** (for hay at Brescia, now part of Italy) = 10.748 839 m<sup>3</sup>;
- 1 **meda** (for firewood at Brescia, now part of Italy) = 7.739 164 m<sup>3</sup>;
- 1 **pertica** (for walls at Brescia, now part of Italy) = 3.869 582 m<sup>3</sup>;
- 1 **carro** (for manure at Brescia, now part of Italy) = 1.289 861 m<sup>3</sup>;
- 1 **braccio** (for factory standard at Brescia, now part of Italy) = 10.748 8 dm<sup>3</sup>.

### 45.4 Units of Dry Capacity

For mining

		Metric
<b>Kübel</b>		38 L
1915	<b>Pariser Kubikzoll</b>	19.836 mL

In Ehrenberg and Routte, now parts of Austria

			Metric
<b>Metzen</b>			23.113 L
4	<b>Viertel</b>		5.778 25 L
16	4	<b>Massl</b>	1.444 56 L

In Fagen, Fendels, Kaunserberg, Kaunsertal, Landeck, Prutz, Ried and Tösens, now parts of Austria

			Metric				Metric
<b>Berg-Mutt</b>			39.553 L	<b>Land-Mutt</b>			24.460 L
12	<b>Metze</b>		3.296 L	12	<b>Metze</b>		2.038 3 L
24	2	<b>Massl</b>	1.648 L	24	2	<b>Massl</b>	1.019 2 L

## In Fiecht, now part of Austria

			Metric
<b>glatter Star</b>			29.869 L
6	<b>Metze</b>		4.978 2 L
16	2 2/3	<b>Massl</b>	1.866 8 L

## In Fliess, now part of Austria

			Metric
<b>Strich-Star</b>			20.533 L
6	<b>Ortsmetze</b>		3.422 17 L

## In Flirsch, Landeck and Stanz, now parts of Austria

			Metric
<b>Landecker Gerichsmass</b>			24.772 L
6	<b>Metze</b>		4.128 7 L
12	2	<b>Massl</b>	2.064 3 L

## In Freundsberg, now part of Austria

			Metric
<b>Korn-Star</b>			31.704 L
2	<b>Halbstar</b>		15.852 L
4	2	<b>Viertelstar</b>	7.926 L

## In Friedberg, Georgenberg, Hauzenheim, Rettenberg and Wattens, now parts of Austria

			Metric
<b>alte Maserei</b>			29.869 L
6	<b>Metze</b>		4.978 2 L
16	2 2/3	<b>Massl</b>	1.866 8 L

## In Galtür and Ischgl, now parts of Austria

				Metric	Metric
<b>Mutt</b>				69.911 L	61.639 L
12	<b>Metze</b>			5.825 9 L	5.136 6 L
24	2	<b>Halbmetze</b>		2.913 0 L	2.568 3 L
48	4	2	<b>Massl</b>	1.456 5 L	1.284 1 L

## For oats in Hall in Tirol, now part of Austria

		Metric
<b>Hafer-Star</b>		32.664 L
12	<b>Massl</b>	2.722 L

## Two alternative scales in Imst, now part of Austria

			Metric				Metric
<b>Streichmass-Star</b>			23.599 L	<b>Streichmass-Star</b>			23.599 L
6	<b>Ortsmetze</b>		3.933 2 L	4	<b>grossen Metze</b>		5.899 7 L
12	2	<b>kleinen Massl</b>	1.966 6 L	8	2	<b>grossen Massl</b>	2.949 9 L

## In Innsbruck, now part of Austria

				Metric
<b>alter glatter Star or Korn-Star</b>				30.571 L
16		<b>grossen Massl</b>		1.910 7 L
20		1¼	<b>Müllermassl</b>	1.528 5 L
32		2	<b>kleinen Massl</b>	955.344 mL

In Inssbruck, now part of Austria, based on [MART3]

		Metric
<b>Star</b>		30.743 426 L
16	<b>Massl</b>	1.921 464 L

In Jenbach and Wiesing, now parts of Austria

		Metric
<b>Mutt</b>		346.100 L
10	<b>Star</b>	34.610 L

In Lienz, now part of Austria

		Metric
<b>Schloss-Müttel</b>		88.660 L
5	<b>Schloss-Vierling</b>	17.732 L

In Lienz, now part of Austria

		Metric
<b>Stadt-Müttel</b>		94.980 L
5	<b>Stadt-Vierling</b>	18.996 L

Heaped measures in Matzen, now part of Austria

		Metric
<b>Metzen</b>		45.154 L
16	<b>Massl</b>	2.822 125 L

In Nauders and Pfunds, now parts of Austria

			Metric	Metric
<b>Mutt</b>			37.216 L	37.993 L
12	<b>Metze</b>		3.101 3 L	3.166 1 L
24	2	<b>Massl</b>	1.550 7 L	1.583 0 L

In Rattenberg, now part of Austria

					Metric
<b>Mutt</b>					951.120 L
30	<b>alter Star</b>				31.704 L
60	2	<b>Reitherer Metze</b>			15.852 L
90	3	1½	<b>Bischofer Metze</b>		10.568 L
150	5	2½	1 2/3	<b>Seoner Metze</b>	6.340 8 L

In Rottenburg am Inn, now part of Austria

		Metric
<b>Urban-Star</b>		34.586 L
16	<b>Massl</b>	2.161 625 L

For food in Thaur, now part of Austria

		Metric
<b>Futterstar</b>		32.849 L
48	<b>Krachele</b>	684.35 mL

In Virgen and Kals, now parts of Austria

		Metric	Metric
<b>Müttel</b>		75.280 L	97.360 L
5	<b>Vierling</b>	15.056 L	19.472 L

In Virgen, now part of Austria

		Metric
<b>Zehent-Müttel</b>		69.885 L
5	<b>Zehent-Vierling</b>	13.997 L

In Zams, now part of Austria

			Metric
<b>Streich-Mass</b>			22.846 L
6	<b>Ortsmetze</b>		3.807 7 L
12	2	<b>Massl</b>	1.903 8 L

Two reported scales in Ala and Pilcante, now parts of Italy, in 1811 and later

			Metric	Metric
<b>somma</b>			156.105 L	157.806 L
4	<b>minale</b>		39.026 2 L	39.451 5 L
16	4	<b>quarta</b>	9.756 6 L	9.862 9 L

In Aldeno, Calliano and Villa, now parts of Italy

			Metric
<b>somma</b>			162.469 L
6	<b>staja</b>		27.078 67 L
24	4	<b>quarta</b>	6.769 54 L

In Ampezzo, now part of Italy

					Metric
<b>stajo</b>					34.347 L
2	<b>mezzo-stajo</b>				17.173 5 L
4	2	<b>quartarola</b>			8.586 75 L
8	4	2	<b>mezzette</b>		4.293 37 L
16	8	4	2	<b>schatta</b>	2.146 69 L

Two reported scales in Arco, Borgo-Valsugna, Caldano, Dro, Lavis, Neumarkt and Toblino in 1811 and later

			Metric	Metric
<b>somma</b>			152.091 L	158.516 L
20	<b>staja</b>		7.604 55 L	7.925 8 L
80	4	<b>quintala</b>	1.901 14 L	1.981 45 L

Two reported alternative scales in Arco, Borgo-Valsugna, Caldano, Dro, Lavis, Neumarkt and Toblino in 1811 and later

				Metric	Metric
<b>somma</b>				152.091 L	158.516 L
5	<b>galede</b>			30.418 2 L	31.703 2 L
20	4	<b>bazzede</b>		7.604 55 L	7.925 8 L
80	16	4	<b>quintale</b>	1.901 14 L	1.981 45 L

At Belluno, now part of Italy

			Metric
<b>sacco</b>			95.775 8 L
8	<b>calvia</b>		11.971 975 L
32	4	<b>quartarolo</b>	2.992 993 75 L

In Bolzano, now part of Italy

		Metric
<b>staio<sup>a</sup> or Star</b>		30.743 426 L
16	<b>misura or Maassel</b>	1.921 464 L

<sup>a</sup> 1 **staio di foraggi** (for fodder) = 42.716 L, and 1 **staio di grano** (for wheat) = 29.806 L

Two reported scales in Brentonico, now part of Italy, in 1811 and later

			Metric	Metric
<b>somma</b>			154.959 L	156.515 L
8	<b>staja</b>		19.370 L	19.564 L
32	4	<b>quarta</b>	4.842 L	4.891 L

At Brescia, now part of Italy

					Metric
<b>soma</b>					145.920 L
12	<b>quarta</b>				12.160 L
48	4	<b>coppo</b>			3.040 L
192	16	4	<b>stoppello</b>		760 mL
768	64	16	4	<b>quartino</b>	190 mL

Two reported scales in Caldonazzo in 1811 and later

			Metric	Metric
<b>somma</b>			193.467 L	195.528 L
8	<b>staja</b>		24.183 4 L	24.441 L
128	16	<b>minelli</b>	1.511 5 L	1.527 6 L

In Cavalese and Cles, now parts of Italy

				Metric
<b>somma</b>				169.300 L
8	<b>staja</b>			21.162 5 L
32	4	<b>quarta</b>		5.290 6 L
128	16	4	<b>minelli</b>	1.322 66 L

In Carzano, Ronchi-Valsugana, Telve di sopra, Telve di sotto and Torcegno, now parts of Italy

				Metric
<b>somma</b>				155.340 L
6	<b>staja</b>			25.89 L
24	4	<b>quarta</b>		6.472 5 L
96	16	4	<b>minelli</b>	1.618 1 L

Two reported scale in Condino and Storo, now parts of Italy, in 1811 and later

			Metric	Metric
<b>somma</b>			174.306 L	176.171 L
12	<b>staja</b>		14.525 5 L	14.681 L
48	4	<b>quarta</b>	3.631 4 L	3.670 2 L

Two reported scales for Creto, now part of Italy, in 1850 and later

			Metric	Metric
<b>somma</b>			162.898 L	164.001 L
15	<b>staja</b>		10.859 87 L	10.933 4 L
60	4	<b>quarta</b>	2.714 97 L	2.733 35 L

Provost scale in Eiers, Glurns, Schlanders, Tanas and Tschengels, now parts of Italy

		Metric
<b>Propstei-Mutt</b>		36.879 L
10	<b>Ortsmetzen</b>	3.687 9 L

In Eiers, Glurns, Schlanders, Tanas and Tschengels, now parts of Italy

		Metric
<b>gross Mutt</b>		42.007 L
20	<b>Massl</b>	2.100 35 L

In Eiers, Glurns, Schlanders, Tanas and Tschengels, now parts of Italy

			Metric
<b>Gerichts-Mutt</b>			39.154 L
10	<b>Metzen</b>		3.915 4 L
20	2	<b>Massl</b>	1.957 7 L

Two reported scales in Magasa, now part of Italy, in 1811 and later

			Metric	Metric
<b>somma</b>			162.898 L	164.639 L
12	<b>staja</b>		13.574 8 L	13.720 L
48	4	<b>quarta</b>	3.393 7 L	3.430 L

Striken measures in Merano, now part of Italy

			Metric
<b>Star</b>			28.305 L
4	<b>Viertel</b>		7.076 25 L
16	4	<b>Massl</b>	1.769 06 L

In Merano, now part of Italy

		Metric
<b>alter Meraner Mutt</b>		42.457 5 L
30	<b>Massl</b>	1.415 25 L

Striken and heaped measures for oats in Merano, now part of Italy

		Metric	Metric
<b>Star</b>		35.798 L	44.813 L
20	<b>Massl</b>	1.790 L	2.241 L

Striken and heaped measures for oats in Merano, now part of Italy (bailiwick scale)

		Metric	Metric
<b>Star</b>		39.432 L	44.813 L
20	<b>Massl</b>	1.972 L	2.241 L

Two reported scales in Molina and Tiarno, now parts of Italy, in 1811 and later

			Metric	Metric
<b>somma</b>			159.016 L	160.715 L
20	<b>staja</b>		7.950 8 L	8.035 75 L
80	4	<b>quarta</b>	1.987 7 L	2.008 94 L

In Nago-Torbole, now part of Italy

			Metric
<b>somma</b>			152.100 L
10	<b>staja</b>		15.210 L
40	4	<b>quarta</b>	3.802 5 L

Two reported scales in Pergine, now part of Italy, in 1811 and later

				Metric	Metric
<b>somma</b>				154.684 L	156.360 L
6	<b>staja</b>			25.775 L	26.06 L
24	4	<b>quarta</b>		6.443 7 L	6.515 L
96	16	4	<b>minelli</b>	1.610 9 L	1.628 7 L

Two reported scales for Riva and Tenno, now parts of Italy, in 1850 and later

			Metric	Metric
<b>somma</b>			162.569 L	160.850 L
16	<b>staja</b>		10.160 6 L	10.053 1 L
64	4	<b>quarta</b>	2.540 1 L	2.513 3 L

Two reported scales in Rovereto, Vallarsa and Volarno, now parts of Italy, in 1811 and later

				Metric	Metric
<b>somma</b>				152.001 L	160.985 L
8	<b>staja</b>			19.000 L	20.123 L
32	4	<b>quarta</b>		4.75 L	5.030 8 L
192	24	6	<b>coppa</b>	791.67 mL	838.46 mL

Two reported alternative scales in Rovereto, Vallarsa and Volarno, now parts of Italy, in 1811 and later

			Metric	Metric
<b>somma</b>			152.001 L	160.985 L
10	<b>staja</b>		15.200 1 L	16.098 5 L
27	2 7/10	<b>sestime</b>	5.629 7 L	5.962 4 L

At Rovereto, now part of Italy, based on [MART3]

				Metric
<b>soma</b>				152.091 100 L
2½	<b>moggio</b>			60.836 440 L
10	4	<b>staio</b>		15.209 110 L
270	108	27	<b>sestina</b>	563.300 mL

Striken and heaped measures for fruit in Schlanders, now part of Italy

		Metric	Metric
<b>alter Futter-Star</b>		35.758 L	42.462 L
16	<b>Massl</b>	2.234 9 L	2.653 9 L

Two reported scale for Stenico and Tione, now parts of Italy, in 1811 and later

			Metric	Metric
<b>somma</b>			174.306 L	176.171 L
20	<b>staja</b>		8.715 3 L	8.808 5 L
80	4	<b>quarta</b>	2.178 8 L	2.202 1 L

Striken and heaped measures for rye in Taufers im Münstertal, now part of Italy

		Metric	Metric
<b>Roggen-Star</b>		24.323 L	29.875 L
16	<b>Massl</b>	1.520 2 L	1.867 2 L

In Telvana, now part of Italy

				Metric
<b>somma</b>				144.558 L
6	<b>staja</b>			24.093 L
24	4	<b>quarta</b>		6.023 25 L
96	16	4	<b>minelli</b>	1.505 81 L

Three reported scales for Trento, now part of Italy, in 1811, 1817 and later

			Metric	Metric	Metric
<b>somma</b> <sup>a</sup>			169.284 L	171.080 L	171.010 L
8	<b>staja</b>		21.160 5 L	21.385 L	21.376 L
128	16	<b>minelli</b>	1.322 5 L	1.336 6 L	1.336 L

<sup>a</sup>[DOUR] also reported one **soma** as 169 L in 1854

Other reported measures:

- 1 **Vierling** (in Kappl, now part of Austria) = 92.230 23 L;
- 1 **Hopfgartner Metzl** (in Hopfgarten, now part of Austria) = 67.250 L;
- 1 **Hafer-Star gehäuft** (heaped measure for oats in Starkenberg, now part of Austria) = 45.383 L;
- 1 **Star gehäuft** (heaped measure in Jenbach and Wiesing, now parts of Austria) = 45.130 L;
- 1 **Futterstar** (for food in Bolzano, now part of Italy) = 42.716 L.
- 1 **Zehent-Star gehäuft** (heaped measure in Feigenberg, Fiecht, Fügen, Pankratzberg and Ried im Zillertal, now parts of Austria) = 42.328 L;
- 1 **Hafer-Star gehäuft** (heaped measure for oats in Freundsberg, now part of Austria) = 42.328 L;
- 1 **Hafer-Star glatt** (stricken measure for oats in Starkenberg, now part of Austria) = 42.271 L;
- 1 **Hafer-Star, Futter-Star or Matzener-Metzen glatt** (stricken measure for oats and fruit in Matzen, now part of Austria) = 37.469 L;
- 1 **Kasten-Star or Futterschütt-Hafer-Star** (for oats in Kitzhübel, now part of Austria) = 36.508 L;
- 1 **alter geäufter Star** (heaped measure in Innsbruck, now part of Austria) = 38.164 L;
- 1 **Star glatt** (stricken measure in Feigenberg, Fiecht, Fügen, Pankratzberg and Ried im Zillertal, now parts of Austria) = 36.154 L;
- 1 **Star** (in Hopfgarten and Zell am Ziller, now parts of Austria) = 36.154 L;
- 1 **Kuppelfutter Vogteistar** (in Rettenberg, now part of Austria) = 35.867 L;
- 1 **Kasten-Star wenig gehäuft** (heaped measure in Amras, Matrei and Steinach, now parts of Austria) = 34.067 L;
- 1 **Hafer-Star glatt** (stricken measure for oats in Freundsberg, now part of Austria) = 33.354 L;
- 1 **Zehent-Star glatt** (stricken measure in Feigenberg, Fiecht, Fügen, Pankratzberg and Ried im Zillertal, now parts of Austria) = 33.354 L;
- 1 **Kasten-Star glatt** (stricken measure in Amras, Matrei and Steinach, now parts of Austria) = 32.920 L;
- 1 **Futter-Star** (for food in Thaur, now part of Austria) = 32.849 L;
- 1 **Hafer-Star glatt** (stricken measure for oats in Rettenberg, now part of Austria) = 31.704 L;
- 1 **gehäufter Star** (heaped measure in Ambras, Ellenbogen, Mieders and Steinach, now parts of Austria) = 30.852 L;
- 1 **Roggen-Star glatt** (stricken measure for rye in Freundsberg near Schwaz, now part of Austria, as reported in 1525) = 30.571 L;
- 1 **Kornstar** (for fruit) = 30.544 L;
- 1 **glatter Star** (in Ambras, Ellenbogen, Mieders and Steinach, now parts of Austria) = 29.791 L;
- 1 **Kalk-Star** (in Hopfgarten, now part of Austria) = 28.822 L;
- 1 **alter Roggenstar** (for rye in Hopfarte and Kitzbühel, now parts of Austria) = 26.900 L;
- 1 **Galfe** (in Thaur, now part of Austria) = 23.085 L;

- 1 **Innicher Pfleg-Star** (in Lienz, now part of Austria) = 23.058 L;
- 1 **Galfe** (in Friedberg, Georgenberg, Hauzenheim, Rettenberg and Wattens, now parts of Austria) = 22.437 L;
- 1 **Kärntner-Scheffel** (in Lienz, now part of Austria) = 20.471 L;
- 1 **Galfe** (in Innsbruck, now part of Austria) = 18.470 L;
- 1 **Galfl gehäuft** (heaped measure in Jenbach and Wiesing, now parts of Austria) = 15.044 L;
- 1 **Zehent-Star** or **Metzel** (in Ecking, now part of Austria) = 13.935 L;
- 1 **Galfl glatt** (stricken measure in Jenbach and Wiesing, now parts of Austria) = 11.536 L;
- 1 **Metzel** (in Sern, now part of Austria) = 6.149 L;
- 1 **sacco** (for charcoal at Brescia, now part of Italy) = 427.954 3 L;
- 1 **somma** (in Mori, now part of Italy) = 175.545 L, in 1811 also reported as 173.693 L;
- 1 **Schaff gehäuft** (heaped measure in Ahornbach (in Puster Valley), now part of Italy) = 95.304 L;
- 1 **Schaff gestrichen** (stricken measure in Ahornbach (in Puster Valley), now part of Italy) = 75.751 L;
- 1 **alter Ultener-Star** (heaped measure in Ulten, now part of Italy) = 44.813 L;
- 1 **alter Vogtei-Star** (bailiwick scale for oats and barley in Ulten, now part of Italy) = 41.168 L;
- 1 **Futter-Star** (for fruit in Taufers im Münstertal, now part of Italy, before 1811) = 37.141 L;
- 1 **alter Ultener-Star glatt** (stricken measure in Ulten, now part of Italy) = 35.798 L;
- 1 **alter Vogtei-Korn-Star** (bailiwick scale for grain in Ulten, now part of Italy) = 31.843 L;
- 1 **Land-Star** or **Zins-Star** (in Neumarkt, now part of Italy) = 29.573 L;
- 1 **resches Star** (in Welsberg, now part of Italy) = 25.340 L;
- 1 **Stock-Star gehäuft** (heaped measure in Neumarkt, now part of Italy) = 24.375 L;
- 1 **Widums-Zins-Star gehäuft** (stricken measure in Taufers im Münstertal, now part of Italy) = 23.615 L;

- 1 **Widums-Zins-Star glatt** (stricken measure in Taufers im Münstertal, now part of Italy) = 20.533 L;
- 1 **Stock-Star glatt** (stricken measure in Neumarkt, now part of Italy) = 20.477 L;
- 1 **Galfe** (stricken measure in Ahornbach (in Puster Valley), now part of Italy) = 18.606 L;
- 1 **St. Jakober-Fütterung** (in Ahornbach (in Puster Valley), now part of Italy) = 14.630 L;
- 1 **St. Johanner-Fütterung-Hafer** (for oats in Ahornbach (in Puster Valley), now part of Italy) = 13.896 L;
- 1 **halbe Galfe** (heaped measure in Ahornbach (in Puster Valley), now part of Italy) = 13.132 L;
- 1 **Galfl** (in Mühlwald (in Puster Valley), now part of Italy) = 10.488 L.

## 45.5 Units of Liquid Capacity

For wine at Innsbruck, now part of Austria

				Metric
alte Yhrn				25.984 L
64	alte Maß			406 mL
128	2	Ziment		203 mL
256	4	2	Fragell	101.5 mL

Alternative scale for wine at Innsbruck, now part of Austria, based on [MART3] and [ROTT2]

				Metric
alte Tiroler Yhrn				25.940 L
32	alte Maß			810.625 mL
128	4	Zimment or Seitel		202.656 mL
256	8	2	Fragell	101.328 mL

Alternative old scale at Innsbruck, now part of Austria, based on [MART3]

				Metric
Yhrn				77.809 875 L
12	Pazeide			6.484 156 L
54	4½	Maass		1.440 924 L

For wine at Innsbruck, now part of Austria

			Metric
neue <b>Yhrn</b>			56.589 L
40	<b>Wiener Maß</b>		1.415 L
160	4	neue <b>Ziment</b>	353.681 mL

Vienna scale in Nord-Tirol, now part of Austria

					Metric
<b>Dreyling</b>					1,358.136 L
24	<b>Eimer</b>				56.589 L
192	8	<b>Eimerpazeide</b>			7.073 625 L
960	40	5	<b>Ortssmass</b>		1.414 725 L
3840	160	20	4	<b>Seitl</b>	353.681 25 mL

Bolzano scale in Nord-Tirol, now part of Austria

					Metric
<b>Pazeide</b>					6.534 L
8	<b>Ortssmass</b>				816.75 mL
16	2	<b>Halbe or Trink</b>			408.375 mL
32	4	2	<b>Seidl or Vierling</b>		204.187 mL
64	8	4	2	<b>Halbseidl, Fragl, Fraggerle or Pfiff</b>	102.094 mL

For general use<sup>4</sup> in Nord-Tirol, now part of Austria

		Metric
<b>Pazeide</b>		6.534 L
8	<b>Ortssmass</b>	816.75 mL

For general use<sup>5</sup> in Nord-Tirol, now part of Austria

		Metric
<b>Pazeide</b>		6.534 L
7	<b>Ortssmass</b>	933.428 5 mL

<sup>4</sup> Used in Amras, Aschau, Axams, Hörtenberg, Imst, Innsbruck, Kals, Landeck, Laudeck, Lichtwer, Lienz, Lienzerklause, Lisens, Matrei, Matzen, Münster, Petersberg, Pfunds, Rattenberg, Rottenburg, Sonnenburg, Sprechenstein, Starms, Steinach, Stubai, Stumm, Tilliach, Tratzberg, Utterheim, Vils, Virgen, Wilten and Zillertal.

<sup>5</sup> Used in Freudensberg, Gries, Rettenberg, Schwarz, Völs and Wangen.

For general use<sup>6</sup> in Nord-Tirol, now part of Austria

		Metric
<b>Pazeide</b>		6.534 L
6	<b>Ortssmass</b>	1.089 L

For general use<sup>7</sup> in Nord-Tirol, now part of Austria

		Metric
<b>Pazeide</b>		6.534 L
5½	<b>Ortssmass</b>	1.188 L

<sup>6</sup> Used in Hall, Spaur, Thaur and Vent.

<sup>7</sup> Used in Kufstein, Mariastein and Thierberg.

For wine in Nauders in Nord-Tirol, now part of Austria

			Metric
<b>Yhre</b>			78.926 L
12	<b>Pazeide</b>		6.577 166 4 L
72	6	<b>Ortsmass</b>	1.096 194 4 L

For general use<sup>8</sup> in Nord-Tirol, now part of Austria

		Metric
<b>Pazeide</b>		6.534 L
5	<b>Ortsmass</b>	1.306 8 L

For milk in the Gschnitztal valley, now part of Austria

		Metric
<b>Napf</b>		2.298 928 1 L
16	<b>Löffel</b>	143.683 mL

For milk in the Zillertal valley, now part of Austria

			Metric
<b>Käsekessel</b>			398.4 L
8	<b>Sächter</b>		49.8 L
64	8	<b>Napf</b>	6.225 L

For general use in Ala and Pilcante, now parts of Italy

		Metric
<b>Brenta</b>		71.651 L
54	<b>Mass</b>	1.326 870 4 L

For general use in Ampezzo, now part of Italy

						Metric
<b>mastello</b>						36.919 L
2	<b>paccede</b>					18.459 5 L
4	2	<b>¼-mastello</b>				9.229 75 L
8	4	2	<b>1/8-mastello</b>			4.614 875 L
16	8	4	2	<b>1/16-mastello</b>		2.307 437 5 L
20	10	5	2½	1¼	<b>boccale</b>	1.845 950 L

At Belluno, now part of Italy

		Metric
<b>mastello</b>		74.733 000 L
40	<b>boccale</b>	1.868 325 L

For general use in present-day Bolzano-Bolzen,<sup>9</sup> now part of Italy

			Metric
<b>Orna or Yhre</b>			78.516 L
6	<b>Stajo</b>		13.086 L
72	12	<b>Ortsmass</b>	1.090 5 L

<sup>8</sup> Used in Kitzbühel and Pillersee.

<sup>9</sup> Used in Ala, Aldeno, Arco, Avio, Belforte, Besenello, Cavalese, Cles, Calliano, Caldonazzo, Castel dei tre corni, Castelfondo, Castello im Fleimstal, Cembra, Fassa, Folgaria, Grumes, Gresta, Judicarien, Levico, Nago, Torbole, Nomi, Pergine, Primiero, Riva, Rovereto, Segonzano, Tenno, Val di Ledro, Val di Lodron and Zambans.

For wine in Bolzano, now part of Italy, during the sixteenth century

								Metric
<b>Fuder</b>								622.480 L
8	<b>Yhre</b>							77.810 L
16	2	<b>Lagel</b>						38.905 L
192	12	6	<b>Pazeide</b>					6.484 167 L
1536	96	48	8	<b>Mass<sup>a</sup></b>				810.520 8 mL
3072	192	96	16	2	<b>Trinkl</b>			405.260 4 mL
6144	384	192	32	4	2	<b>Vierling</b>		202.630 2 mL
12,288	768	384	64	8	4	2	<b>Fraggele</b>	101.315 1 mL

<sup>a</sup>By [KAHN], reported as 1/54 Yhre = 1.441 L

For wine in Bolzano, now part of Italy, in 1769 and 1775

		Metric
<b>Yhre</b>		78.408 L
12	<b>Pazeide</b>	6.534 L

Alternative scale for wine in Bolzano, now part of Italy, according to[KAHN]

		Metric
alte <b>Praschlet-Yhrn</b>		95.317 L
102 9/10	alte <b>Mass</b>	926.3 mL

For wine in present-day Bolzano-Bolzen,<sup>10</sup>  
now part of Italy

		Metric
<b>Pazeide</b>		6.534 L
8	<b>Ortsmass</b>	816.75 mL

For wine in present-day Bolzano-Bolzen,<sup>11</sup>  
now part of Italy

		Metric
<b>Pazeide</b>		6.534 L
7	<b>Ortsmass</b>	933.428 6 L

<sup>10</sup>Used in Altrasen, Antholz, Bruneck, Buchenstein, Deffereggen, Dux, Ehrenburg, Enneberg, Heimfels-Heunfels, Innichen, Michaelsburg, Neuhaus, Neustift, Reifenstein, Rodeneck, Schöneck, Schlossberg, Sterzing, Strassberg, Taufers and Welsberg.

<sup>11</sup>Used in Aicha, Aldeins, Caldif, Deutschnofen, Enn, Flass, Gufidaun, Hauenstein, Jenesien, Karneid, Kastelruth, Kronmetz, Lana, Neuhaus near Terlan, Salegg, Salurn, Sarntal, Stein near Ritten, Tiers, Trostburg, Wälschnofen and Wolkenstein.

For wine in present-day Bolzano-Bolzen,<sup>12</sup>  
now part of Italy

		Metric
<b>Pazeide</b>		6.534 L
5	<b>Ortsmass</b>	1.306 8 L

For must in Bolzano, now part of Italy, during the sixteenth century

		Metric
<b>Yhre</b>		82.141 708 L
88	<b>Ortsmass</b>	933.428 5 mL

For must in Bolzano, now part of Italy, during the seventeenth century

		Metric
<b>Yhre</b>		81.702 L
12	<b>Pazeide</b>	6.808 5 L

For must in Bolzano, now part of Italy, during the nineteenth century

		Metric
<b>Eimer or emero da mosto</b>		81.700 369 L
12	<b>Pazeide</b>	6.808 364 L

New scale for wine in Bolzano, now part of Italy

			Metric
neue <b>Yhrn</b> or <b>emero</b>			56.588 960 L
40	<b>Wiener</b> <b>Mass</b>		1.414 724 L
160	4	<b>ziment</b> or <b>Seitel</b>	353.681 mL

<sup>12</sup>Used in Kurtatsch and Tramin.

For must and cider in Bolzano, now part of Italy

		Metric
<b>Most-Yhrn</b>		81.810 L
88 1/5	<b>Most-Mass</b>	927.55 mL

At Brescia, now part of Italy

							Metric
<b>carro</b>							596.916 L
12	<b>zerla</b>						49.742 70 L
48	4	<b>secchia</b>					12.435 675 L
432	36	9	<b>pinta</b>				1.381 742 L
864	72	18	2	<b>boccale</b>			690.871 mL
1728	128	36	4	2	<b>mezzo or mezzino</b>		345.435 mL
3456	256	72	8	4	2	<b>tazza</b>	172.718 mL

For wine in Brixen during the early eighteenth century

		Metric
<b>Fuder</b>		622.490 L
5	<b>Yhre</b>	124.498 L

For wine in Brixen, Latsfons, Pfeffersberg, Rodeneck, Thurn am Gader, Vahrn, Verdings, and Velthurns

					Metric
<b>Fuder</b>					583.600 L
5	<b>Yhre</b>				116.720 L
40	8	<b>Sächter</b>			14.590 L
80	16	2	<b>Pazeide</b>		7.295 L
720	144	18	9	<b>Mass</b>	810.55 mL

For must in Brixen, Latsfons, Pfeffersberg, Rodeneck, Thurn am Gader, Vahrn, Verdings and Velthurns

			Metric
<b>Yhre</b>			131.304 37 L
8	<b>Sächter</b>		16.413 046 L
160	20	<b>Mass</b>	820.652 mL

In Cadoretal, now part of Italy

		Metric
<b>Mastello</b>		74.733 L
40	<b>Boccale</b>	1.868 325 L

For general use in Carzano, Telve di sopra and Telve di sotto, now parts of Italy

			Metric
<b>Yhre</b>			125.304 L
12	<b>Sächter</b>		10.442 L
124	10 1/3	<b>Mass</b>	1.010 516 1 L

For general use in Grigno, now part of Italy

			Metric
<b>Yhre</b>			128.395 L
2	<b>Sächter</b>		14.266 11 L
132	14	<b>Mass</b>	1.019 007 9 L

For general use in Ivano, now part of Italy

			Metric
<b>Yhre</b>			133.986 L
9	<b>Sächter</b>		66.993 L
126	66	<b>Mass</b>	1.015 045 4 L

For general use in Ronchi and Torcegno, now parts of Italy

			Metric
<b>Yhre</b>			125.304 L
8	<b>Sächter</b>		15.663 L
124	15½	<b>Mass</b>	1.010 516 1 L

For general use in Castellato and Telvana, now parts of Italy, in 1769 and 1781

					Metric	Metric
<b>Yhre</b>					117.376 L	119.326 L
8	<b>Sächter</b>				14.672 L	14.915 75 L
112	14	<b>Mass</b>			1.048 L	1.065 41 L
224	28	2	<b>Halbmass</b>		524 mL	532.705 mL
448	56	4	2	<b>Viertelmass</b>	262 mL	266.352 mL

For wine in Gufidaun, Klausen, Kollman and Villanders, now parts of Italy

					Metric
<b>Fuder</b>					622.488 L
6	<b>Yhre</b>				103.748 L
36	6	<b>Sächter</b>			17.291 33 L
72	12	2	<b>Pazeide</b>		8.645 67 L
720	120	20	10	<b>Mass</b>	864.567 L

For wine in Neumarkt; in Altenburg, Hocheppan, Kaltern and Leimburg, now parts of Italy

			Metric	Metric
<b>Yhre</b>			79.229 L	79.083 L
12	<b>Pazeide</b>		6.602 4 L	6.590 25 L
72	6	<b>Ortsmass</b>	1.100 4 L	1.098 375 L

In Merano, now part of Italy

			Metric
<b>Vogtei-Yhre</b>			72.845 L
12	<b>Vogtei-Pazeide</b>		6.070 417 L
72	6	<b>Vogtei-Mass</b>	1.011 736 L

In Magasa, now part of Italy, in 1811 and 1850

				Metric	Metric
<b>zerla</b>				55.426 L	49.768 L
4	<b>secchia</b>			13.856 5 L	12.442 L
36	9	<b>pinta</b>		1.539 6 L	1.382 4 L
72	18	2	<b>boccale</b>	769.80 mL	691.22 mL

In Molina and Tiarno, now parts of Italy; in Mori, now part of Italy, in 1811

		Metric	Metric
<b>Brenta</b>		114.600 L	113.740 L
81	<b>Mass</b>	1.326 870 3 L	1.404 197 5 L

In Caldonazzo, now part of Italy, as reported in 1811 and 1850

			Metric	Metric
<b>Brenta</b>			94.610 L	93.416 L
2	<b>Congiala</b>		47.305 L	46.708 L
72	36	<b>Mass</b>	1.314 028 L	1.297 444 L

In Pergine, now part of Italy, as reported 1811 and 1817

			Metric	Metric
<b>Brenta</b>			90.894 L	91.486 L
2	<b>Congiala</b>		45.447 L	45.743 L
72	36	<b>Mass</b>	1.262 417 L	1.270 639 L

In Aldeno, Calliano and Villa, now parts of Italy; in Brentonico, now part of Italy

					Metric	Metric
<b>Brenta</b>					109.138 L	106.578 L
2	<b>Congiala</b>				54.569 L	53.289 L
6	3	<b>Staja</b>			18.189 67 L	17.763 L
24	12	4	<b>Viertel</b>		4.547 417 L	4.440 75 L
108	54	18	4½	<b>Mass</b>	1.010 537 L	986.833 mL

In Arco and Drena, now parts of Italy

			Metric
<b>Brenta</b>			116.717 L
9	<b>Staja</b>		12.968 555 L
90	10	<b>Mass</b>	1.296 855 L

In Condino, Creto, Riva, Stenico, Storo, Tenno and Tione, now parts of Italy

			Metric
<b>Brenta</b>			117.776 L
1 1/8	<b>kleine Brenta</b>		104.689 78 L
108	96	<b>Ortssmass</b>	1.090 518 5 L

For wine in Pustertal and Toblach, now parts of Italy

				Metric
<b>Fuder</b>				622.489 L
7	<b>Yhre</b>			88.927 L
84	12	<b>Pazeide</b>		7.410 583 3 L
756	108	9	<b>Mass</b>	823.398 1 mL

At Rovereto, now part of Italy

			Metric
<b>emero</b>			56.589 000 L
40	<b>mossa</b>		1.414 725 L
160	4	<b>zimento</b>	353.681 mL

For squeezed grape mash in Tramin, now part of Italy

		Metric
<b>Braschlet-Yhre</b>		81.592 L
12	<b>Braschlet-Pazeide</b>	6.799 33 L

For general use in Trient, now part of Italy

							Metric
<b>Carro</b>							628.080 L
6	<b>Brenta</b>						104.680 L
12	2	<b>Congiala</b>					52.340 L
24	4	2	<b>Pazeide</b>				26.170 L
48	8	4	2	<b>Stajo</b>			13.085 L
384	64	32	16	8	<b>Boccale</b>		1.635 625 L
576	96	48	24	12	1½	<b>Mossa</b>	1.090 416 7 L

In Trient, now part of Italy

			Metric
<b>Conzo, Orna, or Yhre</b>			78.516 L
48	<b>Boccale</b>		1.635 76 L
72	1½	<b>Ortsmass</b>	1.090 5 L

Other reported measures:

1 **halbe Maass** (for beer at Innsbruck, now part of Austria) = 534.515 mL.

1 **Yhre** (for squeezed grape mash in Gufidaun, Klausen, Kollman and Villanders, now parts of Italy) = 129.685 L;

1 **Yhre** (for must in Gufidaun, Klausen, Kollman and Villanders, now parts of Italy) = 116.716 49 L;

1 **Brente** (in Rovereto) = 113.140L;

1 **Altmass** (for squeezed grape mash in Neumarkt, now part of Italy) = 109.208 L;

1 **Brenta** (for must in Arco and Drena, now parts of Italy) = 103.746 L;

1 **Neumass** (for squeezed grape mash in Neumarkt, now part of Italy) = 102.328 5 L;

1 **Altmass** (for must in Neumarkt, now part of Italy) = 87.713 L;

1 **Neumass** (for must in Neumarkt, now part of Italy) = 87.347 L;

1 **Yhre** (for must in Kastelbell-Tschars and Schlanders, now parts of Italy) = 85.999 L;

1 **Yhre** (for squeezed grape mash in Merano, now part of Italy) = 83.561 L;

1 **Yhre** (for squeezed grape mash in Neumarkt, now part of Italy) = 81.906 L;

1 **Yhre** (for must in Merano, now part of Italy) = 80.570 L;

1 **Yhre** (for wine in Forst, Gargazon, Glurns, Kastelbell-Tschars, Marling, Matsch, Merano, Mölten, Montan, Passeiertal, Schenna, Schlanders, Stein unter Leoben, Tisens and Ultental, now parts of Italy) = 78.926 L;

1 **Alp-Mass** (for milk at Partschins and Rabland, now parts of Italy, in 1622) = 564 mL.

## 45.6 Units of Weight

At Innsbruck, now part of Austria, based on [MART3]

				Metric
<b>Centner</b>				56.290 170 kg
100	<b>Pfund</b>			562.902 g
3200	32	<b>Loth</b>		17.591 g
12,800	128	4	<b>Quentchen or Quintel</b>	4.398 g

For milk in Mühlbachl, now part of Austria

		Metric
<b>Napf</b>		4.15 L
28	<b>Zieger, Krachele, grosser Löffel or Schale</b>	148.214 mL

Three reported scales for milk in the Oberinntal valley, now part of Austria

			Metric	Metric	Metric
<b>Kopf or Zon-Fass</b>			2.80 kg	3.36 kg	3.92 kg
8	<b>Melch</b>		350.04 g	420.05 g	490.05 g
64	8	<b>Löffel</b>	43.75 g	52.50 g	61.26 g

For milk in the Paznaun valley, now part of Austria

		Metric
<b>Schlutte</b>		3.360 378 kg
6	<b>Wiener Pfund</b>	560.063 g

In Belluno and Treviso, now parts of Italy

		Metric	Metric
<b>libra grossa/sottile</b>		516.748 9 g	301.230 g
12	<b>oncia</b>	43.062 4 g	25.102 5 g

For milk in the Zillertal valley, now part of Austria

		Metric
<b>Napf</b>		2.803 54 kg
5	<b>Salzburger Pfund</b>	560.708 g

In Bolzano, now part of Italy, based on [ROTT2]

				Metric
<b>Saum</b>				50.117 2 kg
4	<b>Zentner</b>			12.529 3 kg
100	25	<b>Pfund</b>		501.172 g
1800	450	18	<b>Unze</b>	27.843 g

In Ala, Arco, Brentonico and Mori, now parts of Italy, in 1782 and 1811

		Metric	Metric
<b>libra</b>		327.635 g	330.018 g
12	<b>oncia</b>	27.303 g	27.501 g

In Bolzano, now part of Italy, based on [NIEM] and [MART3]

			Metric	Metric
<b>Saum or soma</b>			200.384 kg	200.442 920 kg
4	<b>Centner or quintale</b>		50.096 kg	50.110 730 kg
400	100	<b>Pfund or libbra</b>	500.96 g	501.107 3 g

In Ala and Pilcante, now parts of Italy, in 1811 and 1841

		Metric	Metric
<b>libra</b>		332.602 g	332.538 g
12	<b>oncia</b>	27.717 g	27.711 g

In Aldeno, Calliano, Rovereto, Vallarsa-Tal, Villa and Volano, now parts of Italy, in 1769 and in 1850

		Metric	Metric
<b>libra<sup>a</sup></b>		332.538 g	332.051 g
12	<b>oncia</b>	27.711 g	27.671 g

<sup>a</sup>According to [ROTT2], also reported as 332.215 g

In Borgo Valsugana, Caldano, Castell Tesino and Lavis, now parts of Italy

		Metric
<b>libra sottile</b>		501.172 g
18	<b>oncia</b>	27.843 g

In Arco, Dro and Nago-Torbole, now parts of Italy, in 1770 and 1811

		Metric	Metric
<b>libra</b>		328.668 g	328.459 g
12	<b>oncia</b>	27.389 g	27.372 g

At Brescia, now part of Italy

						Metric
<b>carro</b>						802.030 750 kg
100	<b>peso or rubbo</b>					8.020 307 5 kg
2500	25	<b>libbra</b>				320.812 3 g
30,000	300	12	<b>oncia</b>			26.734 36 g
480,000	4800	192	16	<b>dramma</b>		1.670 09 g
1,920,000	19,200	768	64	4	<b>quarto</b>	417.72 mg

In Buchenstein, now part of Italy

		Metric
<b>Gerichtspfund</b>		481.651 g
32	<b>Lot</b>	15.052 g

At Caldonazzo, Cavalese, Cles, Male and Trient, now parts of Italy, in 1782, 1811 and 1817

		Metric	Metric	Metric
<b>libra</b> <sup>a</sup>		336.720 g	336.256 g	336.915 g
12	<b>oncia</b>	28.060 g	28.021 g	28.076 g

<sup>a</sup>According to [ROTT2], 1 **libra** (for silk) = 336.828 g

At Condino, Creto, Molina and Tiarno, now parts of Italy, in 1841 and 1850

		Metric	Metric
<b>libra</b>		350.037 g	356.986 g
12	<b>oncia</b>	29.170 g	29.749 g

At Meran (before 1782 and after 1782), Kaltern (in 1839) and Ulten, now parts of Italy

		Metric	Metric	Metric	Metric
<b>Pfund</b> <sup>a</sup>		504.054 g	504.277 g	459.249 g	504.272 g
18	<b>Unze</b>	28.003 g	28.015 g	25.514 g	28.015 g

<sup>a</sup>According to [ROTT2], also reported as 504.347 g

At Lana and Schlanders, now parts of Italy, before 1782

		Metric
<b>Pfund</b>		522.072 g
12	<b>Unze</b>	43.506 g

At Pergine Valsugana, now part of Italy

		Metric
<b>libra grossa</b> <sup>a</sup>		517.654 g
12	<b>oncia</b>	43.138 g

<sup>a</sup>According to [ROTT2], also reported as 516.301 g and as 515.609 g

1 **libra sottile** (in 1782) = 340.589 g.

