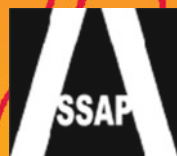


Nai Xia

# Ancient Egyptian Beads



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## Foreword

This book—*Ancient Egyptian Beads*, is based on the Ph.D. dissertation written by Xianai when he studied in London College University, 70 years ago.

Sir William Flinders Petrie said that the study of ancient Egyptian beads would become one of the crucial research topics. Echoing this idea, in 1938 Xianai studying under the supervision of Prof. S. Glanville—the successor of Petrie, chose the topic of ancient Egyptian beads for his Ph.D. dissertation. At that time very few people had researched this field. Taking advantage of a large collection of ancient Egyptian beads at UCL and his direct access to considerable firsthand resources of the forefront Egyptology research, and using his archeological experience in Egypt, Xianai was able to make a detailed analysis and thorough study of the beads. He applied the methods of Petrie for material analysis together with statistics. As a result, his work was praised by Petrie himself who also gave him some advice—this was a unique and fundamental research achievement in Egyptology that is hard to surpass. After the outbreak of World War II, UCL was closed and Xianai returned to China, where in 1943 he finished his dissertation and sent it back to UCL. After the war, UCL gave Xianai special permission to have his dissertation approved without defense and, in this way, in July of 1946 he got his Ph.D. in Egyptian Archaeology. However, due to many reasons, Xianai's Ph.D. dissertation for the last 70 years repose unpublished in the UCL library collection and Petrie Museum, where it is available to selected readers.

In the past 10 years, motivated by its high academic value, with the support of the two directors of Institute of Archaeology of UCL, Prof. Peter Ucko and Prof. Stephen Shennan, Institute of Archaeology of CASS tried hard to find a way to edit and publish Xianai's dissertation. Dr. Wang Tao, who was a Reader in Chinese Archaeology and Cultural Heritage, Institute of Archaeology, University College London, made great efforts to make this happen.

In 1997, with permission from the family of Xianai, the institute of archaeology at CASS got from the library of UCL a photocopy of the typed draft of Xianai's dissertation. Later, Yan Haiying, Professor of Egyptology from the History Department at Peking University was invited to help in editing and reviewing the appendix of the dissertation—'bead corpus' and 20 handmade graphs that were found among the surviving remains of Xianai's personal things in his house. Meanwhile, Prof. Stephen Quirke wrote an article named "On receiving Xia Nai *Ancient Egyptian Beads* in the twenty-first century", in which he expresses his high recognition for the significance of Xianai's dissertation for the archaeological research of Egypt and other countries. Petrie Museum of UCL also created a webpage containing digital photos of Xianai's dissertation and linked it to the homepage of the museum. Fortunately, the moment came for this important work of Xianai—*Ancient Egyptian Beads* to be finally published by Social Sciences Academic Press of CASS together with Springer Ltd. This is undoubtedly a remarkable event for the academia of Egyptology and international archaeology.

November 2013

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## Preface: On Receiving Xia Nai Ancient Egyptian Beads in the Twenty-First Century

In Egyptian archaeology, it is rare for a study to receive publication after more than 65 years, other than for historical or archival reasons. Certainly, those reasons would hold good for the doctoral dissertation of a man who led archaeology in China through extraordinary decades of discovery and research. Yet, for those studying the life and method of Xia Nai, it may not be clear just how much this work represents a crucial and long-awaited advance in archaeology, not only for Egypt, but for the study of the past across Africa and beyond. As the first chapter argues, the sheer quantity of beads in the archaeological record combines with changes in form, material, and technique, to convert the object type into a unique guide to the past. As ubiquitous as the potsherd, the bead delivers perhaps an even more concentrated fusion of ancient choices, each of which opens an avenue of research: from the technical how to the sociological questions of history, why this material, this form, why change or tradition.