At Riva and Tenno, now parts of Italy, in 1782, 1811 and 1839

		Metric	Metric	Metric
<b>libra</b>		331.838 g	329.469 g	329.447 g
12	<b>oncia</b>	27.653 g	27.456 g	27.454 g

At Roveredo, now part of Italy

		Metric
<b>libbra</b>		560.060 g
36	<b>loti</b>	15.557 g

For silk at Roveredo, now part of Italy

			Metric
<b>libbra</b>			331.998 g
12	<b>oncia</b>		27.666 g
144	12	<b>denaro</b>	2.306 g

At Schlanders (after 1782) and Kastelruth (after 1839), now parts of Italy

		Metric	Metric
<b>Pfund</b>		448.246 g	450.448 g
16	<b>Unze</b>	28.015 g	28.153 g

At Torcegno, now part of Italy

				Metric
<b>libra</b>				513.388 g
12	<b>oncia</b>			42.782 g
144	12	<b>dramma</b>		3.565 g
9792	816	68	<b>gran</b>	52.43 mg

At Val Giudicarie, now part of Italy

				Metric
<b>carro</b>				420.5 kg
5	<b>fasso</b>			84.1 kg
50	10	<b>peso</b>		8.41 kg
500	100	10	<b>libbra</b>	841 g

For mulberry leaves in Trento, now part of Italy, as reported in 1811

		Metric
<b>Sack</b>		33.603 78 kg
100	<b>Pfund</b>	336.037 8 g

For potatoes in Trento, now part of Italy, as reported in 1782

		Metric
<b>Peso</b>		8.418 kg
25	<b>Orts-Pfund</b>	336.72 g

For potatoes in Trento, now part of Italy, as reported in 1811

		Metric
<b>Peso</b>		8.400 945 kg
15	<b>Wiener Pfund</b>	560.063 g

For straw and hay in Mori, now part of Italy

		Metric
<b>biroccio</b>		504.056 7 kg
60	<b>pesa</b>	8.400 945 kg

For hay in Giudicarie, now part of Italy

				Metric	Metric
<b>carro</b>				7.486 m <sup>3</sup>	420.500 kg
5	<b>fasse</b>			1.497 2 m <sup>3</sup>	84.100 kg
50	10	<b>pesa</b>		149.72 dm <sup>3</sup>	8.410 kg
500	100	10	<b>libbra</b>	–	841.0 g

For milk in the Schlinigtal valley, now part of Italy

		Metric
<b>Kopf</b>		4.482 46 kg
10	<b>Mark</b>	448.246 g

For cheese in Castle Tyrol, now part of Italy, as reported in 1505

		Metric
<b>Sämb</b>		63.043 375 kg
125	<b>Pfund</b>	504.347 g

For cheese in Gries-Quirein, now part of Italy, as reported in 1465

		Metric
<b>Schott</b>		8.895 13 kg
10	<b>Pfund</b>	889.513 g

For hay in Stubaital

			Metric
<b>Tasche</b>			280.031 50 kg
1¼	<b>Reis</b>		224.025 26 kg
5	4	<b>Wiener Zentner</b>	56.006 31 kg

For gold in Trento

		Metric
<b>Goldpfund</b>		378.504 g
12	<b>Goldunze or oncia da orefici</b>	31.542 g

Venezian scale for gold and silver

		Metric
<b>marco</b>		238.499 360 g
8	<b>oncia</b>	29.812 420 g

For medical use

					Metric
<b>Medicinalpfund</b>					420.009 g
12	<b>Unze</b>				35.000 75 g
96	8	<b>Drachme</b>			4.375 09 g
288	24	3	<b>Skrupel</b>		1.458 36 g
5760	480	60	20	<b>Gran</b>	72.92 mg

Other reported measures:

- 1 **Muth** (for oil) = 58.164 134 kg;
- 1 **Käse** (for cheese in Hall in Tyrol, now part of Austria, as reported in 1320) = 2.660 3 kg;
- 1 **Käse** (for cheese in Kundl, now part of Austria, as reported in 1330) = 1.680 189 kg;
- 1 **peso** (in Caldonazzo, Cavalese, Cles, Male and Trient, now parts of Italy) = 8.400 945 kg;
- 1 **libra** (in Carzano, Ronchi, Telvano, Telve, Telve di Sopra and Torcegno, now parts of Italy) = 512.294 g or 513.388 g;
- 1 **Pfund** (in Alteburg, Neuhaus and Sarntal, now parts of Italy) = 511.172 g;
- 1 **Pfund** or **libra** (in Ampezzo, now part of Italy) = 491.274 g;
- 1 **Gerichtspfund** (in Ampezzo, now part of Italy) = 490.052 g;
- 1 **Pfund, March** or **Mark** (in Glurns, now part of Italy) = 448.246 g;
- 1 **leichtes Pfund** (in Stenico, now part of Italy) = 356.961 g.

46 Uganda

See also *Kenya*.

This area fell under British rule in 1890, with the British East Africa Company administering the region. A British protectorate over Buganda was declared in 1894 and over Ankole, Bunyoro-Kitara, Busoga and Tooro in 1896. The area became part of the British East Africa Protectorate in 1895, and was separated into British East Africa and the Uganda Protectorate in 1903.

Uganda gained its independence in 1962. In 1993, the Kingdom of Buganda was restored, and got a large degree of autonomy from the Ugandan government.

Before colonization, units of length referred to the human body and units of capacity depended upon the article involved. During the late nineteenth century, the protectorate was bound to the British Imperial system of weights and measures. The metric system has been official since 1950 and compulsory since 1967–69.

*Main sources:* [EBER], [STEE], [UN55], [UN66], and [ZASL]

46.1 Currency

- 1967–: 1 Uganda shilling = 100 cents
- 1921–1966: 1 East African shilling = 100 cents
- 1920–1921: 1 East African florin = 100 cents
- 1906–1920: 1 East African rupee = 100 cents
- 1895–1906: 1 Indian rupee = 16 anna = 64 pice
- eighteenth century: cowrie shells (*Cypraea moneta*) and salt packed up in cylindrical leaf packages weighing from 20 to 30 lbs each.

## 46.2 Units of Length

Traditional system

				Metric
<b>jora</b>				~27 m
15	<b>pima</b> <sup>a</sup>			~1.8 m
60	4	<b>mukono</b> <sup>b</sup>		~460 mm
120	8	2	<b>shibiri</b> <sup>c</sup>	~230 mm

<sup>a</sup>The distance from the tip of one outstretched arm to the tip of the other

<sup>b</sup>The distance from the elbow to the tip of the outstretched middle finger

<sup>c</sup>The distance from the tip of the thumb to the tip of the extended second finger

Other traditional measures:

1 **futikamba** (lit. *foot-rope*) = a kind of tape measure, mainly used for textiles;

Wooden poles for home building were measured by using the length of the foot of the builder.

Lengths of cloth were measured either by a short cubit, *mkono mkonde*, or by a full cubit, *mkono mkamili*.

Both of these lengths were determined according to the buyer's arm.

British Imperial-linked system during the late nineteenth century

				Imperial	Metric
<b>maili</b>				1 mile	1,609.344 m
1760	<b>yadi</b>			1 yard	914.4 mm
5280	3	<b>futi</b>		1 foot	304.8 mm
63,360	36	12	<b>inchi</b>	1 inch	25.4 mm

## 46.3 Units of Capacity

Traditionally, the Ganda people used bottle gourds (*Lagenaria siceraria*) to measure liquids.

British Imperial-linked system during the late nineteenth century

				Imperial
<b>debe</b>				4 gallon
8	<b>pishi</b>			1 half gallon
16	2	<b>kisaga</b>		1 quart
32	4	2	<b>kibaba</b> <sup>a</sup>	1 pint

<sup>a</sup>There were two methods for weighing grain: *kibaba cha mfuto*, a level kibaba, and *kibaba cha tele*, a heaped kibaba

Metric-linked system

				Metric
<b>debe</b>				8 L
8	<b>pishi</b>			2 L
16	2	<b>kisaga</b>		1 L
32	4	2	<b>kibaba</b>	500 mL

## 46.4 Units of Weight

Traditional measures used by the Ganda people:

1 **luby**a (for salt) = ~30–40 lbs = ~13½–18 kg;

1 **lutata** (for sweetpotatoes) = ~30 lbs = ~13½ kg;

1 **kiribwa** (for coffee) = ~20 lbs = ~9 kg;

1 **kibo** = ~10 lbs = ~4½ kg.

British Imperial-linked system during the late nineteenth century

			Imperial	Metric
<b>frasila</b>			36 lbs	16.329 kg
36	<b>ratli</b> or <b>ratili</b>		1 lb	453.592 g
576	16	<b>wakia</b> or <b>aunsi</b>	1 oz	28.349 g

After metrification:

1 **kilo** = 1 kg.

## 47 Ukraine [Formerly: Ukrainian National Republic, Ukrainian State, Ukrainian Soviet Socialist Republic]

See also *Bukovina*, *Galicja* and *Lodomeria*, *Moldavia*, *Ottoman Empire*, *Romania*, and *Russia*.

After almost four hundred years of Mongol, Golden Horde, Lithuanian, Polish and Ottoman domination, Hetman Bohdan Khmelnytsky regained Ukrainian independence in the seventeenth century. In the mid-eighteenth century, Eastern Ukraine was controlled by Russia, and Western Ukraine came under Austro-Hungarian rule. With the disintegration of the Russian and Austro-Hungarian Empires, a Soviet Ukrainian People's Republic was set up in 1917 and the Ukrainian People's Republic was founded in 1918. The People's Republic was absorbed by Soviet Ukraine in 1921, and the Ukrainian Soviet Socialist Republic became a founding member of the Soviet Union in 1922. Bukovina gained its independence from Austria in 1918, was part of Romania from 1918 to 1947, when it became part of Ukraine. Carpatho-Ukraine was part of Czechoslovakia until 1939, and part of Hungary until 1945, when it was incorporated into the Ukrainian SSR. Crimea was part of the Russian SFSR, and was then transferred to Ukraine in 1954. Ukraine declared its independence from the Soviet Union in 1991.

Weights and measures were traditionally not standardized, and varied spatially until the rise of the modern centralized states. Standardized scales were adopted during the Polish-Lithuanian Commonwealth, as well as when land areas fell under Austro-Hungarian and Russian rule. The metric system was officially adopted in 1875, and has been compulsory since 1927.

*Main sources:* [BELI], [IANI], [IERO], [HIMK], [HRAT], [KAME], [KRAV], [RYBA], and [SIDO]

## 47.1 Currency

1996–:	1	Ukranian hryvnia	=
	100	kopiyok	
1992–1996:	1	Ukranian karbovanets coupon	
1942–1945:	1	Ukranian karbovanets	
1923–1992:	1	Soviet ruble = 100 kopeks	
1917–1923:	1	Ukranian karbovanets	=
	2	grivna = 200 shahiv	
–1917:	1	Russian ruble = 100 kopeks	

## 47.2 Units of Quantity

1 **tuzin** (used for various commodities) = 12.

For eggs, fruit, vegetables, and coins

копа		Metric
<b>kopa</b>		60
2	<b>polukopa</b> <sup>a</sup>	30

<sup>a</sup>When used for grain sheaves, called **polukipok**

## 47.3 Units of Length

Traditional measures:

- 1 **popryshche** = 1000 kroks;
- 1 **perestril** = the distance an arrow shot from a bow could travel = roughly 60–70 m;
- 1 **koyi sazhen** or **kosovyi sazhen** = the distance between the toes of the left foot and the fingertips of the vertically raised right arm;
- 1 **makhovyi sazhen** = the breadth of the horizontally extended arms;
- 1 **sazhen** or **siazhen** = two large steps;
- 1 **krok** = a step;
- 1 **stopa** = the length of a foot;
- 1 **likot** = the span from the elbow to the tip of the fingers;
- 1 **velyka piad** = (large palm), the span from the extended thumb to the tip of the little finger;
- 1 **mala piad** = (small palm), the span from the extended thumb to the forefinger;
- 1 **palets** = the breadth of the finger.

Traditional upper scale during the eleventh–twelfth centuries

						Metric
(large) <b>verstva</b>						~1900 m
2	(small) <b>verstva</b>					~950 m
4 1/6	2 1/12	(large) <b>hin</b>				~456 m
12½	6¼	3	(middle) <b>hin</b>			~152 m
16 2/3	8 1/3	4	1 1/3	(small) <b>hin</b>		~114 m
1000	500	240	80	60	<b>sazhen</b>	~1.9 m

Polish-Lithuanian scale during the sixteenth century

			Metric
<b>likot</b>			595.2 mm
2	<b>stopa</b>		297.6 mm
24	12	<b>tsal</b> <sup>a</sup>	24.8 mm

<sup>a</sup>The width of a thumb

Other distances used during the sixteenth–seventeenth centuries:

- 1 Ukrainian **mylia** = 9278 m;
- 1 German **Meile** = 7422 m;
- 1 Polish **mila** = 5566 m.

During the eighteenth century in Ukrainian areas that came under Russian rule

				Metric
<b>versta</b>				1066.8 m
500	<b>sazhen</b>			2.133 6 m
1500	3	<b>arshyn</b>		711.2 mm
24,000	48	16	<b>vershok</b>	44.45 mm

British Imperial-linked system before 1927 in Ukrainian areas that came under Russian rule

					Metric
<b>sazhen</b>					2.133 6 m
7	<b>fut</b>				304.8 mm
84	12	<b>diuim</b>			25.4 mm
840	120	10	<b>liniia</b>		2.54 mm
8400	1200	100	10	<b>tochk</b>	254 µm

In Western Ukraine after 1855, when it came under Austro-Hungarian rule

		Metric
<b>sazhen</b>		1.896 m
6	<b>stop</b>	316 mm

Some measures in Western Ukraine after 1855:

- 1 **поштовий ми́лі (postal mile)** = 7580 m;
- 1 **likot** = 778 mm.

For cloth during the nineteenth and twentieth centuries

				Metric
<b>postav</b>				27.968 m
4	<b>stina</b> or <b>stinka</b>			6.992 m
36 4/5	9 1/5	<b>Mira</b>		760 mm
1104	276	30	<b>tsal</b>	25.33 mm

## 47.4 Units of Area

Traditional system during the eleventh–twelfth centuries

				Metric
<b>sokha</b>				~4500 ha
	square <b>verstva</b>			~90.25 ha
		<b>vyt</b>		~63 ha
400–600	10	6–8	<b>desiatyna</b>	~9 ha

Lithuanian scale and Royal scale during the fifteenth century

		Metric	Metric
<b>morg</b> <sup>a</sup>		7123 m <sup>2</sup>	5985 m <sup>2</sup>
300	<b>prut</b>	23.74 m <sup>2</sup>	19.95 m <sup>2</sup>

<sup>a</sup>Said to equal the size of a field that could be ploughed using a pair of oxen in a morning

During the sixteenth century (Polish-Lithuanian Commonwealth)

			Metric
(large) <b>lan</b> <sup>a</sup>			~243,600 m <sup>2</sup>
1 9/20	(small) <b>lan</b>		~168,000 m <sup>2</sup>
43½	30	<b>morg</b>	~5600 m <sup>2</sup>

<sup>a</sup>Also called a **Flemish lan** or a **Chelmno lan**

<sup>b</sup>Also called a **Franconian lan**

After 1557

Боло́ка	моприб	Metric
<b>voloka</b> <sup>a</sup>		~168,000 m <sup>2</sup>
30	<b>morg</b>	~5600 m <sup>2</sup>

<sup>a</sup>The amount of land a peasant could harrow in a day. Later, it was reported as 33 morgy

In Ukrainian areas that came under Russian rule after 1753

				Metric
<b>desiatyna</b>				10,925.397 5 m <sup>2</sup>
2400	<b>square sazhen</b>			4.552 25 m <sup>2</sup>
21,600	9	<b>square arshyn</b>		50.58 dm <sup>2</sup>
1,058,400	441	49	<b>square fut</b>	1.032 dm <sup>2</sup>

Measures in Western Ukraine after 1855:

1 **morg** = 5750 m<sup>2</sup>.

During the eighteenth–nineteenth centuries

						Metric
<b>chvertka</b> <sup>a</sup>						~109,254 m <sup>2</sup>
1 2/3	<b>zahir</b> <sup>b</sup>					~65,552 m <sup>2</sup>
3 1/3	2	<b>vidriz</b>				~32,776 m <sup>2</sup>
5	3	1½	<b>riza</b>			~21,851 m <sup>2</sup>
6 2/3	4	2	1 1/3	<b>polurizka</b>		~16,387 m <sup>2</sup>
10	6	3	2	1½	<b>desiatyna</b>	~10,925 m <sup>2</sup>

<sup>a</sup>Varying by location between 8 and 10 desiatyny

<sup>b</sup>Varying by location between 5 and 6 desiatyny

During the eighteenth–nineteenth centuries

			Metric
<b>klitka</b>			~67,200 m <sup>2</sup>
1 1/11	<b>pishak</b>		~61,600 m <sup>2</sup>
12	11	<b>morg</b>	~5600 m <sup>2</sup>

Other measures reported during the eighteenth–nineteenth centuries:

1 **den** = the amount of land that could be ploughed in a day = about ¾ desiatyna = ~8200 m<sup>2</sup>;

1 **upruh** = the amount of land that could be ploughed using a pair of oxen in a third day = 1/3 den = ~2700 m<sup>3</sup>.

## 47.5 Units of Volume

1 **cubic sazhen** (for lumber) = 9.712 7 m<sup>3</sup>.

## 47.6 Units of Dry Capacity

Traditional measures:

1 **horst** = a handful;

Various wooden containers were used for grain, e.g., **chetveryk**, **korets**, **lukno**, **mishok**, **mirka**, **oslynka**, and **vidro**.

Honey and mead were measured out in containers called **koloda** and **provvara**.

Salt was measured out in containers called **holovazhnia** and **puz**.

In Ukrainian areas that came under Russian rule during the eighteenth–twentieth centuries

				Metric
<b>chetvert</b>				209.9 L
2	<b>mir</b> or <b>osmina</b>			104.95 L
8	4	<b>chetvertyk</b> or <b>chetverik</b>		26.24 L
64	32	8	<b>harntsia</b> or <b>garnets</b>	3.28 L

Other measures reported during the nineteenth century:

In Ukrainian areas that came under Russian rule during the eighteenth–twentieth centuries

						Metric
<b>bochka</b>						491.96 L
40	<b>vidro</b>					12.299 L
400	10	<b>kukhlia</b>				1.229 9 L
800	20	2	<b>pliashka</b>			614.95 mL
4000	100	10	5	<b>chark</b>		122.99 mL
8000	200	20	10	2	<b>shkalyk</b>	61.495 mL

1 **chiló** (for wheat in Odessa) = 2½ chetvert = 524.769 L, but also reported as 9 Metzen of Vienna = 553.381 650 L;  
1 **oko** = 1–1½ L.

47.7 Units of Liquid Capacity

Traditional measures:

Liquids were measured out in vessels called **bochka**, **kad**, **kobel**, **okova**, **skord**, and **vidro**

During the sixteenth century (during the Polish-Lithuanian Commonwealth)

				Metric
<b>bochka</b>				~216 L
72	<b>harnets</b>			~3 L
288	4	<b>kvarty</b>		~750 mL
1152	16	4	<b>kvatyrky</b>	~187.5 L

## 47.8 Units of Weight

During the tenth–eleventh centuries

								Metric
<b>berkovets</b>								165.120 kg
2½	<b>kap</b>							66.048 kg
3 1/3	1 1/3	<b>kentar</b> or <b>kontar</b>						49.536 kg
10	4	3	<b>pud</b>					16.512 kg
300	120	90	30	<b>ansyr</b>				550.4 g
400	160	120	40	1 1/3	<b>hryvnia</b>			412.8 g
38,400	15,360	11,520	3840	128	96	<b>zlotnyk</b>		4.3 g
768,000	307,200	230,400	76,800	2560	1920	20	<b>pochka</b>	215 mg

During the eleventh–twelfth centuries, the Byzantine **didrachm** (about 2 zlotnyky) was also used as a weight.

Warsaw scale during the sixteenth century (Polish-Lithuanian Commonwealth)

							Metric
<b>tsentnar</b>							64.83 kg
5	<b>kamin</b>						12.967 kg
160	32	<b>funt</b>					405.2 g
320	64	2	<b>hryvnia</b> or <b>grzywna</b>				202.6 g
5120	1024	32	16		<b>lut</b>		12.66 g
1,344,000	268,800	8400	4200		262½	<b>as</b>	48.2 mg

Szczecin scale during the sixteenth century (Polish-Lithuanian Commonwealth)

<b>funt</b>				405.5 g
2	<b>hryvnia</b> or <b>grzywna</b>			202.75 g
32	16	<b>lut</b>		12.67 g
8400	4200	262½	<b>as</b>	48.3 mg

Kraków scale during the sixteenth century (Polish-Lithuanian Commonwealth)

						Metric
<b>tsentnar</b>						51.74 kg
5	<b>kamin</b>					10.348 kg
130	26	<b>funt</b>				398.0 g
260	52	2	<b>hryvnia or grzywna</b>			199 g
4160	832	32	16	<b>lut</b>		12.44 g
1,092,000	218,400	8400	4200	262½	<b>as</b>	47.4 mg

In Ukrainian areas that came under Russian rule during the eighteenth–twentieth centuries

						Metric
<b>berkovets</b>						163.8 kg
10	<b>pud</b>					16.38 kg
400	40	<b>funt</b>				409.5 g
12,800	1280	32	<b>lot</b>			12.80 g
38,400	3840	96	3	<b>zlotnyk</b>		4.26 g
3,686,400	368,640	9216	288	96	<b>dolia</b>	44.4 mg

Other measures reported during the nineteenth century:

- 1 **kamin** (for lead, sugar, tobacco, and wax) = 24, 30, 32, or 36 funt;  
 1 **oko** = 1.248–1.283 g.

## 48 Umm al Qaiwain

See *United Arab Emirates*.

## 49 Union of South Africa

See *South Africa*.

## 50 Union of Soviet Socialist Republics (USSR)

See also *Russia*.

## 51 United Arab Emirates [Formerly: Trucial Oman, Trucial States]

During the sixteenth century, most nations along the Trucial coast became influenced by the Ottoman Empire. Thereafter, the region became known as the “Pirate Coast,” as raiders based there harassed the shipping industry. In 1853, the Sheiks in the area signed the Maritime Truce Treaty with the British, under which they agreed to a “perpetual maritime truce.” The Trucial Sheikdoms now also became known as the Trucial States. In 1971, Britain reaffirmed its decision to terminate its treaty relationships with

the Trucial Sheikdoms, whereupon the seven states joined with Bahrain and Qatar in an effort to form a union of Arab Emirates under British protection. The prospective members failed to agree on the terms of the union. Bahrain and Qatar declared their independence, and six of the sheikdoms (Abu Dhabi, Ajman, Fujairah, Sharjah, Dubai and Umm al-Qaiwain) united to form the United Arab Emirates in late 1971. Ras al-Khaimah joined the union in early 1972.

*Main sources:* [LANC] and [UN66]

### 51.1 Currency

- 1973–: 1 UAE dirham = 100 fils  
 1971–1973: 1 UAE dinar = 1000 fils  
 1966–1973: 1 Qatar and Dubai riyal = 100 dirhams (in Qatar and Dubai)  
 1966–1972: 1 riyal = 100 dirhams (in Ras al-Khaima)  
 1966–1971: 1 riyal = 100 dirhams (in Ajman, Dubai, Fujairah, Sharjah, and Umm al-Qaiwain)  
 1966–1971: 1 Bahraini dinar = 1000 fils (in Abu Dhabi)  
 1959–1966: 1 Persian Gulf rupee = 100 naye paise

### 51.2 Units of Capacity

Some containers in use during the nineteenth century:

- 1 **dharfa** = a large open rectangular container;  
 1 **gosah** = a rectangular container somewhat smaller than the dharfa; in some areas, interchangeable with the jirab;

- 1 **jirab** = a rectangular palm leaf sack, used at local markets and at the Bait al Naboodah;  
1 **gallah** or **galla** (for dates) = a round or square palm leaf sack used at local markets;  
1 **yelaa** = a smaller round palm leaf basket.

Other reported measures in the emirate of Ras al-Khaimah:

- 12 jirabs of dates (= about 480 kg) was considered as the minimum annual requirement for a five-member family.  
20 mun of wheat (= about 80 kg) was considered to be the subsistence quantity needed to sustain a family of 5–6 persons, from the wheat harvest until the start of the date crop in June (= 4–6 months).

Some other reported measures:

- 1 **cheeas** (a wooden measure for dry goods, used in Abu Dhabi) = about 2 L heaped, and about 1.6 L stricken measure;  
1 **qadah** = about 700 g or about 0.9 L;  
1 small wooden measure (unknown name, used in Abu Dhabi) = about 150 g or about 0.2 L.

51.3 Units of Weight

During the nineteenth century

							Metric
<b>bahár<sup>a</sup></b>							807.840 kg
10	<b>yilla<sup>b</sup></b>						80.784 kg
20	2	<b>farásala, yeerab, jirab, or ‘airab<sup>b</sup></b>					40.392 kg
25	2½	1¼	<b>gallah<sup>b</sup></b>				32.312 kg
200	20	10	8	<b>mun, mund, or maund</b>			4.039 kg
4800	480	240	192	24	<b>kiya</b>		168.3 g
28,800	2880	1440	1152	144	6	<b>dollar</b>	28.05 g

<sup>a</sup>One **bahar** (for firewood and salt) = 400 mun = 1615.60 kg  
<sup>b</sup>Usually used for dates. The **‘airab** was a rectangular palm leaf sack

Presumed scale for pearls and precious stones

			Metric
<b>yeka</b>			11.6 g
2	<b>methkal</b>		5.8 g
96	48	<b>rthi</b>	121 mg

Some reported local measures for cereal:

- 1 **al shawka** = unknown magnitude;  
1 **al seer** = unknown magnitude, but probably about 0.9 kg.

52 United Arab Republic

See *Egypt* and *Syria*.

This was a union between Egypt and Syria between 1958 and 1961, after which Syria seceded from the union. Egypt itself continued to be known officially as the “United Arab Republic” until 1971.

The metric system has been official since 1961.

53 United Kingdom

See also *Falkland Islands*, *Ireland*, *Scotland*, and *Wales*.

England was unified under William the Conqueror in 1066. The United Kingdom of Great Britain (including Scotland) was founded in 1707, the United Kingdom of Great Britain and Ireland was founded in 1801, and the United Kingdom of Great Britain and Northern Ireland was founded in 1927.

An edict issued by King Edgar the Peaceful (959–975) decided that the measures then in use in the city of Winchester would be valid throughout England. Several of these units dated back to the days when England was part of the Holy

Roman Empire. During early medieval times, the inch was known in both England and Wales as the length of three grains of sound ripe barley taken out the middle of the ear, well dried, and placed end to end in a row. In 1001, King Henry I of England (1100–1135) introduced a new measure of length, which was named the yard, according to William of Malmesbury (1095–1143). According to legend, it was determined by measuring the distance from the king's nose to the end of his thumb when his arm was outstretched. The distance was estimated at 914 mm, first defined by a law in 1305 (33 Edw. I, c.6) and again in 1353 (27 Edw. III, c.10). The length was also chosen to ensure that  $5\frac{1}{2}$  yards equaled a rod, the fundamental unit for measuring land areas. Aecer, the Saxon word from which the word “acre” is derived, meant a field, or sown land that was 4 rods wide and 40 rods long. Usually, this was reported to equal a field representing about 5 h of ploughing by a team of oxen. Around the time of the Domesday Survey (1086), William I required all weights and measures to be authenticated with the Royal Seal.

Some time between 1266 and 1303, in *Compositio ulnarum et perticarum*, standards were established for linear and area measures. During the early fourteenth century, King Edward I repeated the linear and area standards, and quoted values for the wine gallon and the London bushel. In an *Ordinance for Measuring Land*, in 1305, the acre was stated as being 160 square perches.

The *Magna Carta*, sealed by King John in 1215, and reiterated by Henry II in 1225, included a chapter requiring one measure for wine, one for ale and one for corn. The *Assize of Bread and Ale*, in 1266, stipulated standard weights and measures for these commodities.

Since antiquity, seed from the carob tree (*Ceratonia siliqua*), along with grains of barley and wheat, had been used to define units of mass. The carob seed, later also known as the carat (during Roman time, estimated as about 187.5 mg), when used as a unit of measurement, was traditionally regarded as equivalent to the weight of 3 barleygrains or 4 wheat grains. King Henry III (1216–1272) stated that the unit of weight called the grain that had been in use as a unit since the early 700s would be the weight of a

grain of wheat taken from the midst of the Ear and then dried.

In 1421, during the reign of Henry V, coal measures were standardized, while 2 years later, under Henry VI, the varying capacities of barrels, tuns, hogsheads, tertians, and pipes were identified for different goods. In 1495, Parliament ordered the construction of new standards for length, capacity, and weight. These standards were stored in the Treasury. In 1495, copies of the standards were supplied to forty-three shire towns in England.

The medieval dimensions were far from exact, and in addition, there were a large number of local measurements. In the mid 1600s, Queen Elizabeth I (1558–1603) appointed a commission at Cambridge University to examine the measurement system and propose appropriate corrections.

The Imperial Weights and Measures Act of 1824 repealed all previous legislation with respect to weights and measures. The standard yard was defined as the distance, at a temperature of 62 °C, between the centers of two gold studs on a brass rod that was in the custody of the Clerk of the House of Commons. This standard yard was destroyed in 1834, in the fire that burned the Houses of Parliament. A new Imperial standard yard, made of an alloy of copper, tin, and zinc in the ratio 16:2½:1, was thereafter employed.

The metric system has been official since 1897, and compulsory since 1995.

*Main sources:* [BARN3], [BRIT], [CLAR3], [CONN], [GRAH], [HULL], [MART5], [MUNR2], [POST], [ROSS], [WORLD], and [ZUPK5]

### 53.1 Currency

1971–:	1 pound sterling = 100 pence
1707–1970:	1 pound sterling = 20 shillings = 240 pence = 960 farthings

The coins minted during the reign of the Norman kings (1066–1154) were all silver pennies, minted at seventy local mints throughout the country. The first gold pennies were minted during the reign of Henry III. Under Edward I, the

groat = 4 pennies, the halfpenny and farthing came into use, and during the reign of Edward III, a more complex structure of gold and silver coins was established.

53.2 Units of Quantity

- 1 **last** (for red herrings during the sixteenth century) = 20 cade = 12,400;
- 1 **last** (for red herrings as reported c.1660) = 20 cade = 10,000;
- 1 **last** (for leather) = 1200;
- 1 **last** (for stockfish) = 1000;
- 1 **last** (for hides) = 144;
- 1 **last** (for flax and feathers) = 100;
- 1 **last** (for dogstones) = 3 pair;
- 1 **bale, ball, or bail** (for pipes) = 10 gross = 1440;
- 1 **herring-barrel** (for herring) = 1000 herrings (in 1357), and 1440 herrings (in 1713);
- 1 **cade, cag, or cayde** (during the eighteenth century) = 1000 sprats, 720 herrings, or 500 red herrings;
- 1 **cade, cag, or cayde** (for herring during the sixteenth century) = 620;
- 1 **cage or cadge** (for caged animals) = sometimes reported as 560;
- 1 **cask** (for red herring) = 450;
- 1 **case** (for eggs) = 12 trays of 30 eggs = 360;
- 1 **barrel** (for plates, black or white) = 300;
- 1 **box** (for key-rings) = 2 gross = 288;
- 1 **ring** = 240;
- 1 **skive** (for teasels during the fifteenth century (= dried burrs of the Fuller’s teasel (*Dipsacus fullonum* L.)) = about 100 (according to [COBB]);
- 1 **bale, ball, or bail** (for thread) = 100 bolts;
- 1 **hundred** (for skins from cats, coneys, kids and lambs) = 5 score skins = 100 skins;
- 1 **roll** (for parchment from the sixteenth century to the mid-nineteenth century) = 60 skins, later also reported as 72 skins;
- 1 **bale, ball, or bail** (for buckram) = 60 pieces;
- 1 **shock** (for anchors, boards, boxes, iron plates, locks, lutes, mirrors, ropes, shovels, and wooden canes and trays) = 60;

- 1 **sort** (for balances during the seventeenth century) = 4 dozens = 48;
- 1 **timber** = 40 skins of bear, ferret, fitch, martin, mink, otter and sable;
- 1 **bale, ball, or bail** (for fustian) = generally 40 or 45 half-pieces;
- 1 **bind, binne, or byne** (for skins) = 33;
- 1 **kipp** (a large sack) = 30 lamb skins or 50 goat skins;
- 1 **scordik** (for skins) = 24;
- 1 **box** (for kippers) = about 24 pairs;
- 1 **score** (for coal, when loaded on shipboard) = 21 chaldrons (one chaldron for the buyer);
- 1 **burden** (for cod, ling, and mulvel during the fifteenth–sixteenth centuries) = 20 or 22;
- 1 **score** = 20;
- 1 **bale, ball, or bail** (for boultel) = 20 pieces;
- 1 **dozen** = 12;
- 1 **case** (for wine bottles containing 750 mL) = 12;
- 1 **bundle, bondel, bondell, boundell, bundle, bundell, or byndle** (during the fourteenth–eighteenth centuries):
  - bast ropes, glover’s knives, and harness plates = 10;
  - birch brooms = 1 or 2 dozen;
  - brown paper = 40 quires;
- 1 **bundle** (for necklaces during the seventeenth century) = 10;
- 1 **case** (for recorders) = 5;
- 1 **cast** (for earthen pots) = 3;
- 1 **roll** (for cloth) = ½ piece, 600 ells long.

For eels during the thirteenth–nineteenth centuries

<b>gwyde, bind, binda, binde, bynd, or bynde</b>		250 eels
10	<b>stick, estik, estika, estike, stica, sticke, stike, stikke, styk, or styke</b>	25 eels

For garlic and onions

<b>hundred</b>			225
9	<b>bunch, bonch, bonche, bounche, or bunche</b>		25
15	1 2/3	<b>rope</b>	15

For fish

<b>ten hundred</b>					1320
2	<b>maze</b>				660
10	5	<b>long hundred</b>			132
330	165	33	<b>warp</b>		4
660	330	66	2	<b>hand</b>	2

For herring

<b>rees</b>		375
15	<b>glene or glean</b>	25

For colored glass during the fifteenth century

<b>ballon, balon, or balloon</b>		37½
12½	<b>bundle</b>	3

For white glass during the fifteenth century

<b>ballon, balon, or balloon</b>		150
25	<b>bundle</b>	6

For paper during the fifteenth century

<b>ballon, balon, or balloon</b>		12,000 sheets
24	<b>ream</b>	500 sheets

For counting sheep<sup>13</sup> in Cumbria, Lincolnshire and Yorkshire until the late nineteenth century

1 = <b>yana</b>	11 = <b>yana-dik</b>
2 = <b>tana</b>	12 = <b>tana-dik</b>
3 = <b>tethera</b>	13 = <b>tethera-dik</b>
4 = <b>pethera</b>	14 = <b>pethera-dik</b>
5 = <b>pimp</b>	15 = <b>bumfit</b>
6 = <b>sethera</b>	16 = <b>yana-bumfit</b>
7 = <b>lethera</b>	17 = <b>tana-bumfit</b>
8 = <b>hovera</b>	18 = <b>tethera-bumfit</b>
9 = <b>dovera</b>	19 = <b>pethera-bumfit</b>
10 = <b>dik</b>	20 = <b>gigit</b>

For writing paper and printing paper during the sixteenth–twentieth centuries

<b>bale<sup>a</sup></b>				4 800 sheets	5000 sheets
5	<b>mille or bundle</b>			—	1000 sheets
10	2	<b>ream<sup>b</sup></b>		480 sheets	500 sheets
200	40	20	<b>quyre or quire<sup>c</sup></b>	24 sheets	25 sheets

<sup>a</sup>Reported as 10 reams = 200 quyres = 5000 sheets since the late sixteenth century. Cf. British Museum: MS Reg. 18 C. XX (1590–1620). Folio 18b

<sup>b</sup>During the early twentieth century, according to [MART5, p. 191], there was also a **printer’s ream** = 21½ quires = 516 sheets. Since the late twentieth century, the standard ream for all types of paper is 500 sheets

<sup>c</sup>During the early nineteenth century, according to [MART5, p. 191], a “quire outsides” contained 20 imperfect sheets, some of which might even be torn

<sup>13</sup> See *The Athenaeum* **2603–2606**, pp. 338, 372, 403, 433. 15 Sep.–6 Oct. 1877 and *Notes & Queries* **11**, p. 206. Jan.–Jun. 1885.

53.3 Units of Length

Anglo-Saxon scale (occurs in written records between 910 and 1474)

								Metric
<b>millarium</b>								1480 m
8	<b>stade</b> or <b>stadium</b>							185 m
1000	125	<b>stride</b>						1.48 m
2000	250	2	<b>step</b>					740 mm
4,444 4/9	555 5/9	4 4/9	2 2/9	<b>pes manualis</b>				333 mm
5000	625	5	2½	1 1/8	<b>foot</b>			296 mm
8,888 8/9	1,111 1/9	8 8/9	4 4/9	2	1 7/9	<b>shaftment, shaftmond, shaftmonthe, or scaeftemunde<sup>a</sup></b>		166 mm
80,000	10,000	80	40	18	16	9	<b>digit<sup>b</sup></b>	18.5 mm

<sup>a</sup>The distance from the bottom of the fist to the tip of the outstretched thumb

<sup>b</sup>The width of a man’s middle finger

Some other measures reported during the eleventh–eighteenth centuries:

1 **span, spand, spane, spann, spanne, or spayn**  
= the distance from the tip of the smallest finger to the tip of the thumb on the outstretched hand = ½ cubit.

Edward I’s system after 1305

					Metric
<b>rod</b>					~5.03 m
5½	<b>ulna</b>				~0.914 m
16½	3	<b>foot</b>			~305 mm
198	36	12	<b>inch</b>		~25.4 mm
594	108	36	3	<b>barleycorn<sup>a</sup></b>	~8.5 mm

<sup>a</sup>At least as early as the twelfth century, an inch was thought of as 3 barleycorns laid end to end

Other units during the sixteenth–seventeenth centuries:

1 **aulme** = 5½ feet = about 1.65 m (see [HULL, p. 422]);

1 **brace** = the distance between the fingertips of the outstretched arms. [PURC] reported it as the length of a single arm;  
1 **career** (used in falconry) = 120 yd = 109.73 m;  
1 **clue** (for hemp and yarn during the eighteenth–nineteenth centuries) = 4800 yd = 43.872 m.

## Upper scale of the English standard linear system before 1826

								Metric
<b>league</b>								4,827.945 m
3	<b>mile</b>							1,609.315 m
22	7 1/3	<b>cable's length</b>						219.452 m
24	8	1 1/11	<b>furlong</b>					201.164 m
240	80	10 10/11	10	<b>Gunter's chain</b>				20.116 m
800	266 2/3	36 4/11	33 1/3	3 1/3	<b>rope</b>			6.035 m
960	320	43 7/11	40	4	1 1/5	<b>rod, pole or perche</b>		5.019 m
2640	880	120	110	11	3 1/3	2 3/4	<b>fathom</b>	1.829 m

## Middle scale of the English standard linear system before 1826

							Metric
<b>fathom</b>							1.829 m
1 1/5	<b>pace</b>						1.524 m
1 3/5	1 1/3	<b>cloth ell</b>					1.143 m
2	1 2/3	1 1/4	<b>yard<sup>a</sup></b>				914.38 mm
4	3 1/3	2 1/2	2	<b>cubit</b>			457.19 mm
6	5	3 3/4	3	1 1/2	<b>foot</b>		304.794 49 mm
8	6 2/3	5	4	2	1 1/3	<b>span</b>	228.596 mm

<sup>a</sup>[MART3] referred to papers written by Captain Kater, printed in 1818 and 1821 in the Philosophical Transactions of the Royal Society of London, in which the yard was estimated as 914.383 48 mm

## Lower scale of the English standard linear system before 1826

								Metric
span								228.596 mm
1 13/99	Gunter's link							201.164 mm
2¼	1 49/50	hand						101.598 mm
3	2 16/25	1 1/3	palm					76.199 mm
9	7 23/25	4	3	inch <sup>a</sup>				25.399 mm
27	23 19/25	12	9	3	barleycorn			8.466 5 mm
72	63 9/25	32	24	8	2 2/3	part		3.174 9 mm
90	79 1/5	40	30	10	3 1/3	1¼	line	2.539 9 mm

<sup>a</sup>After 1819 = 10,000/393 694 m = 0.025 400 438 m; after 1895 = 0.025 399 978 m; after 1922 = 0.025 399 956 m; after 1932 = 0.025 399 950 m; after 1947 = 0.025 399 931 m; and after 1956 = 0.025 400 m

Upper scale of the Imperial system<sup>14</sup> after 1826

								Metric
<b>statute league</b>								4,828.032 m
3	<b>statute mile</b>							1,609.344 m
24	8	<b>furlong</b>						201.168 m
960	320	40	<b>rod</b>					5.029 2 m
2640	880	110	2¾	<b>fathom</b>				1.828 8 m
5280	1760	220	5½	2	<b>yard</b>			0.914 4 m
15,840	5280	660	16½	6	3	<b>foot</b>		0.304 8 m
190,080	63,360	7920	198	72	36	12	<b>inch</b>	25.4 mm

After July 1, 1959, the British yard was defined identically to the international yard as 0.914 4 m. Before this date, the most precise measurement of the Imperial Standard Yard was 0.914 398 416 m (Sears et al. (1928). *Phil Trans A* 227:281)

Imperial upper scale, based on [MART3]

									Metric
<b>British league</b>									4,827.988 662 m
3	<b>British mile</b>								1,609.329 554 m
24	8	<b>furlong</b>							201.166 194 m
240	80	10	<b>chain</b>						20.116 619 m
754 2/7	251 3/7	31 3/7	3 1/7	<b>forest pole</b>					6.400 742 m
880	293 1/3	36 2/3	3 2/3	1 1/6	<b>woodland pole</b>				5.486 351 m
960	320	40	4	1 3/11	1 1/11	<b>pole or rod</b>			5.029 155 m
2640	880	110	11	3½	3	2¾	<b>fathom</b>		1.828 784 m
3168	1056	132	13 1/5	4 1/5	3 3/5	3 3/10	1 1/5	<b>geometrical pace</b>	1.523 986 m
5280	1760	220	22	7	6	5½	2	1 2/3	<b>yard</b> 914.392 mm

Upper scale of UK system after 1895 (including unofficial units)

								Metric
<b>league</b>								4,828.032 m
3	<b>mile</b>							1,609.344 m
24	8	<b>furlong</b>						201.168 m
26 2/5	8 4/5	1 1/10	<b>cable length</b>					182.88 m
240	80	10	9 1/11	<b>Gunter's chain</b>				20.116 8 m
960	320	40	36 4/11	4	<b>rod or pole</b>			5.029 2 m
2640	880	110	100	11	2¾	<b>fathom</b>		1.828 8 m
5280	1760	220	200	22	5½	2	<b>yard</b>	914.4 mm

After July 1, 1959, the British yard was defined identically to the international yard as 0.914 4 m. Before this date, the most precise measurement of the Imperial Standard Yard was 0.914 398 416 m (Sears et al. (1928). *Phil Trans A* 227:281)

<sup>14</sup> The system was defined by an act of Parliament in 1824 and officially adopted on January 1, 1826.

Lower scale of UK system after 1895 (including unofficial units)

											Metric
<b>yard</b>											0.914 4 m
1 1/5	<b>pace</b>										0.762 0 m
2	1 2/3	<b>cubit</b>									0.457 2 m
3	2½	1½	<b>foot</b>								0.304 8 m
4	3 1/3	2	1 1/3	<b>span</b>							0.228 6 m
4 6/11	–	–	1 17/33	–	<b>Gunter's link</b>						201.168 mm
9	7½	4½	3	2¼	–	<b>hand</b>					101.600 mm
12	10	6	4	3	–	1 1/3	<b>palm</b>				76.2 mm
36	30	18	12	9	198/25	4	3	<b>inch</b>			25.4 mm
432	360	216	144	108	95 1/25	48	36	12	<b>line</b>		2.116 7 mm
5184	4320	2592	1728	1296	1,140 12/25	576	432	144	12	<b>point</b>	176.39 µm

For cloth

										Metric
<b>French ell</b>										1.371 588 m
1 1/5	<b>English ell</b>									1.142 990 m
1½	1¼	<b>yard</b>								914.392 mm
1 53/55	1 7/11	1 17/55	<b>goad</b>							698.494 mm
6	5	4	3 1/18	<b>quarter</b>						228.598 mm
24	20	16	12 2/9	4	<b>nail</b>					57.149 mm
54	45	36	27½	9	2¼	<b>inch</b>				25.40 mm

For yarn

			Metric
<b>dozen</b>			19,750.86 m
12	<b>rand</b>		1,645.905 m
72	6	<b>lea</b>	274.317 5 m

For cotton cordage, based on [MART3]

					Metric
<b>spindle or spyndle</b>					13,825.603 895 m
18	<b>hank</b>				768.089 105 m
126	7	<b>ley, rap, or worp</b>			109.727 015 m
10,080	560	80	<b>thread or bout</b>		1.371 588 m
15,120	840	120	1½	<b>yard</b>	914.392 mm

For dry-spun linen cordage during the eighteenth–twentieth centuries

					Metric
<b>spindle or spyndle<sup>a</sup></b>					13,167.241 805 m
4	<b>hank</b>				3,291.810 451 m
48	12	<b>cut or ley</b>			274.317 537 m
5760	1440	120	<b>thread</b>		2.285 979 m
14,400	3600	300	2½	<b>yard</b>	914.392 mm

<sup>a</sup>This spindle was also used for jute

For flax and hemp, based on [MART3]

								Metric
<b>bundle or bole</b>								54,863.507 520 m
2 7/9	<b>dozen</b>							19,750.862 707 m
20	7 1/5	<b>hank</b>						2,743.175 376 m
33 1/3	12	1 2/3	<b>rand or slip</b>					1,645.905 226 m
100	36	5	3	<b>heer</b>				548.635 075 m
200	72	10	6	2	<b>lea or cut</b>			274.317 538 m
24,000	8640	1200	720	240	120	<b>tread</b>		2.285 979 m
60,000	21,600	3000	1800	600	300	2½	<b>yard</b>	914.392 mm

For wool cordage during the eighteenth–twentieth centuries

							Metric
<b>spindle or spyndle</b>							10,533.793 444 m
36		<b>ley</b>					292.605 373 m
48		1 1/3	<b>skein</b>				219.454 030 m
11,520		320	240		<b>thread or yard</b>		914.392 mm

For maritime use, based on [MART3]

		Metric
<b>sea league</b>		5,556.031 111 m
3	<b>sea mile</b>	1,852.010 370 m

For maritime use

								Metric
<b>nautical league</b>								5,559.552 m
3	<b>nautical mile</b>							1,853.184 m
30	10	<b>cable length<sup>a</sup></b>						185.318 4 m
30 2/5	10 2/15	1 1/75	<b>cable length</b>					182.880 m
256	85 1/3	8 8/15	8	<b>shackle<sup>b</sup></b>				22.86 m
1216	405 1/3	40 8/15	40	5	<b>Nautical chain</b>			4.572 m
3040	1,013 1/3	101 1/3	100	12½	2½	<b>fathom</b>		1.828 8 m
6080	2,026 2/3	202 2/3	200	25	5	2	<b>yard</b>	0.914 4 m

<sup>a</sup>This version of the cable length was used in the British Navy. [CLAR3]

<sup>b</sup>Used for the anchor chains of ships. In 1949, the British Navy changed the length to 15 fathoms, thus making it the same length as the American shot

Scale used by land surveyors

							Metric
<b>statute mile or land</b>							1,609.344 m
8	<b>furlong</b>						201.168 m
80	10	<b>Gunter's chain</b>					20.116 8 m
320	40	4	<b>rod or perch</b>				5.029 2 m
1760	220	22	5½	<b>yard</b>			0.914 4 m
5280	660	66	16½	3	<b>foot</b>		304.8 m
8000	1000	100	25	4 9/11	1 17/33	<b>Gunter's link</b>	201.168 m

Other units reported during the nineteenth century:

1 **billet, belet, billet, billet, billette, bylet, byllet, or bylott** (used for single sticks of firewood). Traditional billets had a length of 40 in = about 1.016 m. A single billet had a circumference of 7½ inches = about 19.050 cm, a cast billet (used for single sticks of firewood) = 10 inches = about 25.40 cm, and double cast billet = 14 inches = about 35.56 cm;

1 **iron** (used for measuring the thickness of sole leather) = 1/48 in = 530 µm.  
1 **bolt** (for canvas) = 42 yd = 38.405 m;  
1 **bolt** (for textiles in general) = 40 yd = about 36.58 m;  
1 **bolt** (for wallpaper of 18 in width) = 16 yd = 14.630 m;  
1 **bolt** (for wallpaper of 30 in width) = 15 yd = 13.716 m;

53.4 Units of Area<sup>15</sup>

During the early Middle Ages, based on [NOY] and [TOML]

							Metric
<b>librata terræ<sup>a</sup></b>							~485,614 m <sup>2</sup>
10	<b>solidata</b>						~48,561 m <sup>2</sup>
15	1 1/5	<b>acreme</b>					~40,468 m <sup>2</sup>
120	12	10	<b>acre<sup>b</sup></b>				~4047 m <sup>2</sup>
240	24	20	2	<b>obolata</b>			~2023 m <sup>2</sup>
480	48	40	4	2	<b>nook</b>		~1012 m <sup>2</sup>
960	96	80	8	4	2	<b>farding-deal</b>	~506 m <sup>2</sup>

<sup>a</sup>As much land area as would yield 20 shillings per annum. [TOML]

<sup>b</sup>A piece of land 40 perches long by 4 perches wide

For pieces of land during the eleventh–eighteenth centuries

							Metric
<b>ploughgang, plowland, carucate, carue, or hide<sup>a</sup></b>							647,485.698 m <sup>2</sup>
4	<b>virgate<sup>b</sup></b>						161,871.424 m <sup>2</sup>
8	2	<b>bovate<sup>c</sup></b>					80,935.712 m <sup>2</sup>
16	4	2	<b>fardel<sup>d</sup>, farthingdale, or acreme</b>				40,467.856 m <sup>2</sup>
160	40	20	10	<b>acre</b>			4,046.785 m <sup>2</sup>
640	160	80	40	4	<b>farthingdale or rood<sup>e</sup></b>		1,011.696 m <sup>2</sup>

<sup>a</sup>Probably originated as the amount of land needed to support a peasant family for a period of 1 year. During the eleventh century, usually expressed in terms of acres, with 60, 64, 72, 80, 96, 100, 120, 140, 160, and 180 acres being the most common measurements. This area was known as a carucate in Derby, Leicester, Lincolnshire, Norfolk, Nottingham, Suffolk, and Yorkshire

<sup>b</sup>There was no standard acreage established for the virgate, but each virgate generally contained 12, 15, 20, 24, 28, 30, 34, 40, 44, 48, or 64 acres

<sup>c</sup>Probably originated as the amount of land that could be farmed with the help of one ox. In ancient records, also called one oxgang. This could be, in actual practice, between 4 and 32 acres, depending on the quality of the soil. It was sometimes equated with the virgate, but more often with a half virgate. The term acreme is mostly confined to medieval legal documents

<sup>d</sup>It was traditionally said to equal 7–10 acres of scale, but later said to equal 10 statute acres. The fardel came to be identified by the farthingdale and was superseded by it. In medieval legal documents, the fardel was also known as an acreme

<sup>e</sup>During the seventeenth century, said to equal a piece of land that was 1 perch in breadth and 40 perches in length. See [HATT, p. 22]

<sup>15</sup> Sometimes area units are written with sq. (an abbreviation of the word square) as a prefix instead of raising the unit to the power of two. In some scientific books written before the 1960s, the prefix square was represented by a square symbol (□) drawn before the unit.

Upper scale, based on [MART3] and [TREA]

							Metric
<b>barony</b>							16,187,135.083 75 m <sup>2</sup>
6¼	<b>mile of land</b>						2,589,941.613 4 m <sup>2</sup>
40	6 2/5	<b>hide of land or hideland</b>					404,678.377 1 m <sup>2</sup>
133 1/3	21 1/3	3 1/3	<b>yard of land</b>				121,403.513 1 m <sup>2</sup>
4000	640	100	30	<b>acre of land</b>			4,046.783 8 m <sup>2</sup>
16,000	2560	400	120	4	<b>farundel of land, fardingdeal, or fardingale</b>		1,011.695 9 m <sup>2</sup>
40,000	6400	1000	300	10	2½	<b>square chain</b>	404.678 4 m <sup>2</sup>

Lower scale, based on [MART3]

					Metric
<b>square rod or square pole</b>					25.292 399 m <sup>2</sup>
2 289/400	<b>square of flooring</b>				9.290 137 m <sup>2</sup>
30¼	11 1/9	<b>square yard</b>			83.611 2 dm <sup>2</sup>
272¼	100	9	<b>square foot</b>		9.290 1 dm <sup>2</sup>
39,204	14,400	1296	144	<b>square inch</b>	6.45 cm <sup>2</sup>

Scale used by surveyors during the nineteenth–twentieth centuries

						Metric
<b>section of land or square mile</b>						2,589,988.110 336 m <sup>2</sup>
640	<b>statute acre</b>					4,046.856 422 4 m <sup>2</sup>
2560	4	<b>rood</b>				1,011.714 105 6 m <sup>2</sup>
6400	10	2½	<b>square chain</b>			404.685 642 24 m <sup>2</sup>
102,400	160	40	16	<b>square rod</b>		25.292 852 64 m <sup>2</sup>
64,000,000	100,000	25,000	10,000	625	<b>square link</b>	4.046 856 42 m <sup>2</sup>

During the nineteenth–twentieth centuries

						Metric
<b>square rod</b>						25.292 852 64 m <sup>2</sup>
10 89/100	<b>square pace</b>					2.322 576 m <sup>2</sup>
30¼	2 7/9	<b>square yard</b>				83.612 736 dm <sup>2</sup>
272¼	25	9	<b>square foot</b>			9.290 304 dm <sup>2</sup>
39,204	3600	1296	144	<b>square inch</b>		6.451 6 cm <sup>2</sup>
3,920,400	360,000	129,600	14,400	100	<b>square line</b>	6.451 6 mm <sup>2</sup>

Other units reported during the nineteenth century:

- 1 **butt of land, butta terrae, or butta terre** (reported between the fifteenth and nineteenth centuries) = a strip of land between two parallels of the open field. Often used synonymous with rig, ridge, and selion.
- 1 **bolt** (for finished cloth) = 1160 sq yd = 969.91 m<sup>2</sup> (for cotton, 100 yd × 42 in. or 1660 sq yd = 1387.97 m<sup>2</sup> (for wool, 100 yd × 60 in);
- 1 **bolt** (for wallpaper) = 55–60 sq ft (generally 20½" × 33' or 27" × 27' per double roll bolt);
- 1 **bolt** (for borders) = a single roll of border, generally 15 ft;
- 1 **square** (for finished lumber, roofing materials, such as shingles or slates, and other building materials during the nineteenth–twentieth centuries) = material sufficient to cover 100 sq ft = 11 1/9 sq yd = 4 paces = about 9.290 340 6 m<sup>2</sup>.

53.5 Circular Units

Circular units, mainly used for wire sizes, represent the area of a disc of a diameter equal to the equivalent linear unit.

53.6 Units of Volume

			Metric
<b>circular inch</b>			5.067 077 9 cm <sup>2</sup>
645 5/31	<b>circular millimeter</b>		
1,000,000	1550	<b>circular mil</b>	

Traditional system,<sup>16</sup> used for volumes of boxes and containers after 1305 and after 1901

				Metric	Metric
<b>cubic yard</b>				764.512 820 929 dm <sup>3</sup>	764.559 430 272 dm <sup>3</sup>
27	<b>cubic foot</b>			28.315 289 664 dm <sup>3</sup>	28.317 015 936 dm <sup>3</sup>
46,656	1728	<b>cubic inch</b>		16.386 163 cm <sup>3</sup>	16.387 162 cm <sup>3</sup>
46,656,000	1,728,000	1000	<b>cubic line</b>	16.386 163 mm <sup>3</sup>	16.387 162 mm <sup>3</sup>

For firewood and timber, based on [MART3]

					Metric
<b>fathom</b>					6.116 274 m <sup>3</sup>
1 5/7	<b>cord<sup>a</sup> or line</b>				3.567 827 m <sup>3</sup>
2	1 1/6	<b>stack</b>			3.058 137 m <sup>3</sup>
4 8/25	2 13/25	2 4/25	<b>load<sup>b</sup></b>		1.415 804 m <sup>3</sup>
216	126	108	50	<b>cubic foot</b>	28.316 dm <sup>3</sup>

<sup>a</sup>The **cord** or **line** was also reported as 128 cu ft = 3.624 459 m<sup>3</sup>

<sup>b</sup>For timber. Reported since the seventeenth century. There was also a **tun** = 43 cu ft = 1.217 592 m<sup>3</sup>

Other measures reported during the nineteenth century:

- 1 **case** (for Normandy glass) = 120 cu ft = 11.148 m<sup>3</sup>;
- 1 **line of wood** (for firewood) = 8 × 4 × 4 feet = 128 cubic feet = 3.624 46 m<sup>3</sup>;
- 1 **line of wood** (for firewood) = 14 × 3 × 3 feet = 126 cubic feet = 3.567 83 m<sup>3</sup>;
- 1 **crad** (for wood) = about 1.4 m<sup>3</sup>;
- 1 **serch** (for stones) = 25 cu ft = 70.790 2 dm<sup>3</sup>.

<sup>16</sup>The base measure was the cubic inch, which was redefined in 1901 as 16.387 162 cm<sup>3</sup> [JUDS1].

For maritime cargo during the twentieth–twenty-first centuries

						Imperial	Metric
<b>twenty-foot unit</b>						1280 ft <sup>3</sup>	36.2 m <sup>3</sup>
12 4/5	<b>register ton<sup>a</sup></b>					100 ft <sup>3</sup>	2.828 m <sup>3</sup>
32	2½	<b>last or shipping ton<sup>a</sup></b>				40 ft <sup>3</sup>	1.131 m <sup>3</sup>
40	2 6/7	1 1/7	<b>displacement ton</b>			35 ft <sup>3</sup>	991 dm <sup>3</sup>
280	20	8	7	<b>barrel bulk</b>		5 ft <sup>3</sup>	141 dm <sup>3</sup>
315	22½	9	7 7/8	1 1/8	<b>tea chest<sup>b</sup></b>	4 4/9 ft <sup>3</sup>	125 dm <sup>3</sup>

<sup>a</sup>[MART3] reported 1 **register ton** = 2.831 608 m<sup>3</sup>, and 1 **ton of shipping** = 1.132 643 m<sup>3</sup>

<sup>b</sup>According to [KAHN], it was also equal to 38.1 kg

## 53.7 Units of Capacity

Scale used in cooking after 1824

								Metric
<b>tumbler or breakfast cup</b>								284.13 mL
2	<b>teacup</b>							142.06 mL
4	2	<b>wine glass</b>						71.03 mL
10	5	2½	<b>fluid ounce</b>					28.41 mL
20	10	5	2	<b>tablespoon</b>				14.21 mL
40	20	10	4	2	<b>dessertspoon</b>			7.10 mL
80	40	20	8	4	2	<b>teaspoon</b>		3.55 mL
160	80	40	16	8	4	2	<b>salt spoon</b>	1.78 mL

Scale used in cooking during the early twentieth century

									Metric
<b>breakfast cup</b>									284.130 mL
2	<b>teacup</b>								142.065 mL
10	5	<b>fluid ounce</b>							28.413 mL
16	8	1 3/5	<b>tablespoon</b>						17.758 mL
24	12	2 2/5	1½	<b>dessertspoon</b>					11.839 mL
48	24	4 4/5	3	2	<b>teaspoon</b>				5.919 mL
96	48	9 3/5	8	4	2	<b>salt spoon</b>			2.960 mL
192	96	25 3/5	16	8	4	2	<b>dash</b>		1.480 mL
384	192	51 1/5	32	16	8	4	2	<b>pinch</b>	0.740 mL
576	288	76 4/5	48	24	12	6	3	1½	<b>drop</b> 0.493 mL

53.8 Units of Dry Capacity

Upper scale for corn<sup>17</sup> from 1497 to 1601

							Metric
<b>last</b>							2,811.616 48 L
2	<b>load, tun or wey</b>						1,405.808 24 L
10	5	<b>quarter</b>					281.161 648 L
20	10	2	<b>coom</b>				140.580 824 L
80	40	8	4	<b>bushel</b>			35.145 206 L
~320	~160	~32	~16	~4	<b>peck</b>		8.797 075 4 L
~640	~320	~64	~32	~8	2	<b>gallon</b>	4.398 537 7 L

The gallon and bushel standards did not mathematically equal the 1:8 ratio

Lower scale for corn from 1497 to 1601

					Metric
<b>gallon</b>					4.398 537 7 L
2	<b>pottle</b>				2.199 268 85 L
4	2	<b>quart</b>			1.099 634 42 L
8	4	2	<b>pint</b>		549.817 212 mL
32	16	8	4	<b>gill</b>	137.454 303 mL

For figs and raisins during the fifteenth century, based on [CARU]

			Metric
<b>sort</b>			115.5 L
3	<b>piece</b>		38.5 L
12	4	<b>quartern</b>	9.62 L

Upper scale for corn<sup>18</sup> from 1601 to 1702

							Metric
<b>last</b>							2,816.165 28 L
2	<b>load, tun or wey</b>						1,408.082 64 L
10	5	<b>quarter or sester</b>					281.616 528 L
20	10	2	<b>coom</b>				140.808 264 L
80	40	8	4	<b>bushel</b>			35.202 066 L
~320	~160	~32	~16	~4	<b>peck</b>		8.814 772 6 L
~640	~320	~64	~32	~8	2	<b>gallon</b>	4.407 386 3 L

In the eighteenth century, Bishop Fleetwood wrote that a sester was “what we now call a quarter, or a seam, containing 8 bushels”

The gallon and bushel standards did not mathematically equal the 1:8 ratio

<sup>17</sup>The system was based upon the gallon measuring 268.43 cu in and the bushel measuring 2,144.81 cu in.

<sup>18</sup>The system was based upon the gallon measuring 268.97 cu in and the bushel measuring 2,148.28 cu in.

Lower scale for corn from 1601 to 1702

					Metric
<b>gallon</b>					4.407 386 3 L
2	<b>pottle</b>				2.203 693 15 L
4	2	<b>quart</b>			1.101 846 58 L
8	4	2	<b>pint</b>		550.923 288 mL
32	16	8	4	<b>gill</b>	137.730 822 mL

Upper scale for corn<sup>19</sup> from 1702 to 1825

								Metric
<b>last</b>								2,818.970 64 L
2	<b>load, tun or wey</b>							1,409.485 32 L
10	5	<b>quarter</b>						281.897 064 L
20	10	2	<b>coom</b>					140.948 532 L
40	20	4	2	<b>strike</b>				70.474 266 L
80	40	8	4	2	<b>bushel</b>			35.237 133 L
320	160	32	16	8	4	<b>peck</b>		8.809 283 25 L
640	320	64	32	16	8	2	<b>gallon</b>	4.404 641 62 L

Lower scale for corn from 1702 to 1825

					Metric
<b>gallon</b>					4.404 641 62 L
2	<b>pottle</b>				2.202 320 81 L
4	2	<b>quart</b>			1.101 160 41 L
8	4	2	<b>pint</b>		550.580 20 mL
32	16	8	4	<b>gill</b>	137.645 05 mL

Imperial upper scale<sup>20</sup> after 1825

							Metric
<b>last</b>							2,907.812 48 L
2	<b>tun or wey</b>						1,453.906 24 L
10	5	<b>quarter or seam</b>					290.781 248 L
20	10	2	<b>coom</b>				145.390 624 L
40	20	4	2	<b>strike</b>			72.695 312 L
80	40	8	4	2	<b>bushel</b>		36.347 656 L

Other reported measures:

1 **amber** (for salt in Saxon during the eleventh–thirteenth centuries) = 4 bu = about 141 L. See also amber as a unit of liquid capacity.

1 **ark, archa, or arke** (for bread, corn, fruit, meal, etc., from the thirteenth to the seventeenth century) = a large wooden bin or hutch for dry commodities. It had no standard dimensions.

<sup>19</sup>The system was based upon the bushel measuring 2,150.42 cu in.

<sup>20</sup>The system was defined by an act of Parliament in 1824 and adopted January 1, 1826.

## Imperial lower scale after 1825

							Metric
<b>bushel</b>							36.347 656 L
4	<b>peck</b>						9.086 914 L
8	2	<b>gallon</b>					4.543 457 L
16	4	2	<b>pottle</b>				2.271 728 5 L
32	8	4	2	<b>quart</b>			1.135 864 25 L
64	16	8	4	2	<b>pint</b>		567.932 125 mL
128	32	16	8	4	2	<b>half pint</b>	283.966 062 mL

The Imperial gallon was defined as the volume that equals 10 lb av of distilled water weighed in air at 62° F and at a barometric pressure of 30 inches of mercury. In 1824, the volume of the Imperial gallon was determined as 277.274 cu in

## Imperial upper scale after 1864, based on [MART3] (1 gallon = 4.543 581 87 L)

							Metric
<b>load</b>							2,907.892 397 L
2	<b>wey</b>						1,453.946 198 L
2½	1¼	<b>chaldron</b>					1,163.156 959 L
10	5	4	<b>quarter</b>				290.789 240 L
13 1/3	6 2/3	5 1/3	1 1/3	<b>boll</b>			218.091 930 L
20	10	8	2	1½	<b>coom</b>		145.394 620 L
40	20	16	4	3	2	<b>strike</b>	72.697 310 L
80	40	32	8	6	4	2	<b>bushel</b> 36.348 655 L

## Imperial lower scale after 1864, based on [MART3] (1 gallon = 4.543 581 87 L)

							Metric
<b>bushel</b>							36.348 655 L
4	<b>peck</b>						9.087 164 L
8	2	<b>gallon</b>					4.543 582 L
16	4	2	<b>pottle</b>				2.271 791 L
32	8	4	2	<b>quart</b>			1.135 895 L
64	16	8	4	2	<b>pint</b>		567.948 mL
256	64	32	16	8	4	<b>gill</b>	141.987 mL

## For coal after 1826 and after 1864, based on [MART3]

					Metric	Metric
<b>chaldron</b>					1,308.515 616 L	1,308.551 579
4	<b>vat</b>				327.128 904 L	327.137 895 L
12	3	<b>sack</b>			109.042 968 L	109.045 965 L
36	9	3	<b>bushel</b>		36.347 656 L	36.348 655 L
144	36	12	4	<b>peck</b>	9.086 914 L	9.087 164 L

## For various dry commodities after 1864

							Metric
<b>last</b>							2,909.497 6 L
2½	<b>chaldron</b>						1,163.799 04 L
10	4	<b>quarter</b>					290.949 76 L
40	16	4	<b>strike</b>				72.737 44 L
80	32	8	2	<b>bushel</b>			36.368 72 L
160	64	16	4	2	<b>kenning</b>		18.184 36 L
320	128	32	8	4	2	<b>peck</b>	9.092 18 L
640	256	64	16	8	4	2	<b>gallon</b> 4.546 09 L

1 **barrel** (from the seventeenth to the nineteenth century):

- apples = 3 bu = about 106 L;
- beef = 32 wine gal = about 121 L;
- coal = about 140 L;
- nuts = 3 bu = about 106 L.

1 **cement barrel** = 5 bu = 181.743 L;

1 **eel barrel** (for salted eels during the fifteenth century) = 30 gal (as defined by Henric VI in 1423), 42 gal (as reported in 1462<sup>21</sup>), and 42 wine gallons (as defined by Edward IV in 1482/83);

1 **herring-barrel** (for herring) = traditionally must be no smaller than 32 gallons old wine measures. In 1855, it was reported as 26 2/3 Imp. gal. See also herring-barrel as a unit of quantity;

1 **salmon barrel** (for salmon) = 42 wine gallons (as defined by Edward IV in 1482/83);

1 **salmon butt** (for salmon) = 82 wine gallons;

1 **soap barrel** (for soap) = 32 wine gallons;

1 **box, boxe, or boxse** (for herring during the eighteenth–nineteenth centuries) = 6¼ to 12½ Imp gal = about 28.4 to 42.6 L;

1 **bucket** (for chalk) = 4 Imp gal = 18.182 L;

1 **carage** (for bricks, lime, and stones during the sixteenth–seventeenth centuries) = 64 bu = 137,472 cu in = 2,252.762 L;

1 **cask** (for pilchards) = 50 gal = 189 L;

1 **coddus** (for grain during the seventeenth century) = undetermined size;

1 **boil** = 218 L.

1 **last** (for grain and rapeseed) = 10 quarters = 80 bu;

1 **last** (for gunpowder) = 24 barrels = 2 400 lbs;

1 **last** (for codfish, meal, soap, pitch, tar and white herring) = 12 barrels, but by the twentieth century, reported as 11 barrels for meal;

1 **last** (for wool) = 12 sacks;

## 53.9 Units of Liquid Capacity

From the seventh to the thirteenth century:

1 **amber** (for Welsh ale) = ½ mitta = about 32 gallons. This is first mentioned in a tax that the king of West Saxons placed on ale in 694. See also amber as a unit of dry capacity.

The unit has also been spelled: **ambra, ambre, ambrum, ambyr, awmbyr, and awmyr**. From the eleventh to the fifteenth century:

1 **sester** (for honey) = about 500 mL.

From the fourteenth to the fifteenth century:

1 **asine** (for wine) = a sack-load or burden of one ass, probably on the order of several gallons of wine, but without standard dimensions.

From the fifteenth to the eighteenth century:

1 **butt** (for ale and beer) = 108 gal (was reported as 108–117 gal for other liquids) = 408.98 L;

1 **aume, alme, ame, aum, or awme** (for Rheinisch wine) = 40 gal = about 151 L, or sometimes as one wine tierce = 42 gal = about 159 L;

1 **cheopinnet** (during the fifteenth–sixteenth centuries) = ½ pt = 0.25 L;

From the seventeenth to the nineteenth century:

1 **barrel** (for vinegar) = 34 gal = about 129 L;

1 **anker** (for brandy) = 10 wine gallons = 37.854 L;

1 **cast** = 8 gal = 30.3 L;

<sup>21</sup> Malynes, Gerard. *Consuetudo, vel, Lex mercatoria: or, The ancient law-merchant, in three parts, according to the essentials of traffick: necessary for statesmen, judges, magistrates, temporal and civil lawyers, mint-men, merchants, mariners, and all others negotiating in any parts of the world*. London: Printed by Adam Islip, 1462, p. 50.

As vessels of common sizes had to be used in commercial situations, certain standard volumes came into use.

Upper scale for hypothetical Merchants' wine gallon system<sup>22</sup> from 1266 to 1707

						Metric
<b>tun<sup>a</sup></b>						924.97 L
2	<b>butt or pipe</b>					462.48 L
3	1½	<b>firkin<sup>a</sup> or puncheon</b>				308.32 L
4	2	1 1/3	<b>hogshead<sup>a</sup></b>			231.24 L
6	3	2	1½	<b>tierce<sup>b</sup></b>		154.16 L
8	4	2 2/3	2	1 1/3	<b>barrel</b>	115.62 L

<sup>a</sup>The tun, firkin and hogshead were in use by no later than 1439

<sup>b</sup>The tierce was in use by no later than 1536

Middle scale for hypothetical Merchants' wine gallon system from 1266 to 1707

						Metric
<b>barrel<sup>a</sup></b>						115.62 L
1¾	<b>rundlet<sup>a</sup></b>					66.07 L
2	1 1/7	<b>octave</b>				57.81 L
3 3/20	1 4/5	1 23/40	<b>anker</b>			36.705 L
7 7/8	4½	3 75/80	2½	<b>sester</b>		14.682 L
31½	18	15¾	10	4	<b>gallon</b>	3.670 5 L

<sup>a</sup>The wine barrel and rundlet were in use by no later than 1483

The tun was reported as 252 gallons in Statute 2 Henry VI c 14 (in 1423), 18 Henry VI c 17 (in 1439), 1 Richard II c 13 (in 1483) and 28 Henry VIII c 4 (in 1536). This standard tun was not the only tun that existed. In a copy from a 1702 copy (British Museum Add. Roll, 16577) of a manuscript by T. Forgon, internally dated July 15, 1507, a "tunne" is mentioned as 60 times 4 gallons = 240 gallons. According to [HAYE, p. 211], there was a tun, used by Merchants called the Civil Gauge, of 236 gallons during the early eighteenth century. According to [BERR, p. 163], the Guildhall of the City of London used a wine gallon standard of 224 cu in in 1688. This gallon would have equaled 8 Merchants' pounds of wheat (i.e., if the wheat had a specific gravity of 0.953 g/cc), or 8 lb av of wine (i.e., if the wine had a specific gravity of 0.988 g/cc)

Lower scale for hypothetical Merchants' wine gallon system from 1266 to 1707

						Metric
<b>gallon</b>						3.670 5 L
4	<b>quart</b>					917.63 mL
6	1½	<b>bottle</b>				611.75 mL
8	2	1 1/3	<b>pint</b>			458.81 mL
32	8	5 1/3	4	<b>gill</b>		114.70 mL
128	32	21 1/3	16	4	<b>fluid ounce</b>	26.68 mL

<sup>22</sup>The system was based upon a gallon equal to 8 Merchants' pounds of wheat, as decreed by Henry III's Royal Ordinance of 1266. Cooking oil and honey were also sold by these measures.

Henry VII Winchester wine and ale gallon system<sup>23</sup> from 1497 to 1601

					Metric
<b>sester</b>					61.579 527 8 L
14	<b>gallon</b>				4. 398 537 7 L
28	2	<b>pottle</b>			2.199 27 L
56	4	2	<b>quart</b>		1.099 63 L
112	8	4	2	<b>pint</b>	549.82 mL

In 1521, 1 sester for ale was reported as containing 14 gallons

Elizabeth I wine gallon system<sup>24</sup> from 1601 to 1824

				Metric
<b>wine gallon</b>				4.407 386 3 L
2	<b>pottle</b>			2,209.69 L
4	2	<b>quart</b>		1,101.85 L
8	4	2	<b>pint</b>	550.92 L

Upper scale for Queen Anne Winchester wine gallon system<sup>25</sup> from 1707 to 1824

						Metric
<b>tun</b>						953.87 L
2	<b>pipe or butt</b>					476.94 L
3	1½	<b>puncheon or tertian</b>				317.96 L
4	2	1 1/3	<b>hogshead</b>			238.47 L
6	3	2	1½	<b>fierce</b>		158.98 L
8	4	2 2/3	2	1 1/3	<b>barrel</b>	119.23 L

Middle scale for Queen Anne Winchester wine gallon system from 1707 to 1824

						Metric
<b>barrel</b>						119.23 L
1 2/3	<b>rundlet</b>					68.13 L
2	1 1/7	<b>octaive</b>				59.62 L
3 3/20	1 4/5	1 23/40	<b>anker</b>			37.85 L
31½	18	15¾	10	<b>gallon</b>		3.785 203 7 L
126	72	63	40	4	<b>quart</b>	946.30 mL

<sup>23</sup> The system was based upon the gallon measuring 268.43 cu in, as established by Henry VII. According to Statute 12 Henry VII of 1496, a pint of wine and ale equaled 8 gallon = 12½ Troy ounces of wheat.

<sup>24</sup> The system was based upon the gallon measuring 268.97 cu in, as established by Elizabeth I in 1601.

<sup>25</sup> The system, officially adopted by Queen Anne in 1707 (Anne chap. 27 s 17.), was based upon the gallon measuring 231.0 cu in, but the official standard actually measured 230.824 cu in.

Lower scale for Queen Anne Winchester wine gallon system from 1707 to 1824

							Metric
<b>quart</b>							946.30 mL
1½	<b>bottle</b>						630.87 mL
2	1 1/3	<b>pint</b>					473.15 mL
8	5 1/3	4	<b>gill</b>				118.29 mL
32	21 1/3	16	4	<b>fluid ounce</b>			29.57 mL
256	170 2/3	128	32	8	<b>fluid dram</b>		3.695 mL
15,360	10,240	7680	1920	480	60	<b>minim</b>	61.6 µL

Ale gallon system<sup>26</sup> before 1803

									Metric
last									1,774.42 L
2	tun								887.21 L
8	4	hogshead							221.80 L
12	6	1½	barrel						147.87 L
24	12	3	2	kilderkin					73.93 L
48	24	6	4	2	firkin				36.97 L
384	192	48	32	16	8	ale-gallon			4.620 898 L
1536	768	192	128	64	32	4	quart		1.155 22 L
3072	1536	384	256	128	64	8	2	pint	577.61 mL

Upper scale for beer gallon system<sup>27</sup> before 1824

								Metric
<b>tun</b>								998.11 L
2	<b>pipe or butt</b>							499.06 L
4	2	<b>hogshead</b>						249.53–332.70 L
6	3	1½–2	<b>barrel</b>					166.35 L
6 6/17	3 3/17	1 10/17–2 2/17	1 1/17	<b>country barrel</b>				157.11 L
12	6	3–4	2	1 8/9	<b>kilderkin</b>			83.18 L
24	12	6–8	4	3 7/9	2	<b>firkin or tertian</b>		41.59 L
216	108	54–72	36	34	18	9	<b>gallon</b>	4.620 898 L

<sup>26</sup> The system was, according to [POST], based upon the beer gallon measuring 282 cu in. According to [DOUR, p. 543], the system was abolished in 1803.

<sup>27</sup> The system was based upon the beer gallon measuring 282 cu in. According to [ZUPK2, p. 50], ale was also officially measured with this system after 1803.

Lower scale for beer gallon system before 1824

						Metric
<b>beer-gallon</b>						4.620 898 L
4	<b>quart</b>					1.155 22 L
6	1½	<b>bottle</b>				770.15 mL
8	2	1 1/3	<b>pint</b>			577.61 mL
32	8	5 1/3	4	<b>gill</b>		144.40 mL
160	40	26 2/3	20	5	<b>fluid ounce</b>	28.88 mL

Ale, beer and porter gallon system<sup>28</sup> from 1688 to 1803

								Metric
<b>hogshead</b>								233.94 L
1½	<b>barrel</b>							155.96 L
3	2	<b>kilderkin</b>						77.98 L
6	4	2	<b>firkin</b>					38.99 L
51	34	17	8½	<b>gallon</b>				4.587 L
96	68	34	17	2	<b>pottle</b>			2.293 5 L
204	136	68	34	4	2	<b>quart</b>		1.147 L
408	272	136	68	8	4	2	<b>pint</b>	573.4 mL

Ale, beer and porter gallon system after 1803, based on [MART3]

										Metric
<b>load</b>										1,962.827 368 L
2	<b>tun</b>									981.413 684 L
4	2	<b>but</b>								490.706 842 L
6	3	1½	<b>puncheon</b>							327.137 895 L
8	4	2	1 1/3	<b>hogshead</b>						245.353 421 L
12	6	3	2	1½	<b>barrel</b>					163.568 947 L
24	12	6	4	3	2	<b>kilderkin</b>				81.784 474 L
48	24	12	8	6	4	2	<b>firkin</b>			40.892 237 L
432	216	108	72	54	36	18	9	<b>gallon</b>		4.543 582 L
1728	864	432	288	216	144	72	36	4	<b>quart</b>	1.135 895 L
3456	1728	864	576	432	288	144	72	8	2	<b>pint</b> 567.948 mL

<sup>28</sup> The system was based upon a barrel stated, in a statute of William III and Mary II in 1689, as being 34 gallons of ale or beer. According to the English Cyclopædia. Vol. 1. London: Bradbury and Evans, 1859, sp. 951, this was equal to 9518 cu in.

Upper Imperial scale<sup>29</sup> after 1824

									Metric
<b>tun</b>									981.39 L
2	<b>butt or pipe</b>								490.69 L
3	1½	<b>puncheon</b>							327.13 L
4	2	1 1/3	<b>hogshead</b>						245.35 L
6	3	2	1½	<b>barrel</b>					163.56 L
12	6	4	3	2	<b>kilderkin</b>				81.78 L
24	12	8	6	4	2	<b>firkin</b>			40.89 L
48	24	16	12	8	4	2	<b>pin</b>		20.45 L
216	108	72	54	36	18	9	4½	<b>gallon</b>	4.545 457 L

The Imperial gallon was defined in 1824 as 277.274 cu in and stated as 10 lbs av of distilled water weighed in air at 62° F and at a barometric pressure of 30 inches of mercury. In 1932, the capacity was found to be 277.421 cu in. In 1963, the WMA defined it as the volume occupied by 10 lbs av of distilled water of density 998.859 kg/m<sup>3</sup> weighed in air of density 1.217 kg/m<sup>3</sup> against brass weights of density 8136 kg/m<sup>3</sup>

Upper British Imperial scale<sup>30</sup> after 1824

									Metric
<b>tun</b>									954.545 970 L
2	<b>butt or pipe</b>								477.272 985 L
3	1½	<b>puncheon</b>							318.181 990 L
4	2	1 1/3	<b>hogshead</b>						236.363 764 L
8	4	2 2/3	2	<b>barrel</b>					119.318 246 L
11 2/3	5 5/6	3 8/9	2 11/12	1 11/24	<b>kilderkin</b>				81.818 226 L
14	7	4 2/3	3 1/2	1½	1 1/5	<b>roundlet</b>			68.181 855 L
23 1/3	11 2/3	7 7/9	5 5/6	2½	2	1 2/3	<b>firkin</b>		40.909 113 L
46 2/3	23 1/3	15 5/9	11 2/3	5	4	3 1/3	2	<b>pin</b>	20.454 556 L
210	105	70	52½	26¼	18	15	9	4½	<b>gallon</b> 4.545 457 L

The Imperial gallon was defined in 1824 as 277.274 cu in and stated as 10 lbs av of distilled water weighed in air at 62° F and at a barometric pressure of 30 inches of mercury. In 1932, the capacity was found to be 277.421 cu in. In 1963, the WMA defined it as the volume occupied by 10 lbs av of distilled water of density 998.859 kg/m<sup>3</sup> weighed in air of density 1.217 kg/m<sup>3</sup> against brass weights of density 8136 kg/m<sup>3</sup>

<sup>29</sup> The system was defined by an Act of Parliament in 1824 and officially adopted on January 1, 1826. All these units became illegal for trade on October 1, 1995, except for the fluid ounce and pint, which could be used for sales of beer, cider, fruit juice, lemonade and water in returnable containers up to no later than December 31, 1999, and the pint was retained indefinitely for draft sales of beer and cider and for milk sold in returnable containers.

<sup>30</sup> See note 29.

## Lower British Imperial-linked system after 1824

									Metric
<b>gallon</b>									4.545 457 L
2	<b>pottle or stoup</b>								2.271 73 L
4	2	<b>quart</b>							1.135 86 L
6	3	1½	<b>bottle</b>						757.24 mL
8	4	2	1 1/3	<b>pint</b>					567.93 mL
32	16	8	5 1/3	4	<b>gill<sup>a</sup></b>				141.98 mL
160	80	40	26 2/3	20	5	<b>fluid ounce</b>			28.40 mL
1280	640	320	213 1/3	160	40	8	<b>fluid drachm</b>		3.55 mL
76,800	38,400	19,200	12,800	9600	2400	480	60	<b>minim<sup>b</sup></b>	59.2 µL

<sup>a</sup>Also called roquille, quartern and noggin<sup>b</sup>Also called drop

## Some other units

									Metric
<b>last</b>									2,909.092 48 L
10	<b>seam or quarter</b>								290.909 248 L
20	2	<b>coomb</b>							145.454 624 L
40	4	2	<b>strike</b>						72.727 312 L
640	64	32	16	<b>gallon</b>					4.545 457 L
5120	512	256	128	8	<b>chopin or pint</b>				568.182 125 mL
10,240	1024	512	256	16	2	<b>demiard or halfpint</b>			284.091 062 mL

## British Imperial-linked system after 1864, based on [MART3] (1 gallon = 4.543 581 87 L)

										Metric
<b>tun<sup>a</sup></b>										1,144.982 631 L
2	<b>pipe<sup>b</sup> or butt</b>									572.491 316 L
3	1½	<b>puncheon</b>								381.660 877 L
4	2	1 1/3	<b>hogshead<sup>c</sup></b>							286.245 658 L
6	3	2	1½	<b>tierce</b>						190.830 438 L
14	7	4 2/3	3½	2 1/3	<b>rundlet</b>					81.784 474 L
252	126	84	63	42	18	<b>gallon</b>				4.543 582 L
1008	504	336	252	168	72	4	<b>quart</b>			1.135 895 L
2016	1008	672	504	336	144	8	2	<b>pint</b>		567.948 mL
8064	4032	2688	2016	1344	576	32	8	4	<b>gill</b>	141.987 mL

<sup>a</sup>1 tun (for red wines from Spain) = 210 gal = 954.152 193 L<sup>b</sup>1 pipe (for wine from Lisbon) = 117 gal = 531.599 079 L, (for wine from Oporto) = 115 gal = 522.511 915 L, (for wine from Madeira) = 108 gal = 500.706 842 L, (for wine from Malaga) = 105 gal = 477.076 096 L, (for wine from Tenerife) = 100 gal = 454.358 187 L, (for wine from Marsala) = 93 gal = 422.553 114 L, and (for wine from Cádiz) = 92 gal = 418.009 532 L<sup>c</sup>1 hogshead (for wine from Bordeaux) = 46 gal = 209.004 766 L

Apothecaries’ units<sup>31</sup>

						Metric
<b>gallon</b>						4.546 09 L
8	<b>pint</b>					568.261 25 mL
160	20	<b>fluid ounce</b>				28.413 062 5 mL
1280	160	8	<b>fluid dram or fluidram</b>			3.551 632 812 5 mL
3840	480	24	3	<b>fluid scruple</b>		1.183 877 604 16 mL
76,800	9600	480	60	20	<b>minim</b>	59.193 880 208 3 µL

Other measures used during the thirteenth–nineteenth centuries:

- 1 **basket** (for medlars) = 2 bu = about 705 L;
- 1 **stuck** or **hock** (for spirits) = about 260–265 gal.;
- 1 **tonneau** (for spirits) = about 190–200 gal.;
- 1 **puncheon** (for Scotch whiskey) = about 112–120 gal.;
- 1 **butt** (for spirits) = about 108–117 gal.;
- 1 **puncheon** (for brandy) = about 100–110 gal.;
- 1 **pipe** (for spirits and wine) = about 90–120 gal.;
- 1 **puncheon** (for rum) = about 90–100 gal.;
- 1 **puncheon** (for spirits) = about 70–120 gal.;
- 1 **hogshead** (for brandy) = about 56–61 gal.;
- 1 **hogshead** (for madeira) = about 45–48 gal.;
- 1 **hogshead** (for spirits in general) = about 44–60 gal.;
- 1 **caroteel** (for oil) = 1/8 pipe = 119 L;
- 1 **aume** or **hock** (for spirits) = about 30–32 gal.;
- 1 **aume** (for wine from Rhine) = 30 gal.;
- 1 **quarter** (for spirits) = about 17–30 gal.;
- 1 **octave** (for Scotch whiskey) = 16 gal.;
- 1 **firkin** (for spirits) = 10 gal.;

- 1 **bottle, botel, botele, bottle, botell, botelle, bottle, bottle, bottelle, or bottelle** (during eighteenth century) = 4 gal = 15.1 L (for aqua fortis), and about 1/5 gal = about 760 mL (for wine);
- 1 **barn gallon** (for milk) = 17 pints = 9.65 L (according to *The journal of horticulture, cottage gardener and home farmer*, Oct. 14, 1880, p. 362). When the wholesale dealers bought from the farmers, the barn gallon consisted of 17 pints, although when they resold to the milk distributors, they reduced it to 16 pints. See [PRAT, p. 30].
- 1 **bodge or bogge** (for milk during the sixteenth–seventeenth centuries) = a false unit of capacity used illegally by chandlers, milk women, and others in place of the pottle. The buyer was deceived into believing that it contained ½ gal = about 1.89 L, although its actual capacity was less than ½ pint = about 0.57 L.
- 1 **breakfast cup, breakfastcupful, or tumbler-ful** (used in food recipes during the twentieth–twenty-first centuries) = 10 Imp fl oz = about 284.13 mL;

<sup>31</sup> The system, which came into use shortly after introduction of the imperial gallon in 1824 and was abolished on January 1, 1971, was closely related to the system of mass, and took advantage of the approximate equivalence of weight and volume of water and similar fluids.

53.10 Units of Weight

Tower Pound Weight System from 791 to 1527, when it was abolished by Henry VIII

							Metric
<b>Tower bushel</b>							22.394 5 kg
8	<b>Tower gallon</b>						2.799 3 kg
64	8	<b>Tower pound<sup>b</sup></b>					349.914 g
768	96	12	<b>Tower ounce</b>				29.159 g
15,360	1920	240	20	<b>pennyweight</b>			1.458 g
345,600	43,200	5400	450	22½	<b>Troy grain<sup>a</sup></b>		0.064 8 g
491,520	61,440	7680	640	32	64/45	<b>wheat grain</b>	0.045 6 g

<sup>a</sup>Originally called a **barley grain**. Traditionally, the weight of 3 barley grains was said to equal 4 wheat grains

<sup>b</sup>The Moneyer's or Saxon Pound (791–1066) or Moneyer's Tower Pound (1066–1527) was defined by Offa, the Anglo-Saxon King of Mercia (757–796) in 791. The last standard (see [CONN, p. 116]) was a bell-shaped brass weight found in Westminster Abbey in 1841. It was found to weigh 5395 medieval grains

Presumed system during the reign of Henry III (1216–1272)

				Metric
gold penny				~32 g
1 203/437	ounce			~22 g
20	13 21/32	silver penny		~1.6 g
640	437	32	wheat grain	~50 mg

Merchants' Pound Weight System (The Merchants' Pound was officially enacted in 1266 by Henry III and abolished in 1527 by Henry VIII)

							Metric
<b>bushel</b>							27.993 6 kg
8	<b>gallon</b>						3.499 2 kg
64	8	<b>Merchants' pound or liber mercatoria</b>					437.4 g
960	120	15	<b>Tower ounce</b>				29.159 g
19,200	2400	300	20	<b>pennyweight</b>			1.458 g
432,000	54,000	6750	450	22½	<b>Troy grain<sup>a</sup></b>		0.064 8 g
641,400	76,800	9600	640	32	64/45	<b>wheat grain</b>	0.045 6 g

<sup>a</sup>Originally called a **barley grain**. Traditionally, the weight of 3 barley grains was said to equal 4 wheat grains

For lead in London c.1300

				Metric
<b>fother</b>				952.5 kg
12	<b>wey</b>			79.38 kg
30	2½	<b>fotmal</b>		31.75 kg
175	14 7/12	5 5/6	<b>stone</b>	5.44 kg

Hanseatic Merchants’ Pound Weight System from the thirteenth century until 1582, used in trading with the Hanseatic League

							Metric
bushel							29.859 8 kg
8	gallon						3.732 5 kg
64	8	Hanseatic Merchants’ pound					466.56 g
1024	128	16	Tower ounce				29.159 g
20,480	2560	320	20	pennyweight			1.458 g
460,800	57,600	7200	450	22½	Troy grain		0.064 8 g
655,360	81,920	10,240	640	32	64/45	wheat grain	0.045 6 g

During the mid-thirteenth century, a class of merchandise that was sold in bulk and weighed on large steelyards was given the name ‘aveir de peis’ (= goods of weight). Since the seventeenth century, it has usually been written as ‘Avoir-du-pois.’ The various Avoirdupois systems that have been used since then are summarized below in a simple overview.