Xia Nai originally arrived in London to seek training with Flinders Petrie, an established practitioner and theoretician in archaeological fieldwork at the time: the Petrie manual *Methods and Aims in Archaeology* [3] may have been a decisive factor, if widely known in Beijing University circles before 1938. The historical setting for his doctoral research has been established in some detail: the class of the 1930s Chinese archaeological doctorates in London is explored by Peter Ucko and Wang Tao [6]. The missing part of this story is the development of archaeology in Egypt, under the shadow of colonial force down to the 1952 revolution that brought full independence. Given the English military occupation of Egypt in 1882–1922 and continued control in 1922–1952, Petrie plays a leading role in this story as the first university professor in England teaching Egyptian archaeology (from 1892). Delivered at the peak of Victorian imperialism, his 1893 inaugural lecture already assumed the archaeology of any country to be competitive terrain for the frontline European powers: where ‘France’ had occupied art history, and ‘Germany’ writing, England could take material culture. With dazzling clarity and ambition, Petrie laid out the material branches for his future material study of the past—and presumably this is the programme that caught the attention of the Beijing University educators four decades later. Excavated closed contexts are the anchor for a chronological chart of all production and all human engagement with the world, from art to the zoological encounter with other species. Beads, the core of jewellery, stood at the forefront of this materialist approach. As paraphrased from Petrie at the start of the Xia Nai dissertation, “beads with pottery constitute the alphabet of archaeological research” (Chapter 1, with n.1 citing Petrie, *Handbook of Egyptian Antiquities*, p. 15).

Certainly there were serious objections, and many objectors to any proposal to centre archaeological research on beads. Xia Nai noted and accepted these concerns when he insisted that any researcher “while accepting the advantages of beads as archaeological evidence, ... should not overlook their limitations”—massive diffusion by reuse and trade, or mixing of material from different periods in the ground at later date (Chapter 1, p. 2, 4). Yet, he also argued that the risks have been exaggerated and the quantitative

potential underestimated: while a researcher should avoid “drawing conclusions from isolated examples” (p. 5), careful attention to context does enable archaeologists to distinguish use and reuse, and assess the less frequent cases of reuse within each period. Analysis should include study of “signs of wear and tear” (p. 3), but above all should build on well-documented excavation, in Egyptian archaeology on the cemetery documentation methods established by Petrie and his foremost 1920–1930s follower Guy Brunton (p. 4). As the research must avoid misleading single items, and build on Petrie and Brunton, Xia Nai finds the most solid material base in the “Petrie Collection in University College, London” (pp. 5–6), supported by two other principal collections formed mainly from excavation, the Egyptian Museum, Cairo and the Ashmolean Museum, Oxford. His intimacy with the material grew from the intensive labour of registering “over a thousand strings” (p. 7). The resulting index of 1760 cards provides for each string eight items of information: “registration number, provenance, date, use, reference, remarks, drawing, and photograph number”; and, more astonishingly, for each type of bead on the string, six further items observed: “form, perforation, colour, material, decoration, and number” (pp. 7–8).