British Avoirdupois weight systems:

- From 1497 to 1558: The magnitude of 1 pound avoirdupois was authorized by a standard of Henry VII.
- From 1558 to 1574: The magnitude of 1 pound avoirdupois was exactly the mass of Elizabeth I’s series of prototypes.
- From 1574 to 1588: The magnitude of 1 pound avoirdupois was exactly the mass of Elizabeth I’s second series of prototypes.
- From 1588 to 1824: The magnitude of 1 pound avoirdupois was exactly the mass of Elizabeth I’s third series of prototypes.

British Imperial weight system:

From 1825 to 1834: The magnitude of 1 Imperial pound was defined as exactly 7000/5760 of the mass of the Imperial Troy Pound standard

established by Harris in 1758. The Troy prototype was, along with the prototype yard, destroyed on October 16, 1834 in the burning of the Houses of Parliament.

From 1853 to 1959: The magnitude of 1 Imperial pound was defined as exactly the mass of a prototype in platinum, which was stamped P.S. 1844. A comparison of the British Imperial Standard Pound and the International Prototype Kilogram made in 1883 led to the equivalence 1 lb av = 453.592 427 7 g. In 1889, Britain rounded it off to 453.592 43 g. By Order-in-Council, it was declared in 1898 that, on the basis of the comparative measurement of the new prototype pound and the international prototype kilogram, 1 kg = 2.204 622 3 lb, so 1 lb = 453.592 436~ g (making the prototype pound obsolescent, but not displacing it). Careful measurement in 1960 of the prototype BI pounds still in practical use showed the British master copy as being 453.592 338~ g, and the Canadian one as being 453.592 43~ g. [*Nature* 1959: **183**, 80–1]

From 1893 to 1959: The Mendenhall Order in 1893 defined the US Customary pound as  $\frac{1}{2.20462234}$  kg =  $\frac{1}{453.5924277}$  g, i.e., 1 kg = 2.204 622 34 lb.

## International pound system:

Since 1959: The international pound is defined as  
 exactly 0.453.592 37 kg, so 1 kg =  
 2.204 622 62~ lb.

Avoir-du-pois<sup>32</sup> Pound Weight System from 1340 to 1582

						Metric
<b>avoir-du-pois pound</b>						453.081 6 kg
2	<b>half pound</b>					226.540 8 g
4	2	<b>quarter pound</b>				113.270 4 g
16	8	4	<b>avoir-du-pois ounce</b>			28.317 6 g
6992	3496	1748	437	<b>Troy grain</b>		0.064 8 g
9944	4972	2486	1243/2	64/45	<b>wheat grain</b>	0.045 6 g

## Avoir-du-pois Wool Weight System from 1352 to 1582

									Metric
<b>last</b>									1,979.1 kg
2	<b>sarpler</b>								329.843 4 kg
12	2	<b>sack</b>							164.921 7 kg
24	4	2	<b>half sack or wey</b>						82.460 9 kg
48	8	4	2	<b>quarter sack</b>					41.230 4 g
156	26	13	6½	¾	<b>tod</b>				12.686 3 g
312	52	26	13	6½	2	<b>stone</b>			6.343 1 g
624	104	52	26	13	4	2	<b>clove or nail</b>		3.171 6 g
4368	728	364	182	91	28	14	7	<b>avoir-du-pois pound</b>	453.081 6 g

## Avoir-du-pois Hay Weight System from 1352 to 1582

			Metric
<b>load</b>			913.412 kg
36	<b>truss</b>		25.372 6 kg
2016	56	<b>avoir-du-pois pound</b>	453.081 6 g

<sup>32</sup> The system was known as 'avoirdupois' from the Old French *aver de peis* (goods of weight).

Avoir-du-pois Coal Weight System from, 1421 to 1676

				Metric
<b>keel</b>				18,120 kg
20	<b>chalder</b>			907.16 kg
640	32	<b>bushel</b>		28.32 kg
40,000	2000	62½	<b>avoir-du-pois pound</b>	453.081 6 g

Haverdepoise Merchants' Pound Weight System<sup>33</sup> from 1497 to 1582

				Metric
<b>Haverdepoise Merchants' pound</b>				497.664 g
16	<b>troy ounce</b>			31.104 g
320	20	<b>penny weight</b>		1.555 2 g
7680	480	24	<b>Troy grain</b>	0.064 8 g

The Haverdepoise Merchants' pound of Henry VII was established on the basis of 7680 troy grains

For Flemish glass and lead in northern England during the fourteenth–sixteenth centuries

				English	Metric
<b>wey</b>				252 lbs av	114.30 kg
1½	<b>waw</b> <sup>a</sup>			168 lbs av	76.20 kg
18	12	<b>stone</b>		14 lbs av	6.35 kg
60	40	3 1/3	<b>bunch</b> <sup>b</sup>	4 1/5 lbs av	1.905 kg

<sup>a</sup>Also spelled **wal**, **wall**, and **waugh**

<sup>b</sup>Also spelled **bonch**, **bonche**, **bounce**, and **bunche**

For figs and raisins in England during the fifteenth–sixteenth centuries

				Metric
<b>hogshead</b>				304.812 kg
2	<b>sort</b> <sup>a</sup>			152.406 kg
6	3	<b>piece</b>		50.802 kg
24	12	4	<b>quartern</b>	12.700 kg

<sup>a</sup>Also spelled **soortt**, **sorte**, **sort**, and **sortte**

Upper scale of Henry VII Winchester Corn Weight System<sup>34</sup> from 1497 to 1601

							Metric
last							1991 kg
2	wey, ton or load						95.328 kg
10	5	quarter					199.065 6 kg
20	10	2	coom				99.532 8 kg
80	40	8	4	bushel			24.883 2 kg
320	160	32	16	4	peck		6.220 8 kg
640	320	64	32	8	2	gallon	3.110 4 kg

Lower scale of Henry VII Winchester Corn Weight System from 1497 to 1601

						Metric
<b>gallon</b>						3.110 4 kg
2	<b>pottle</b>					1.555 2 kg
4	2	<b>quart</b>				777.6 g
8	4	2	<b>pint</b>			388.8 g
32	16	8	4	<b>gill</b>		97.2 g
100	50	25	25/2	25/8	<b>Troy ounce</b>	31.104 g

<sup>33</sup> The system was used for ordinary merchandise other than gold, silver and bread.

<sup>34</sup> Presumed system based upon the dry capacity standard for the bushel and the gallon, established by Henry VII in 1497.

For fruit in England during the fifteenth–sixteenth centuries

		Metric
<b>sort</b>		40.824–102.057 kg
3	<b>frail</b>	13.608–34.019 kg

For wheat during the early eighteenth century

									Metric
<b>last</b>									1911 kg
1 2/3	<b>wey</b>								1147 kg
10	6	<b>quarter</b>							191.103 kg
20	12	2	<b>coomb</b>						95.551 5 kg
40	24	4	2	<b>strike</b>					47.775 7 kg
80	48	8	4	2	<b>bushel</b>				23.887 9 kg
320	192	32	16	8	4	<b>peck</b>			5.972 kg
640	384	64	32	16	8	2	<b>gallon</b>		2.986 kg
5120	3072	512	256	128	64	16	8	<b>pond or pint</b>	373.248 g

Avoirdupois weight system, based on [DOUR], [MART3] and [HATC]

	Metric	Metric	Metric
<b>ton</b>	1,015.938 836 3 kg	1,016.047 541 6 kg	1,016.047 038 0 kg
<b>hundredweight</b>	50.796 941 82 kg	50.802 377 08 kg	50.802 351 90 kg
<b>quarter</b>	12.699 235 45 kg	12.700 594 27 kg	12.700 587 98 kg
<b>stone</b>	6.349 617 73 kg	6.350 297 13 kg	6.350 293 99 kg
<b>pound</b>	453.544 123 364 g	453.592 652 5 g	453.592 427 7 g
<b>ounce</b>	28.346 507 7 g	28.349 540 8 g	28.349 526 7 g
<b>dram</b>	1.771 656 7 g	1.771 846 3 g	1.771 845 4 g
<b>grain</b>	64.792 02 mg	64.798 95 mg	64.798 92 mg

Upper scale

<b>ton</b>					
20	<b>hundredweight</b>				
22 2/5	1 3/25	<b>cental</b>			
80	4	3 4/7	<b>quarter</b>		
160	8	7 1/7	2	<b>stone</b>	
2240	112	100	28	14	<b>pound</b>

Lower scale

<b>pound</b>				
16	<b>ounce</b>			
256	16	<b>dram</b>		
768	48	3	<b>scruple</b>	
7000	437½	27 11/32	9 11/96	<b>grain</b>

For butter and cheese

									Metric
<b>wey</b>									161.478 984 kg
89/59	<b>whey</b>								107.047 866 kg
89/56	59/56	<b>barrel</b>							101.604 754 kg
89/28	59/28	2	<b>Dutch cask</b>						50.802 377 kg
178/42	472/147	64/21	32/21	<b>tub</b>					38.101 783 kg
89/14	236/49	32/7	16/7	1½	<b>firkin</b>				25.401 119 kg
44½	236/7	32	16	10½	7	<b>clove</b>			3.628 741 kg
237 1/3	157 1/3	149 1/3	85 1/3	56	37 1/3	5 1/3	<b>roll</b>		680.389 g
356	236	224	112	84	56	8	1½	<b>pound</b>	493.593 g

For charcoal, based on [MART3]

								Metric
<b>score</b>								25,604.398 048 kg
21	<b>chaldron</b>							1,219.257 050 kg
25 1/5	1 1/5	<b>ton</b>						1,016.047 542 kg
84	4	3 1/3	<b>vat</b>					304.814 262 kg
252	12	10	3	<b>sack</b>				101.604 754 kg
756	36	30	9	3	<b>bushel</b>			33.868 251 kg
3024	144	120	36	12	4	<b>peck</b>		8.467 063 kg

For coal in London before 1664

		Metric
<b>chaldron</b>		2134 kg
20	<b>boll</b>	106.7 kg

For coal in London after 1695

		Metric
<b>chaldron</b>		2,692.8 kg
24	<b>boll</b>	112.2 kg

For coal in London between 1664 and 1695

		Metric
<b>chaldron</b>		2667 kg
21	<b>boll</b>	127.0 kg

For coal in London during the nineteenth century

				Metric
<b>keel</b>				16 329.325 320 kg
16	<b>chalder</b>			1,020.582 832 kg
576	36	<b>bushel</b>		28.349 523 kg
36,000	2250	62½	<b>pound</b>	453.592 g

For coal in Newcastle

							Metric
<b>ship load</b>							430,807.496 384 kg
20	<b>keel</b>						21,540.374 819 kg
160	8	<b>chaldron</b>					2,692.546 852 kg
4240	212	26½	<b>sack</b>				101.604 754 kg
12,720	636	79½	3	<b>bushel</b>			33.868 251 kg
50,880	2544	318	12	4	<b>peck</b>		8.467 063 kg
949,760	47,488	5936	224	74 2/3	18 2/3	<b>pound</b>	453.593 g

Upper scale for corn (presumed system, by [ROSS], that follows the units defined by Henry VII, based upon the bushel established by Elisabeth I in 1601)

							Metric
<b>last</b>							1994 kg
2	<b>load or wey</b>						996.94 kg
10	5	<b>quarter</b>					199.39 kg
20	10	2	<b>coom</b>				99.69 kg
80	40	8	4	<b>bushel<sup>a</sup></b>			24.923 4 kg
320	160	32	16	4	<b>peck</b>		6.23 kg
640	320	64	32	8	2	<b>gallon<sup>a</sup></b>	3.116 6 kg

<sup>a</sup>Based on bulk density of wheat used by [ROSS, p. 34]. The gallon and bushel standards did not mathematically equal the 1:8 ratio

Lower scale for corn (presumed system, by [ROSS], that follows the units defined by Henry VII, based upon the bushel established by Elisabeth I in 1601)

					Metric
<b>gallon</b>					3.115 kg
2	<b>pottle</b>				1.56 kg
4	2	<b>quart</b>			779.2 kg
8	4	2	<b>pint</b>		389.6 g
32	16	8	4	<b>gill</b>	97.4 g

Upper scale for corn (presumed system, by [ROSS], that follows the units defined by Henry VII, based upon the bushel established by William III in 1702)

							Metric
<b>last</b>							1996 kg
2	<b>load or wey</b>						997.93 kg
10	5	<b>quarter</b>					199.59 kg
20	10	2	<b>coom</b>				99.79 kg
80	40	8	4	<b>bushel<sup>a</sup></b>			24.948 3 kg
320	160	32	16	4	<b>peck</b>		6.23 kg
640	320	64	32	8	2	<b>gallon<sup>a</sup></b>	3.114 7 kg

<sup>a</sup>Based on bulk density of wheat used by [ROSS, p. 35]. The gallon and bushel standards did not mathematically equal the 1:8 ratio

Lower scale for corn (presumed system, by [ROSS], that follows the units defined by Henry VII, based upon the bushel established by William III in 1702)

					Metric
<b>gallon</b>					3.114 7 kg
2	<b>pottle</b>				1.56 kg
4	2	<b>quart</b>			778.7 g
8	4	2	<b>pint</b>		389.3 g
32	16	8	4	<b>gill</b>	97.3 g

## For flour

						Metric
<b>load</b>						1,066.849 920 kg
8 2/5	<b>sack<sup>a</sup></b>					127.005 943 kg
12	1 3/7	<b>barrel<sup>b</sup></b>				88.904 160 kg
42	5	3½	<b>bushel</b>			25.401 189 kg
168	20	14	4	<b>stone</b>		6.350 297 kg
2352	280	196	56	14	<b>pound</b>	453.593 g

<sup>a</sup>For flour from France, Italy, Spain, Germany and Scotland<sup>b</sup>For wheat flour from Canada, Denmark, Hungary, Russia and USA

## For glass

			Metric
<b>seam</b>			54.431 118 kg
24	<b>stone</b>		2.267 963 kg
120	5	<b>pound</b>	453.593 g

## For gunpowder

			Metric
<b>load</b>			1,088.622 366 kg
24	<b>barrel</b>		45.359 265 kg
2400	100	<b>pound</b>	453.593 g

## For new hay (considered new for three months, and if baled before the first of September)

			Metric
<b>load</b>			979.760 129 kg
36	<b>truss</b>		27.215 559 kg
2160	60	<b>pound</b>	453.593 g

1 yd<sup>3</sup> of new hay = 6 stones

## For old hay (baled after the first of September)

			Metric
<b>load</b>			914.442 787 kg
36	<b>truss</b>		25.401 189 kg
2016	56	<b>pound</b>	453.593 g

1 yd<sup>3</sup> of old hay = 8 or 9 stones

## For lead in London and Newcastle

							Metric
<b>foster</b>							1,422.466 558 kg
1 119/273	<b>fodder or fother<sup>a</sup></b>						990.646 353 kg
18 2/3	13	<b>load or wey</b>					76.203 566 kg
28	19½	1½	<b>stannary hundred</b>				50.802 377 kg
44 4/5	31 1/5	2 2/5	1 3/5	<b>fotmal</b>			31.751 486 kg
261 1/3	182	14	9 1/3	5 5/6	<b>stone</b>		5.443 112 kg
3136	2,184	168	112	70	12	<b>pound</b>	453.593 g

<sup>a</sup>Varied between 2184 lbs av and 2464 lbs av, cf. in Hull = 19½ stannary hundreds of 120 lb av = 2340 lbs av

## For oil

			Metric
<b>tun</b> (252 gal)			1,028.748 136 kg
20¼	<b>hundredweight</b>		50.802 377 kg
2268	112	<b>pound</b>	453.593 g

## For potash

			Metric
<b>load</b>			1,088.622 366 kg
12	<b>barrel</b>		90.718 530 kg
2400	200	<b>pound</b>	453.593 g

For salt

								Metric
<b>ton</b>								1,066.844 kg
5¼	<b>quarter</b>							203.208 kg
8 2/5	1 3/5	<b>sack</b>						127.005 kg
16 4/5	3 1/5	2	<b>charge<sup>a</sup></b>					63.502 kg
21	4	2½	1¼	<b>hundredweight</b>				50.802 kg
42	8	5	2½	2	<b>bushel</b>			25.401 kg
336	64	40	20	16	8	<b>gallon</b>		3.175 kg
2352	448	280	140	112	56	7	<b>pound</b>	453.59 g

<sup>a</sup>Sometimes also reported as 2¼ Cwt = 114.304 kg. This unit was used during the fifteenth–seventeenth centuries, and also written as chaarge, charge, chardge, and chargia

For soap

				Metric
<b>load</b>				1,393.436 628 kg
12	<b>barrel</b>			116.119 719 kg
48	4	<b>firkin</b>		29.029 930 kg
3072	256	64	<b>pound</b>	453.593 g

For steel during the twelfth–nineteenth centuries

				Imperial	Metric
<b>burden, burdon, burdyn, burdyng, burthen, or byrdyn</b>				180 lbs	81.646 kg
9	<b>score</b>			20 lbs	9.072 kg
12	1 1/3	<b>sheave or sheffe<sup>a</sup></b>		15 lbs	6.804 kg
30	3 1/3	2½	<b>gad or gadde</b>	6 lbs	2.721 kg

<sup>a</sup>Also reported as 1/6 burden

For straw

			Metric
<b>load</b>			587.856 078 kg
36	<b>truss</b>		16.329 335 kg
1296	36	<b>pound</b>	453.593 g

For tin

		Metric
<b>stannary hundred</b>		54.431 kg
120	<b>pound</b>	453.59 g

For wool, based on [MART3]

							Metric
<b>load</b>							1,981.292 706 kg
12	<b>sack</b>						165.107 726 kg
24	2	<b>wey</b>					82.553 863 kg
156	13	6½	<b>tod</b>				12.700 594 kg
312	26	13	2	<b>stone</b>			6.350 297 kg
624	52	26	4	2	<b>clove</b>		3.175 149 kg
4368	364	182	28	14	7	<b>pound</b>	453.593 g

For wool, based on [MART3]

			Metric
<b>pack</b>			108.862 237 kg
12	<b>score</b>		9.071 853 kg
240	20	<b>pound</b>	453.593 g

Upper scale for wood until the eighteenth century

							British	Metric
<b>last</b>							4368 lbs av	1,981.281 kg
6	<b>sarpler</b> or <b>sarplar</b>						728 lbs av	330.214 kg
12	2	<b>sack</b>					364 lbs av	165.107 kg
24	4	2	<b>wey</b>				182 lbs av	82.553 kg
36 2/5	6 1/15	3 1/30	1 31/60	<b>pack</b>			120 lbs av	54.431 kg
156	26	13	6½	4 26/91	<b>tod<sup>a</sup></b>		28 lbs av	12.701 kg
180	30	15	7½			<b>cark, carke, or kark</b>	24.266 lbs av	11.007 kg

<sup>a</sup>Varied between 20 and 40 lbs av

Lower scale for wool until the eighteenth century

							British	Metric
<b>sarpler</b>							150 lbs av	68.038 kg
5 5/14	<b>tod</b>						28 lbs av	12.701 kg
7½	1 2/5	<b>score</b>					20 lbs av	9.072 kg
10 5/7	2	1 3/7	<b>stone<sup>a</sup></b>				14 lbs av	6.350 kg
21 3/7	4	2 6/7	2	<b>clove</b> or <b>nail<sup>b</sup></b>			7 lbs av	3.175 kg
30	5 3/5	4	2 4/5	1 2/5	<b>cark, carke, or kark</b>		5 lbs av	2.268 kg
150	28	20	14	7	5	<b>pound</b>	1 lbs av	453.59 g

<sup>a</sup>Varied between 7 and 20 lbs av

<sup>b</sup>Varied between 7 and 10 lbs av

Other measures reported during the thirteenth–nineteenth century for different commodities:

1 **bale** (for cotton) = 750 lbs = about 340.19 kg,  
but during the twentieth century, also reported  
as 720 lbs = about 326.59 kg.

1 **bag, bagg, or bagge**:

almonds = 3 Cwt = about 152.406 kg;  
aniseed = 3 to 4 Cwt = about 152.406 –  
203–208 kg;  
cement = 50.0 kg;  
coal = 112 lb = about 50.08 kg;  
cocoa = 1 Cwt = about 50.802 kg;  
coffee beans = 1¼–1½ Cwt = about  
63.502–76.203 kg;  
cotton yarn = 2½–4¼ Cwt = about  
113.397–192.776 kg;

currants = 4 Cwt = about 203.208 kg;  
flour = about 127.0 kg (net weight), some  
say 196 lb = about 88.9 kg;  
goat-hair = 2–4 Cwt = about  
101.605–203.208 kg;  
lime = 1 heaped bu = about 45.0 L;  
pepper = 1¼–3 Cwt = about  
61.235–146.964 kg;  
pimentoes = 1 Cwt = about 45.359 kg;  
rice = 168 lbs = 76.203 566 kg;  
sage = 1 Cwt = about 50.802 kg;  
Spanish wool = 240 lb = about 108.862 kg;  
wool = 26 stones = about 165.1 kg (net  
weight).

1 **bale, baele, bail, bal, bala, ball, balle, bayl, bayll, boillun, boyllum, boylun, or buyllon**:  
almonds = 3 Cwt = 146.964 kg;  
caraway seeds = 3 Cwt = 152.406 kg;

- cochineal = 1½ Cwt = 76.203 kg;  
 coffee = 2 to 2½ Cwt = 101.604–127.005 kg;  
 cotton yarn = 3 to 4 Cwt = 136.077–181.436 kg;  
 flaxen yarn = 240 lbs = 108.862 kg;  
 hay or straw = 224 lbs = about 101.605 kg;  
 hemp = 20 Cwt = 1,016.040 kg;  
 hops = 177.4 kg;  
 licorice = 2 Cwt = 101.605 kg;  
 madder = 8 Cwt = 406.416 kg;  
 raw silk = 1 to 4 Cwt = 50.802–203.208 kg;  
 Spanish wool = 2¼ Cwt = 114.304 kg;  
 Wool = 180 lbs = about 81.646 kg.
- 1 **balet, balett, balette, or ballet** (for various commodities) = ½ bale;
- 1 **band or bande** (for iron) = 3 Cwt = 24 stones = about 152.41 kg;
- 1 **anchovy barrel** (for anchovies during the eighteenth century) = 16 lbs = about 7.257 kg ([CROU, p. 71]);
- 1 **barrel** (during the seventeenth–twentieth centuries):  
 anchovies = 30 lb = about 13.608 kg;  
 barilla = 2 Cwt = about 101.605 kg;  
 barley = 224 lb = about 101.605 kg;  
 butter = 224 lb = about 101.605 kg;  
 candles = 120 lb = about 54.431 kg;  
 coffee = 1–1½ Cwt = about 50.802–76.203 kg;  
 flour = 196 lb = about 88.904 kg;  
 gunpowder = 1/24 last = 100 lb = about 45.359 kg;  
 oatmeal = 2 Cwt = about 101.605 kg;  
 oats = 196 lb = about 88.904 kg;  
 pilchard = 30 lbs = 13.607 780 kg;  
 potash = 2 Cwt = about 101.605 kg;  
 raisins = 1 Cwt = about 50.802 377 kg;  
 rosin = 2 Cwt = about 101.605 kg;  
 Spanish tobacco = 2–3 Cwt = about 101.605–152.406 kg;  
 wheat = 280 lb = about 127.005 kg.
- 1 **basket, baskatt, baskete, baskete, baskett, baskyt, baskyt, basquet, basquette, baszkett, or baszkette** (during the thirteenth–nineteenth centuries):  
 asafoetida = 20 to 50 lb = about 9.072–22.679 kg;
- cherries (in Kent) = 48 lb = about 21.772 kg;
- 1 **block** (used for tin during the sixteenth century) [HATC2, p. 4]:  
 Cornish tin = between 200 and 300 lbs = about 9.07–13.6 kg;  
 Devon tin (also as **slabs**) = between 100 and 150 lbs = about 4.54–6.8 kg;
- 1 **bloom ton** (for iron) = 2 464 lbs = about 1 117.6 kg;
- 1 **bottle, botel, botele, bottle, botell, botelle, bottle, bottle, bottelle, or bottelle** (for hay or straw) = 7 lbs = 3.175 kg;
- 1 **box, boxe, or boxse** (during the eighteenth–nineteenth centuries):  
 aloes = 14 lb = about 6.350 kg;  
 almonds = 25 lb = about 12.247 kg;  
 camphor = 1 Cwt = about 0.802 kg;  
 quicksilver = 100–200 lb = about 45.359–90.718 kg;  
 whitefish = 70 to 140 lb = about 50.8 to 60 kg.
- 1 **brick** (used among masons during the nineteenth century) = 7 lbs = about 3.178 kg;
- 1 **butress** (during the fifteenth century for coal) = undetermined size;
- 1 **canister or cannister** (for tea) = from 75 lbs to 100 lbs = 34.019–45.359 kg;
- 1 **cark, carke, or kark** (for spices) = 3 or 4 Cwt = 136.077 or 181.436 kg;
- 1 **caroteel, caretell, caroteele, caroteelle, or carroteel** (during the fifteenth–nineteenth centuries):  
 cloves = 4–5 Cwt = about 181.436–226.795 kg;  
 currants = 5–9 Cwt = 254.010–457.218 kg;  
 mace = 3 Cwt = about 152.00 kg;  
 nutmeg = 6–7½ Cwt = about 293.928–367.410 kg;
- 1 **case, caas, cace, cais, cas, cass, cassa, or casse**:  
 annatto = 2¼ Cwt = about 102.058 kg;  
 apples = 40 lb = about 18.144 kg;  
 licorice juice = 1½ Cwt = about 76.203 kg;  
 ordinary glass = 1¾ Cwt = about 88.903 kg or 196 lb (based on the 112 lb Cwt) = about 88.906 kg;  
 onions = 120 lb = about 54.431 kg;  
 sinopia = about 5 Cwt = about 254.00 kg;

steel = about 1 Cwt = about 50.00 kg;  
 vermillion = about  $2\frac{1}{2}$  Cwt = about 127.00 kg.

1 **cask** or **caske** (during the seventeenth–nineteenth centuries):

almonds = about 3 Cwt = about 152.00 kg;  
 arsenic = 4 Cwt = about 181.436 kg;  
 bristles = 10 Cwt = about 508.020 kg;  
 butter (in Caithness) = 72–84 lb = about 32.658–38.101 kg;  
 butter (as Dutch cask) = 112 lb = 2 firkins = about 50.8 kg;  
 clover seed = 7–9 Cwt = about 355.614–457.218 kg;  
 cloves, mace, and nutmeg = about 300 lb = about 136.00 kg;  
 cocoa =  $1\frac{1}{4}$  Cwt = about 63.502 kg;  
 currants = 5–9 Cwt = about 254.01–457.218 kg;  
 mace = about 3 Cwt = about 152.406 kg;  
 madder = 15–23 Cwt = about 762.030–1,168.446 kg;  
 raisins =  $1\text{--}2\frac{1}{2}$  Cwt = about 50.802–127.005 kg;  
 soda = 3–4 Cwt = about 152.406–203.208 kg;  
 sugar = 8–11 Cwt = about 391.904–538.868 kg;  
 tallow = 9 Cwt = about 457.218 kg;  
 tobacco = 224 lb = about 101.604 kg;  
 wheat flour = 2 Cwt = about 101.604 kg.

1 **chest, cest, chast, chaste, cheste, chist, chiste, chyst, ciste, or cyst** (during the seventeenth–nineteenth centuries):

castle-soap =  $2\frac{1}{2}$ –3 Cwt = about 127.005–152.406 kg;  
 cochineal =  $1\frac{1}{2}$  Cwt = about 76.203 kg;  
 gum arabic = 4–6 Cwt = about 181.436–272.154 kg;  
 indigo =  $1\frac{1}{2}$ –2 Cwt = about 68.038–90.718 kg;  
 isinglass =  $3\frac{1}{2}$  Cwt = about 158.756 kg;  
 sugar = 3 Cwt = about 152.406 kg.

1 **clout** (for silk during the fifteenth century) = 4 lbs = 1.814 kg;

1 **faggot** (for steel) = 120 lbs = 54.431 118 kg;  
 1 **foot** (for tin) = 60 lbs = 27.215 559 kg;

1 **gallon** (for linseed oil) =  $9\frac{3}{8}$  lbs = 4.252 431 kg;

1 **gallon** (for olive oil) = 9 lbs = 4.082 334 kg;

1 **journey** (during the early seventeenth century, a unit by which workers at the mint measured their production of coins) = 30 Troy pounds.<sup>35</sup>

1 **stand, stoned, stoond, or stoonde** (for Burgundy pitch during the thirteenth–nineteenth centuries) =  $1\frac{1}{4}$  Cwt to 3 Cwt = about 63.502 kg to about 152.406 kg;

1 **stone** (for butter) = 16 lbs = 7.257 482 kg;

1 **stone** (for hemp) = 32 lbs = 14.514 965 kg;

1 **stone** (for meat) = 8 lbs = 3.628 741 kg;

1 **tub** (for tea) = 60 lbs = 27.215 559 kg;

### 53.11 Troy Weight System

The Troy system of weights was introduced no later than the late fourteenth century. The system was probably based on a system of weights used at the fair of Troyes. In medieval times, Troyes, present-day capital of the Aube department in France, was an important international trade centre. The system became the basis for the British system of coinage, in which the penny was literally one pennyweight of silver, 12 pence made one troy ounce of silver, or a shilling, and 20 shillings made a troy pound of sterling silver.

The Troy system was not officially legalized until 1824, and was subsequently abolished in 1875; however, the troy ounce continues to be used in the pricing of precious metals.

<sup>35</sup> [MALY, p. 279].

Upper scale of Troy Pound Weight System<sup>36</sup> from 1497 to 1878

								Metric
<b>ton</b>								746.496 kg
250/64	<b>quarter</b>							191.103 kg
20	256/50	<b>hundredweight</b>						37.375 kg
31¼	8	25/16	<b>bushel</b>					23.888 kg
250	64	25/2	8	<b>gallon</b>				2.986 kg
500	128	25	16	2	<b>pottle</b>			1.493 kg
1000	256	50	32	4	2	<b>quart</b>		746.496 g
2000	512	100	64	8	4	2	<b>Troy pound and pint</b>	373.268 g

Lower scale of Troy Pound Weight System from 1497 to 1995

					Metric
<b>Troy pound and pint</b>					373.268 g
12	<b>Troy ounce</b>				31.104 g
240	20	<b>pennyweight</b>			1.555 2 g
5760	480	24	<b>Troy grain</b>		64.8 mg

Troy imaginary mint system for precious metals, based on [DOUR]

					Metric
<b>Troy grain</b>					64.792 02 mg
20	<b>mite</b>				3.239 601 mg
480	24	<b>droit</b>			134.983 4 µg
11,520	576	24	<b>periot</b>		5.624 3 µg
276,480	13,824	576	24	<b>blank</b>	0.234 3 µg

Troy imaginary mint system for precious metals, based on [ZUPK2]

					Metric
<b>Troy grain</b>					64.792 02 mg
20	<b>mite</b>				3.239 601 mg
480	24	<b>droit</b>			134.983 4 µg
9600	480	20	<b>periot</b>		6.749 2 µg
230,400	11,520	480	24	<b>blank</b>	0.281 2 µg

Troy pound carat system, used by gold and silver refiners, during the eighteenth century)

						Metric
<b>Troy pound</b>						373.248 g
12	<b>ounce</b>					31.104 g
24	2	<b>carat</b>				15.552 g
96	8	4	<b>grain</b>			3.888 g
384	32	16	4	<b>quarter</b>		972 mg
5760	480	240	60	15	<b>Troy grain</b>	64.8 mg

<sup>36</sup> Used for precious metals, coinage and bread.

Troy weights, used for precious metals, black powder, and gemstones

				Metric
<b>Troy pound</b>				373.241 721 6 g
12	<b>ounce</b>			31.103 476 8 g
240	20	<b>pennyweight</b>		1.555 173 84 g
5760	480	24	<b>grain</b>	64.798 91 mg

Ounce carat system, used by gold and silver refiners during the eighteenth century

					Metric
<b>Troy ounce</b>					31.104 g
24	<b>carat</b>				1.296 g
96	4	<b>grain</b>			324 mg
384	16	4	<b>quarter</b>		81 mg
480	20	5	1¼	<b>Troy grain</b>	64.8 mg

For jewels and other precious stones during the eighteenth century

							Metric
<b>Troy ounce</b>							31.104 g
152	<b>carat</b>						204.6 mg
608	4	<b>grain</b>					51.2 mg
1216	8	2	<b>eighth carat</b>				25.6 mg
2432	16	4	2	<b>sixteenth carat</b>			12.8 mg
4864	32	8	4	2	<b>thirty-second carat</b>		6.4 mg
9728	64	16	8	4	2	<b>sixty-fourth carat</b>	3.2 mg

For medical use after August 30, 1878, based on [MART3]

						Metric
<b>quart</b>						1.132 981 631 kg
2	<b>pint</b>					566.990 816 g
4	2	<b>half pint</b>				283.495 408 g
40	20	10	<b>fluid ounce</b>			28.349 541 g
320	160	80	8	<b>dram</b>		3.543 693 g
19,200	9600	4800	480	60	<b>minim</b>	58.796 mg

For gold, silver and money before November 1, 1852, based on [MART3]

				Metric
<b>Troy pound</b>				373.241 954 g
12	<b>ounce</b>			31.103 496 g
240	20	<b>pennyweight</b>		1.555 175 g
5760	480	24	<b>grain</b>	64.799 mg

For diamonds and jewels, based on [MART3]

				Metric
<b>Troy ounce</b>				31.103 496 g
151½	<b>carat</b>			205.304 mg
604	4	<b>diamond-grain</b>		51.326 mg

### 53.13 Moneyers' Weight

This system was used, from the late sixteenth century until the mid-nineteenth century, for medicine, precious metals, and to compute exact coin weight. It was legalised by an Act of Parliament dated July 17, 1649, in *An Act touching the monies and coins of England*. See also [WARD2, p. 32] and [MORY, Pt. I, Book III, Ch. 6, p. 136].

### 53.12 Apothecary Systems of Weight

Winchester Apothecary liquid weight system before 1826

					Metric
<b>gallon</b>					3,779.006 4 g
8	<b>pint</b>				472.375 80 g
128	16	<b>fluid ounce</b>			29.523 49 g
1024	128	8	<b>fluid drachm</b>		3.690 44 g
61,440	7680	480	60	<b>minim</b>	61.51 mg

The system was based upon the wine gallon measuring 231 cu in

Imperial Apothecary liquid weight system after 1826

					Metric
<b>gallon</b>					4,536.000 g
8	<b>pint</b>				567.000 g
160	20	<b>fluid ounce</b>			28.350 g
1280	160	8	<b>fluid drachm</b>		3.544 g
76,800	9600	480	60	<b>minim</b>	59.06 mg

The system was based upon the Imperial gallon measuring 277.27 cu in (in 1824, defined as 10 av lb of water weighed at 62° F at 30 inches of barometric pressure)

Apothecary weight system during the eighteenth–twentieth centuries

					Metric	Metric
<b>Troy pound</b>					373.248 g	373.241 721 6 mg
12	<b>Troy ounce</b>				31.104 g	31.103 476 8 mg
96	8	<b>dram or drachm</b>			3.888 g	3.887 934 6 mg
288	24	3	<b>scruple<sup>a</sup></b>		1.296 g	1.295 978 2 mg
5760	480	60	20	<b>Troy grain</b>	64.8 mg	64.798 91 µg

The system was replaced by the metric system during the first half of the twentieth century. Sometimes “ap” was added to the front of the unit to identify it as part of the apothecaries’ system

<sup>a</sup>The symbol for the scruple is ə

Scale based on [HORS]

						Metric
<b>pennyweight</b>						1.555 174 010 88 g
24	<b>grain</b>					64.798 917 12 mg
480	20	<b>mite</b>				3.239 945 856 mg
11,520	480	24	<b>droit or droict</b>			134.997 744 µg
230,400	9600	480	20	<b>periot</b>		6.749 887 2 µg
5,529,600	230,400	11,520	480	24	<b>blank, blanc, blanck, or blancke, or blanke</b>	0.281 245 3 µg

During the seventeenth–nineteenth centuries, local variations were reported for some units. Below, some of those are listed.

Units of Dry Capacity

1 **bushel** (for corn) = 9 gal = about 39.6 L.

53.14 Bedfordshire

Units of Volume

1 **stack** (for wood) = about 3.058 2 m<sup>3</sup>.

Units of Dry Capacity

1 **bushel** = 2 pt above the Winchester bu = about 364 L;  
1 **load** (or wheat) = about 182 L;

Units of Liquid Capacity

1 **canter** (for ale) = about 115 L;  
1 **mug** (for ale) = about 568.24 mL.

Units of Weight

1 **tod** (for wool) = about 13.154 kg.

53.15 Berkshire

Units of Quantity

1 **bundle, bondel, bondell, boundell, bundle, bundell, or byndle** (for hogsheads hoops) = 120 to 480;  
1 **bolt, bollttee, bolte, boutl, or bowlte** (for osiers) = 42 in (1.067 m) around and 14 in (355.6 mm) from the butts.

53.16 Buckinghamshire

Units of Capacity

1 **load** (for chalk) = 16 buckets = about 846 L;  
1 **bucket** (for chalk) = 1½ bu = about 52.9 L, but [DOUR] reported it as 54.5 L;  
1 **flat** (for vegetables) = about 36.37 L.

53.17 Cambridgeshire

Units of Quantity

1 **bunch** (for osiers) = 45 in (= 1143 m) in circumference at the band;  
1 **bunch** (for reeds) = 28 in (= 7.112 m) in circumference at the band.

Units of Dry Capacity

1 **load** (for osiers) = 80 bunches;  
1 **ring** (in Huntingdonshire)<sup>37</sup> = ½ quarter;  
1 **last** (for oats) = 10½ seams = about 2 960 L;

<sup>37</sup> According to Rogers, James E. Thorold. *A History of Agriculture and Prices in England*. Vol. 1. Oxford: Clarendon Press, 1882, p. 168.

- 1 **load** (for wheat) = about 176 L;
- 1 **chaldre** (for lime) = about 1.409 L.

**Units of Weight**

- 1 **hundred** (for cheese) = about 54.431 kg.

**53.18 Cheshire**

**Units of Length**

- 1 **pole** = 24 ft.

**Units of Area**

			Square yard	Metric
(Cheshire) <b>acre</b> or <b>Forest acre</b>			10,240	8,561.944 m <sup>2</sup>
4	<b>quarter</b>		2560	2,140.486 m <sup>2</sup>
160	40	<b>square rood</b>	64	53.512 m <sup>2</sup>

**Units of Dry Capacity**

- 1 **colbrond** (for coal) = unknown value;
- 1 **barrow** (for salt) = 6 pk = about 52.9 L;
- 1 **measure** (for barley and oats) = 38 qt = about 41.8 L;
- 1 **measure** (for malt) = 32–36 qt = about 35.2–39.6 L;
- 1 **kiver** (for corn) = 12 sheaves of unknown value.

**Units of Weight**

- 1 **load** (for oatmeal) = 240 lbs = about 108.862 kg;
- 1 **measure** (for cheese and potatoes) = 120 lbs = about 54.431kg;
- 1 **bushel** (for potatoes) = 90 lbs = about 40.823 kg;

- 1 **measure** (for wheat) = 75 lbs = about 34.019 kg;
- 1 **bushel** (for wheat) = 70–75 lbs = about 31.751–34.019 kg;
- 1 **bushel** (for barley) = 60 lbs = about 27.215 kg;
- 1 **bushel** (for oats) = 45–50 lbs = about 20.411–22.679 kg;
- 1 **dish** = 24 oz = about 680 g;
- 1 **half-dish** = 12 oz = about 340 g.

**53.19 Cornwall**

*Main source:* [COUR3]

**Units of Quantity**

- 1 **Cornish last** (for fish) = 132,000;
- 1 **Cornish long hundred** (for fish) = 8 × 120 + 5 = 965;
- 1 **Cornish cran** (for fish) = 800;
- 1 **Cornish mease** (for herring) = 505;
- 1 **Cornish hundred** (for fish) = 132;
- 1 **Cornish burn** (for hake, a species of fish, in West Cornwall) = 21;
- 1 **Cornish wrap** (for fish) = 4.

Units of Length

						Metric
<b>Cornish mile</b>						2,414.016 m
440	<b>Cornish perch</b> <sup>a</sup>					5.486 4 m
528	1 1/5	<b>Cornish fathom</b>				4.572 m
2640	6	5	<b>yard</b>			914.4 mm
7920	18	15	3	<b>foot</b>		304.8 mm
95,040	216	180	36	12	<b>inch</b>	25.4 mm

<sup>a</sup>In West Cornwall, also reported as **lace**

Units of Area

During the seventeenth–eighteenth centuries, based on [CARE]

				Metric
<b>Knight’s fee</b>				4,370,622.84 m <sup>2</sup>
4	<b>Cornish acre</b> <sup>a</sup>			1,092,655.71 m <sup>2</sup>
16	4	<b>ferling or farthing</b>		273,163.927 5 m <sup>2</sup>
1080	270	67½	<b>statute acre</b>	4,046.873 m <sup>2</sup>

<sup>a</sup>During the twelfth century, reported as **acras Cornubiensis terræ**

During the eighteenth century, based on [MORT] and [EDWA]

					Metric
<b>woodland acre</b> <sup>a</sup>					4,816.093 593 6 m <sup>2</sup>
120	<b>lease</b>				40.134 113 28 m <sup>2</sup>
160	1 1/3	<b>lace</b>			30.100 584 96 m <sup>2</sup>
320	2 2/3	2	<b>lorgh or land rod</b>		15.050 292 48 m <sup>2</sup>
480	4	3	1½	<b>stick</b>	10.033 528 32 m <sup>2</sup>

<sup>a</sup>Equal to 4 perches by 40 perches. Also called **Cornish acre**

Units of Capacity

- 1 **hogshead** (for oats) = 9 bu = about 317 L;
- 1 **bushel** (for potatoes in the eastern part of Cornwall) = 16 gal = about 70.5 L;
- 1 **topcliff** (for tin) = ½ gal = about 1.89 L;
- 1 **poddle** = about 1.10 L;
- 1 **bushel** (for potatoes in the western part of Cornwall) = about 1.057 L.

Units of Weight

- 1 **bushel** (for potatoes) = 220 lbs = about 99.790 kg;
- 1 **hundred** (for iron and tin) = 120 lbs = about 54.431 kg;
- 1 **Cornish metric gallon** = 5 kg;
- 1 **Cornish gallon** = 10 lbs = 4.536 kg;
- 1 **Cornish apple gallon** = 7 lbs = 3.175 kg;

53.20 Cumberland

Units of Dry Capacity

- 1 **bushel** (or barley, oats and potatoes at Penrith) = 20 gal = about 88.1 L;
- 1 **bushel** (or rye and wheat at Penrith) = 16 gal = about 70.5 L;
- 1 **bushel** (at Carlisle) = about 1.057 L.

Units of Weight

- 1 **stone** (for hay, tallow, wool and yarn) = 16 lbs = about 7.26 kg;
- 1 **stone** (for beef) = 14 or 16 lbs = about 6.35–7.26 kg.

53.21 Derbyshire

Units of Quantity

- 1 **shock** (for corn) = 12 sheaves.

Units of Length

- 1 **lea** (for linen) = 1/12 hank = 300 yd = about 274.32 m;
- 1 **lea** (for cotton and spun silk) = 1/7 hank = 120 yd = about 109.725 m;
- 1 **cord** (a unit used in describing the size of deposits of lead ore) = 14 yd (for flat veins or pipe) or 29 yd (for rake veins).

Units of Area

- 1 **bay** (area of slater’s work) = 500 ft<sup>2</sup> of slate installed on a roof = about 46.452 m<sup>2</sup>. [BRIT, p. 167]

Units of Volume

- 1 **ruck** (for bark) = 5¼ cubic yards = about 5.014 m<sup>3</sup>;
- 1 **cord** = 128, 155 or 162½ cubic feet = about 3.624, 4.389 or 4.601 m<sup>3</sup>;
- 1 **stack** (for coal) = about 105 cubic feet = about 2.973 3 m<sup>3</sup>.

Units of Dry Capacity

- 1 **load** (for charcoal) = 144 level bu = about 5 074 L;
- 1 **chalder** (for lime) = 32 heaped bu = about 1 441 L;
- 1 **score** (for lime) = 20–22 heaped bu = about 901–991 L;
- 1 **seam** (for lime) = 8 struck bu = about 282 L;
- 1 **box** (for coal) = 2½ struck or leveled bu = about 88.1 L;
- 1 **dish** (for minerals in general) = about 17.59 L;
- 1 **thrave** (for corn) = 2 kivers = 24 sheaves of unknown value;
- 1 **kiver** (for corn) = 12 sheaves of unknown value;
- 1 **shock** (for corn or straw) = 12 sheaves, sometimes 10 sheaves, of unknown value.

For lead ore

				Metric
<b>mineral day or take up</b>				3524 L
1 1/3	<b>bout or boot</b>			2643 L
3 5/9	2 2/3	<b>load</b>		991.125 L
32	24	9	<b>dish<sup>a</sup></b>	110.125 L

<sup>a</sup>Reported as 14–16 pt = about 110.1–125.8 L

## Units of Weight

- 1 **fother** (for lead) =  $22\frac{1}{2}$  Cwt = about 1,143.0 kg;
- 1 **pig** (for iron and lead as a name for a casting from a pig mold) =  $352\frac{1}{2}$  lbs = about 159.89 kg;
- 1 **corf** (for coal) = 2 Cwt = about 101.604 kg;
- 1 **hundred** (for cheese, potatoes and coal) = 120 lbs = about 54.431 kg;
- 1 **bushel** (for potatoes) = 90 lbs = about 40.823 kg.