The recording took place just before the entire UCL Egyptian archaeology collection was packed up for safe storage during wartime, a massive operation calling on all hands, including Xia Nai as a graduate student of the college. As a result, the index preserves a considerable amount of information since lost, and on these terms alone will be of great value to any future researchers into any of the finds from the excavations. A single example may illustrate this extraordinary value of the Xia Nai corpus as primary documentation. The card for string 1593 records two green faience beads of type 311A4, PN8b, from “Kahun, Illahun (1889) XII”, meaning the late Middle Kingdom town-site near al-Lahun, cleared for Petrie by a trained Fayoumi team in 1889, and named by Petrie “Kahun”. The card adds that there was also a green glazed steatite cylinder “carved with three crocodiles”, and that the material was from a “mummy on floor—End Rank A”. 1889 is early in the history of development of archaeological recording methods for settlement sites, and Petrie made himself sole recorder for the clearance of a town 250 by 280 metres. Consequently, the Petrie excavation reports give no stratigraphy, and very few find spots. However, in his first of two seasons of recording, Petrie did assign letters to the blocks of housing between streets, and published a plan that includes Rank A. In his publications on the site, and in his weekly ‘Journals’ to a small personal circle of readers in England, there is no mention of the cylinder, or of the presence of any burials in this row of buildings [2]. Instead, the available record for Rank A, apart from the card, gives the impression of ‘regular’ town houses. Now, Petrie did record finds in two Rank A houses (perhaps joined at some point), including arguably the most important single item from the Lahun excavations—the only ancient Egyptian mask surviving from a domestic context. The repairs on the mask indicate that this was used extensively; the lion-like face of the mask evoking the birth-protecting deity Aha (later called Bes), and the other finds in the houses (figurine of lion-face woman, musical clappers) suggest equipment for birthing rituals. However, the presence of a burial nearby reminds us how fragile the documentation for the site is, and how “we must be careful in drawing conclusions from isolated examples” (Xia Nai, p. 5). Suddenly we realise the limits to our knowledge even for such an exceptionally important archaeological landscape. The earlier interpretation of the unique mask may remain the most plausible, but we need the carefully documented contexts of more recent excavations, as at Elephantine [5] before we can impose our strict division between living and dead on the finds. This is just one instance where the Xia Nai records may extend and change the picture from early excavations on which much of our archaeology and history of Egypt have been constructed.

In order to provide full access to the research underpinning the dissertation, Petrie Museum Manager Tonya Nelson and Conservation Manager Susanna Pancaldo secured funding for the digitisation and online publication of the Xia Nai cards. Kristin A. Phelps provided the time and the paper conservation experience and training to undertake the digital photography of all index cards; guidance and facilities were generously provided by Stuart Laidlaw, lecturer in archaeological photography at the Institute of Archaeology. Thanks to their time and care, the cards were all digitised in 2011, and Sam Washington UCL Museums and Collections Information Officer has created webpages for access to these new digital resources on the Petrie Museum website in 2012. The cards allow a full appreciation of the great research operation as developed by Xia Nai; his characteristically meticulous attention to detail in recording is sustained across the entire chronological series that had accumulated at UCL from the work of Flinders Petrie and his contemporaries and immediate successors.

Xia Nai took care to specify the parameters of the research and its corpus in space and time (p. 6): geographically, as Egypt (including imports from outside, as well as Sinai, but excluding Nubia, at the time not represented in the collection), and, chronologically, down to the first millennium BC (Petrie's "Roman-Coptic," more or less the first millennium AD, is strongly represented in the collection, but would have exceeded the constraints of a London Ph.D.). A greater problem lay in defining the formal material limits to the dissertation. Xia Nai notes how subjective it is to separate beads from amulets in archaeology: he cites the colonial classic study by Winifred Blackman, *Fellahin of Upper Egypt* [1], for the observation that "in modern Egypt, necklaces of ordinary blue beads are worn as charms against the evil eye" (p. 6). This observation could be greatly expanded with more extensive documentation from the great collection of materials worn for health, assembled by Dr. Tawfik Canaan in Palestine during the early twentieth century, under English occupation. Future research may reunite what anthropology and archaeology have divided between them. For the initial study of the beads, scientific analysis required a hypothetical, testable base, the fictive 'objective', and so the question was left suspended, bracketed for the future: the bead was accepted as the non-figurative form, leaving intact the category of Amulets as the part of the collection published by Petrie under that name two decades earlier (pp. 6–7). The summary offered to readers implies a whole future research programme: "throughout this essay, the term 'beads' is used in this qualified sense, that is, it includes ordinary beads and pendants, but excluding amulets" (p. 7).