## 53.22 Devonshire

### Units of Area

- 1 **Devonshire acre** = 160 perches  $\times$  5 f. = 4000 sq yd, based on a perch of 15 f. = about 3700 m<sup>2</sup>;
- 1 **piece** (for kersey) = 12 to 14 yd  $\times$  4 quarters = about 10.97 to 12.80 m  $\times$  910 mm.

### Units of Volume

- 1 **rope** (for cob-work or masonry) = 20 f. long  $\times$  1 f. high  $\times$  18 in thick.

### Units of Dry Capacity

- 1 **wey** (for lime) = 48 double Win. bu = about 3383 L;
- 1 **seam** (for Welsh coal) = 16 heaped bu = about 720 L;
- 1 **hogshead** (for lime) =  $11\frac{1}{2}$  bu = about 458 L;
- 1 **bushel** (for wheat) = 3 leveled and 1 heaped pk = about 396 L;
- 1 **seam** (or lime) = 8 heaped bu = about 360 L;
- 1 **knitch** = 6 sheaves of reed.

### Units of Weight

- 1 **seam** (for dung) = 3 Cwt = about 152.406 kg;
- 1 **bag** (for wheat) = 140 lbs = about 63.503 kg;

- 1 **bushel** (for barley) = 50 lbs = about 22.679 kg;
- 1 **bundle** (for oat straw) = 40 lbs = about 18.144 kg;
- 1 **bushel** (for oats) = 36–40 lbs = about 16.329–18.144 kg;
- 1 **bundle** (for barley straw) = 35 lbs = about 15.876 kg;
- 1 **bundle** (for wheat straw) = 28 lbs = about 12.70 kg.

## 53.23 Dorsetshire

### Units of Length

- 1 **goad** =  $16\frac{1}{2}$  feet = about 5.032 5 m;
- 1 **lug** = 15 feet and 1 inch = about 4.600 4 m.

### Units of Area

- 1 **acre** = 134 square perches = about 3400 m<sup>2</sup>.

### Units of Dry Capacity

- 1 **hogshead** (for lime) = 4 bu = about 141 L.

### Units of Weight

- 1 **wey** (for hemp) = 32 lbs = about 14.515 kg.

## 53.24 Durham

### Units of Area

- 1 **yacker** = 1 acre.

### Units of Quantity

- 1 **chalder** (for grindstones) = 1–36 in number, depending on their size.

## Units of Dry Capacity

- 1 **load** (for lime) = 27 bu = about 951 L;  
 1 **bushel** (for corn) = 8 to 8½ gal = about 35.2 to 37.4 L;  
 1 **kenning** (for corn) = 2 pecks = about 18.184 L;  
 1 **beatment** or **hoop** (for grain) = ¼ pecks = about 2.20 L;  
 1 **tope** = unknown size;  
 1 **topette** = ½ tope = unknown size;  
 1 **batten** (for straw) = 1/12 thrave.

## Units of Weight

- 1 **bing** (for lead ore) = 8 Cwt = about 406.416 kg;  
 1 **corf** (for coal) = 3¼ Cwt = about 165.106 kg;  
 1 **box** (for salmon) = 8 stones = about 50.802 kg;  
 1 **bushel** (for wheat at Stockton) = 60 lbs = about 27.215 kg;  
 1 **bushel** (for oats at Stockton) = 35 lbs = about 15.876 kg;  
 1 **stone** (for wool) = 18 lbs = about 8.164 kg.

### 53.25 Essex

## Units of Quantity

- 1 **piece** (for colored cloth) = 28 to 30 yards × 7 quarters = about 25.60 to 27.43 m × 1.60 m;  
 1 **bolt**, **bollttee**, **bolte**, **boult**, or **bowlte** (for osiers) = 1/80 load;  
 1 **knot** (for wool yarn) = 80 turns around the bobbin.

For hop poles, faggots etc.

		Heads
<b>hundred</b>		120
20	<b>score</b>	6

For teasels

		Heads
<b>staff</b>		1250
50	<b>bunch</b> or <b>glean</b>	25

## Units of Length

- 1 **reel** (for wool) = 1¼ yards and 1½ yards = about 1.143 m and 1.372 m.

## Units of Dry Capacity

- 1 **load** (for chalk) = 90 bu = about 3 171 L;  
 1 **load** (for clay) = 40 bu = about 1 409 L;  
 1 **chaldron** (for apples, turnips, carrots, potatoes, etc.) = 36 bu = about 1268 L;  
 1 **load** (for shingle) = 24 bu = about 846 L;  
 1 **sack** (for charcoal) = 8 pk = about 70.5 L.

## Units of Weight

- 1 **ton** (for potatoes) = 22½ Cwt = about 1,143.047 kg;  
 1 **wey** (for cheese) = 180, 182, 224, 256, 336 or 416 lbs = about 81.646 kg, 82.553 kg, 101.604 kg, 116.119 kg, 188.693 kg or 233.620 kg;  
 1 **hundred** (for potatoes) = 120 lbs = about 54.431 kg;  
 1 **clove** (for cheese and butter) = 8 lbs = about 3.628 kg.  
 1 **stone** (for beef) = 8 lbs = about 3.628 kg.

### 53.26 Gloucestershire

## Units of Quantity

- 1 **bundle** (for hogshhead hoops) = 36;  
 1 **bundle** (for osiers) = 1¼ feet (= about 457 mm) in circumference;

For teasels (for middlings)

			Heads
<b>pack</b>			20,000
40	<b>staff</b>		500
1000	25	<b>bunch</b> or <b>glean</b>	20

For teasels (for kings)

			Heads
<b>pack</b>			9000
30	<b>staff</b>		300
900	30	<b>bunch or glean</b>	10

### Units of Volume

1 **cord** (for wood) = 8 f. 4 in long, 4 f. 4 in high,  
2 f. 2 in deep = about 78 ft<sup>3</sup> = about 2.209 m<sup>3</sup>.

### Units of Capacity

1 **cask** (for cider) = 110 gal = about 440 L;  
1 **bushel** (for corn) = usually 9½ gal = about  
41.8 L, but sometimes 9, 9¼ or 10 gal = about  
39.6, 40.7 or 44.0 L.

### Units of Weight

1 **thrive** (for straw) = 24 boltings or trusses =  
576 lbs = about 251.268 kg;  
1 **tod** (for wool) = 28½ lbs = about 12.927 kg;  
1 **bolting, boltin, or bolton** (for straw) = 24 lbs  
= about 10.886 kg;  
1 **stone** (for beef) = 12½ or 15 lbs = about  
5.670 kg or 6.804 kg.

## 53.27 Hamborough

### Units of Quantity

1 **bundle, bondel, bondell, boundell, bundle, bundell, or byndle** (for yarn) = 20 skein;

## 53.28 Hampshire

### Units of Quantity

1 **load** (for rafter poles) = 30 bundles = 1800;  
1 **hyle** (for harvested flax) = 10 sheaves;

1 **bundle, bondel, bondell, boundell, bundle, bundell, or byndle** (for osiers) = 42 in (= about 1.067 m) around the lower band;

### Units of Length

1 **lea** (for yarn) = 200 threads on a reel of 4 yd =  
1/7 hank = 800 yd = 731.5 m;  
1 **skein** (for yarn) = 480 yd = about 438.91 m;  
1 **reel** (for flax) = 2 yards = about 1.829 m.

### Units of Weight

1 **hundred** (for cheese) = 120 lb = about 54.431 kg.

## 53.29 Herefordshire

### Units of Length

1 **pole** (for wood) = 21 feet;  
1 **perch** of ditching = 21 feet;  
1 **lug** = 20 feet;  
1 **perch** of walling = 16½ feet or 8 yards;  
1 **perch** of fencing = 7 yards.

### Units of Area

1 **math** (in concept, the amount of land a man could mow in a day) = about 1 statute acre = about 4050 m<sup>2</sup>;  
1 **Herefordshire acre** = 3226 2/3 sq yd, based on a perch of 13½ ft = about 2700 m<sup>2</sup>;  
1 **hopacre** (the area occupied by 1000 hop plats) = about ½ statute acre = about 2000 m<sup>2</sup>;  
1 **lug** (for coppice wood) = 49 sq yd = about 40.969 m<sup>2</sup>.

### Units of Capacity

1 **hogshead** (for cider) = 110 gal = about 416 L;  
1 **bushel** (for grain) = 10 gal = about 44.0 L;  
1 **bushel** (for malt) = 8½ gal = about 37.4 L.

## Units of Weight

1 **stone** (for beef and wool) = 12 lb =

### 53.30 Hertfordshire

## Units of Length

1 **lug** or **perch** = 20 feet = about 6100 m.

## Units of Capacity

1 **load** (for chalk) = 22 buckets = 33 bu = about 1163 L;

1 **load** (for wheat) = 5 bu = about 176 L;

1 **sack** (for ashes) = 5 bu = about 176 L;

1 **bucket** (for chalk) = 1½ bu = about 52.9 L, but [DOUR] reported it as 54.5 L.

### 53.31 Huntingdonshire

## Units of Weight

1 **last** (for oats) = about 1,524.060 kg;

1 **pack** (for wool) = 240 lb = about 108.862 kg.

### 53.32 Kent

## Units of Area

1 **salung** (the amount of land that could be farmed each year with a single plough) = probably 160–400 acres = about 66–160 ha.

## Units of Capacity

1 **warp** (for herring) = 1/33 long hundred = 1/330 long thousand = 13,300 last = a cast of 4.

## Units of Weight

1 **bag** (for hops) = 2½ Cwt = about 127.005 kg;

1 **pack** (for flax or flour) = 240 lb = about 108.862 kg.

### 53.33 Lancashire

## Units of Length

1 **piece** (for washer: 15 to 18 yd) = about 13.72 to 16.46 m in length;

1 **perch** = 5½, 6, 6½, 7, 7½, or 8 yds.

## Units of Area

1 **Staffordshire acre** or **Forest acre** (used in the south of Lancashire) = 10,240 sq yd = 8,561.944 m<sup>2</sup>;

1 **West Derby acre** = 9000 sq yd, based on a perch of 56¼ ft = 7,525.15 m<sup>2</sup>;

1 **piece** (for cotton: 22 yd × 3 quarters) = about 20.12 m × 0.69 m = 13.88 m<sup>2</sup>.

## Units of Dry Capacity

1 **load** (for oats) = 7½ or 9 bu = about 264 or about 317 L;

1 **load** (for barley) = 6 bu = about 211 L;

1 **load** (for beans) = 4½ or 5 bu = about 159 or about 176 L;

1 **load** (for peas and wheat) = 4½ bu = about 159 L;

1 **windle** (in North Lancashire for barley, beans, and wheat) = 3½ bu = about 123 L;

1 **aghendole, ackendole, aigendole, akendole, aighendole, haughendole, or haughendo** (for grain during the sixteenth and seventeenth centuries) = 1/8 coomb = about 18.184 L. See also [HOU], p. 132] and [TAPA, p. 182]. According to [JAMI2, p. 20], also used for liquids = 7 quarts.

Units of Weight

- 1 **pack** (for lamb’s wool) = 480 lbs = about 217.724 kg;
- 1 **horseload** (in East Lancashire) = 4 Cwt = about 203.2 kg
- 1 **load** (for potatoes at Ulverstone) = 260 lbs = about 117.933 kg (unwashed potatoes) and 250 lbs = about 113.397 kg (washed potatoes);
- 1 **load** (for potatoes) = 2 Cwt = about 101.604 kg;
- 1 **windle** (for corn, peas and vetches in North Lancashire) = 220 lbs = about 99.79 kg;
- 1 **bushel** or **measure** (for potatoes) = 90 lbs = about 40.823 kg;
- 1 **bushel** (for wheat) = 70 lbs = about 31.751 kg;
- 1 **bushel** (for barley at Liverpool) = 60 lbs = about 27.215 kg;
- 1 **bushel** (for oats at Liverpool) = 45 lbs = about 20.412 kg;
- 1 **awkendale** (for little potatoes) = 7 lbs = 3.175 kg, see also [MLC, p. 60] and [HSLC, p. 140].

53.34 Leicestershire

Units of Length

- 1 **perch** = 8 yds of hedging.

Units of Area

- 1 **Leicester acre** = 2308¾ sq yd, based on a perch of about 112/5 f. = about 1,930.4 m<sup>2</sup>;
- 1 **plack** = 5 sq yd = about 4.181 m<sup>2</sup>.

Units of Weight

- 1 **hundred** (for cheese) = 120 lbs = about 54.431 kg
- 1 **bushel** (for potatoes) = 80 lbs = about 36.287 kg.

53.35 Lincolnshire

Units of Area

- 1 **bescia** (during the fourteenth century) = used for turf-cutting on the fens representing the amount of land that could presumably be dug annually by one man with a spade between May 1st and August 1st;
- 1 **carucate** = the amount of land that could be kept in cultivation by a single plough = 8 bovates or oxgangs;
- 1 **acre** = 5 roods = about 0.51 ha.

53.36 London

Units of Dry Capacity

For charcoal, based on [MART3]

						Metric
score						26,640.018 720 L
21	London chaldron					1,268.572 320 L
84	4	vat				317.143 080 L
252	12	3	sack			105.714 360 L
756	36	9	3	bushel		35.238 120 L
3024	144	36	12	4	peck	8.809 530 L

For other dry commodities, based on [MART3]

								Metric
<b>quarter</b>								281.904 960 L
8	<b>Winchester bushel</b>							35.238 120 L
32	4	<b>peck</b>						8.809 530 L
64	8	2	<b>gallon</b>					4.404 765 L
128	16	4	2	<b>pottle</b>				2.202 382 L
256	32	8	4	2	<b>quart</b>			1.101 191 L
512	64	16	8	4	2	<b>pint</b>		550.596 mL
2048	256	64	32	16	8	4	<b>gill</b>	137.649 mL

## Units of Liquid

For beer and for ale, based on [MART3]

										Metric	Metric
<b>tun</b>										998.142 048 L	887.237 376 L
2	<b>butt</b>									499.071 024 L	443.618 688 L
3	1½	<b>puncheon</b>								332.714 016 L	295.745 792 L
4	2	1 1/3	<b>hogshead</b>							249.535 512 L	221.809 344 L
6	3	2	1½	<b>barrel</b>						166.357 008 L	147.872 896 L
12	6	4	3	2	<b>kilderkin</b>					83.178 504 L	73.936 448 L
24	12	8	6	4	2	<b>firkin</b>				41.589 252 L	36.968 224 L
216	108	72	54	36	18	9	<b>gallon</b>			4.621 028 L	4.621 028 L
864	432	288	216	144	72	36	4	<b>quart</b>		1.155 257 L	1.155 257 L
1728	864	576	432	288	144	72	8	2	<b>pint</b>	577.628 mL	577.628 mL

For other liquids, based on [MART3]

												Metric
tun												953.898 120 L
2	pipe											476.949 060 L
3	1½	puncheon										317.966 040 L
4	2	1 1/3	hogshead									238.474 530 L
6	3	2	1½	tierce								158.983 020 L
14	7	4 2/3	3½	2 1/3	rundlet							68.135 580 L
28	14	9 1/3	7	4 2/3	2	firkin						34.067 790 L
126	63	42	31½	21	9	4½	foot					7.570 620 L
252	126	84	63	42	18	9	2	Wine gallon				3.785 310 L
1008	504	336	252	168	72	36	8	4	quart			946.327 mL
2016	1008	672	504	336	144	72	16	8	2	pint		473.164 mL
8064	4032	2688	2016	1344	576	288	64	32	8	4	gill	118.291 mL

**53.37 Middlesex****Units of Volume**

1 **stack** (for wood) = 4 yd<sup>3</sup> = about 3.058 2 m<sup>3</sup>.

**Units of Weight**

1 **load** = 36 trusses = 2 160 lbs (for new hay) = about 979.754 kg, and = 2 016 lb (for old hay) = about 914.436 kg;

1 **pad** (for potatoes) = 112 lbs = about 50.802 kg;

1 **bushel** = (for potatoes) = 56 lbs = about 25.401 kg;

1 **nipper** (for vegetables) = 12 lbs = about 5.443 kg.

**53.38 Norfolk****Units of Area**

1 **piece** = except in Essex, Norfolk, and Suffolk = 28 to 30 yd × 7 quarters = about 25.60 to 27.43 m × 1.60 m;

1 **carucate** = the amount of land that could be kept in cultivation by a single plough = 8 bovates or oxgangs.

**Units of Dry Capacity**

1 **leap, lib, or lip** (for grains) = ½ bu = 4 gal = about 18.2 L.

**Units of Weight**

1 **coomb or coom** (for grains) = 252 lbs = 114.305 kg.

**53.39 Northamptonshire****Units of Area**

1 **yacker** = archaic dialectal name for acre.

**Units of Volume**

1 **stack** (for wood) = 4 yd<sup>3</sup> = about 3.058 2 m<sup>3</sup>.

**Units of Liquid Capacity**

1 **gait** (for water) = 2 buckets = about 70 L

**53.40 Northumberland****Units of Area**

1 **oxgang** = 12 acres = about 4.86 ha.

**Units of Dry Capacity**

1 **kenning** (for corn) = 2 pecks = about 18.184 L;

1 **beatment or beating** (for grain) = ¼ pk = about 2.20 L.

**Units of Weight**

1 **bing** (for lead ore) = 8 Cwt = about 406.416 kg;

1 **pig** (for iron and lead as a name for a casting from a pig mold) = 168 lbs = about 76.203 kg;

1 **stone** (for wool) = 18 or 24 lbs = 8.165 or 10.886 kg.

**53.41 Nottinghamshire****Units of Weight**

1 **corfull or corkefull** (for coal) = 1½–3 Cwt = about 76.2–152.4 kg.

**53.42 Oxfordshire****Units of Length**

1 **perch** = 6 yds of draining.

**Units of Dry Capacity**

1 **bushel** (for wheat) = 9 gal and 3 pt = about 41.1 L.

**Units of Weight**

1 **load** (for straw) =  $22\frac{1}{2}$  Cwt = about 1,143.045 kg.

**53.43 Shropshire****Units of Length**

1 **piece** (for flannel) = 100 yd = 91.44 m;  
1 **ell** = 54 in = 1.372 m.

**Units of Volume**

1 **stack** (for coal) =  $4 \text{ yd}^3 = 3.052 \text{ 82 m}^3$ .

**Units of Dry Capacity**

1 **bag** or **sack** (for wheat) = 3 bu = about 106 L;  
1 **bushel** (for barley, peas, and oats) =  $9\frac{1}{2}$  to 10 gal = 41.8 to 44.0 L;  
1 **hoop, hop, hopa, or hope** (for grain) = 1 pk = 8.81 L.

**Units of Weight**

1 **stack** (for coal) = 25 Cwt = 1,270.05 kg;  
1 **hundred** (for potatoes) = 120 lbs = 54.431 kg;  
1 **gawn, gaun, or goan** (for butter) = 12 lbs = 5.443 kg.

**53.44 Somersetshire****Units of Length**

1 **rope** (for wall-building) = 20 f. = 6.096 m.

**Units of Area**

1 **Somersetshire acre** = 160 perches  $\times$  5 feet = 4000 sq yd, based on a perch of 15 f. = about  $3700 \text{ m}^2$ .

**Units of Dry Capacity**

1 **bushel** (for coal) = 9 gal = 39.6 L.

**Units of Weight**

1 **wey** (for hemp) = 30 lbs = 13.608 kg;  
1 **brawler** (for a sheaf of straw) = 7 lbs = 3.175 kg.

**53.45 Staffordshire****Units of Quantity**

1 **piling** (for wheat straw) = 3 sheaves.

**Units of Area**

1 **acre** = about  $9110 \text{ m}^2$ ;  
1 **Staffordshire acre** or **Forest acre** = 10,240 sq yd =  $8,561.944 \text{ m}^2$ .

**Units of Dry Capacity**

1 **bushel** (for barley, beans, oats, and peas) =  $9\frac{1}{2}$  gal = 41.8 L.

**Units of Weight**

1 **bag** (for wheat) = 210 lbs = 95.254 kg;  
1 **hundred** (for cheese) = 120 lbs = 54.431 kg;  
1 **bushel** (for wheat) = 72 lbs = 32.658 kg.

**53.46 Suffolk****Units of Length**

- 1 **skein** (for yarn) = 1600 yd = 1,463.04 m or 2400 yd = 2,194.56 m;  
 1 **lea, rap, or wrap** (for wool) = 40 threads on a reel of 3 yd = 120 yd = 109.725 m;  
 1 **lea or snap** (for worsted yarn) = 40 threads on a reel of 2 yd = 1/7 hank = 80 yd = 73.152 m;  
 1 **stetch** = the ridge of the multi-gang plow, between two furrows, pulled by a team of horses or oxen = 98 in = 2.489 2 m.

**Units of Area**

- 1 **carucate** = the amount of land that could be kept in cultivation by a single plough = 8 bovates;  
 1 **piece** (for colored cloth) = 28 to 30 yd × 7 quarters = about 25.60 to 27.43 m × 1.60 m.

**Units of Dry Capacity**

- 1 **load** (for carrots and turnips) = 40 bu = 1409 L.

**Units of Liquid Capacity**

- 1 **meal** (for milk) = the quantity taken from a cow at one milking = generally 10–40 L.

**Units of Weight**

- 1 **clove** (for butter and cheese) = 10½ lbs = about 4.762 kg.

**53.47 Surrey****Units of Quantity**

- 1 **load** (for hoops) = 30 bundles = 1800.

**Units of Dry Capacity**

- 1 **load** (for limestone) = 40 bu = 1409 L;  
 1 **chalder** (for lime) = 32 bu = 1128 L;  
 1 **load** (for chalk) = 30–35 bu = 1057 L–1409 L.

**Units of Weight**

- 1 **bag** (for hops) = 2½ Cwt = about 127.005 kg;  
 1 **bushel** (for potatoes) = 60 lb = about 27.215 kg;  
 1 **bushel** (for turnips) = 50 lb = about 22.679 kg.

**53.48 Sussex****Units of Quantity**

- 1 **load** (for faggots) = 100;  
 1 **warp** (for herring) = 1/33 long hundred = a cast of 4.

**Units of Area**

- 1 **acre** = 100–212 square perches = 0.25–0.54 ha.

**Units of Length**

- 1 **piece** (for broadcloth, a woolen cloth) = 28 to 30 yd = 25.60–27.43 m in length.

**Units of Volume**

- 1 **cord** (stacked wood) = 126 ft<sup>3</sup> = 3.568 m<sup>3</sup>.

**Units of Dry Capacity**

- 1 **load** (for oats) = 80 bu = 2 819 L;  
 1 **load** (for wheat) = 40 bu = 1 409 L;  
 1 **load** (for limestone) = 12 bu = 423 L;  
 1 **swod** (a small basket) = about 1 bu = 35.2 L;  
 1 **leap, lib, or lip** (for grain) = 4 gal = 18.2 L.

**Units of Liquid Capacity**

1 **meal** (for milk) = the quantity taken from a cow at one milking = generally 10–40 L.

**Units of Weight**

1 **draught** (for wool) =  $\frac{1}{4}$  pack with one extra lb for the turn of the scale = 61 lbs = 27.669 kg.

**53.49 Warwickshire****Units of Weight**

1 pot (for beans and peas) = 40 lbs = 18.114 kg.

**53.50 Westmoreland****Units of Area**

1 **Westmoreland acre** = 6760 sq yards, based on a perch of  $42\frac{1}{4}$  ft = 5,652.22 m<sup>2</sup>.

**Units of Dry Capacity**

1 **bag** (for potatoes) = about  $7\frac{1}{2}$  bu = about 264 L;

1 **load** (for potatoes) =  $4\frac{1}{2}$  heaped bu = 203 L;

1 **bushel** (for barley at Appleby) = 20 gal = 88.1 L;

1 **bushel** (for potatoes) = 16 gal = 70.5 L;

1 **measure** (for oatmeal) = 16 qt = 17.6 L.

**Units of Weight**

1 **stone** (for butter) = 20 lbs = 9.06 kg;

1 **stone** (for beef) = 14, 16 or 20 lbs = 6.34 kg, 7.25 kg, or 9.06 kg.

**53.51 Wiltshire****Units of Length**

1 **lug** = 15,  $16\frac{1}{2}$  or 18 f. = 4.575, 5.032 5, or 5.49 m.

**Units of Area**

1 **Wiltshire acre** = 3630 sq yards, based on a perch of 14 f.  $3\frac{1}{2}$  in = 3,035.14 m<sup>2</sup>.

**53.52 Worcestershire****Units of Quantity**

1 **bundle** (for osiers) = a bunch that is 38 in (= about 0.965 m) in circumference.

**Units of Area**

1 **acre** = 90–141 square perches = about 0.23–0.36 ha;

1 **piece** (for bagging, a coarse cloth) =  $36\text{ yd} \times 31\text{ in}$  =  $32.92\text{ m} \times 78.74\text{ m}$ .

**Units of Dry Capacity**

1 **pot** (for apples and potatoes) = 5 pk = about 440 L;

1 **carnock** (for barley and oats) = 4 bu = about 141 L;

1 **sack** (for apples) = 4 bu = about 141 L;

- 1 **carnock** (for wheat) = 3 bu = about 105.7 L;  
 1 **barrow** (for salt at Worcester) = 6 pk = about 52.9 L;  
 1 **bushel** (at Evesham and Worcester) =  $9\frac{1}{2}$  and  $9\frac{3}{4}$  gal = about 41.8 L and about 42.9 L;  
 1 **bushel** (at Evesham) = 9 gal = about 41.1 L;  
 1 **bushel** (at Worcester) =  $8\frac{1}{2}$  gal = about 37.4 L.

### Units of Liquid Capacity

- 1 **hogshead** (for cider) = 110 gal = about 416 L.

## 53.53 Yorkshire

### Units of Quantity

- 1 **pack** (for teasels) = 1350 bunches = 13,500 heads in all;  
 1 **fandam** (for measuring the circumference of haystacks) = measured by a circle of people hugging the stack, with their outstretched hands just touching;  
 1 **ruck, rook** or **ruckle of beans** (for harvested beans) = 4 bean sheaves set up to dry in a field;  
 1 **thrave** (for straw) = 12 bundles;  
 1 **bundle** (for teasels) = 10 heads;  
 1 **bunch** (for straw for thatching) =  $1/12$  thrave.

### Units of Area

- 1 **carucate** = the amount of land that could be kept in cultivation by a single plough = 8 bovates;  
 1 **Irish plantation acre** =  $7840 \text{ yd}^2 = 0.655 \text{ ha}$ ;  
 1 **stang** (for land areas in the East Ride) = 40 square perch =  $1210 \text{ yd}^2 = \text{about } 1,011.7 \text{ m}^2$ .

### Units of Capacity

- 1 **mineral day** or **take up** (for lead ore) = 32 dishes = 3524 L;  
 1 **bout** or **boot** (for lead ore) = 24 dishes = 2643 L;  
 1 **last** (for corn and rape-seeds) = 10 seams = 28.19 hL;  
 1 **chalder** (for lime) = 32 bu = 1 128 L;  
 1 **seam** (for chopped bark) = 9 heaped bu = about 405 L;  
 1 **dish** (for lead ore) = 14–16 pt = 110.1–125.8 L;  
 1 **bushel** = 36.3–38.5 L;  
 1 **aghendole, akendole, or aighendole** (for grain during the sixteenth and seventeenth centuries) =  $1/8$  coomb = about 18.184 L.

### Units of Weight

- 1 **pack** (for lamb's wool) = 44 lbs = 19.958 kg;  
 1 **tod** (for wool) =  $29\frac{1}{2}$  lbs = 13.381 kg;  
 1 **stone** (for wheat in the West Riding) 22 lbs = 9.98 kg;  
 1 **stone** (for wool) = 16,  $16\frac{3}{4}$ ,  $17\frac{1}{2}$ , 18, and 19 lbs = 7.26, 7.60, 7.94, 8.16, and 8.62 kg;  
 1 **loggin** (for bundles of straw) = 14 lbs = 6.35 kg.

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## 54 United States of America

See also *Howland Island, Jarvis Island, Johnston Atoll, Kingman Reef, Midway Islands, Navassa Island, Palmyra Atoll, Texas, and Wake Island*. See *United States of America*.

The eastern seaboard and mainland of America were explored by British explorer John Cabot in 1497. In 1607, Virginia became a British colony. By 1733, thirteen British colonies (New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia,

North Carolina, South Carolina and Georgia) had been set up. In 1776, the United States declared its independence from Great Britain.

Before the Revolutionary War, a wide range of communal and colonial systems were in use. In addition to parts of the English system, units of measurement from Spain, Portugal, France and Italy were also used. A wide range of measuring systems was also in use by Native Americans. In 1790, Thomas Jefferson proposed a decimal system of measurement for the United States, but it was rejected by Congress. The United States remains the only industrialized country that has not fully switched to the metric system.

*Main sources:* [ARNE], [FISC], [FRAZ], [GUER], [HARM], [HOLL], [JUDS2], [MART3], [ROSS] and [SMIT]

## 54.1 Currency

1792–: 1 US dollar = 100 cents

### 54.1.1 Connecticut

1763–1793: 1 Connecticut pound = 20 shillings  
1 Connecticut shilling (“Colonial”) =  $1 \frac{1}{3}$  Lawful Money notes

1755–1793: 1 Connecticut pound = 20 shillings  
1 Connecticut shilling (“Lawful Money”) =  $2 \frac{1}{10}$  New Tenor shillings =  $7 \frac{1}{3}$  Old Tenor shillings

1740–1754: 1 Connecticut pound = 20 shillings  
1 Connecticut shilling (“New Tenor shillings”) =  $3 \frac{1}{2}$  Old Tenor shillings

1709–1741: 1 Connecticut pound = 20 shillings  
1 Connecticut shilling (“Old Tenor shillings”) = 180 pence sterling

### 54.1.2 Delaware

1723–1793: 1 Delaware pound = 20 shillings = 180 pence sterling

### 54.1.3 Georgia

1735–1793: 1 Georgia pound = 20 shillings = 240 pence sterling

### 54.1.4 Maryland

1751–1793: 1 (New) Maryland pound = 20 shillings  
1 (New) Maryland shilling =  $1 \frac{1}{4}$  Proclamation shillings  
1733–1750: 1 Maryland pound (“Proclamation money”) = 20 shillings = 180 pence sterling

### 54.1.5 Massachusetts

1775–1793: 1 Massachusetts pound = 20 shillings = 240 pence sterling

### 54.1.6 New Hampshire

1763–1793: 1 New Hampshire pound = 20 shillings

1 New Hampshire shilling (“Colonial”) = 1 1/3 Lawful Money notes

1755–1793: 1 New Hampshire pound = 20 shillings

1 New Hampshire shilling (“Lawful Money”) = 3 1/3 New Tenor shillings = 13 1/3 Old Tenor shillings

1742–1754: 1 New Hampshire pound = 20 shillings

1 New Hampshire shilling (“New Tenor shillings”) = 4 Old Tenor shillings

1709–1741: 1 New Hampshire pound = 20 shillings

1 New Hampshire shilling (“Old Tenor shillings”) = 180 pence sterling

54.1.7 New Jersey

1709–1793: 1 New Jersey pound = 20 shillings = 180 pence sterling

54.1.8 New York

1709–1793: 1 New York pound = 20 shillings = 160 pence sterling

54.1.9 Pennsylvania

1709–1793: 1 Pennsylvania pound = 20 shillings = 180 pence sterling

54.1.10 South Carolina

1748–1793: 1 South Carolina pound (“Lawful Money”) = 20 shillings

1 Lawful shilling = 4 2/3 Proclamation shillings

1703–1747: 1 South Carolina pound (“Proclamation Money”) = 20 shillings = 160 pence sterling

54.1.11 Virginia

1755–1793: 1 Virginia pound (“Proclamation Money”) = 20 shillings = 180 pence sterling

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54.2 Units of Length

British system before 1893

									Metric
statute mile									1,609.329 554 m
8	furlong								201.166 194 m
352	44	rod or pole							4.571 960 m
880	110	2½	fathom						1.828 784 m
1760	220	5	2	yard					914.392 mm
5280	660	15	6	3	foot				304.797 mm
63,360	7920	180	72	36	12	inch			25.400 mm
190,080	23,760	540	216	108	36	3	barleycorn		8.467 mm
633,600	79,200	1800	720	360	120	10	3 1/3	line	2.540 mm

## US Statute system between 1893 and 1959

									Metric
<b>statute mile</b>									1,609.347 218 694 m
8	<b>furlong</b>								201.168 402 337 m
352	44	<b>rod or pole</b>							4.572 009 144 m
880	110	2½	<b>fathom</b>						1.828 803 656 m
1760	220	5	2	<b>yard</b>					914.401 829 mm
5280	660	15	6	3	<b>foot</b>				304.800 610 mm
63,360	7920	180	72	36	12	<b>inch</b>			25.400 051 mm
190,080	23,760	540	216	108	36	3	<b>barleycorn</b>		8.466 684 mm
633,600	79,200	1800	720	360	120	10	3 1/3	<b>line</b>	2.540 005 mm

## US Statute system after 1959

											Metric
statute mile											1,609.344 m
1760	yard										914.400 mm
2112	1 1/5	Pace									762.000 mm
5280	3	2½	foot								304.800 mm
10,560	6	5	2	spann							152.400 mm
15,840	9	7½	3	1½	hand						101.600 mm
63,360	36	30	12	6	4	inch					25.400 mm
380,160	216	180	72	36	24	6	pica				4.233 mm
2,534,400	1440	1200	480	240	160	40	6 2/3	line			635.0 µm
6,336,000	3600	3000	1200	600	400	100	16 2/3	2½	caliber		254.0 µm
63,360,000	36,000	30,000	12,000	6000	4000	1000	166 2/3	25	10	milli-inch	25.4 µm

## US Survey system for Coast and Geodetic surveys

									Metric
<b>league</b>									4,828.041 656 082 m
3	<b>survey mile</b>								1,609.347 218 694 m
24	8	<b>furlong</b>							201.168 402 337 m
240	80	10	<b>chain</b>						20.116 840 234 m
960	320	40	4	<b>rod</b>					5.029 210 058 m
15,840	5280	660	66	16½	<b>survey foot</b>				304.800 610 mm
24,000	8000	1000	100	25	1 17/33	<b>link</b>			201.168 402 mm

## Nautical measures before 1893

		Metric
<b>nautical league</b>		5,556.031 111 m
3	<b>nautical mile or sea mile<sup>a</sup></b>	1,852.010 370 m

<sup>a</sup>It was designed to approximate an average 1/60 degree of latitude

## Nautical measures between 1893 and 1959

			Metric
<b>US nautical league or cannon shot</b>			5,559.747 m
3	<b>US nautical mile</b>		1,853.249 m
25 1/3	8 4/9	<b>US cable length</b>	219.464 m

Nautical measures between 1959 and 2006

						Metric
<b>US nautical league</b>						5,559.552 m
3	<b>US nautical mile</b>					1,853.184 m
25 1/3	8 4/9	<b>US cable length</b>				219.456 m
3040	1,013 1/3	120	<b>fathom</b>			1.828 8 m
6080	2,026 2/3	240	2	<b>yard</b>		914.4 mm
18,240	6080	720	6	3	<b>foot</b>	304.8 mm

Nautical measures since 2006

		Metric
<b>nautical league</b>		5556 2m
3	(international) <b>nautical mile<sup>a</sup></b>	1852 m

<sup>a</sup>This value was stated at an international conference in 1929

Navy anchor chains come in 15-fathom lengths called shots. The chains vary in size according to the size of the ship and her anchor. To help one tell how much chain has been payed out and is under water, a special color-coding system is used to identify the various shots. Each of the detachable links that marks the beginning of another shot of chain is painted, alternatively, red, white, or blue. The links on either side are painted white and pieces of wire are also twisted onto the last white link, which is useful when you cannot see the links clearly but still can feel the turns of the wire. As a warning that you are almost out of chain, every link in the next-to-last shot is painted yellow and every link in the last shot is painted red.

Navy color-coding system for anchor chains

Shot number	Color of detachable links	Number of adjacent links painted white	Turns of wire on last white links	Length
1	Red	1	1	15 fathoms
2	White	2	2	30 fathoms
3	Blue	3	3	45 fathoms
4	Red	4	4	60 fathoms
5	White	5	5	75 fathoms
6	Blue	6	6	90 fathoms

Some other reported measures:

- 1 **skein** (for thrown silk) = 1000 yd = 914.4 m;
- 1 **cut** (for yarn) = 300 yd = 274.32 m;
- 1 **skein** (for yarn or thread) = 360 f. = 109.728 m;
- 1 **bolt** (commercial unit for finished cloth)<sup>38</sup> = 100 yd = 91.44 m;
- 1 **bolt** (commercial unit for textiles such as canvas) = 40 yd = 36.58 m;
- 1 **bolt** (commercial unit for wallpaper, of 18 in width) = 16 yd = 14.630 m;
- 1 **bolt** (commercial unit for wallpaper, of 18 in width) = 15 yd = 13.716 m.

<sup>38</sup> Cotton bolts are traditionally 42 in wide, = about 1.067 m, and wool bolts are usually 60 in wide, = about 1.524 m.

54.3 Units of Area

British-linked system before 1893

							Metric
<b>township</b>							93,237,940.490 659 m <sup>2</sup>
5 19/25	<b>barony</b>						16,187,142.446 295 m <sup>2</sup>
36	6¼	<b>section or mile of land</b>					2,589,942.791 407 m <sup>2</sup>
23,040	4000	640	<b>acre</b>				4,046.785 611 m <sup>2</sup>
4,460,544	774,400	123,904	193 3/5	<b>square rod</b>			20.902 818 m <sup>2</sup>
111,513,600	19,360,000	3,097,600	4840	25	<b>square yard</b>		83.611 2 dm <sup>2</sup>
1,003,622,400	174,240,000	27,878,400	43,560	225	9	<b>square foot</b>	9.290 1 dm <sup>2</sup>

US survey system

							Metric
<b>survey township</b>							93,239,944.931 452 085 m <sup>2</sup>
36	<b>section<sup>a</sup></b>						2,589,998.470 318 113 m <sup>2</sup>
23,040	640	<b>acre</b>					4,046.872 609 872 m <sup>2</sup>
230,400	6400	10	<b>square chain</b>				404.687 260 987 m <sup>2</sup>
1,003,622,400	27,878,400	43,560	4356	<b>square survey foot</b>			9.290 341 161 dm <sup>2</sup>
16,057,958,400	446,054,400	696,960	69,696	16	<b>square rod</b>		58.064 632 cm <sup>2</sup>
144,521,625,600	4,014,489,600	6,272,640	627,264	144	9	<b>square inch</b>	6.451 626 cm <sup>2</sup>

<sup>a</sup>The section is equal to 1 **square survey mile**. The section was first defined by an act of May 20, 1785. See also: *U.S. Revised Statutes*, 2395 (a1877)

Some other reported measures:

1 **bolt** (commercial unit for wool cloth) = 1660  
sq yd = 1,387.97 m<sup>2</sup>;

1 **bolt** (commercial unit for cotton cloth) = 1160  
sq yd = 969.91 m<sup>2</sup>;

1 **square** = 100 square (survey) feet = 9.290  
341 161 m<sup>2</sup>;

1 **bolt** (commercial unit for wallpaper)<sup>39</sup> =  
55–60 sq ft = 5.110–5.574 m<sup>2</sup>.

<sup>39</sup> Most wallpaper comes either 20½" × 33' or 27" × 27' per double roll bolt.

54.4 Units of Volume

British-linked system before 1893

							Metric
cord <sup>a</sup>							3.624 459 m <sup>3</sup>
–	ton of shipping <sup>b</sup>						2.831 608 m <sup>3</sup>
–	–	ton of shipping <sup>c</sup>					1.585 700 m <sup>3</sup>
–	–	–	ton of shipping <sup>d</sup>				1.132 643 m <sup>3</sup>
–	–	–	–	cubic yard			764.534 dm <sup>3</sup>
–	–	–	–	–	serch <sup>e</sup>		707.902 dm <sup>3</sup>
128	100	48	40	27	25	cubic foot	28.316 dm <sup>3</sup>

- <sup>a</sup>For firewood  
<sup>b</sup>For hay  
<sup>c</sup>For timber. If the timber was not round, it was reported as 54 cubic feet = 1.529 068 m<sup>3</sup>  
<sup>d</sup>For cotton, furs, walnuts and wax  
<sup>e</sup>For stones

US system between 1893 and 1959

				Metric
acre-foot				1,233.489 239 263 m <sup>3</sup>
1,613 1/3	cubic yard			764.559 445 824 dm <sup>3</sup>
43,560	27	cubic foot		28.317 016 512 dm <sup>3</sup>
75,271,680	46,656	1728	cubic inch	16.387 162 333 cm <sup>3</sup>

US system after 1959

				Metric
acre-foot				1,233.481 837 547 52 m <sup>3</sup>
1,613 1/3	cubic yard			764.554 857 984 dm <sup>3</sup>
43,560	27	cubic foot		28.316 846 592 dm <sup>3</sup>
75,271,680	46,656	1728	cubic inch	16.387 064 cm <sup>3</sup>

- For wood:

1 **pulp cord** (for logs destined for the pulp mill)<sup>40</sup> = 8 f. and 4 in logs stacked 4 f. high and 8 f. wide =

1 **standard cord** (for fuel wood)<sup>41</sup> = a pile of 4-ft logs stacked 4 f. high and 8 f. wide = 128 cu ft = 1536 board feet = 3.624 56 m<sup>2</sup>;

1 **face cord** (for firewood and stove wood) = a 4 f. high and 8 f. wide stack, whose depth is
- equal to the length of the pieces, usually 12, 16 or 24 inches, in the stack. This gives us ¼, 1/3 and ½ standard cords, respectively.

1 **bundle** (for firewood) = anything from three to five logs = normally a stack of 2-ft logs stacked 1 f. high and 1 f. wide;

Some other reported measures:

1 American **bale** (for cotton) = 54 × 27 × 27 in = 500 lbs;

1 **bessonette bale** (for cotton) = cylinder of 22 in in diameter, and 34 or 48 in long = 275 lbs or 425 lbs;

1 **bale of straw** (in garden shops) = 3 cu ft = 0.085 m<sup>3</sup>.

<sup>40</sup> [JOHN5, p. 170].

<sup>41</sup> Since roundwood cannot be stacked to give a solid volume, the actual wood volume varies between 70 and 90 cu ft of solid wood. See also *the U.S. National Institute of Standards and Technology Handbook 130*, Sect. 2.4.1.2.

## 54.5 Units of Capacity

In recipes, quantities were generally specified by volume, but sometimes by weight or by count. At any rate, most cookbooks did not specify quantities precisely, and the smallest amounts, such as dashes, pinches and smidgens, were generally not uniformly defined, e.g., according to

[HARD, p. xv], a dash of salt is the amount that falls out when you turn the shaker upside down and then quickly put it right again. These units of measurement were used for liquids, as well as for dry bulk, such as flour, sugar, salt and spices.

A more exact specification of quantities by volume were introduced by [FARM] in 1896.

Upper scale for units of capacity used in food recipes, based on [CARD]

							Metric
<b>water glassful</b>							473.176 473 000 mL
1 3/5	<b>breakfast cup</b>						295.735 295 625 mL
2	1 1/4	<b>cup</b>					236.588 236 500 mL
3 1/5	2	1 3/5	<b>teacupful</b>				147.867 647 812 50 mL
6 2/5	4	3 1/5	2	<b>wine glassful</b>			73.933 823 906 25 mL
16	10	8	5	2½	<b>coffee measure</b>		29.573 529 562 50 mL
32	20	16	10	5	2	<b>tablespoon</b>	14.786 764 781 250 mL

Lower scale for units of capacity used in food recipes, based on [CARD]

							Metric
<b>tablespoon</b>							14.786 764 781 250 mL
1½	<b>dessert spoon</b>						9.857 843 187 500 mL
3	2	<b>teaspoon</b>					4.928 921 593 750 mL
5	3 1/3	1 2/3	<b>dash</b>				2.957 352 956 250 mL
6	4	2	1 1/5	<b>coffee spoon</b>			2.464 460 796 875 mL
12	8	4	2 2/5	2	<b>salt spoon</b>		1.232 230 398 437 mL
24	16	8	4 4/5	4	2	<b>pinch</b>	616.115 199 219 µL
30	20	10	6	5	2½	1¼	<b>drop</b> 492.892 159 375 µL

Scale for units of capacity used in food recipes, based on IndiaCurry.com and accuracyproject.org/pinchdash.html

								Metric
<b>breakfast cup</b>								236.588 mL
16	<b>tablespoon</b>							14.787 mL
48	3	<b>teaspoon</b>						4.929 mL
96	6	2	<b>coffee spoon</b>					2.464 mL
384	24	8	4	<b>dash</b>				616.1 µL
768	48	16	8	2	<b>pinch</b>			308.1 µL
1536	96	32	16	4	2	<b>smidgen</b>		154.0 mL
3072	192	64	32	8	4	2	<b>nip</b>	77.0 mL
4608	288	96	48	12	6	3	1½	<b>drop</b> 51.3 µL

Scale for units of capacity used in food recipes, based on various cookbooks from the late twentieth century

											Metric
<b>cup</b>											236.588 mL
1 1/3	<b>ladleful</b>										177.441 mL
5 1/3	4	<b>jigger</b>									44.360 mL
16	12	3	<b>tablespoon</b>								14.787 mL
<b>48</b>	36	9	3	<b>teaspoon</b>							4.929 mL
192	144	36	12	4	<b>tad</b>						1.232 mL
384	288	72	24	8	2	<b>dash<sup>a</sup></b>					616.1 µL
768	576	144	48	16	4	2	<b>pinch<sup>b</sup></b>				308.0 µL
1536	1152	288	96	32	8	4	2	<b>smidgen</b>			154.0 µL
3072	2304	576	192	64	16	8	<b>4</b>	2	<b>drop</b>		77.0 µL
6144	4608	1152	384	128	32	16	8	4	2	<b>hint</b>	38.5 µL

<sup>a</sup>According to [STEI5, p. 293], the dash could also be defined as 1/16 teaspoon

<sup>b</sup>Traditionally said to equal the amount one can grasp between the thumb and the forefinger. Normally considered to be two or three dashes

## 54.6 Units of Dry Capacity

British system, based on the Winchester bushel

												Metric
<b>quarter</b>												281.904 960 L
1 1/7	<b>tierce</b>											246.666 840 L
1 3/5	1 2/5	<b>barrel</b>										176.190 600 L
2	1¼	1¼	<b>half quarter</b>									140.952 480 L
8	7	5	4	<b>bushel</b>								35.238 120 L
16	14	10	8	2	<b>half bushel</b>							17.619 060 L
32	28	20	16	4	2	<b>peck</b>						8.809 530 L
64	56	40	32	8	4	2	<b>gallon</b>					4.404 765 L
128	112	80	64	16	8	4	2	<b>pottle</b>				2.202 382 L
256	224	160	128	32	16	8	4	2	<b>quart</b>			1.101 191 L
512	448	320	256	64	32	16	8	4	2	<b>pint</b>		550.596 mL
1024	896	640	512	128	64	32	16	8	4	2	<b>half pint</b>	275.298 mL
2048	1792	1280	1024	256	128	64	32	16	8	4	2	<b>gill</b> 137.649 mL

British system for coal<sup>a</sup>

					Metric
<b>chaldron</b>					1,308.215 205 L
4	<b>vat or strike</b>				327.053 801 L
12	3	<b>sack</b>			109.017 934 L
36	9	3	<b>bushel</b>		36.339 311 L
144	36	12	4	<b>peck</b>	9.084 828 L

<sup>a</sup>Larger quantities were generally sold by weight, such as 1 **ton** = 907.185 305 kg

US system

						Cubic inch	Metric
(dry) <b>barrel</b>						7,056.000 000	115.627 123 584 L
–	<b>bushel</b>					2,150.420 000	35.239 070 669 L
–	4	<b>peck</b>				537.605 000	8.809 767 542 L
–	8	2	(dry) <b>gallon</b>			268.802 500	4.404 883 771 L
–	32	8	4	(dry) <b>quart</b>		67.200 625	1.101 220 943 L
–	64	16	8	2	(dry) <b>pint</b>	33.600 312 5	550.610 471 mL

- Some other reported measures:
- 1 **led** (for oats) = 15,000 bu = 528,586.060 L;  
1 **led** (for barley) = 10,000 bu = 352,390.707 L;  
1 **led** (for rice and rye) = 8571 bu = 302,034.075 L;  
1 **led** (for wheat) = 8000 bu = 281,912.565 L;  
1 **chaldron** = 36 bu = 1268.606 L;

1 **dry barrel** or **apple barrel** (for apples and other fruit and vegetables)<sup>42</sup> = 7056 in 3 = 105 dry quarts = 115.627 L;  
1 **standard cranberry barrel** (for cranberries)= 5826 cu in = 95.471 L;  
1 **Indian barrel** = 32 gal = 121.131 L;  
1 **box** (for citrus fruit) = 1.6 bu = 56.383 L;  
1 **small measure** (for dry vegetables) = ¼ peck = 2.202 L.

<sup>42</sup> The Congress stated it, in 1912 (Aug 3, 1912, c 273 § 1, 37 Stat. 250), as having staves 28½ inches long, heads 17⅛ inches in diameter and 26 inches apart, a circumference at the bulge of 64 inches, and “as nearly as possible,” a capacity of 7056 cu in. Apple barrels with other capacities were to be marked on the ends, in 72-point gothic letters, with the fraction of the standard apple barrel that they contained.

54.7 Units of Liquid Capacity

British-linked system

										Metric
pipe or butt										476.949 060 L
1½	puncheon									317.966 040 L
2	1 1/3	hogshead								238.474 530 L
3	2	1½	tierce							158.983 020 L
–	–	–	–	cask						121.129 920 L
6	4	2	1 1/3	–	barrel					119.237 265 L
189	126	63	42	32	31½	gallon				3.785 310 L
756	504	252	168	128	126	4	quart			946.327 mL
1512	1008	504	336	256	252	8	2	pint		473.164 mL
6048	4032	2016	1344	1024	1008	32	8	4	gill	118.291 mL

Other measures reported during the eighteenth–nineteenth centuries:

- 1 **ton of shipping** = 200 U.S. gal = 757.062 000 L;
- 1 **barrel of petroleum** or **petroleum barrel** (for petroleum from the 1870s)<sup>43</sup> = 42 U.S. gal = 158.983 020 L;
- 1 **barrel of petroleum** or **petroleum barrel** (for petroleum until the 1870s)<sup>44</sup> = 40 U.S. gal = 151.412 400 L;

<sup>43</sup> Derrick’s Hand Book has the following entry for *August 31, 1866*: “The Register says the oil producers have issued the following circular: Whereas, It is conceded by all producers of crude petroleum on Oil Creek that the present system of selling oil by the barrel, without regard to the size, is injurious to the oil trade, alike to the buyer and seller, as buyers with an ordinary size barrel cannot compete with those with large ones. We, therefore, mutually agree and bind ourselves that from this date we will sell no crude by the barrel or package, but by the gallon only. An allowance of two gallons will be made on the gauge of each and every 40 gallons in favor of the buyer.” But the 42-gallon barrel was not in common use until the early 1870s. See also [DERR], [GALE], [HARD], and [SPEC].

<sup>44</sup> The barrels probably came to the oil fields in Pennsylvania from Virginia, where they used 40-gallon barrels for salt (based on an Act of February 18, 1819) and for corn (based on an Act of February 23, 1831).

- 1 **beer barrel, barrel of beer, or brewers’ barrel** (commercial unit for beer) = 31 U.S. gal = 117.35 L;
- 1 **aum** (for wine) = between 30 and 32 U.S. gal, but usually 30 U.S. gal = 113.559 168 L;
- 1 **cranberry barrel** (for cranberries)<sup>45</sup> = 5826 cu in = 95.471 L;
- 1 **Indian barrel** (said to equal the load of a mule; according to [KAHN], for general use) = 20 U.S. gal = 75.706 200 L;
- 1 **Indian barrel** or **rundlet** (according to [REUS], for wine) = 18 U.S. gal = 68.135 580 L;
- 1 **can** (for milk) = 10 U.S. gal = 37.853 100 L;
- 1 **bucket** (for various commodities; generally informal) = 5 U.S. liq gal = 18.927 L;
- 1 **jack** (during colonial times) = a mug or pitcher made of leather and waterproofed with wax or tar, of no certain volume.

<sup>45</sup> First defined by the Congress in 1915 (March 4, 1915 c 168 §1, 38 Stat. 1186) as a barrel with staves 28½ inches long, and no thicker than ¼ inch, heads 16¼ inches in diameter and 25¼ inches apart, and a circumference at the bulge of 58½ in.

## Upper scale for US system

									Metric
<b>tun</b>									953.923 769 568 L
4	<b>hogshead</b>								238.480 942 392 L
6	1½	<b>oil barrel</b>							158.987 294 928 L
8	2	1 1/3	<b>barrel</b>						119.240 471 196 L
252	63	42	31½	<b>US (liquid) gallon</b>					3.785 411 784 L
504	126	84	63	2	<b>US pottle<sup>a</sup></b>				1.892 705 892 L
1008	252	168	126	4	2	<b>US (liquid) quart</b>			946.352 946 mL
2016	504	336	252	8	4	2	<b>US (liquid) pint</b>		431.176 473 mL
4032	1008	672	504	16	8	4	2	<b>US cup</b>	236.588 236 50 mL

<sup>a</sup>During the twenty-first century, called a half gallon

## Lower scale for US system

									Metric
<b>US cup</b>									236.588 236 50 mL
2	<b>US gill<sup>a</sup></b>								118.294 118 25 mL
4	2	<b>US jack<sup>b</sup></b>							59.147 059 125 mL
5 1/3	2 2/3	1 1/3	<b>jigger</b>						44.360 294 344 mL
8	4	2	1½	<b>US fluid ounce</b>					29.573 529 562 mL
16	8	4	3	2	<b>tablespoon</b>				14.786 764 781 mL
48	24	12	9	6	3	<b>teaspoon</b>			4.928 921 594 mL
64	32	16	12	8	4	1 1/3	<b>US fluid dram</b>		3.696 691 195 mL
3840	1920	960	720	480	240	80	60	<b>minim<sup>c</sup></b>	61.611 520 µL

<sup>a</sup>During the twenty-first century, called a half cup

<sup>b</sup>During the twenty-first century, called a quarter cup

<sup>c</sup>Sometimes said to equal 1 **drop** = 0.95 grain of pure water

## System usually used in bartending and drink recipes

			Metric
<b>fluid ounce</b>			29.573 mL
10 2/3–16	<b>pinch<sup>a</sup></b>		1.848–2.772 mL
32	2–3	<b>dash<sup>b</sup></b>	0.924 mL

<sup>a</sup>According to [HARD, p. xv], the amount you can grasp between your thumb and forefinger (= 2–3 dashes)

<sup>b</sup>Also called **splash**. According to the famous saloonkeeper Trader Vic (Victor Jules Bergeron, Jr (1902–84)), the dash was, when applied to bitters in mixed drinks, = 1/8 teaspoon (= 0.61 mL), but otherwise (e.g., for sugar syrup, grenadine, orgeat and lemon juice) = 1½ teaspoon (= 7.4 mL). See [SARV, p. 27] and [LORD, p. 77]. [FENN] reported the dash as 1/6 barspoon = about 0.822 mL

## 54.8 Units of Weight

### British avoirdupois system

									Metric
<b>ton</b>									1,016.047 542 kg
20	<b>hundredweight</b>								50.802 377 kg
80	4	<b>quarter</b>							12.700 594 kg
160	8	2	<b>stone</b>						6.350 297 kg
2240	112	28	14	<b>pound</b>					453.593 g
35,840	1792	448	224	16	<b>ounce</b>				28.350 g
573,440	28,672	7168	3584	256	16	<b>dram</b>			1.772 g
1,720,320	86,016	21,504	10,752	768	48	3	<b>scruple</b>		591 mg
17,203,200	860,160	215,040	107,520	7680	480	30	10	<b>grain</b>	59.1 mg

### Upper US avoirdupois system

							Metric
<b>long ton or gross ton<sup>a</sup></b>							1,016.046 908 800 kg
1 3/25	<b>short ton or US ton</b>						907.184 740 000 kg
20	17 6/7	<b>long hundredweight</b>					50.802 345 440 kg
22 2/5	20	1 3/25	<b>short hundredweight or US hundredweight</b>				45.359 237 000 kg
80	71 3/7	4	3 4/7	<b>quarter</b>			12.700 586 360 kg
2240	2000	112	100	28	<b>pound</b>		453.592 370 000 g

<sup>a</sup>Less used measure

### Lower US avoirdupois system

						Metric
<b>pound</b>						453.592 370 000 g
16	<b>ounce</b>					28.349 523 125 g
256	16	<b>dram or drachm</b>				1.771 845 195 312 5 g
768	48	3	<b>scruple</b>			590.615 065 104 mg
7000	437½	27 11/32	9 11/96	<b>grain</b>		64.798 910 000 mg
140,000	8750	546 7/8	182 7/24	20	<b>mite</b>	3.239 945 500 mg

The various Avoirdupois systems that have been used since 1830 are summarized below.

US Avoirdupois weight system:

From 1830 to 1901: The US pound avoirdupois was defined as exactly 7000/5760 of the mass of the Troy pound of the Mint.

From 1901 to 1959: The US pound avoirdupois was defined as exactly 0.453 592 427 7 of the International Prototype of the Kilogram, as represented by Kilogram No. 20.

US Customary weight system:

From 1866 to 1893: The US Customary pound was specified in 1866 by the statute that spawned the Mendenhall Order (but not enacted to displace the extant prototype definition)  $\frac{1}{4}$  1/2.204 622 78 kg  $\frac{1}{4}$  453.592 338~ g, i.e., 1 kg  $\frac{1}{4}$  2.204 622 78 lb.

International pound system:

Since 1959: The international pound is defined as exactly 0.453.592 37 kg, so 1 kg  $\frac{1}{4}$  = 2.204 622 62~ lb.

Metric-linked measures:

1 **quintal** = 100 kg. (Legalized by the Act of July 28, 1866, and declared invalid in Federal Register February 26, 1982, 47 FR 8399–8400).

Some other reported measures during the twentieth century:

1 **cord** (for pulpwood) = varied with tree species, ranging from about 5200 lbs for pine = 2360 kg,

to about 5800 lbs for hardwood = 2630 kg;

1 **bloom ton** (for iron) = 2464 lbs = 1,117.652 kg;

1 **humpheon** (for corn flour) = 800 lbs = 362.874 kg;

1 **barrel** (for cement) = 4 bags = 376 lbs = 170.551 kg;

1 **bale** (for cotton during the early twentieth century) = 301½ lbs = 136.758 kg;

1 **barrel** (for pitch) = 283½ lbs = 128.593 kg;

1 **barrel** (for beans and salt) = 280 lbs = 127.006 kg;

1 **large lime barrel** (for lime)<sup>46</sup> = net 280 lbs = 127.006 kg;

1 **barrel** (for soap) = 256 lbs = 116.120 kg;

1 **barrel** (for butter) = 224 lbs = 101.605 kg;

1 **barrel** (for beef, corn meal, fish, pork and potash) = 200 lbs = 90.719 kg;

1 **barrel** (for rye flour and wheat flour) = 196 lbs = 88.904 kg;

1 **small lime barrel** (for lime)<sup>47</sup> = net 180 lbs = 81.647 kg;

1 **barrel** (for rough rice) = 162 lbs = 73.482 kg;

1 **bale** (for cigar tobacco) = 150 to 170 lbs = 68.039 to 77.111 kg;

1 **barrel** (for raisins) = 112 lbs = 50.802 kg;

1 **quintal** (for fish) = 112 lbs = 50.802 kg;

1 **sack or bag** (for rough or milled rice, feed and flour) = 100 lbs = 45.359 kg;

1 **barrel** (for gunpowder) = 100 lbs = 45.359 kg;

1 **basket** (for raisins) = 100 lbs = 45.359 kg;

1 **bag** (for feed) = net 99  $\frac{3}{5}$  lbs = 45.178 kg;

1 **bag** (for flour and sugar) =  $\frac{1}{2}$  bbl = net 98 lbs = 44.452 kg;

1 **bag or bale** (for Portland cement) = 94–96 lbs = 42.638–43.545 kg;

1 **bushel** (for coal) = 80 lbs = 36.287 kg;

1 **bushel** (for wheat) = 60 lbs = 27.215 kg;

1 **bushel** (for corn, salt and rye) = 56 lbs = 25.401 kg;

1 **bag** (for flour) = sometimes  $\frac{1}{4}$  bbl = net 49 lbs = 22.226 kg;

1 **bushel** (for barley) = 48 lbs = 21.772 kg;

1 **bushel** (for rough rice) = 45 lbs = 20.412 kg;

1 **bushel** (for oats) = 32 lbs = 14.515 kg;

1 **box** (for fruit) = 25 lbs = 11.340 kg;

1 **brick** (masonry unit) = 7 lbs = 3.178 kg.

<sup>46</sup> Defined by Congress on August 23, 1916, c 396 § 1, 39 Stat. 530.

<sup>47</sup> Defined by Congress on August 23, 1916, c 396 § 1, 39 Stat. 530.

British-linked system for medical use

					Metric
<b>troy pound</b>					373.241 954 g
12	<b>troy ounce</b>				31.103 496 g
96	8	<b>Dram</b>			3.887 937 g
288	24	3	<b>scruple</b>		1.295 979 g
5760	480	60	20	<b>troy grain or minim</b>	64.799 mg

British-linked system for gold, silver and coinage after 1828

				Metric	Metric
<b>troy pound</b>				373.241 954 g	373.241 721 600 g
12	<b>troy ounce</b>			31.103 496 g	31.103 476 800 g
240	20	<b>penny weight</b>		1.555 175 g	1.555 173 840 g
5760	480	24	<b>grain</b>	64.799 mg	64.798 910 mg

British-linked system for diamonds and jewels

			Metric
<b>troy ounce</b>			31.103 496 g
151½	<b>carat</b>		205.304 mg
606	4	<b>diamond grain</b>	51.236 mg

British-linked system for pearls

			Metric
<b>troy ounce</b>			31.103 496 g
20	<b>pennyweight</b>		1.555 175 g
600	30	<b>pearl grain</b>	51.839 mg

Some native North American tribes used their own systems of weights and measures:

54.9 Hopi Nation

Units of Length

- 1 **tutskwatuwani** = a mile;
- 1 **kwiya** (used in describing cultivated fields) = the conventional distance between

windbreakers, consisting of rows of brush, to control wind erosion = usually stated as 10–12 **kuktuwanis** = ~2.5–3 m;

- 1 **mámki** = the distance between the fingertips of outstretched arms;
- 1 **kwílaki** = the length of one step = ~800 mm;
- 1 **kuktuwani** (= foot) = ~250 mm;
- 1 **tukye’lemi** = the distance between the tip of the outstretched thumb and the tip of the outstretched middle finger;
- 1 **tumamoyi** = the distance between the tip of the thumb and the tip of the outstretched index finger;
- 1 **nalöqmats** = adverb used to indicate the width of the four fingers on a hand;
- 1 **löqamats** = adverb used to describe the width of the index and middle fingers held together;
- 1 **malatstuwani** = the width of one finger.

Units of Area

- 1 **mori’uysaq** = adverb used to indicate the size of a bean field = ~1–2 acres.

Units of Volume

- 1 **owakotqa** (used for quarried, stacked rock) = ~3.6 m<sup>3</sup>.

54.10 Lakota-Speaking People

Units of Length

US linked system

Mile	Yard	Cubit	Metric
<b>maki yutapi</b>			1,609.344 m
1760	<b>iyoya</b>		914.4 mm
3520	2	<b>wicispa</b>	457.2 mm

Units of Weight

- 1 **wakapa** = 1 US pound = 453.592 g.

### 54.11 Inupiat-Speaking People

#### Units of Length

- 1 **isagnigum avvaja** = the distance from neck to outstretched fingertip;  
 1 **isagniq** = the distance from fingertip to fingertip of a person with outstretched arms = about 6 feet.

### 54.12 Mormons

**antion** A unit of weight, used as a grain measure in gold, described in the Book of Mormon, = 3 schiblon.<sup>48</sup>

**Senum** In the Book of Mormon, a unit of weight used as a grain measure in gold,<sup>49</sup> described and defined as “the judge’s wages for a day.” It is said to equal ½ seon.<sup>50</sup>

### 54.13 Nez People

A tribe of Native Americans who live in the Pacific Northwest region.

#### Units of Quantity

- 1 **ták’aw** = a bundle;

#### Units of Length

- 1 **sepinewit ninewi** = a mile;  
 1 **wetumk** = a footstep.

<sup>48</sup> “Now an **antion** of gold is = three shiblon” (The Book of Alma 11:19).

<sup>49</sup> “A senum of silver was = a **senine** of gold, and either for a measure of barley, and also for a measure of every kind of grain” (The Book of Alma 11:7).

<sup>50</sup> “And the judge received for his wages <sup>a</sup>according to his time—a <sup>b</sup>**senine** of gold for a day, or a senum of silver, which is = a **senine** of gold; and this is according to the law which was given” (The Book of Alma 11:3) and “Now the amount of a seon of gold was twice the value of a **senine**” (The Book of Alma 11:8).

### Units of Capacity

- 1 **‘iselipt ‘iselipi** = a handful;  
 1 **mólmol** = a cup made of horn;  
 1 **tiléxnim ni’kay tilèx** = a cup made of china;  
 1 **hi’kay** = a cup;  
 1 **teminewit hínawi** = a bushel;  
 1 **‘itetp’es ‘ite** = a box or container;  
 1 **‘ispalx** = a sack;  
 1 **‘itetpes ‘ite** = a small sack;  
 1 **‘ise’pt ‘isepi** = a packload.

#### Units of Time

- 1 **wéwtukt wéwtuk** = 24 h;  
 1 **kuckucemix kúc** = a minute.

### 54.14 Alabama

#### Units of Weight

- 1 **bale** (for cotton) = 500 lbs = 226.796 kg;

### 54.15 Alaska

Numerous indigenous peoples occupied Alaska for thousands of years before the arrival of European peoples in 1741.

#### 54.15.1 Ahtna Tribes

*Main source:* [KARI]

#### Units of Length

- 1 **batestniigi** = in concept, the distance between the fingertips when arms are outstretched;  
 1 **net’aa nina’ic’et’i** = in concept, the distance from the center of the chest to the fingertips of an outstretched arm;

#### Units of Liquid Capacity

- 1 **guuxiniic** = a coffee pot of unknown size, probably not used as a measure;  
 1 **tсениic** = a tea pot of unknown size, probably not used as a measure.

## 54.16 Arkansas

### Units of Weight

Customary weights as reported in 1894:

- 1 **bushel** (for ear corn) = 70 lbs = 31.751 kg;
- 1 **bushel** (for white beans, Irish potatoes, peas and wheat) = 60 lbs = 27.215 kg;
- 1 **bushel** (for onions) = 57 lbs = 25.855 kg;
- 1 **bushel** (for shelled corn) = 56 lbs = 25.401 kg;
- 1 **bushel** (for blackwheat) = 52 lbs = 23.587 kg;
- 1 **bushel** (for sweet potatoes) = 50 lbs = 22.680 kg;
- 1 **bushel** (for dried apples) = 24 lbs = 10.886 kg;
- 1 **bushel** (for bluegrass seed) = 14 lbs = 6.350 kg.

## 54.17 California

### Units of Area

- 1 **caballería** = a parcel of land large enough that the colonist to whom it was granted would be able to provide the state with one armed and mounted man whenever the need arose. (See also [ARNE])

### Units of Dry Capacity

Various measures reported during the late nineteenth century:

- 1 **bushel** (for flour) = 1 Winchester bushel = 35.239 L;
- 1 **bushel** (for rye flour) =  $\frac{1}{2}$  Winchester bushel = 17.619 L.

### Units of Weight

Customary weights, as reported in 1894:

- 1 **ton** (for grain) = 2000 lbs = 907.184 kg;
- 1 **sack** (for wheat flour from Chile) = 50, 100, or 200 lbs = 22.680 kg, 45.359 kg, or 90.718 kg;

- 1 **box** (for grapefruits) = net 80 lbs = 36.287 kg;
- 1 **box** (for lemons in California) = net 76 lbs = 34.473 kg;
- 1 **box** (for oranges in California) = net 70 lbs = 31.751 kg;
- 1 **bushel** (for wheat) = 60 lbs = 27.215 kg;
- 1 **bushel** (for shelled corn) = 52 lbs = 23.587 kg;
- 1 **bushel** (for blackwheat) = 40 lbs = 18.144 kg.

## 54.18 Colorado

### Units of Weight

Customary weights, as reported in 1894:

- 1 **bushel** (for ear corn) = 70 lbs = 31.751 kg;
- 1 **bushel** (for white beans, Irish potatoes and wheat) = 60 lbs = 27.215 kg;
- 1 **bushel** (for onions) = 57 lbs = 25.855 kg;
- 1 **bushel** (for shelled corn) = 56 lbs = 25.401 kg;
- 1 **bushel** (for blackwheat) = 52 lbs = 23.587 kg;
- 1 **bushel** (for bluegrass seed) = 14 lbs = 6.350 kg.

## 54.19 Connecticut

### Units of Weight

Customary weights, as reported in 1894:

- 1 **bushel** (for white beans, Irish potatoes and peas) = 60 lbs = 27.215 kg;
- 1 **bushel** (for shelled corn, rye and wheat) = 56 lbs = 25.401 kg;
- 1 **bushel** (for onions and turnips) = 50 lbs = 22.680 kg;
- 1 **bushel** (for blackwheat) = 48 lbs = 21.772 kg.
- 1 **bushel** (for buckwheat) = 45 lbs = 20.412 kg;
- 1 **bushel** (for oats) = 28 lbs = 12.701 kg.

**54.20 Delaware****Units of Weight**

Customary weights, as reported in 1894:

1 **bushel** (for wheat) = 60 lbs = 27.215 kg;

1 **bushel** (for shelled corn) = 56 lbs = 25.401 kg;

**54.21 Florida****Units of Weight**

1 **pallet box** (for fruit in Florida) = 400 kg;

1 **bag** (canvas bag used for collecting citrus fruit in Florida)<sup>51</sup> = 25 kg capacity, but also 20 kg capacity for younger pickers.

1 **box** (for oranges) = net 90 lbs = 40.823 kg;

1 **box** (for grapefruits) = net 80 lbs = 36.287 kg;

**54.22 Georgia****Units of Weight**

1 **bale** (for cotton) = 375 lbs = 170.097 kg;

1 **barrel** (for rosin)<sup>52</sup> = 280 lbs = 127.006 kg;

**54.23 Illinois****Units of Weight**

1 **bushel** (for wheat) = 60 lbs = 27.215 kg;

1 **bushel** (for Indian corn) = 56 lbs = 25.401 kg;

1 **bushel** (for rye) = 54 lbs = 24.494 kg;

1 **bushel** (for barley) = 44 lbs = 19.958 kg;

1 **bushel** (for buckwheat) = 40 lbs = 18.144 kg;

1 **bushel** (for oats) = 32 lbs = 14.515 kg.

**54.24 Indiana****Units of Weight**

1 **bushel** (for mineral coal) = 70 lbs = 31.751 kg;

1 **bushel** (for beans, potatoes, timothy seed and wheat) = 60 lbs = 27.215 kg;

1 **bushel** (for onions) = 57 lbs = 25.855 kg;

1 **bushel** (for flax seed, Indian corn and rye) = 56 lbs = 25.401 kg;

1 **bushel** (for buckwheat, coarse salt, fine salt and corn meal) = 50 lbs = 22.680 kg;

1 **bushel** (for barley) = 48 lbs = 21.772 kg;

1 **bushel** (for castor seed) = 46 lbs = 20.865 kg;

1 **bushel** (for timothy seed) = 45 lbs = 20.412 kg;

1 **bushel** (for hemp seed) = 44 lbs = 19.958 kg;

1 **bushel** (for dried peaches) = 33 lbs = 14.968 kg;

1 **bushel** (for oats) = 32 lbs = 14.515 kg;

1 **bushel** (for dried apples) = 25 lbs = 11.340 kg;

1 **bushel** (for blue grass seed) = 14 lbs = 6.350 kg.

**54.25 Iowa****Units of Weight**

1 **bushel** (for beans, clover seed, potatoes and wheat) = 60 lbs = 27.215 kg;

1 **bushel** (for onions) = 57 lbs = 25.855 kg;

1 **bushel** (for flax seed, Indian corn and rye) = 56 lbs = 25.401 kg;

1 **bushel** (for buckwheat) = 52 lbs = 23.587 kg;

1 **bushel** (for coarse salt and fine salt) = 50 lbs = 22.680 kg;

1 **bushel** (for barley) = 48 lbs = 21.772 kg;

1 **bushel** (for castor beans) = 46 lbs = 20.865 kg;

1 **bushel** (for timothy seed) = 45 lbs = 20.412 kg;

1 **bushel** (for hemp seed) = 44 lbs = 19.958 kg;

<sup>51</sup> [LADA, p. 217].

<sup>52</sup> *Park's Ann. Code*, 1914, vol. 1, ch. 2, sec. 1819 (1903).

- 1 **bushel** (for oats) = 35 lbs = 15.877 kg;  
 1 **bushel** (for dried peaches) = 33 lbs = 14.968 kg;  
 1 **bushel** (for dried apples) = 24 lbs = 10.866 kg;  
 1 **bushel** (for blue grass seed) = 14 lbs = 6.350 kg.

## 54.26 Kentucky

### Units of Weight

- 1 **bushel** (for clover seed and wheat) = 60 lbs = 27.215 kg;  
 1 **bushel** (for corn, flax seed and wheat) = 56 lbs = 25.401 kg;  
 1 **bushel** (for buckwheat) = 52 lbs = 23.587 kg;  
 1 **bushel** (for coarse salt and fine salt) = 50 lbs = 22.680 kg;  
 1 **bushel** (for barley) = 48 lbs = 21.772 kg;  
 1 **bushel** (for timothy seed) = 45 lbs = 20.412 kg;  
 1 **bushel** (for oats) = 33½ lbs = 15.195 kg.

## 54.27 Louisiana

### Units of Area

At New Orleans

		Metric
<b>arpent</b>		3,418.868 3 m <sup>2</sup>
100	<b>perche carrée</b>	34.188 683 m <sup>2</sup>

### Units of Weight

For shrimp

			Metric
<b>barrel</b> <sup>a</sup>		120 lbs av	54.4 kg
1 5/7	<b>basket</b> <sup>b</sup>	70 lbs av	31.7 kg

<sup>a</sup>*Statutes*, 1920, **2**, 1409

<sup>b</sup>*Acts*, 1924; Act No. 140, p. 232

Other reported measures:

- 1 **balle** (for cotton) = 500 lbs = 226.796 kg;  
 1 **barrel** (for rice) = 200 lbs = 90.718 kg;  
 1 **barrel** (for Turkish granular) = 196 lbs = 88.904 kg.

## 54.28 Massachusetts

### Units of Weight

- 1 **bushel** (for coarse salt and fine salt) = 70 lbs  
 1 **bushel** (for beans, peas, potatoes and wheat) = 60 lbs = 27.215 kg;  
 1 **bushel** (for corn and rye) = 56 lbs = 25.401 kg;  
 1 **bushel** (for onions) = 50 lbs = 22.680 kg;  
 1 **bushel** (for buckwheat and clover seed) = 46 lbs = 20.865 kg;  
 1 **bushel** (for oats) = 30 lbs = 13.608 kg.

## 54.29 Michigan

### Units of Weight

- 1 **bushel** (for clover seed and wheat) = 60 lbs = 27.215 kg;  
 1 **bushel** (for Indian corn and rye) = 56 lbs = 25.401 kg;  
 1 **bushel** (for barley) = 48 lbs = 21.772 kg;  
 1 **bushel** (for buckwheat) = 42 lbs = 19.051 kg;  
 1 **bushel** (for oats) = 32 lbs = 14.515 kg;  
 1 **bushel** (for dried apples and dried peaches) = 28 lbs = 12.701 kg.

## 54.30 Mississippi

### Units of Dry Capacity

- 1 **charcoal barrel** (commercial unit for charcoal)<sup>53</sup> = ¾ U.S. bu = 114.527 L.

<sup>53</sup> *Hemingway's Ann. Code*, 1917, ch. 72, sec. 3354.

Units of Weight

1 **bale** (for cotton) = 500 lbs = 226.796 kg.

54.31 Missouri

Units of Weight

- 1 **bushel** (for wheat) = 60 lbs = 27.215 kg;
- 1 **bushel** (for rye) = 56 lbs = 25.401 kg;
- 1 **bushel** (for corn) = 52 lbs = 23.587 kg;
- 1 **bushel** (for coarse salt and fine salt) = 50 lbs = 22.680 kg.

54.32 New Jersey

Units of Quantity

During the seventeenth century:

- 1 **lap** (for hides and furs, as reported in 1673 [WHIT3, p. 132]) = a bundle.
- [LEDE, p. 133] reported it as 20 deerskins.

Units of Weight

- 1 **bushel** (for clover seed) = 64 lbs =
- 1 **bushel** (for wheat) = 60 lbs = 27.215 kg;
- 1 **bushel** (for corn and rye) = 56 lbs = 25.401 kg;
- 1 **bushel** (for flax seed) = 55 lbs = 24.947 kg;
- 1 **bushel** (for buckwheat) = 50 lbs = 22.680 kg;
- 1 **bushel** (for barley) = 48 lbs = 21.772 kg;
- 1 **bushel** (for oats) = 30 lbs = 13.608 kg.

54.33 New York

Units of Dry Capacity

During the seventeenth century:

- 1 **skipple** = 27.8 L.

During the nineteenth century:

For fruit

			Metric
<b>keg</b>			45.359 265 kg
4	<b>box</b>		11.339 816 kg
100	25	<b>Pound</b>	453.592 65 g

- 1 **ton** (for iron, coal from England, raw clay, sulphur crude oil, hemp, straw and hay) = 2240 lbs = 1,016.047 kg;
- 1 **cargo** or **ton** (for anthrasite from Pennsylvania, copper, colored wood, honey, sugar, coal, leather, potash, solid wood and rice) = 2000 lbs = 907.185 kg;
- 1 **barrel** (for coffee in sacks) = 1830 lbs = 794.074 kg;
- 1 **barrel** (for coffee, cacao and codfish) = 1600 lbs = 725.748 kg;
- 1 **barrel** (for flour) = 1568 lbs = 711.233 kg;
- 1 **barrel** (for cacao) = 1307 lbs = 592.846 kg;
- 1 **barrel** (for codfish) = 1200 lbs = 544.311 kg;
- 1 **barrel** (for cacao) = 1120 lbs = 508.024 kg;
- 1 **barrel** (for dry skins and black tea) = 1000 lbs = 453.593 kg;
- 1 **puncheon** (for wheat flour and raw silk from China) = 800 lbs = 362.874 kg;
- 1 **barrel** (for rice) = 600 lbs = 272.156 kg;
- 1 **bale** (for cotton) = 360–500 lbs = 163.293–226.796 kg;
- 1 **tierce** (for salt and lard) = 304 lbs = 137.892 kg;
- 1 **tierce** (for fish) = 300 lbs = 136.078 kg;
- 1 **barrel** (for turpentine and resin) = 280 lbs = 127.006 kg;
- 1 **barrel** (for fish, salt, tallow, pitch and tar) = 200 lbs = 90.718 kg;
- 1 **barrel** (for wheat flour) = 196 lbs = 88.904 kg;
- 1 **barrel** (for hand-worked clay, corn meal, mineral coal and lead) = 100 lbs = 45.359 kg;
- 1 **bushel** (for beans, clover seed, peas, potatoes and wheat) = 60 lbs = 27.215 kg;
- 1 **bushel** (for onions) = 57 lbs = 25.855 kg;
- 1 **bushel** (for corn, rye, butter, flax seed, fine salt and coarse salt) = 56 lbs = 25.401 kg;
- 1 **bushel** (for barley and buckwheat) = 48 lbs = 21.772 kg;

- 1 **bushel** (for castor beans) = 46 lbs = 20.865 kg;  
 1 **bushel** (for timothy seed) = 45 lbs = 20.412 kg;  
 1 **bushel** (for hemp seed) = 44 lbs = 19.958 kg;  
 1 **bushel** (for oats and dried peaches) = 32 lbs = 14.515 kg;  
 1 **barrel** (for powder firearms) = 25 lbs = 11.340 kg;  
 1 **bushel** (for dried apples) = 22 lbs = 9.979 kg;  
 1 **bushel** (for blue grass seed) = 15 lbs = 6.804 kg;  
 1 **gallon** (for refined petroleum) = 6½ lbs = 2.948 kg.

### 54.34 Ohio

#### Units of Weight

- 1 **bushel** (for clover seed) = 64 lbs = 29.030 kg;  
 1 **bushel** (for wheat) = 60 lbs = 27.215 kg;  
 1 **bushel** (for beans, flax seed, Indian corn and rye) = 56 lbs = 25.401 kg;  
 1 **bushel** (for coarse salt and fine salt) = 50 lbs = 22.680 kg;  
 1 **bushel** (for barley) = 48 lbs = 21.772 kg;  
 1 **bushel** (for timothy seed) = 42 lbs = 19.051 kg;  
 1 **bushel** (for dried peaches) = 33 lbs = 14.968 kg;  
 1 **bushel** (for oats) = 32 lbs = 14.515 kg;  
 1 **bushel** (for dried apples) = 25 lbs = 11.340 kg.

### 54.35 Pennsylvania

#### Units of Weight

- 1 **bushel** (for coarse salt) = 85 lbs = 38.555 kg;  
 1 **bushel** (for fine salt) = 62 lbs = 28.123 kg;  
 1 **bushel** (for wheat) = 60 lbs = 27.215 kg;  
 1 **bushel** (for Indian corn and rye) = 56 lbs = 25.401 kg;  
 1 **bushel** (for buckwheat) = 48 lbs = 21.772 kg;  
 1 **bushel** (for barley) = 47 lbs = 21.319 kg;  
 1 **bushel** (for oats) = 32 lbs = 14.515 kg.

### 54.36 Rhode Island

#### Units of Weight

- 1 **bushel** (for potatoes) = 60 lbs = 27.215 kg;  
 1 **bushel** (for corn meal and onions) = 50 lbs = 22.680 kg.

### 54.37 South Carolina

#### Units of Weight

- 1 **bale** (for cotton) = 362 lbs = 164.200 kg;

### 54.38 Texas

(For units of measure before 1846, see the entry *Texas*).

#### Units of Area

- 1 **block** = 1 sq mile = 2,589,998.470 318 m<sup>2</sup>;  
 1 **labor** = 177.1 acres = 716,701.139 208 m<sup>2</sup>;

### 54.39 Vermont

#### Units of Weight

- 1 **bushel** (for potatoes and wheat) = 60 lbs = 27.215 kg;  
 1 **bushel** (for corn and rye) = 56 lbs = 25.401 kg;  
 1 **bushel** (for barley and buckwheat) = 46 lbs = 20.865 kg;  
 1 **bushel** (for oats) = 32 lbs = 14.515 kg.

### 54.40 Wisconsin

#### Units of Weight

- 1 **bushel** (for clover seed and wheat) = 60 lbs = 27.215 kg;  
 1 **bushel** (for Indian corn and rye) = 56 lbs = 25.401 kg;

1 **bushel** (for barley) = 48 lbs = 21.772 kg;  
1 **bushel** (for buckwheat) = 42 lbs = 19.051 kg;  
1 **bushel** (for oats) = 32 lbs = 14.515 kg;  
1 **bushel** (for dried apples and dried peaches) =  
28 lbs = 12.701 kg.

The metric system has been official since  
1862, legally optional since 1867, and compul-  
sory since 1894.

56.1 Currency

55 Upper Volta

See *Burkina Faso*.

56 Uruguay [Formerly: Banda Oriental and Cisplatine Province]

This area was discovered by the Spanish naviga-  
tor Juan Díaz de Solís in 1516. The Portuguese  
settled the area and founded a Colony in 1680.  
After years of struggle, Spain gained control of  
the area in 1778, when it became a colony and  
part of the Vice-Royalty of Rio de la Plata.  
Uruguay gained its independence in 1825, and  
was reincorporated into the United Provinces of  
Rio de la Plata. It seceded from the United  
Provinces in 1828 and founded the República  
Oriental del Uruguay in 1830.

1993–: 1 peso uruguayo = 100 centésimo  
1973–1993: 1 nuevo peso = 100 centésimo  
1863–1973: 1 peso fuerte = 100 centésimo  
1856–1862: 1 onza de oro = 16 pesos  
(Patacones) = 15,360 centésimos  
(for gold)  
1 patacón = 8 reales =  
960 centésimos (for silver)  
1 peso fuerte = 10 reales = 1000  
centésimos (for new silver)  
1854–1856: 1 escudo = 10 reales = 1000  
centésimos de real (for gold)  
1 patacón = 10 reales = 1000  
centésimos de real (for silver)  
1828–1854: 1 peso corriente or patacón =  
8 reales = 800 centésimos de real  
1 onza de oro = 16 pesos (for  
gold)

56.2 Units of Length

Traditional system before 1868

								Metric
<b>legua</b>								5,154.000 m
60	<b>cuadra</b>							85.900 m
6000	100	<b>vara</b>						859.000 mm
18,000	300	3	<b>pié</b>					286.333 mm
24,000	400	4	1 1/3	<b>palmo</b>				219.950 mm
216,000	3600	36	12	9	<b>pulgada</b>			23.661 mm
2,592,000	43,200	432	144	108	12	<b>linea</b>		1.972 mm
31,104,000	518,400	5184	1728	1296	144	12	<b>punto</b>	163 µm

### 56.3 Units of Area

Traditional system before 1868

					Metric
<b>legua cuadrada</b>					26,563.716 m <sup>2</sup>
1 1/3	<b>suerte de estancia</b>				19,922.787 m <sup>2</sup>
3600	2700	<b>cuadra cuadrada</b>			7,378.810 m <sup>2</sup>
36,000,000	27,000,000	10,000	<b>vara cuadrada</b>		73.788 1 dm <sup>2</sup>
324,000,000	243,000,000	90,000	9	<b>pié cuadrada</b>	8.198 7 dm <sup>2</sup>

### 56.4 Units of Volume

Traditional system before 1868

		Metric
<b>vara cubica</b>		633.840 dm <sup>3</sup>
27	<b>pié cubico</b>	23.476 dm <sup>3</sup>

### 56.5 Units of Dry Capacity

Traditional system before 1868

							Metric
lastre							2,059.080 L
2	tonelada						1,029.540 L
4	2	cahiz					514.770 L
7½	3¾	1 1/8	double fanega				274.544 L
15	7½	3¾	2	fanega			137.272 L
30	15	7½	4	2	media fanega		68.636 L
60	30	15	8	4	2	cuartilla <sup>a</sup>	34.318 L

<sup>a</sup>Also reported as 13.73 L

For wheat at Montevideo

			Metric
<b>cahiz</b>			511.125 L
3¾	<b>fanega</b>		136.30 L
15	4	<b>cuartilla</b>	34.075 L

## 56.6 Units of Liquid Capacity

Oil was generally sold by weight.

For wine and other liquids, except spirits and lin oil, before 1868

								Metric
<b>pipa<sup>a</sup></b>								455.424 000 L
4	<b>cuarterola</b>							113.856 000 L
6	1½	<b>barril</b>						75.904 000 L
24	6	4	<b>caneca</b>					18.976 000 L
192	48	32	8	<b>frasco</b>				2.372 000 L
384	96	64	16	2	<b>medio</b>			1.186 000 L
768	192	128	32	<b>4</b>	2	<b>cuarto</b>		593.000 mL
1536	384	256	64	8	4	2	<b>octavo</b>	296.500 mL

<sup>a</sup>For wine

For spirits and lin oil before 1868

		Metric
<b>pipa</b>		484.519 680 L
128	<b>gallon</b>	3.785 310 L

## 56.7 Units of Weight

Traditional system before 1868

										Metric
<b>tonelada</b>										918.800 000 kg
8	<b>fanega<sup>a</sup></b>									114.850 000 kg
20	2½	<b>quintal</b>								45.940 000 kg
26 2/3	3 1/3	1 1/3	<b>pesada<sup>b</sup></b>							34.455 000 kg
50	6¼	2½	1 7/8	<b>pesada<sup>c</sup></b>						18.376 000 kg
80	10	4	3	1 3/5	<b>arroba<sup>d</sup></b>					11.485 000 kg
2000	250	100	75	40	25	<b>libra</b>				459.400 g
4000	500	200	150	80	50	2	<b>marco</b>			229.700 g
32,000	4000	1600	1200	640	400	16	8	<b>onza</b>		28.712 5 g
512,000	64,000	25,600	19,200	10,240	6400	256	128	16	<b>adarme</b>	1.794 5 g
18,432,000	2,304,000	921,600	691,200	368,640	230,400	9216	4608	576	36	<b>grano</b> 49.8 mg

<sup>a</sup>For wheat = 225–230 libras = 103.36–105.66 kg

<sup>b</sup>For salted hides

<sup>c</sup>For hides and skins at Montevideo

<sup>d</sup>Usually used for rice, sugar, olive oil and wool

Metric-linked system after 1868

			Metric
<b>fanega</b>			100 kg
10	<b>arroba</b>		10 kg
250	25	<b>libra</b>	400 g

During the late nineteenth–twentieth centuries:

1 **bolsa** (for brown rice) = 50 kg.

For medical use

						Metric
<b>libra medicinal<sup>a</sup></b>						459.400 000 g
16	<b>onza</b>					28.712 500 g
128	8	<b>dracma</b>				3.589 062 g
384	24	3	<b>escrupulo</b>			1.196 354 g
768	48	6	2	<b>ovalo</b>		598.177 mg
9216	576	72	24	12	<b>grano</b>	49.848 mg

<sup>a</sup>Previously, it was equal to 12 onzas = 344.550 g

For gold and silver

				Metric
<b>marco</b>				229.700 000 g
8	<b>onza</b>			28.712 500 g
128	16	<b>adarme</b>		1.794 500 g
4608	576	36	<b>grano</b>	49.8 mg

## 57 Urundi

See *Burundi*.

## 58 Uzbekistan [Former: Uzbek Soviet Socialist Republic]

During the early nineteenth century, the area was under the nominal control of the khanates of Bukhara, Khiva, and Kokand, all of which were conquered by Russia from 1855 to 1876. Uzbekistan was part of the Turkestan Soviet Socialist Republic when the Soviet Union was founded in 1923. The Uzbek SSR was proclaimed in 1924, and acceded to the Soviet Union in 1925. The Republic of Uzbekistan declared its independence in 1991.

*Main source:* [CHVO]

### 58.1 Currency

1994–: 1 Uzbekistani som = 100 tiyin  
1993: 1 som coupon  
1924–1992: 1 Soviet ruble = 100 kopeks

## 58.2 Units of Weight

1 **agra** = ~ 61 g;  
1 **alada** = ~ 16 g.

## 59 Vanuatu [Formerly: New Hebrides]

Some of these Islands were discovered by the Portuguese navigator Pedro de Quiros in 1606. In 1774, Captain Cook named the islands the New Hebrides. The New Hebrides was ruled jointly by a British-French naval commission from 1887 until 1906, when the New Hebrides became a joint British-French Condominium. The islands gained their independence as Vanuatu in 1980.

The metric system has been used since the late nineteenth century. Before that, Melanesian weights and measures were used, along with some French and British measures. With more than 100 local languages in use, along with French and English, some weights and measures were expressed in Bislama, a pidgin English with only about 2500 words.

## 59.1 Currency

1981–:	1 Vanuatu vatu
1969–1981:	1 New Hebridean franc = 100 centimes
1945–1969:	1 New Hebridean franc (as part of CFP franc) = 100 centimes
1941–1945:	1 New Hebridean franc = 100 centimes
1935–1941:	1 Australian pound = 20 shillings = 240 pence
c.1906–1940:	1 pound sterling = 20 shillings = 240 pence
c.1906–1941:	1 French franc = 100 centimes

## 59.2 Units of Length

1 **yad** = 1 English yard;  
1 **fut** = 1 English foot.

## 60 Vatican City State

See also *Papal State* and *Holy See*.

The Vatican City State was established by the Lateran Treaty between by the Kingdom of Italy and the Holy See in 1929. Most of the territory of the former Papal State was absorbed into the Kingdom of Italy in 1860, and the rest into the city of Rome with Lazio in 1870.

### 60.1 Currency

2002–:	1 euro = 100 euro-cents
1929–2002:	1 Vatican lira = 100 centesimo

## 61 Venad Swaroopam (Twelfth Century–1729)

See also *Kingdom of Travancore*.

This mediaval Hindu feudal kingdom lasted until the formation of the Kingdom of Travancore in 1729.

## 62 Venda

See *South Africa*.

The Republic of Venda was a Bantustan in northern South Africa between 1979 and 1994. It was never internationally recognized as a state.

## 63 Venezuela

See also *Colombia*.

The coast of Venezeula was discovered by Christopher Columbus in 1498. The area was settled by the Spanish in 1528, and later became part of New Grenada. Caracas was founded in 1567. New Grenada gained its independence in 1816. Venezeula was incorporated into Gran Colombia from 1819 until 1830, when it became a sovereign and independent state.

The metric system has been legally optional since 1857, and compulsory since 1912–14.

*Main sources:* [BAUE], [CARD], [ECON], [UN55], [UN66] and [WALK]

### 63.1 Currency

2008–:	1 Venezuelan bolívar fuerte = 100 céntimos
1879–2007:	1 Venezuelan bolívar = 100 céntimos
1871–1879:	1 Venezuelan venezolano = 100 centavos
1865–1871:	1 Venezuelan venezolano de oro = 10 reales or décimos = 100 centavos
1857–1865:	1 Venezuelan peso fuerte de oro = 10 reales = 100 centavos
1854–1857:	1 Venezuelan venezolano peso = 10 reales = 100 centavos
1848–1854:	1 Venezuelan peso = 5 francos = 10 reales = 100 centavos

- 1843–1847: 1 Venezuelan peso = 10 reales = 100 centavos
- 1832–1843: 1 Venezuelan peso fuerte = 10 reales = 100 centavos fuertes
- 1830–1832: 1 Venezuelan peso sencillo = 8 reales = 100 centavos
- 1821–1830: 1 Gran Colombian onza = 16 pesos = 128 reales
- 1810–1821: 1 Spanish escudo = 2 pesos = 16 reales

In Caracas, based on [WALK, p. 69]

		Metric
<b>fanega</b>		20,754 m <sup>2</sup>
28,900	<b>vara cuadrada</b> <sup>a</sup>	7181 cm <sup>2</sup>

<sup>a</sup>7,186.25 cm<sup>2</sup>, based on [BAUE]

Other measures reported during the nineteenth century:

- 1 **plaza** (for agriculture) = 10–20 m<sup>2</sup>;
- 1 **tarea** (for agriculture) = 500–833 m<sup>2</sup>;
- 1 **cuartilla** = 100–2500 m<sup>2</sup>;
- 1 **almud** = 400–25,600 m<sup>2</sup>;
- 1 **area** = 555 m<sup>2</sup>;
- 1 **medida** (for agriculture) = 625 m<sup>2</sup>;
- 1 **medio** (portuguese unit) = 5000 m<sup>2</sup>;
- 1 **fanegada** = 0.45–4 ha;
- 1 **tablón** = 0.6–1.0 ha;
- 1 **cuadro** (in East Venezuela) = 0.64–1.0 ha;
- 1 **cuadro** (in West Venezuela) = 0.64–1.8 ha;
- 1 **carga** = 1 ha;
- 1 **legua** = 1600–2500 ha.

63.2 Units of Length

Traditional system

			Metric
<b>legua</b>			5,572.109 4 m
3	<b>milla</b>		1,857.369 8 m
6666	2222	<b>vara</b> <sup>a</sup>	835.9 mm

<sup>a</sup>1 **vara** (in Caracas, based on [BAUE]) = 847.717 mm

Alternative scale

			Metric
<b>legua</b>			5,371.493 4 m
3	<b>milla</b>		1,790.497 8m
6426	2142	<b>vara</b>	835.9 mm

Metric-linked system in the Táchira province during the late nineteenth century

			Metric
<b>meile</b>			5024 m
62 4/5	<b>cabulla</b>		80 m
6280	100	<b>vara</b>	800 mm

63.3 Units of Area

Traditional system

		Metric
<b>fanega</b>		6,987.288 m <sup>2</sup>
10,000	<b>vara cuadrada</b>	6,987.288 cm <sup>2</sup>

63.4 Units of Volume

- 1 **vara** (for cedar) = 1 vara × ½ vara × 1/3 vara = 101.53 dm<sup>3</sup>.

63.5 Units of Dry Capacity

Some measures reported during the nineteenth century:

- 1 **lata** = 7–17 L;
- 1 **cajon** = 25–55 L;
- 1 **huacal** = 28–70 L;
- 1 **canasto** = 28–140 L;
- 1 **ceston** = 70 L;
- 1 **fanega** = 117 L.

### 63.6 Units of Liquid Capacity

				Metric
<b>carga</b>				57.856 L
3 7/11	<b>arroba<sup>a</sup></b>			15.910 4 L
6 2/13	1 9/13	<b>almud</b>		9.401 6 L
80	22	13	<b>botella</b>	723.2 mL

<sup>a</sup>Also reported as 16.136 L

Other measures reported during the nineteenth–twentieth centuries:

- 1 **barril** = 70–100 L;
- 1 **kiste** (for spirits) = 80 or 100 botellas = 57.856 L or 72.320 L;
- 1 **curga** (for copaifera) = 80 botellas = 57.856 L.

### 63.7 Units of Weight

Castilian scale

			Metric
<b>quintal</b>			46.009 3 kg
4	<b>arroba</b>		11.502 3 kg
100	25	<b>libra</b>	460.093 g

For cacao in Maracaibo, based on [MART3]

			Metric
<b>fanega</b>			44.168 918 kg
24	<b>millare</b>		1.840 372 kg
96	4	<b>libra</b>	460.093 g

Metric-linked lower scale in the Zulia province

						Metric
<b>Tercio</b>						40 kg
2	<b>cabulla<sup>a</sup></b>					20 kg
8	4	<b>botijuela</b>				5 kg
16	8	2	<b>litro</b>			2.5 kg
40	20	5	2½	<b>libra</b>		1 kg
160	80	20	10	4	<b>vara, bajote, bojote, or manojo</b>	250 g

<sup>a</sup>For garlic and bananas

Other measures reported during the nineteenth–twentieth centuries:

- 1 **carga** (for coffee in Maracaibo) = 250 Castilian libras = 115.023 225 kg;
- 1 **paquete** or **paquette** = 1.2–2 kg;
- 1 **millar** (for cocoa in Maracaibo) = 4 Castilian libras = 1.84 kg;
- 1 **cuartilla** = 2–10 kg;
- 1 **mancuerna** = 2–15 kg;
- 1 **lata** (in Zulia) = 5–12 kg;
- 1 **madeja** = 5–15 kg;
- 1 **palito** = 9–18 kg;
- 1 **almud** = 9–50 kg;
- 1 **cuenta** = 10–50 kg;
- 1 **caja** = 18–63 kg;
- 1 **bulto** = 18–80 kg;
- 1 **huacal** (for vegetables) = 20–50 kg;
- 1 **saco** = 20–60 kg;
- 1 **canasto** (for beans and yuca) = 20–100 kg;
- 1 **carga** = 22–345 kg;
- 1 **fanega** = 46–400 kg;
- 1 **fanega** (for cocoa from Maracaibo) = 96 Castilian libras = 44.17 kg;
- 1 **fanega** (for cocoa) = 110 Castilian libras = 50.61 kg;
- 1 **mara** = 50–200 kg;
- 1 **ceston** (for yuca in Monagas) = 50 kg;
- 1 **bag** = 62.5 kg.

Metric-linked upper scale in the Zulia province

					Metric
<b>punto</b>					600 kg
1½	<b>mil</b>				400 kg
10	6 2/3	<b>cuadro</b>			60 kg
12	8	1 1/5	<b>paca</b>		50 kg
15	10	1½	1¼	<b>tercio</b>	40 kg

64 Venice

See also *Italy*.

The Republic of Venice existed as a state from 697 until 1797.

65 Videha

See also *India*.

Videha was a kingdom in ancient India. Mithila, present-day Janakpur in Southern Nepal, was the capital of Videha.

*Main source:* [ASB]

65.1 Units of Dry Capacity

For grain

								Metric
<b>báha</b>								~1947 L
20	<b>c'hári</b>							~970 L
80	4	<b>mánica</b>						~24 L
320	16	4	<b>dróna</b>					~6 L
1280	64	16	4	<b>ad'haca</b>				~1.5 L
5120	256	64	16	4	<b>prast'ha</b>			~0.8 L
20,480	1024	256	64	16	4	<b>cudava</b>		~0.2 L
81,920	4096	1024	256	64	16	4	<b>pala</b>	~0.05 L

66 Vietnam

See also *Annam Protectorate*, *Cambodia*, *Cochinchina*, *French Indochina*, *Laos*, *Paracel Islands*, and *Tonkin*.

Vietnam was under direct Chinese rule from 111 BCE to 968 CE. A national resistance movement drove the Chinese out of Vietnam in 1428. Under the Le dynasty, the borders of Vietnam were gradually pushed southward. By 1757, however, the country had been divided into two parts, and it was not reunited until 1802, by the general Nguyen Anh, who became the emperor Gia Long. Vietnam was created out of three states, Tonkin in the north, Annam in the center, and Cochinchina

in the south. Cochinchina was made a French colony in 1862, and Annam and Tonkin became French protectorates in 1884. The Union of Indochina was formed in 1887, and also included Laos and Cambodia. The Japanese occupied Indochina in 1945. The Democratic Republic of Vietnam proclaimed its independence in 1945. The Autonomous Republic of Cochinchina was declared in 1946, and was renamed South Vietnam in 1947, Vietnam in 1948, and the State of Vietnam in 1949, though it was still a French Protectorate. The division between North and South Vietnam was not formally recognized until the Geneva Accords of 1954. In the South, the Republic of Vietnam was established in 1955. The North and South were unified as the Socialist Republic of Vietnam in 1976.

The metric system has been official since 1911 and compulsory since 1950.

*Main sources:* [ĐANG], [MART3], [UN55] and [UN66]

66.1 Currency

- 1985–: 1 new đồng = 100 xu or su
- 1978–1985: 1 đồng = 10 hào
- 1975–1977: 1 “liberation” đồng = 500 old South Vietnamese đồng (South Vietnam)
- 1946–1977:

	1 North Vietnamese đồng = 10 hào (North Vietnam)	Other reported measures:
1953–1975:	1 South Vietnamese đồng = 100 xu or su (South Vietnam)	1 hô = 1/166 dặm = 4.337 m.
1878–1954:	1 Viet-Nameese piaster = 100 centimes	
–1878:	1 shuc = 10 cuan = 100 mot-tien = 6000 đồng	

66.2 Units of Length

Traditional and metric-linked upper scale

									Metric	Metric
<b>độ</b>									–	120,000 m
50 50/59	<b>coursame</b>								4,159.5 m	–
250	4 11/12	<b>lý</b> or <b>dặm</b>							–	720 m
30,000	590	120	<b>sào</b>						7.05 m	6 m
45,000	885	180	1½	<b>trượng</b>					4.70 m	4 m
90,000	1770	360	3	2	<b>ngũ, bộ, or tằm</b>				2.35 m	2 m
450,000	8850	1800	15	10	5	<b>thước</b> or <b>xích</b>			470 mm	400 mm
4,500,000	88,500	18,000	150	100	50	10	<b>túc</b>		47 mm	40 mm
45,000,000	885,000		1500	1000	500	100	10	<b>phân</b>	4.7 mm	4 mm

Traditional and metric-linked lower scale

						Metric	Metric
<b>phân</b>						4.7 mm	4 mm
10	<b>ly</b>					0.47 mm	0.4 mm
100	10	<b>hào</b>				0.047 mm	0.04 mm
1000	100	10	<b>tí</b>			4.7 µm	4 µm
10,000	1000	100	10	<b>hốt</b>		0.47 µm	0.4 µm
100,000	10,000	1000	100	10	<b>vi</b>	0.047 µm	0.04 µm

For buildings

			Metric
<b>gon</b>			188 m
10	<b>cay</b>		18.8 m
300	30	<b>thước may</b>	625 mm

## 66.3 Units of Area

Traditional system

						Metric
<b>mâu</b>						4965 m <sup>2</sup>
10	<b>sào or cao</b>					496.5 m <sup>2</sup>
150	15	<b>thước or xích</b>				33.1 m <sup>2</sup>
1500	150	10	<b>thốn or tấc</b>			3.31 m <sup>2</sup>
15,000	1500	100	10	<b>phân</b>		0.331 m <sup>2</sup>
150,000	15,000	1000	100	10	<b>ly or gang</b>	0.033 1 m <sup>2</sup>

Metric-linked upper scale

						Metric
<b>mâu</b>						3600 m <sup>2</sup>
10	<b>sào or cao</b>					360 m <sup>2</sup>
100	10	<b>miếng</b>				36 m <sup>2</sup>
150	15	1½	<b>thước or xích</b>			24 m <sup>2</sup>
900	90	9	6	<b>than</b>		4 m <sup>2</sup>

Metric-linked lower scale

						Metric
<b>than</b>						4 m <sup>2</sup>
1 2/3	<b>thốn or tấc</b>					2.4 m <sup>2</sup>
16 2/3	10	<b>phân</b>				24 dm <sup>2</sup>
25	15	1½	<b>ghế, o, or khẩu</b>			16 dm <sup>2</sup>
100	60	6	4	<b>ly or gang</b>		4 dm <sup>2</sup>

## 66.4 Units of Volume

Traditional system

					Metric
<b>hộc</b> (10 ngũ × 1 ngũ × 1 thước )					16 m <sup>3</sup>
10		<b>lẻ</b> (1 ngũ × 1 ngũ × 1 thước )			1.6 m <sup>3</sup>
250		25		<b>lai</b> (1 ngũ × 1 ngũ × 1 ngũ)	64 dm <sup>3</sup>

For soil extraction (one thước deep over an area of 1 thước × 1 thước)

					Vietnamese	Metric
<b>mau</b>					22,500 thước <sup>2</sup> × 900 ngũ <sup>2</sup>	14,400 m <sup>3</sup>
10	<b>sào</b>				2250 thước <sup>2</sup> × 90 ngũ <sup>2</sup>	1440 m <sup>3</sup>
100	10	<b>miếng</b>			225 thước <sup>2</sup> × 9 ngũ <sup>2</sup>	144 m <sup>3</sup>
900	90	9	<b>than</b>		25 thước <sup>2</sup> × 1 ngũ <sup>2</sup>	16 m <sup>3</sup>
22,500	2250	225	25	<b>ô</b>	1 thước <sup>2</sup> × 1 thước	0.64 m <sup>3</sup>

## 66.5 Units of Dry Capacity

Metric-linked upper scale (usually used for cereal)

								Metric
<b>hộc</b>								60 L
1 1/3	<b>gia nan</b>							45 L
1½	1 1/8	<b>gia</b>						40 L
2	1½	1 1/3	<b>phuong</b>					30 L
3	2¼	2	1½	<b>thùng or gia chếc</b>				20 L
30	22½	20	15	10	<b>thăng</b>			2 L
60	45	40	30	20	2	<b>đầu<sup>a</sup></b>		1 L
120	90	80	60	40	4	2	<b>bát or baht</b>	500 mL

<sup>a</sup>For rice, the unit was called **uýn** or **uýn**

Metric-linked lower scale (usually used for cereal)

								Metric
<b>bát or baht</b>								500 mL
2½	<b>cap</b>							200 mL
5	2	<b>lé</b>						100 mL
25	10	5	<b>thước</b>					20 mL
250	100	50	10	<b>sào</b>				2 mL
2500	1000	500	100	10	<b>toát</b>			0.2 mL
25,000	10,000	5000	1000	100	10	<b>quê</b>		0.02 mL
150,000	60,000	30,000	6000	600	60	6	<b>túc</b>	0.003 33 mL

Other reported measures:

1 **garce** = 4486 L.

Traditional upper scale before 1891

					Metric
<b>tạ</b>					60.45 kg
10	<b>yến</b>				6.045 kg
100	10	<b>cân</b>			604.5 g
1600	160	16	<b>lạng</b>		37.781 g
16,000	1600	160	10	<b>đồng or tiền</b>	3.781 g

## 66.6 Units of Liquid Capacity

Liquids were generally sold by weight.

Some reported measures:

1 **legger** = ~540 L.

## 66.7 Units of Weight

Chinese scale:

1 **tael** = 37.448 586 1 g.

## Traditional lower scale before 1891

							Metric
<b>đồng or tiền</b>							3.781 g
10	<b>phân</b>						0.378 1 g
100	10	<b>ly</b>					37.81 mg
1000	100	10	<b>hào</b>				3.781 mg
10,000	1000	100	10	<b>ti</b>			378.1 µg
100,000	10,000	1000	100	10	<b>hốt</b>		37.81 µg
1,000,000	100,000	10,000	1000	100	10	<b>vi</b>	3.781 µg

## British Imperial upper scale after 1891

					Imperial	Metric
<b>tạ<sup>a</sup></b>					133 1/3 lbs	60.479 020 kg
10	<b>yến</b>				13 1/3 lbs	6.047 902 kg
100	10	<b>cân</b>			1 1/3 lbs	604.790 g
1600	160	16	<b>lạng</b>			37.799 g
16,000	1600	160	10	<b>đồng or tiền</b>		3.779 9 g

<sup>a</sup>For rice = 134 lbs = 60.781 415 kg

## British Imperial lower scale after 1891

							Metric
<b>đồng or tiền</b>							3.779 9 g
10	<b>phân</b>						0.377 99g
100	10	<b>ly</b>					37.799 mg
1000	100	10	<b>hào</b>				3.779 9 mg
10,000	1000	100	10	<b>ti</b>			377.99 µg
100,000	10,000	1000	100	10	<b>hốt</b>		37.799 µg
1,000,000	100,000	10,000	1000	100	10	<b>vi</b>	3.779 9 µg

## Metric-linked upper scale, as reported in 1955

							Metric
<b>háp or picul</b>							120 kg
2	<b>tạ</b>						60 kg
20	10	<b>yến</b>					6 kg
200	100	10	<b>cân</b>				600 g
3200	1600	160	16	<b>lạng</b>			37.5 g
32,000	3200	1600	160	10	<b>đồng or tiền</b>		3.75 g

## Metric-linked lower scale, as reported in 1955

							Metric
<b>đồng or tiền</b>							3.75 g
10	<b>phân</b>						375 mg
100	10	<b>ly</b>					37.5 mg
1000	100	10	<b>hào</b>				3.75 mg
10,000	1000	100	10	<b>ti</b>			375 µg
100,000	10,000	1000	100	10	<b>hốt</b>		37.5 µg
1,000,000	100,000	10,000	1000	100	10	<b>vi</b>	3.75 µg

67 **Vijayanagara Empire  
(1336–1646)**

See *India*.

in use during the nineteenth century. The metric system is now used, along with some units from the US Customary system.

*Main sources:* [HOPK], [PEFF], [UN55] and [UN66]

68 **Virgin Islands (British Virgin Islands)**

The Virgin Islands were discovered by Christopher Columbus in 1493. The first British settlement was established on Tortola in 1666. The Virgin Islands were part of the Leeward Islands from 1833 until 1959. They became a British crown colony in 1950.

The metric system is used, along with some units from the British Imperial system.

*Main source:* [BRIT2]

68.1 **Currency**

- 1935–: 1 US dollar = 100 cents
- 1935–1973: 1 British West Indian dollar = 100 cents
- 1833–1935: 1 Pound sterling = 20 shillings = 240 pence

69 **Virgin Islands (United States Virgin Islands) [Former: Danish West Indies]**

The French Order of Malta ruled in St. Croix from 1650 until 1733, when it fell under Danish Rule. The Virgin Islands (St. Thomas, St. John, St. Croix, and 62 other islets) were part of the Danish West Indies from 1756 to 1917, when they were purchased by the United States for \$25 million because of their strategic importance to the Panama Canal. Britain had ruled over the islands from 1801 to 1802, and from 1807 to 1815.

Some French units were used during the late eighteenth century, and some Danish units were

69.1 **Currency**

- 1917–: 1 US dollar = 100 cents
- 1904–1917: 1 Danish West Indies daler = 5 franks = 100 cents = 500 bit
- 1859–1904: 1 Danish West Indies franc = 20 cents
- 1784–1859: 1 West Indies rigsbankdaler courant = 4/5 Danish rigsbankdaler courant  
1 Danish rigsbankdaler = 10 reales = 96 rigskilling

69.2 **Units of Length**

US Customary system

			Metric
<b>mile</b>			1,609.344 m
1760	<b>yard</b>		914.4 mm
5280	3	<b>feet</b>	304.8 mm

### 69.3 Units of Area

For sugar cane plantations on St. Croix from 1751 to 1917

			English statute acres	Metric
<b>fuldkommen</b>			146.21	591,690.874 m <sup>2</sup>
150	<b>agres</b> (200 × 200 fod)		0.974 7	3,944.606 m <sup>2</sup>
6,000,000	40,000	<b>kvadrat fod</b>	–	9.861 dm <sup>2</sup>

### 69.4 Units of Liquid Capacity

Some reported measures:

- 1 **gallon** (for gasoline) = 3.785 L;
- 1 **ounce** (for beer and other beverages) = 29.6 mL.

### 69.5 Units of Weight

For meat and other commodities

		Metric
<b>pound</b>		453.59 g
16	<b>ounce</b>	28.35 g

## 70 Volga-Kama Bulgaria (c.700–1240s)

See also *Khazar Khagnate* and *Tatarstan*.

This Kingdom was founded by Khan Kotrag. It lasted until the 1240s, when it became part of the Mongol Empire.

*Main source:* [VALE]

### 70.1 Units of Weight

For gold during the ninth century

			Metric
<b>qadaq</b>			409.50 g
2	<b>saum</b>		204.75 g
96	48	<b>mitqal</b>	4.265 625 g

For silver during the ninth century

		Metric
<b>qadaq</b>		327.60 g
96	<b>nayat</b>	3,412 5 g

## 71 Wake Island

See *United States of America*.

One of the United States Minor Outlying Islands. The only human population consists of temporarily stationed scientific and military personnel.

## 72 Wales

See also *United Kingdom*.

The Roman province of Britannia, representing Wales and what was to become England, was one of the Roman Empire's Celtic provinces. When Rome fell, Germanic tribes invaded England, and the survivors among the British population were attracted to Wales. Wales was divided into smaller Kingdoms, such as Dyfed (c.410–920), Ceredigion (fifth century–early tenth century), Gwynedd (fifth century–1216), Gwent (c.500–1067), Morgannwg (942–1091) and Deheubarth (920–1197). In 1536, Wales became an integral part of England.

*Main sources:* [CLAR], [DAVI3], [DONI], [DOVE], [GEMM], [OWEN], [SECO] and [ZUPK5]

### 72.1 Currency

- 1971–: 1 pound sterling = 100 pence
- 1707–1970: 1 pound sterling = 20 shillings = 240 pence = 960 farthings

Even before the conquest, English coins were circulated in Wales to some extent, but as late as

72.3 Units of Length

During the tenth century, according to the Laws of Howell, based on [OWEN, p. 184–185]

								Metric
mýlltýr (mile)								6,196.5 m
1000	týr (land)							6.196 5 m
3000	3	neýt (leap)						2.065 5 m
9000	9	3	cam (pace)					688.5 mm
27,000	27	9	3	troetued (foot)				229.5 mm
81,000	81	27	9	3	palýw (palm breadth)			76.5 mm
243,000	243	81	27	9	3	llet (inch)		25.5 mm
729,000	729	243	81	27	9	3	gronýn heýd (barleycorn)	8.5 mm

the fourteenth century, payment in cattle was still common. The “da” was used as a noun meaning both “cattle” and “goods.”

When a person was found guilty of homicide, he/she had to pay a reparational payment to the family of his/her victim. This payment was called a galans.

72.2 Units of Quantity

For eels during thirteenth–nineteenth centuries

gwyde		250 eels
10	stick , estik, estika, estike, stica, sticke, stike, stikke, styk, or styke	25 eels

For herring in South Wales, based on [GEMM]

last		10,000 or 12,000
20	mease, maise, meas, meash, or mayse <sup>a</sup>	500 or 600

<sup>a</sup>[SECO] reported it as 30 score of 21 each = 630

During the seventeenth–nineteenth centuries, based on [ZUPK5]

						Metric
ridge <sup>a</sup>						6.172 2 m
1 5/22	perch					5.029 2 m
3	2 4/9	leap <sup>a</sup> , lepe, or leape				2.057 4 m
6¾	5½	2¼	yard			914.39 mm
20¼	16½	6¾	3	foot		304.79 mm
243	198	81	36	12	inch	25.40 mm

<sup>a</sup>Mainly for land surveying

For cloth during the fourteenth–seventeenth centuries

		Metric
llathen <sup>a</sup>		2.743 m
2	cyvelin, cyfelin, cyfydd, or cyvydd	1.371 m

<sup>a</sup>In Montgomeryshire, also called pared

## 72.4 Units of Area

During the thirteenth century and early fourteenth century, based on [DOVE] and [OWEN]

							Metric
<b>cantref</b> or <b>cantrev</b>							9,241.60 ha
2	<b>cymwd<sup>a</sup></b> or <b>cwmwd</b>						4,620.80 ha
25	12½	<b>maenol<sup>b</sup></b>					369.66 ha
100	50	4	<b>tref<sup>c</sup></b> or <b>trev</b>				92.42 ha
400	200	16	4	<b>gavael</b> or <b>gafel</b>			23.10 ha
1600	800	64	16	4	<b>rhandir<sup>d</sup></b>		5.775 ha
6400	3200	256	64	16	4	<b>tyddyn<sup>e</sup></b> or <b>tyddin</b>	1.444 ha
25,600	12,800	1024	256	64	16	4	<b>erw<sup>f</sup></b> 36.1 a

<sup>a</sup>In Anglesey

<sup>b</sup>Orinally signified an extent of rock-strewn land

<sup>c</sup>According to [WILL5, p. 136], the tref was the house or dwelling-place. It was also reported as 92.48 ha

<sup>d</sup>Originally, an extent of share-land. In concept, the area that one family would farm full-time. Some sources reported that Bleddyn ap Cynfyn (during the eleventh century) made a rule that the size of the tyddyn should be 12 acres for an uchelwr (optimas), 8 acres for a mab aillt (hereditary villein), and 4 acres for a godaeog (“under-villein”). Some sources say that the tyddyn should be 4 acres for all classes. See [CHAR7, p. 381] and [SEEB2, p. 192]

<sup>e</sup>Originally, the area of ground encompassing a homestead or tenement. In concept, the land area for one family to farm, as a supplement to off-farm employment. Similar to demesne-lands, which were worked on the land lords’s behalf by villeins or by serfs, in fulfilment of their feudal obligations

<sup>f</sup>1 **erw** (in Pembrokeshire) and 1 **erw Llan Giwg** (in the south of Cardiganshire, parts of Caermarthenshire, and Glamorganshire) = 10,240 sq yd = 8,561.944 m<sup>2</sup>. [DAVI3, p. 503–504]

For arable land during the thirteenth–nineteenth century, mainly based on [ZUPK5]

							Metric
<b>plowland<sup>a</sup></b>							173,376.582 m <sup>2</sup>
8	<b>oxland</b>						21,672.073 m <sup>2</sup>
12 4/5	1 3/5	<b>farthyngstange</b>					13,545.045 m <sup>2</sup>
64	8	5	<b>stang<sup>b</sup></b>				2,709.009 m <sup>2</sup>
640	80	50	10	<b>daeiorwork</b>			270.901 m <sup>2</sup>
2560	320	200	40	4	<b>square pearch</b>		67.725 m <sup>2</sup>
10,240	1280	800	160	16	4	<b>square pole</b>	16.931 m <sup>2</sup>
207,360	25,920	16,200	3240	324	81	20¼	<b>square yard</b> 83.622 dm <sup>2</sup>

<sup>a</sup>Also reported as **plewland**, **ploughland**, **ploweland**, **plowelande**, **plowland**, **plowlande**, **plowelonde**, **plowlond**, or **plowlonde**. In concept, as much land as can be cultivated in a year by one plough

<sup>b</sup>Also reported as **stanga**, **stange**, **stangell**, **stangue**, **steng**, **stong**, or **stonge**. During the early seventeenth century, said be 8 poles × 20 poles. In some regions in the south of Wales, according to [DONI], the stang was reported as ¼ erw = 1080 sq yd = 903.0 m<sup>2</sup>

In Anglesey and Caernarvon

			sq yd	Metric
<b>erw</b>			4320	3,611.520 m <sup>2</sup>
1 1/3	<b>cyvar</b> or <b>cyfar</b>		3240	2,709.063 m <sup>2</sup>
213 1/3	160	<b>paladr</b>	20¼	16.929 m <sup>2</sup>

In Brenockshire

			sq yd	Metric
<b>cyfar bach</b> or <b>cyfar bieting</b>			2560	2,140.49 m <sup>2</sup>
4		<b>ystangel</b>	640	535.12 m <sup>2</sup>

In South Wales

			sq yd	Metric
<b>cyvar</b> or <b>cyfar</b>			2821	2,358.723 m <sup>2</sup>
4	<b>quarter</b>		705¼	589.681 m <sup>2</sup>
192	48	<b>llath</b> <sup>a</sup>	—	12.285 m <sup>2</sup>

<sup>a</sup>Reported as varying by location between 11½ and 24 sq yd = 9.615 and 20.067 m<sup>2</sup>

For grain and lime in Aberthaw; in Cardiff; in Cowbridge and Neath, Neath Port Talbot; in Swansea, Glamorganshire; and in East Wales

				Metric	Metric	Metric	Metric	Metric
<b>crynog</b> or <b>cranock</b> <sup>a</sup>				370.01 L	352.39 L	387.63 L	422.86 L	436.48 L
4	<b>llesetraid</b> <sup>b</sup>			92.50 L	88.10 L	96.91 L	105.72 L	109.12 L
16	4	<b>peccaid</b> <sup>c</sup>		23.12 L	22.02 L	24.23 L	26.43 L	27.28 L
64	16	4	<b>pedwran</b>	5.781 L	5.506 L	6.057 L	6.607 L	6.82 L

<sup>a</sup>According to Second Report of the Commissioners appointed to consider the Subject of Weights and Measures, 13 July 1820. *Parliamentary Papers 1820*, (HC314) vii. Also **cranoke**, **crenneke**, **crennoc**, **crennock**, **crenoke**, **crineoke**, **cronnog**, **cryneoke**, **crynog**, **crynoke**, **krenneke**, or **krennock**

<sup>b</sup>Sometimes, for wheat, reported to weigh 168 lbs in Aberthaw and in Cardiff

<sup>c</sup>Sometimes reported as being synonymous with **hobed** and **hoop**

Other reported measures:

- 1 **rhaw** = 240 sq yd = 200.667 m<sup>2</sup>;  
 1 **gwaith gwr** (used for peatland in North Wales)  
 = 150 sq ft = about 13.935 m<sup>2</sup>;  
 1 **cyvar** or **cyfar** (in Merionethshire) = 2430 sq  
 yd = 2,031.723 m<sup>2</sup>;

1 **rhwd sqwar** or **rhwd o dir**<sup>54</sup> (for potato grow-  
 ing and sod-paring in Northern Powys) =  
 164 sq yd = 53.511 m<sup>2</sup>;

1 **bat** (in South Wales) = 11 sq ft = 1.022 m<sup>2</sup>.

## 72.5 Units of Volume

1 **rhaw** (for peat) = 280 sq yd × 18 inches deep  
 = 140 cu yd = 107.035 m<sup>3</sup>, but sometimes  
 reported as 15 poles of 4 sq yd each = 120 cu  
 yd = 91.744 m<sup>3</sup>.

## 72.6 Units of Dry Capacity

For grain and lime in Anglesey and Caernavonshire

				Metric
<b>peget</b>				281.90 L
2	<b>hobed</b> or <b>hobaid</b>			140.95 L
4	2	<b>stored</b>		70.47 L
8	4	2	<b>bushel</b>	35.23 L

Other reported measures:

- 1 **nive** (for salt) = 7 barrels = 1 036 L;  
 1 **bag** (for oats, in South Wales) = 170 quarts =  
 7 heaped measures or 8½ striked measures =  
 299 L;

<sup>54</sup> According to [PALM], also known as “Welsh rood,” “square rod” and “digging rood” in neighboring parts of England.

- 1 **peget** (for grain in Anglesley and Caernarfonshire) = 2 hobeds = 8 bu = 281.9 L;
- 1 **stack** (for oats in Glamorganshire) = 6 bu = 211 L;
- 1 **barrel** (for culms) = 40 gal = 4 heaped bushels = 180 L;
- 1 **tub** (for export wheat in South Wales) = 4 bu = 145.47 L;
- 1 **hobed** (for lime in North Wales) = 2 storeds = 141 L;
- 1 **peget** (for lime in Anglesley and Caernarfonshire) = 4 bu = 140.9 L;
- 1 **barrel** (for lime) = 3 bushel =  $3\frac{1}{4}$  Winchester bu = 114 L;
- 1 **stack** (for barley and wheat in Glamorganshire) = 3 bu = 106 L;
- 1 **llestraid** (for grain in Neath and Swansea) = 22 or 24 gal = 96.9 L or 105.7 L;
- 1 **llestraid** (for grain in Cardiff) = 20 gal = 88.1 L;
- 1 **stored** (for corn and lime in North Wales) = 2 bu = 70.5 L;
- 1 **measure** (for oats in South Wales) = 20 quarts = 35.2 L;
- 1 **hoop** (for grain in Montgomeryshire) = 5 gal = 22.0 L;
- 1 **kibin** (in Anglesey and Caernarfonshire) =  $\frac{1}{2}$  bu = 18.164 L;
- 1 **meiliaid** (for grain in Llandovery) =  $\frac{1}{4}$  bu = 8.81 L.

## 72.7 Units of Liquid Capacity

Some reported measures:

- 1 **bushel** (in Montgomeryshire) = 20 gal = 90.922 L;
- 1 **bushel** (in Monmouthshire) = 10 to  $10\frac{1}{2}$  gal = about 45.46 to 47.73 L;
- 1 **bushel** (in Brecknockshire) = 10 gal = about 45.46 L;
- 1 **blue** =  $\frac{1}{12}$  gal = 378.8 mL.

## 72.8 Units of Weight

For wool in the south of Wales, based on [DONI], [FENN] and [SECO]

			British	Metric
<b>maen</b>			26 lbs	11.793 kg
4	<b>topston</b>		6½ lbs	2.948 kg
13	$3\frac{1}{4}$	<b>pws or pwys<sup>a</sup></b>	2 lbs	907.2 g

<sup>a</sup>[SECO, p. 29] reported it as  $\frac{1}{14}$  maen

For straw in Midlothian

		British	Metric
<b>kemple</b>			90.718 to 108.862 kg
40	<b>windlen</b>	5–6 lbs	2.268 to 2.271 kg

Other reported measures:

- 1 **wey** (in South Wales) = 8 tons 2 Cwt = 8,229.937 kg;
- 1 **ton** (for coal in North Wales) = 2 688 lbs = 1,219.250 kg;
- 1 **ton** (for lime in South Wales) = 1 904 lbs = 863.635 kg;
- 1 **ton** (for lime in North Wales) = 1 344 lbs = 609.625 kg;
- 1 **sack** (for wheat in North Wales) =  $1\frac{1}{2}$  hobeds = 260 lbs = 117.934 kg;
- 1 **hobbet or hobbit** = 210 lbs (for new potatoes) = 95.254 kg, 200 lbs (for old potatoes in Flintshire) = 90.718 kg, 180 lbs (for beans) = 81.647 kg, 168 lbs (for wheat) = 76.203 kg, 147 lbs (for barley) = 66.678 kg, and 105 lbs (for oats) = 47.627 kg;
- 1 **hobed or hobaid** (for wheat in North Wales) = 173 lbs = 78.471 kg;
- 1 **pwn** (for straw in North Wales) = 160 lbs = 72.57 kg;
- 1 **tapnet** (for figs) = 20 to 30 lbs = 9.072 to 13.608 kg;
- 1 **stone** (for beef) = 12 lbs = 5.443 kg;
- 1 **gawn, gaun, or goan** (for butter) = 12 lbs = 5.443 kg;
- 1 **stone** (for wool) = 4, 5, 6, 7, 11, 13, 14, 15, 17, 18, 21, 24, and 26 lbs.

73 Wallachia

See also *Romania*.

Wallachia was founded as a principality in the early fourteenth century by Basarab I (1310–1352), after a rebellion against Charles I of Hungary. In 1415, Wallachia became an Ottoman tributary state. The area was occupied by Russia between 1768 and 1854. In 1859, Wallachia united with Moldavia to form the United Principalities of Moldavia and Wallachia.

The **palmă** unit was first mentioned during the late sixteenth century. Starting in the late seventeenth century, there were two different systems in use. The **palmă lui Șerban vodă** (= 245 mm) was established during the reign of Șerban Cantacuzino (1678–1688), and the **palmă lui Constantin vodă** (= about 252.5 mm) was established during the reign of Constantin Brâncoveanu (1688–1714). The introduction of two different systems resulted in numerous problems in measurements. Another palmă, known as **palmă lui Știrbei vodă**, was introduced during the reign of Barbu Știrbei (1849–1853 and 1854–1856). In 1855, the Governor for internal bussiness proposed the use of one single system for length, following the example of the French system introduced in 1812 by Napoleon I, based on the palmă lui Știrbei vodă being 200 mm.

Main source: [BAUE]

Other measures during the early nineteenth century:

- 1 **poștă** = ~20 km;
- 1 **leghe** = 4–5.5 km;
- 1 **stânjen marin** (for maritime use) = 1.83 m;
- 1 **stânjen pescăresc** (for fishing) = ~1.5 m;
- 1 **khalibi** or **cotu** (for silk) = 683.0 mm;
- 1 **endăseh** (for wool, linen and cotton) = 641.1 mm.

73.1 Units of Length

Traditional system

								Metric
<b>forsang</b>								7,848.48 m
400	<b>laut</b>							19.62 m
4000	10	<b>stânjen</b>						1.962 12 m
5,333 1/3	13 1/3	1 1/3	<b>pas mare</b> <sup>a</sup>					1.471 6 m
8000	20	2	1½	<b>pas mic</b>				981.060 mm
32,000	80	8	6	4	<b>palmă</b>			245.302 mm
64,000	160	16	12	8	2	<b>pounc or lat de palmă</b>		122.651 mm
512,000	1280	128	96	64	16	8	<b>degite</b>	15.331 mm

<sup>a</sup>For maritime use

## In Muntenia (Greater Wallachia)

							Metric
<b>funie</b>							24.24 m
4	<b>prăjină</b>						5.91 m
12	3	<b>stânjén</b>					1.97 m
96	24	8	<b>palmă</b>				246.25 mm
768	192	64	8	<b>palmac</b>			30.781 mm
960	240	80	10	1¼	<b>deget</b>		24.625 mm
9600	2400	800	100	12½	10	<b>linie</b>	2.462 mm

There was also 1 **cot** = 637 mm.

## Decimalized Serban scale and Constantin scale

						Metric	Metric
<b>laut</b>						19.665 m	20.2 m
10	<b>stânjén al lui Serban vodà</b>					1.966 5 m	2.02 m
80	8		<b>palmă</b>			245.812 mm	252.5 mm
800	80		10	<b>deget</b>		24.581 mm	25.25 mm
8000	800		100	10	<b>linia</b>	2.458 mm	2.525 mm

## During the late nineteenth century

							Metric
<b>mil</b>							7.848.534 4 m
1.333 1/3	<b>praschtschine</b>						5.886 400 8 m
4.000	3	<b>stânjén</b>					1.962 133 6 m
40.000	30	10	<b>puhm or palmă</b>				196.213 36 mm
400.000	300	100	10	<b>deget</b>			19.621 336 mm
4.000.000	3.000	1.000	100	10	<b>linia</b>		1.962 134 mm

## 73.2 Units of Area

Some traditional units:

1 **lugăr** = the amount of land area that could be ploughed by two oxen in 1 day;

1 **prăjină** = 180–210 m<sup>2</sup>.

## Upper scale in Muntenia (Greater Wallachia)

							Metric
<b>falcie or falce</b>							11.137.95 m <sup>2</sup>
2 2/9	<b>pogon or lugăr</b>						5.012.08 m <sup>2</sup>
8 8/9	4	<b>feredelă</b>					1.253.02 m <sup>2</sup>
20	9	2¼	<b>funie pătrată</b>				556.90 m <sup>2</sup>
64	28 4/5		3 1/5	<b>deinită</b>			174.03 m <sup>2</sup>
2.880	1.296		144	45	<b>stânjén pătrat</b>		3.867 m <sup>2</sup>

Lower scale in Muntenia (Greater Wallachia)

				Metric
<b>stânjen pătrat</b>				3.867 m <sup>2</sup>
64	<b>palmă pătrat</b>			604.2 cm <sup>2</sup>
6.400	100	<b>deget pătrat</b>		604.2 mm <sup>2</sup>
64.000	1.000	10	<b>linia pătrat</b>	60.42 mm <sup>2</sup>

During the late nineteenth century

			Metric
<b>pogone<sup>a</sup></b>			4,989.558 916 8 m <sup>2</sup>
144	<b>praschtschine pătrat</b>		34.649 714 7 m <sup>2</sup>
129,600	900	<b>palmă pătrat</b>	3.849 968 3 dm <sup>2</sup>

<sup>a</sup>24 praschtschine × 6 praschtschine

73.3 Units of Volume

For wood

		Metric
<b>stânjen</b>		8 m <sup>3</sup>
8	<b>stere</b>	1 m <sup>3</sup>

73.4 Units of Dry Capacity

Traditional system and metric-linked system

								Metric	Metric
<b>chila</b>								679.26 L	640 L
9 1/11	<b>obroc mare</b>							74.316 L	–
10	1 1/10	<b>banite mare</b>						67.926 L	64 L
18 2/11	2	1 9/11	<b>obroc mic</b>					37.158 L	–
20	2 1/5	2	1 1/10	<b>banite mic</b>				33.963 L	32 L
400	44	40	22	20	<b>oca</b>			1.698 L	1.6 L
1600	176	160	88	80	4	<b>litra</b>		424.5 mL	400 mL
3200	352	320	176	160	8	2	<b>cinzec</b>	212.3 mL	200 mL

For grain

					Metric	Metric
<b>kila</b> <sup>a</sup>					396.8 L	393.2 L
2	<b>mirza</b>				198.4 L	196.6 L
16	8	<b>dimerli, demerli, or dimerla</b> <sup>b</sup>			24.8 L	24.575 L
25 3/5	12 4/5	1 3/5	<b>viadra or wiadra</b>		15.5 L	15.359 L
256	128	16	10	<b>oca</b>	1.55 L	1.536 L

<sup>a</sup>Reported as 20,023 2/3 Paris cubic inches, but later defined as 19,842 Paris cubic inches = 393.2 L

<sup>b</sup>Varied by location between 20 and 30 L

For cereal during the late nineteenth century

		Metric
<b>kila</b>		681.274 4 L
8	<b>baniță</b> <sup>a</sup>	85.159 3 L

<sup>a</sup>A vessel that contains 11 oka of wheat, 11 oka of buck-wheat, 11 oka of millet and 11 oka of barley

Other measures reported during the nineteenth century:

1 **baniță** (for grain, inland measure) = 34.063 L;

1 **banite brăila** = 20 L.

## 73.5 Units of Liquid Capacity

Some traditional measures:

1 **chiup** (large vessel for liquids) = 30–40 L;

1 **câblă** = a bucket of wheat.

Upper scale in Muntenia (Greater Wallachia)

					Metric
<b>butie</b> <sup>a</sup>					1,545.60 L
1 1/3	<b>giumătate or poloboc</b> <sup>b</sup>				1,159.20 L
2	1½	<b>butoi</b> <sup>c</sup>			772.80 L
4	3	2	<b>balercă</b>		386.40 L
120	90	60	30	<b>vadră or tină</b>	12.88 L

<sup>a</sup>Varying between 100 and 200 vedre

<sup>b</sup>Varying between 80 and 100 vedre

<sup>c</sup>Varying between 50 and 80 vedre

## Lower scale in Muntenia (Greater Wallachia)

											Metric
<b>baleră</b>											386.40 L
1¼	<b>chila</b>										309.12 L
2½	2	<b>merță</b>									154.56 L
18	14 2/5	7 1/5	<b>baniță<sup>a</sup></b>								21.47 L
25	20	10	1 7/18	<b>dimerla or dimeril</b>							15.456 L
30	24	12	1 2/3	1 1/5	<b>vadră or tină</b>						12.88 L
300	240	120	16 2/3	12	10	<b>oca or cofă</b>					1.288 L
1200	960	480	66 2/3	48	40	4	<b>litra</b>				322 mL
4400	1920	960	133 1/3	96	80	8	2	<b>cinzec</b>			161 mL
5500	2400	1200	166 2/3	120	100	10	2½	1¼	<b>dram</b>		128.8 mL
8800	7680	3840	266 2/3	384	320	16	4	2	1 3/5	<b>ciocan</b>	80.5 mL

<sup>a</sup>Varying by location between 21 and 34 L

In Wallachia during the late nineteenth century, based on [KAHN] and on [BAUE]

					Metric	Metric
<b>vadră, vedro, or viadra</b>					10.950 L	12.813 L
10	<b>oca</b>				1.095 L	1.281 3 L
40	4	<b>litra</b>			273.750 mL	320.325 mL
4000	400	100	<b>dram</b>		2.737 mL	3.203 mL

**73.6 Units of Weight**

In Muntenia (Greater Wallachia); in Wallachia during the eighteenth century and the late nineteenth century

								Metric	Metric	Metric
<b>merță</b>								508.8 kg	–	–
2 3/11	<b>cechioa</b>							223.9 kg	–	–
9 1/11	4	<b>cântara<sup>a</sup></b>						55.97 kg	–	56.365 584 kg
10	4 2/5	1 1/10	<b>baniță</b>					50.88 kg	54.08 kg	–
400	176	44	40	<b>oca</b>				1.272 kg	1.352 kg	1.281 036 kg
909 1/11	400	100	90 10/11	2 3/11	<b>lodre</b>			559.68 g	–	–
1600	704	176	160	4	1 19/25	<b>litra</b>		318 g	338 g	320.259 g
160,000	7040	1760	16,000	400	176	100	<b>dram</b>	3.18 g	3.38 g	3.202 g

<sup>a</sup>According to [BAUE], also reported as 45 oca

Other measures reported during the late nineteenth century:

1 **kila** (for legumes) = 100 oca = 128.103 6 kg.

74

Wallis and Futuna [Formerly:  
Uvea and Futuna]

Uvea (on the island of Wallis) was put under the authority of the French colony of New Caledonia in 1887. The islands of Futuna and Alofi also signed a treaty establishing them as French protectorates in 1888. In 1961, the islands became the French Overseas Territory of the Wallis and Futuna Islands, and in 2003, it became a French overseas collectivity.

The metric system has been official since 1847.

74.1

Currency

1949–: 1 CFP (Cour de Franc Pacifique) franc  
= 100 centimes

1888–: 1 New Caledonia franc =  
100 centimes

–1873: 1 French franc = 100 centimes

75

Wassoulou Empire

See also *Guinea* and *Toucouleur Empire*.

This Empire lasted from 1878 to 1898, when it was conquered by the French colonial army.

76

West Bank

The West Bank is an area on the west side of the Jordan River, which, after the first Arab-Israeli war in 1948, was annexed by Jordan. After the Six Day War in 1967, it became occupied by Israel.

77

West Pakistan

See *Pakistan*.

78

Western Sahara [Formerly:  
Spanish West Africa  
and Spanish Sahara]

See also *Mauritania* and *Morocco*.

Morocco ceded Western Sahara to Spain in 1860. In 1884, the area was renamed Spanish West Africa. Spanish Sahara came into existence in 1924, when the territories of Rio de Oro, Cape Juby and La Aguera were conjoined. In 1946, Spanish Sahara and Ifni were also conjoined to reform Spanish West Africa. The area became the overseas province of Spanish Sahara in 1958, when Cape Judy was returned to Morocco. In 1975, when Spain was about to give up its claim to the area, it was invaded by both Morocco and Mauritania. Morocco annexed the northern two thirds of Western Sahara in 1976, and the rest of the area in 1979 when Mauritania withdrew from it.

Before the late nineteenth century, the weights and measures were the same as those in Morocco.

*Main source:* [UN66]

78.1

Currency

1975–: 1 Moroccan dirham =  
100 centimes

1975–1979: 1 Mauritanian ouguiya or ougiya  
= 5 khoums

1884–1975: 1 Spanish peseta = 100 céntimos

78.2

Units of Length

Castilian system			
			Metric
<b>peso</b>			1.393 2 m
1 2/3	<b>vara</b>		835.9 mm
5	3	<b>pie</b>	278.6 mm

78.3 Units of Area

Spanish-linked system

		Metric
fanegada or marco real		6,439.56 m <sup>2</sup>
12	celemín	536.63 m <sup>2</sup>

78.4 Units of Dry Capacity

Spanish-linked system

		Metric
fanega		55.5 L
12	celemín	4.625 L

78.5 Units of Liquid Capacity

Spanish-linked system and metric-linked system for wine

			Metric	Metric
cántaro			16.128 L	16 L
8	azumbre		2.016 L	2 L
32	4	cuartillo	504 mL	500 mL

Other measures reported during the nineteenth century:

1 arroba (for oil) = 12.563 L.

79 Western Samoa

See *Samoa*.

80 Yap

See *Micronesia*.

81 Yemen [Former regions: South Yemen (1967–90), Mutawakkilite Kingdom of Yemen (1926–62), Yemen Arab Republic (1962–90), Aden (1886–1963)]

See also *Aden*, *North Yemen* and *South Yemen*.

This area was part of the Ottoman Empire from 1517 to 1918. The Federation of Arab Emirates of the South was formed in 1959, and included 17 South Arabian countries. In 1962, the Aden colony joined the Federation, and it was renamed the Federation of South Arabia. The Federation gained its independence as the People’s Republic of South Yemen in 1967. The Qasimi state was founded in 1597. It was occupied by the Ottoman Empire in 1872 and annexed in 1876. It gained its independence in 1918, and became the Mutawakkilite Kingdom of Yemen in 1926. It was renamed the Yemen Arab Republic in 1962. The Yemen Arab Republic and the People’s Republic of South Yemen were unified in 1990 as the Republic of Yemen.

81.1 Currency

1990–: 1 Yemeni rial = 100 fils

82 Yemen Arab Republic

See *North Yemen*.

83 Yorùbáland

See also *Benin*, *Nigeria*, *Oyo Empire* and *Togo*.

The Ilé-Ifẹ Kingdom, located in present-day Oṣun State in Nigeria, dates back to the seventh century BCE. The Ife Empire was surpassed by the Oyo Empire, which lasted until the early twentieth century.

Not much is known about the indigenous standards of weights and measures among the Yoruba kingdoms. At any rate, it is known that the weight and size of an object was often determined by comparison with other objects. Hence, it is possible that two objects of the same size but different weights may have been exchanged for one another. During colonization, the British system for weights and measures came into use. The metric system has been reported as being used since the early 1980s.

*Main sources:* [ABRA], [FAKI], [FALO], [JOHN3], [LEAT] and [WATS]

83.1 Currency

During the seventh–eleventh centuries, silent trade, in which sellers and buyers practiced barter by exchanging goods for other goods or services without any medium of exchange and without seeing one another, was widely used.

Cowrie shells, referred to as *owo*, were also used in trading, since at least the sixteenth century. Some scholars have reported that *Cypraea annulus* was generally recognized as being of less value than *Cypraea moneta*. Other intermediate products, like cotton fabric and salt, were also used instead of coins.

The Arabian *dīnār* was commonly used in trans-Saharan trade until the early nineteenth century.

Number	Cowrie Enumeration	Mathematics
1	Ookan	1
2	Eeji	2
3	Eeta	3
4	Eerin	4
5	Aarun	5
6	Eefa	6
7	Eeje	7
8	Eejo	8
9	Eesan	9
10	Eewa	10
11	Ookanla	10 + 1
12	Eejila	10 + 2
13	Eetala	10 + 3
14	Eerinla	10 + 4
15	Eedogun	20 – 5
16	Eerindilogun	20 – 4
17	Eetadilogun	20 – 3
18	Eejidilogun	20 – 2
19	Ookandilogun	20 – 1
20	Okowo	20
21	Ookanelogun	20 + 1
22	Eejilelogun	20 + 2
23	Eetalelogun	20 + 3
24	Eerinlelogun	20 + 4
25	Eedogbon	30 – 5
26	Eerindilogbon	30 – 4
27	Eetaldilogbon	30 – 3
28	Eejidilogbon	30 – 2
29	Ookandilogbon	30 – 1
30	Ogbowo	30

(continued)

								Number of cowries
àpò or ókò (= bag or sack)								20,000
10	head							2000
16 2/3	1 2/3	mithqal						12 × 100 = 1200
20 5/6	2 5/60	1 1/4	gros					12 × 80 = 960
27 7/9	2 7/9	1 2/3	1 1/3	soa				12 × 60 = 720
41 2/3	4 1/6	2 1/2	2	1½	ackie			12 × 40 = 480
100	10	6	4 4/5	3 3/5	2 2/5	igbió		200
500	50	30	24	18	12	5	string	40

There was also a quite complicated system for cowrie enumeration. The table below is based on a table compiled by [FALO].

Number	Cowrie Enumeration	Mathematics
35	Aarundilogoji	$40 - 5$
40	Ogoji	$20 \times 2$
45	Aarundiladota	$((20 \times 3) - 10) - 5$
50	Aadota	$(20 \times 3) - 10$
55	Aarundilogota	$(20 \times 3) - 5$
60	Ogota	$20 \times 3$
65	Aarundiladorin	$((20 \times 4) - 10) - 5$
70	Aadorin	$(20 \times 4) - 10$
75	Aarundilogorin	$(20 \times 4) - 5$
80	Ogorin	$20 \times 4$
85	Aarundiladoru	$((20 \times 5) - 10) - 5$
90	Aadorun	$(20 \times 5) - 10$
95	Aarundilogorun	$(20 \times 5) - 5$
100	Ogorun	$20 \times 5$
110	Aadofa	$(20 \times 6) - 10$
120	Ogofa	$20 \times 6$
130	Aadoje	$(20 \times 7) - 10$
140	Ogoje	$20 \times 7$
150	Aadojo	$(20 \times 8) - 10$
160	Ogojo	$20 \times 8$
170	Aadosan	$(20 \times 9) - 10$
180	Ogosan	$20 \times 9$
190	Ewaldinnigba	$(20 \times 10) - 10$
200	Igbiwo	$20 \times 10$
210	Ewalerugba	$(20 \times 10) + 10$
220	Ogunlugba	$(20 \times 10) + 20$
230	Ogbonwolerugba	$(20 \times 10) + 30$
240	Ojilugba	$(20 \times 10) + 40$
250	Aadotalerugba	$(20 \times 10) + (20 \times 3) - 10$
260	Otalerugba	$(20 \times 10) + (20 \times 3)$
270	Aadorinlerugba	$(20 \times 10) + (20 \times 4) - 10$
280	Orinlugba	$(20 \times 10) + (20 \times 4)$
290	Aadorunlerugba	$(20 \times 10) + (20 \times 5) - 10$
300	Odunrun	$(20 \times 20) - 100$
400	Irinwo	$20 \times 20$
500	Eedegbeta	$(200 \times 3) - 100$
600	Egbeta	$200 \times 3$
700	Eedegberin	$(200 \times 4) - 100$
800	Egberin	$200 \times 4$
900	Eedegberun	$(200 \times 5) - 100$
1000	Egberun	$200 \times 5$
1100	Eedegbefa	$(200 \times 6) - 100$
1200	Egbefa	$200 \times 6$
1300	Eedegbeje	$(200 \times 7) - 100$
1400	Egbeje	$200 \times 7$
2000	Egbewa	$200 \times 10$
2400	Egbejila	$200 \times 12$

(continued)

Number	Cowrie Enumeration	Mathematics
2500	Egbetala-din-ogorun	$(200 \times 13) - 100$
3500	Egbejedinlogun-din-ogorun	$(200 \times 18) - 100$
4000	Egbaji	$2000 \times 2$
4500	Egbetalelogun-din-ogorun	$(200 \times 23) - 100$
5000	Egbedogbon	$200 \times 25$
5500	Egbetalelogbon-din-ogorun	$(200 \times 33) - 100$
6000	Egbata	$2000 \times 3$
7000	Edegbarin	$(2000 \times 4) - 1000$
8000	Egbarin	$2000 \times 4$
9000	Edegbarun	$(2000 \times 5) - 1000$
10,000	Egbarun	$2000 \times 5$
20,000	Egbaawa	$2000 \times 10$
30,000	Eedogun	$2000 \times 15$
40,000	Egbagun	$20,000 \times 2$
1,000,000	Egbegberun	$1000 \times 1000$

As the British metallic currencies came into use during the late nineteenth century, the cowrie shells began to be referred to as *owo eyo*, the British copper coins as *kobo* and the shilling as *sile*.

## 83.2 Units of Length

Some reported traditional measures:

1 **igbonwọ** or **igbon-rọn** = the distance from the elbow to the tip of the middle finger;

1 **gira** = about 57 mm.

British Imperial-linked system

					Metric
màìlì or ìbùsọ					1,609.344 m
8	òréré				201.168 m
1760	220	ọpá or ọpá-aṣọ			914.4 mm
5280	660	3	ẹṣẹ		304.8 mm
63,360	7920	36	12	ika	25.4 mm

Metric system

					Metric
òkẹmítà					1000 m
1000	mítà				1 m
10,000	10	ìdà-ìdì mítà			100 mm
100,000	100	10	ìdà-àpò mítà		10 mm
1,000,000	1000	100	10	ìdà-òkẹ mítà	1 mm

83.3 Units of Area

The general term used for the measurement of area is *ojú*, meaning *surface*, e.g., 1 square foot = 1 *ojù-ẹsè kan*, and 1 square meter = 1 *ojú mítà*.

83.4 Units of Volume

The general term used for the measurement of area is *àyè*, e.g., 1 cubic meter = 1 *àyè mítà*.

83.5 Units of Capacity

British Imperial-linked system

			Metric
àgbá			163.565 L
36	gálọ̀nù		4,543 46 L
288	8	ọ̀suwọ̀n oninọ kerere	567.93 mL

Metric system

				Metric
lità				1 L
10	ìdà-ìdì lità			100 mL
100	10	ìdà-àpò lità		10 mL
1000	100	10	ìdà-òkẹ lità	1 mL

Other reported terms:

1 *akonwọsilẹ* or *ikonwọsilẹ* = brimful (applied to dry measures).

83.6 Units of Weight

The term *iwọ̀n*, meaning *measure*, may precede the unit used.

British Imperial-linked system

				Metric
(iwọ̀n) tóònú				1,016.047 kg
160	(iwọ̀n) sítónù <sup>a</sup>			6.350 kg
2240	14	(iwọ̀n) pọ̀un		453.592 g
35,840	224	16	(iwọ̀n) àùnsì	28.349 g

<sup>a</sup>Translated as “stone.”

Metric system

					Metric
(iwɔŋ) ɔkɛgráàmù					1 kg
1000	(iwɔŋ) gráàmù				1 g
10,000	10	(iwɔŋ) ìdà-ìdì gráàmù			100 mg
100,000	100	10	(iwɔŋ) ìdà-àpò gráàmù		10 mg
1,000,000	1000	100	10	(iwɔŋ) ìdà-ɔkɛ gráàmù	1 mg

84 Yugoslavia [Present-day Bosnia and Herzegovina, Croatia, Kosovo, Macedonia, Montenegro, Serbia, and Slovenia]

Other measures reported during the nineteenth century:

1 agatsch = 5,000.94 m;  
1 rif = 777 mm.

A union of the former Kingdoms of Serbia and Montenegro, Bosnia, Herzegovina, Croatia, Carniola, and Voivodina was proclaimed in 1929.

The metric system became official in 1873, legally optional from 1876, and compulsory after 1883.

Main source: [CARD]

84.1 Currency

1918–2003: 1 Yugoslav dinar = 100 para  
1918–1922: 1 Yugoslav krone

84.2 Units of Length

Traditional system

					Metric
khvat or kvat					1.896 m
2 2/3	archine or arsin <sup>a</sup>				711 mm
6	2¼	stopa			316 mm
52 1/5	21¾	8 7/10	palaz		36.322 mm
870	326¼	145	16 2/3	linija	2.179 mm

<sup>a</sup>Varied by locality between 600 and 712 mm

84.3 Units of Area

Traditional system and metric-linked system after 1883

							Metric	Metric
<b>lanaz</b> <sup>a</sup>							5,751.706 m <sup>2</sup>	5,760 m <sup>2</sup>
1 270375/ 449625	<b>hvat or dan oranja</b> <sup>b</sup>						3,591.820 m <sup>2</sup>	3,597 m <sup>2</sup>
2 38/125	1 1097/ 2500	<b>raliza, ralica, or ralo</b>					2,496.400 m <sup>2</sup>	2,500 m <sup>2</sup>
7 1/5	4 2779/ 5600	3 1/8	<b>motyka</b>				798.848 m <sup>2</sup>	800 m <sup>2</sup>
8 8/35	5 97/700	3 4/7	1 1/7	<b>dunum</b>			698.992 m <sup>2</sup>	700 m <sup>2</sup>
1600	999 1/6	694 4/9	222 2/9	194 4/9	<b>square khvat</b>		3.594 816 m <sup>2</sup>	3.6 m <sup>2</sup>
57,600	35,970	25,000	8000	7000	36	<b>square stopa</b>	9.985 6 dm <sup>2</sup>	10 dm <sup>2</sup>

<sup>a</sup>Also reported as 5,754.56 m<sup>2</sup>

<sup>b</sup>Also reported as 3,596.6 m<sup>2</sup>

84.4 Units of Dry Capacity

Traditional system

					Metric
<b>kile</b>					393.728 L
2	<b>mirze</b>				196.864 L
16	8	<b>demerli or dimerli</b>			24.608 L
256	128	16	<b>oka, ocaua, or oke</b>		1.538 L
1024	512	64	4	<b>littra</b>	384.5 mL

84.5 Units of Liquid Capacity (Usually Measured by Weight)

Traditional system

				Metric
<b>akov</b>				56.60 L
4	<b>viadra</b>			14.15 L
40	10	<b>oka, ocaua, or oke</b>		1.415 L
160	40	4	<b>littra</b>	353.75 mL

84.6    Units of Weight

Traditional system used before 1883 and metric-linked system after 1883

					Metric	Metric
<b>tovar</b> <sup>a</sup>					128.104 kg	125 kg
2½	<b>akov</b>				51.241 6 kg	50 kg
100	40	<b>oka</b>			1.281 04 kg	1.25 kg
400	160	4	<b>satlijk</b>		320.26 g	312.5 g
40,000	16,000	400	100	<b>dramm</b>	3.202 6 g	3.125 g

<sup>a</sup>Also said to be the size of a load that a horse could carry. [HADŽ, p. 15]

Metric-linked system during the late nineteenth century

			Metric
<b>vagon or wagon</b> <sup>a</sup>			10,000 kg
100	<b>tovar</b>		100 kg
10,000	100	<b>oka</b>	1 kg

<sup>a</sup>Mainly for corn, roots and coal  
Great Britain. Dept. of Overseas Trade. Economic Conditions in Yugoslavia. 1921, p. 4

85    Zaire

See *Congo*.

86    Zambia [Formerly: Northern Rhodesia]

David Livingstone reached the Zambezi River in 1855. In 1888, the British South Africa Company obtained mineral rights from the Litunga, for the area, which later became Northwestern Rhodesia. Northeastern Rhodesia and North-western Rhodesia were merged to form Northern Rhodesia in 1911. Northern Rhodesia became a British Protectorate in 1924. The area was part of the Federation of Rhodesia and Nyasaland (comprising present-day Malawi, Zambia and Zimbabwe) from 1953 to 1963. Northern Rhodesia gained its independent, as Zambia, in 1964.

The Bemba tribe had no definite units of length, capacity or weight. The British system for weights and measures was in general use for trading starting in the late nineteenth century.

The metric system has been used since 1937, and compulsory since 1970.

*Main sources:* [JONE3], [RICH5], [UN55], and [UN66]

86.1    Currency

- 1968–:            1 Zambian kwacha = 100 ngwee  
1964–1968:    1 Zambian pound = 20 shillings  
                      = 240 pence  
1956–1964:    1 Rhodesia and Nyasaland pound  
                      = 20 shillings = 240 pence  
1939–1955:    1 Southern Rhodesia pound =  
                      20 shillings = 240 pence  
1896–1940:    1 British pound sterling =  
                      20 shillings = 240 pence =  
                      960 farthings

86.2    Units of Length

The **mpanga** has been reported by [RICH5] as a journey of about 4–5 English miles = about 6½–8 km.

86.3    Units of Area

The Bemba territories were divided into districts. These districts were known as **i-calo** (*pl.* i-fyalo). Its inhabitants all paid tribute to the one chief and expected to receive supernatural or material help from him in return.

The Bembas also used the term **mpanga**. This could mean the area immediately surrounding a headman's village or the strip of bush between one open marshy place and the next.

1 **mputa** (for cultivated land and village mounds) = a circular band about 300 yards across that lies all around the village;

1 **ifitemene** (*pl.* icitemene) = a roughly circular millet garden in the bush, equal to about 4000 m<sup>2</sup> in size; after it was sown, it was called an **ubukula** (*pl.* amakula), and in its second and subsequent years of life, it was called an **icifwani** (*pl.* ififwani).

## 86.4 Units of Dry Capacity

The Bembas used carrying-baskets (**umuseke**, *pl.* imiseke) for grain that were reported to contain about 50 lbs (= about 23 kg), but also as varying from about 40 to 60 lbs (18–27 kg). They also used smaller eating-baskets (**icipe**, *pl.* ifipe) that were reported to contain about 6 lbs (= about 2.7 kg).

Other reported measures:

1 **debbie** (for paraffin) = 4 Imp gal = 18.184 L.

## 87 Sultanate of Zanzibar [Formerly: Zanguebar Island; Zanzibar and Pemba]

See also *Kenya*, *Tanganyika*, and *Tanzania*.

The Hadimu and Tumbatu tribes were the indigenous people of Zanzibar. Most Hadimu settled on the southern part the Island, while the Tumbatu predominantly settled in the North. Different tribes established themselves on the surrounding islands. The Waunguja tribe was established on the Unguja Island, the Wapemba tribe on the Pemba Island and the Watumbatu on the Tumbato Island. When the Portuguese arrived in present-day Zanzibar in the 1400s, the indigenous tribes were probably already trading with the mainland and Persia. The Omani Arabs conquered the island in 1698, and the

area, along with a substantial portion of the East African coast, became an overseas holding of Oman. In 1856, Zanzibar became an independent Sultanate. Control of the coastal areas was lost to Britain and Germany in 1888. Zanzibar, then known as Zanguebar Island, was proclaimed a British protectorate in 1890, and the Lamu Island became part of the Kenya protectorate the same year, as did the coastal domains of Zanzibar and Pemba in 1895. The British protectorate over Zanzibar was terminated in 1963. The Sultanate was replaced by the People's Republic of Zanzibar in early 1964. A few months later, Zanzibar united with Tanganyika to form the United Republic of Tanganyika and Zanzibar. In late 1964, the name was changed to Tanzania.

Traditional systems of weights and measures were generally related to the relative dimensions of the human body. The units of measurement were given different names by each tribe, based on their language, for example, Kiswahili, Makonde and Kiunguja. Consequently, weights and measures varied greatly in Zanzibar during the eighteenth–nineteenth centuries. There were no standards among traders, and the influences from Persia, Arabia, Germany and Britain were significant. Stone weights were used instead of metal weights, and the rapacity among sellers made a notable difference in the sizes and contents of one and the same denomination. During the early twentieth century, the British Imperial systems, with somewhat customary names, were adopted for international trading. The broad spectrum of measurement systems and names of measurement units in use during the eighteenth and nineteenth centuries is clearly shown in the sprawling compilation below.

*Main sources:* [BURT], [BURT2], [CLAR], [FARA], [FLAG], [KÜRC], [MART3], [SIMM], [STEE] and [UN55]

### 87.1 Currency

1936–1966:	1 East African shilling = 100 cents
1908–1935:	1 Zanzibar rupee = 100 cents

- 1882–1908: 1 Zanzibar ryal = 136 pysa  
1 Indian rupee = 16 annas = 192 pies
- 187?–1882: 1 Zanzibar dollar = 2 nusu = 4 ruba = 8 toman = 16 annas = 32 biia = 128 ruba biia
- 1861–187?: 1 Zanzibar riyal = 4 robos = 16 annas = 128 pice
- ?–1908: 1 Girsh Aswad or Maria Theresa thaler
- Eighteenth century: *Conus papilionaseus* and *Conus imperialis* were used as currencies among the Manyemas.

Customary system in central regions during the seventeenth century, based on [SIMM]

					Metric
<b>miranga or gana</b>					~480 m
10	<b>ugoyye or ugoe</b>				~48 m
240	24	<b>fundo</b>			~2 m
1200	120	5	<b>khete</b>		~0.4 m
2400	240	10	2	<b>bitil</b>	~0.2 m

## 87.2 Units of Length

Traditional measures:

- 1 **farsakh** = about 5.5 km;  
1 **kos** = about 3.5 km;  
1 **mkono** or **thiraa kamili** = the distance from the finger-tips to the elbow;  
1 **thiraa konde** = the distance from the elbow-joint to the tip of the thumb;  
1 **fundo** = the double length around the throat to the elbow-bone;  
1 **khete** = the distance from the tip of the index finger to the wrist;  
1 **scibr** = the distance from the tip of the thumb to the little finger;  
1 **bitil** or **mörita** = the distance from the tip of the thumb to that of the forefinger.

Customary system in coastal regions during the seventeenth century, based on [SIMM]

					Metric
<b>miranga or gana</b>					~480 or ~800 m
6 or 10	<b>ugoyye or ugoe</b>				~80 m
60 or 100	10	<b>fundo<sup>a</sup></b>			~8 m
600 or 1000	100	10	<b>khete<sup>b</sup></b>		~0.8 m
2400 or 4000	400	40	4	<b>bitil<sup>c</sup></b>	~0.2 m

<sup>a</sup>In plural = *mafundo*

<sup>b</sup>In concept, a double length around the throat, or around the thumb to the elbow-bone

<sup>c</sup>The distance from the tip of the index finger to the wrist

British Imperial-linked system for unbleached cotton cloth during the early nineteenth century, based on [BURT]

								Metric
<b>jurah<sup>a</sup></b>								25.602 976–40.233 248 m
3½–5½	<b>takah<sup>b</sup></b>							7.315 136 m
7–11	2	<b>doti<sup>c</sup></b>						3.657 568 m
14–22	4	2	<b>shukkah<sup>d</sup></b>					1.828 784 m
28–44	8	4	2	<b>wár or var</b> (= 1 English yard)				914.392 mm
56–88	16	8	4	2	<b>mukono<sup>e</sup></b>			457.196 mm
	32	16	8	4	2	<b>scibr</b>		228.598 mm
140–220	40	20	6	5	2½	1¼	<b>bitil<sup>f</sup></b>	182.878 4 mm

<sup>a</sup>Also called **gorah** and **takah**

<sup>b</sup>Also called **taca**

<sup>c</sup>Also called **saub**, **schucca**, **tobe**, and **unguo**

<sup>d</sup>Amongst the Wasawahili, about 450 mm, and amongst the Somal, 480–490 mm [BURT2]. Also called **ba'a**, **lupande**, **mwenda**, and **upande**

<sup>e</sup>Also called **durrah**, **draa**, **mucono**, and **zirá'a**

<sup>f</sup>Also called **fitr**

British Imperial-linked system for cloth during the nineteenth century, based on [BURT2] and [SUND]

							Metric
<b>takah</b>							18.288–27.432 m
2½–3¾	<b>jurah or gorah</b>						7.315 m
5–7½	2	<b>doti or duti</b>					3.658 m
10–15	4	2	<b>saub, tobe, or shukkah</b>				1.829 m
40–60	16	8	4	<b>zirá'a</b>			457.2 mm
80–120	32	16	8	2	<b>shibr</b>		228.6 mm

British Imperial-linked system for kaniki<sup>a</sup> or kiniki cloth during the early nineteenth century, based on [BURT]

							Metric
<b>korjah, kurjah, or kori<sup>b</sup></b>							14.630 272 m
2	<b>takah, jurah, or gorah</b>						7.315 136 m
4	2	<b>doti or tobe</b>					3.657 568 m
8	4	2	<b>shukkah</b>				1.828 784 m
16	8	4	2	<b>war</b>			914.392 mm
32	16	8	4	2	<b>mukono or ziraà</b>		457.196 mm

<sup>a</sup>Indigo-dyed cotton

<sup>b</sup>Also used for timber and hides

British Imperial-linked system for general use during the early twentieth century, based on [KÜRC]

				Metric
<b>shukkah</b>				1.828 8 m
2	<b>wári</b> (= 1 yd)			0.914 4 m
3 1/5	1 3/5	<b>ohra</b>		571.5 mm
4	2	1¼	<b>dhurra, durra, or mkono</b>	457.2 mm

### 87.3 Units of Capacity

Both dry commodities and liquids were usually sold by weight.

Traditional measures for dry commodities:

1 **pata** = the amount held with hands cupped together = about 225 g of grain;

1 **ukusi** = ½ pata = about 112 g of grain;

1 **chupo** = a very small amount of grain;

1 **hububu** = a few countable grains;

1 **haba** = a single grain.

Customary system, based on [MART3]

			Metric
<b>djezla, dscesla, or jizla<sup>a</sup></b>			205.714 000 L
60	<b>pissi, chila, keila, or pishi</b>		3.428 567 L
240	4	<b>chibabo or kibaba</b>	857.142 mL

<sup>a</sup>1 **djezla** (for cowries) = 158.666 710 kg, 1 **djezla** (for rice) = 129.273 906 kg and 1 **pissi** (for sesame) = 2.154 565 kg

German-linked system for dry commodities, based on [CLAR]

							Metric
<b>scheffel</b>							177.224 L
8	<b>simri</b>						22.153 L
32	4	<b>viertel</b>					5.538 L
64	8	2	<b>achtel</b>				2.769 L
128	16	4	2	<b>mässlein</b>			1.385 L
256	32	8	4	2	<b>ecklein</b>		692.3 mL
1024	128	32	16	8	4	<b>viertlein</b>	173.1 mL

Customary system during the late nineteenth century, British Imperial-linked system and metric-linked system

						Metric	Imperial	Metric
djezla or jizla						257.36 L	136.383 L	240 L
10	frasela					25.736 L	13.638 L	24 L
60	6	pissi, keila, or pishi <sup>a</sup>				4.289 L	2.273 L	4 L
240	24	4	kibaba <sup>b</sup>			1.072 L	1 pt = 568.261 mL	1 L
480	48	8	2	nusu kibaba or musu kibaba		536.17 L	284.131 mL	500 mL
960	96	16	4	2	roba kibaba or robo kibaba	268.08 L	142.065 mL	250 mL

<sup>a</sup>Defined as 6½ lb av of fresh water or 6 lb av of rice

<sup>b</sup>Defined as 26 oz of fresh water or 1½ lb av of rice

During the mid nineteenth century, no fixed liquid measures were used by the poorer classes. Shopkeepers sold oil and treacle by tin-ladlefuls (*kikombe*), by the bottle (*chupa*), or by the tin in which American oil was imported (*tanaki*, *tini*, or *debe*).

Other measures reported during the nineteenth century:

1 **frasila**, **frasela**, or **frasala** (for clover) =  
1000 L.

## 87.4 Units of Weight

Since the late eighteenth century, the weight of a silver dollar, silver rupee or German Mark was the base unit for weighing. As the actual weight of the coins varied, different scales were in use.

Customary system, ordinary scale during the early nineteenth century

									Metric
<b>mzo</b> <sup>a</sup>									161.597 kg
1 3/7	<b>kiss</b> <sup>b</sup>								113.118 kg
2½	1¼	<b>balle</b>							64.639 kg
10	7	4	<b>frasila</b> <sup>c</sup>						16.160 kg
40	28	16	4	<b>maund de Mascot</b>					4.040 kg
60	42	24	6	1½	<b>pishi</b>				2.693 28 kg
120	84	48	12	3	2	<b>mani</b> <sup>d</sup>			1.346 64 kg
360	252	144	36	9	6	3	<b>rátel</b> <sup>e</sup>		448.88 g
5760	4032	2304	576	144	96	48	16	<b>wakiah</b> <sup>f</sup>	28.055 g

<sup>a</sup>Sometimes reported as **djezla**, **girila**, **gisla**, **jigla**, **jizlah**, or **mso**. During the early nineteenth century, also said to equal 116 1/3 mani = 156.66 kg

<sup>b</sup>Sometimes reported as **makdasu**

<sup>c</sup>Sometimes reported as **bazla**, **faraslah**, or **frassla**. As **bazla**, = 15.525 kg, **frassla légère**, = 15.875 kg, and **frassla lourdie**, = 16.166 kg

<sup>d</sup>Sometimes reported as **amnam**, **annam**, **maund orinaire**, or **maund ordinaire**. Also reported as 1.347 206 kg.

<sup>e</sup>Sometimes reported as **arate** or **rattel**

<sup>f</sup>Sometimes reported as **wakia**, **wakeia**, or **wakiyyat**. The German crown, sometimes called the black dollar, from the East India Company's possessions, was the base unit for the system of weights. The weight of a black dollar varied according to the supply, and there were both lighter and heavier scales in use as well. As **wakiah légère**, = 28.067 g, and **wakiah lourdie**, = 31.10 g

Customary system, mainly based on [BURT2]

									Metric	Metric
<b>kandi</b> <sup>a</sup>									323.689 kg	318.24 kg
2	<b>jizlah</b>								161.844 kg	159.12 kg
20	10	<b>farsalah</b> <sup>b</sup>							16.184 kg	15.912 kg
120	60	6	<b>kaylah</b>						2.697 4 kg	2.652 kg
240	120	12	2	<b>man</b>					1.348 7 kg	1.326 kg
480	240	24	4	2	<b>nisf man</b> <sup>c</sup>				674.352 g	663 g
720	360	36	6	3	1½	<b>ratl</b> <sup>d</sup>			449.568 g	442 g
960	4320	432	8	4	2	1 1/3	<b>ruba man</b> <sup>c</sup>		337.176 g	331.5 g
11,520	5760	576	96	48	24	16	12	<b>wakiyya</b> <sup>f</sup>	28.098 g	27.625 g

<sup>a</sup>The kandi for ivory = 21 farasileh = 333.354 kg, for copal and cloves, = 22 farasileh = 349.228 kg. According to [BURT2], it varied between 2.103 and 3 jizleh = 334.6–477.6 kg

<sup>b</sup>Generally used for coffee, rubber, ivory and cloves. It was also reported as being used for coconut oil, paint oil and spirits of turpentine. According to [BURT2, p. 416], in trading during the late nineteenth century, said to equal 35 lbs av = 15.874 kg

<sup>c</sup>Nisf = half

<sup>d</sup>Without wear, the 16 coins should weigh 449.568 g, but according to some eyewitnesses, the average ratl weighed only 442 g. [BURT2, p. 416]

<sup>e</sup>Ruba = quarter

<sup>f</sup>This unit is the weight of a German Mark

Customary system, based on [MART3]

						Metric
<b>candi</b>						339.496 013 kg
3	<b>makdasu</b> or <b>chiss</b>					113.165 338 kg
21	7	<b>frassla</b>				16.166 477 kg
252	84	12	<b>man</b> or <b>amman</b>			1.346 206 kg
756	252	36	3	<b>rattl</b>		449.069 g
12,096	4032	576	48	16	<b>vachiah</b>	28.067 g

*Frassla* was, according to [MART3], the usual measure for ivory, rubber, cloves and coffee. Other commodities were usually sold by the *man*.

Portuguese-linked system during the late nineteenth century

			Metric
<b>bahār</b>			235.008 kg
20	<b>frāsila</b>		11.750 39 kg
250	12½	<b>mann</b>	940.032 g

British Imperial-linked system during the early twentieth century

						Imperial	Metric
<b>girla, jigla, or ġisla<sup>a</sup></b>						360 lbs	163.3 kg
10	<b>frasila, frazila, frasla, or farsalah<sup>b</sup></b>					36 lbs	16.33 kg
60	6	<b>kayla, kaila, keila, or pishi</b>				6 lbs	2.722 kg
122 2/59	12 12/59	2 2/59	<b>maund</b>			2.95 lbs	1.338 kg
360	36	6	2 19/20	<b>ratili</b>		1 lb	453.592 g
5760	576	96	47 1/5	16	<b>wakiah</b>	1 oz	28.349 5 g

<sup>a</sup>Also reported as 350 lb = 158.76 kg

<sup>b</sup>Also reported as 35 lb = 15.876 kg

For grain on Lamu Island during the late nineteenth century, based on [FARA]

			Imperial	Metric
<b>mani, mfuto, or kibaba</b>			2 lbs	907.184 g
2	<b>ratli</b> or <b>patani</b>		1 lb	453.592 g
4	2	<b>pata</b>	½ lb	226.796 g

Average values for corn, based on [BURT2]

						Metric
<b>khandi</b>						330.4–354 kg
1 13/15–2	<b>jizlah</b>					177 kg
7–15	3¼–7½	<b>farrah</b>				23.6–47.2 kg
112–120	60	8–16	<b>kaylah<sup>a</sup></b>			2.95 kg
448–480	240	32–64	4	<b>kibabah or kubabah</b>		734 g
672–960	360–480	48–128	6–8	1½–2	<b>ratl</b>	492–369 g

<sup>a</sup>Varied between 5 and 8 lbs = 2.27–3.63 kg. On the mainland, in southern parts of Benadir (now part of Somalia), = 2½ kibabahs

For corn, as used by Banyan merchants,<sup>a</sup> based on [BURT]

							Metric
<b>kandi</b>							1094–1396 kg
8	<b>jizlah<sup>b</sup></b>						136.8–163.2 kg
20	2½	<b>frasilah</b>					54.7–65.3 kg
480	60	24	<b>kayia</b>				2.28–2.72 kg
640	80	32	1 1/3	<b>pishi</b>			1.71–2.04 kg
960	120	48	2	1½	<b>kisaga</b>		1.14–1.36 kg
1920	240	96	4	3	2	<b>kibabah or kubabah</b>	0.57–0.68 kg

<sup>a</sup>Indian merchants that emigrated to East Africa

<sup>b</sup>In Kiswahili, also called **mzo**

British Imperial-linked system for corn during the late nineteenth century

				Metric
<b>farrah</b>				14.288–58.060 kg
8–16	<b>kayla, kaila, keila, or pishi</b>			2.722–3.629 kg
21–64	4	<b>kibabah or kibaba</b>		680.4–907.2 g
31½–128	6–8	1½–2	<b>artal, ratili, or ratl (= 1 lb av)</b>	453.592 g

British Imperial-linked system for rice during the late nineteenth century

			Imperial	Metric
<b>kayla, kaila, keila, or pishi</b>			6 lbs	2.722 kg
2	<b>kisaga</b>		3 lbs	1.361 kg
4	2	<b>kibabah or kibaba</b>	1½ lb	680.4 g

British Imperial-linked system for fresh water during the late nineteenth century

			Imperial	Metric
<b>kayla, kaila, keila, or pishi</b>			6½ lbs	2.949 kg
2	<b>kisaga</b>		¾ lbs	1.474 kg
4	2	<b>kibabah or kibaba</b>	26 fl oz	737.1 g

British Imperial-linked system for Cutch salt

			Imperial	Metric
<b>kandha</b>			60 lbs	27.2 kg
10	<b>kaylah</b>		6 lbs	2.72 kg
17	1 7/10	<b>farasilah</b>	about 3.5 lbs	1.60 kg

British Imperial-linked system for Surat salt

			Imperial	Metric
<b>kandha</b>			60 lbs	27.2 kg
10	<b>kaylah</b>		6 lbs	2.72 kg
22	2 1/5	<b>farasilah</b>	2 8/11 lbs	1.24 kg

British Imperial-linked system for ghee

				Imperial	Metric
<b>maund</b>				3 lbs	1.361 kg
2	<b>half maund</b>			1½ lbs	680.4 g
4	2	<b>quarter maund</b>		¾ lb	340.2 g
8	4	2	<b>eighth maund</b>	3/8 lb	170.1 g

Other measures reported during the nineteenth–twentieth centuries:

- 1 **farsalah** (for dates) = 70 lbs = 31.75 kg;
- 1 **kiski** = 50–52 lbs = 22.68–23.59 kg;
- 1 **farsalah** (for beads) = 35 lbs = 15.875 kg;
- 1 **farsalah** (for coffee) = 7½ lbs = 3.40 kg;
- 1 **pakhacheh** (for vegetables and manioc) = a bundle of varying size, according to the price of the article;
- 1 **tola** (for gemstones) = 11.398 g.

**88      Zimbabwe [Formerly: Southern Rhodesia, Republic of Rhodesia and Zimbabwe Rhodesia]**

Mashonaland and Matabeleland, which were administered by the British South Africa Company, were united as Southern Rhodesia in 1901. Southern Rhodesia became a British colony in

1923. It was part of the Federation of Rhodesia and Nyasaland (comprising present-day Malawi, Zambia and Zimbabwe) from 1953 to 1963. In 1964, Northern Rhodesia became independent, renamed Zambia. Southern Rhodesia declared its independence, as Rhodesia, in 1965. The country was renamed Zimbabwe Rhodesia in 1979. It was subsequently re-named Southern Rhodesia during a short period of renewed direct British rule, before the country became formally independent, as Zimbabwe, in 1980.

The traditional systems of weights and measures, normally based on the dimensions of the human body and various appliances, were later influenced by Semitic and Portuguese systems. The British influence in trade increased during the nineteenth century, and also had influence on the weights and measures used. The metric system has been compulsory since 1969.

*Main sources:* [MADA] and [MENN2]

## 88.1 Currency

1980–:	1 Zimbabwe dollar = 100 cents
1970–1980:	1 Rhodesian dollar = 100 new pence
1965–1970:	1 Rhodesian pound = 20 shillings = 240 pence
1956–1965:	1 Rhodesia and Nyasaland pound = 20 shillings = 240 pence
1940–1956:	1 Southern Rhodesian pound = 20 shillings = 240 pence
1900–1940:	1 pound sterling = 20 shillings = 240 pence = 960 farthings
–1900:	gold, beads, cloth, cattle, guns, hoes, and ivory were used for trading activities various iron gongs and bells, called gunga, have also been found to be used as currency in the area

## 88.2 Units of Quantity

1 **ikikose** = a bundle of fruit, flowers or bananas.

## 88.3 Units of Length

British Imperial-linked system (in Senga dialect) for trading in calico and cotton goods

			Metric
<b>mukwamba</b>			1.828 8 m
2	<b>lupande</b>		914.4 mm
4	2	<b>mkono</b>	457.2 mm

British Imperial-linked system among Shona-speaking people

				Metric
<b>maira</b>				1,609.315 m
1760	<b>yadhi</b>			914.383 mm
5280	3	<b>tsoka</b>		304.794 mm
63,360	36	12	<b>inichi</b>	25.399 mm

Metric names:

- 1 **kiromita** (among Shona-speaking people) = 1000 m;
- 1 **mita** (among Shona-speaking people) = 1 m;
- 1 **mitha** (among Ndebele-speaking people) = 1 m.

## 88.4 Units of Area

- 1 **ihagere** (among Ndebele-speaking people) = 1 ha.

## 88.5 Units of Dry Capacity

Some reported measures:

- 1 **raroni** (among Shona-speaking people) = 1 dry gallon = 4.405 L.
- 1 **ikitana** (among Nyakyusa-speaking people) = a bamboo cup (no specific size);
- 1 **ikikufi** (among Nyakyusa-speaking people) = a handful.

## 88.6 Units of Liquid Capacity

Some reported measures:

- 1 **ililebe** (among Nyakyusa-speaking people) = about 18 L;
- 1 **garoni** (among Shona-speaking people) = 1 gal = 3.79 L;
- 1 **rira** (among Shona-speaking people) = 1 L;
- 1 **ilitha** (among Ndebele-speaking people) = 1 L.

88.7 Units of Weight

In the Fungwe district (used for weighing gold nuggets from the river Mazoe), based on [MENN2]:

- 1 mashanu = 18.7 g;
- 1 matikari or matikari-mairi = 16.9 g;
- 1 mana = 16.0 g;
- 1 nya-rupota = 9.4 g;
- 1 nya-badza = 9.2 g;
- 1 nya-rusumbi = 6.6 g;
- 1 tanga = 5.8 g;
- 1 tanga-diki = 2.8 g;
- 1 mopo = 1.5 g.

British-linked system in Shona

				Metric
diki ton				907.18 kg
2000	pondo			453.592 g
32,000	16	aunzi		28.349 g
1,400,000	7000	437½	mbeu	64.8 mg

Metric system among Shona-speaking people

		Metric
kirogiramu		1 kg
1000	giramu	1 g

89 Zulu Kingdom

See also *Mthethwa Paramountcy* and *Colony of Natal*

This Kingdom was formed in 1816 by Shaka kaSenzangakhona (c.1787–1828), and was absorbed into the Colony of Natal in 1897.

... and that's all I have to say about that.

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