This future research never happened. Under the exceptional historical conditions of its completion, the research never received publication, either in England or in China: war and revolution carried both its author and his supervisor (Stephen Glanville) and examiners into other worlds of action. As a study of Egypt, perhaps it fell too far outside the priorities of national excavation and training. In London, the three men most able to appreciate its impact were his supervisor Steven Glanville, the successor to Petrie as UCL Professor and curator, and the archaeologists with greatest expertise in study of beads, Guy Brunton and Oliver Myers. All may have lost contact with the author, and were themselves soon lost to archaeology, as they found postwar employment elsewhere (Glanville) or not at all (Brunton and Myers). Still more extraordinarily, no one else in the archaeology of Egypt or of Africa took up the task of publishing a corpus or a corpus-based study of the beads of the region. The global encyclopedias have perhaps filled the gap sufficiently for fieldwork, or the older publications by fieldworkers such as Brunton have perhaps been enough for comparative study. Perhaps, even in London the successful dissertation of Xia Nai deterred anyone from simply repeating what for many others would amount to a lifetime of work. No one took up the task, leaving still a gaping hole at the centre of the practice and theory of archaeology in northeast Africa, a gap with direct impact on the study of its most closely related lands in west Asia and southeast Europe. Publication of the core work and its supporting corpus may, then, be



the missing necessary condition for continuing this crucial area of study into a vital part of life. For the 'ordinary bead' offers us something universally precious: our most material and most intimate connection, between human as lived body and a tangible world of sensation.

Prof. Stephen Quirke

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# Contents

## Part I Introduction

<b>1</b>	<b>Archaeological Value of Beads</b> . . . . .	3
<b>2</b>	<b>Scope of the Study</b> . . . . .	7
<b>3</b>	<b>Method of Registration</b> . . . . .	9
<b>4</b>	<b>Mode of Treatment</b> . . . . .	13
<b>5</b>	<b>Nomenclature and Identification of Materials</b> . . . . .	17

## Part II Technical Methods of Bead-Making

<b>6</b>	<b>Glass Beads</b> . . . . .	23
6.1	Section I: Manufacture of Glass Beads . . . . .	23
6.2	Section II: Decoration of Glass Beads . . . . .	25
<b>7</b>	<b>Stone Beads</b> . . . . .	27
7.1	Section I: Hard Stone Beads . . . . .	27
7.2	Section II: Beads of Soft Stone . . . . .	33
7.3	Section III: Beads of Glazed Stone . . . . .	34
	References . . . . .	36
<b>8</b>	<b>Beads of Pasty Materials</b> . . . . .	37
8.1	Section I: Faience Beads . . . . .	37
8.2	Section II: Beads of Other Pasty Materials . . . . .	40
<b>9</b>	<b>Metal Beads</b> . . . . .	43
9.1	Section I: Manufacture of Metal Beads . . . . .	43
9.2	Section II: Decoration of Metal Beads. . . . .	45
<b>10</b>	<b>Beads of Miscellaneous Materials</b> . . . . .	47

**Part III Classification and Corpus**

<b>11 Principle of Classification</b> . . . . .	53
<b>12 A New Classification</b> . . . . .	57
<b>13 Principle of a Corpus</b> . . . . .	59
<b>14 A New Corpus</b> . . . . .	65
14.1 Section I: General Scheme of the New Corpus . . . . .	65
14.2 Section II: How to Use the New Corpus . . . . .	66
14.3 Section III: How to Revise the Corpus . . . . .	69

**Part IV Chronological Survey**

<b>15 Prehistoric Period</b> . . . . .	73
15.1 Section I: Neolithic Period . . . . .	73
15.2 Section II: The Badarian Culture . . . . .	74
15.3 Section III: Predynastic Period . . . . .	76
References . . . . .	81
<b>16 The Early Dynastic Period</b> . . . . .	83
<b>17 Old Kingdom</b> . . . . .	89
<b>18 The First Intermediate Period</b> . . . . .	97
<b>19 The Middle Kingdom</b> . . . . .	103
<b>20 The Second Intermediate Period</b> . . . . .	111
<b>21 The New Empire</b> . . . . .	117
<b>22 The Late Period</b> . . . . .	127
<b>23 The Greco–Roman Period</b> . . . . .	137
<b>List of Abbreviations of Periodicals Cited</b> . . . . .	147
<b>Bibliography</b> . . . . .	149
<b>Bead Corpus</b> . . . . .	151
<b>Afterword</b> . . . . .	173

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## Abstract

Egyptian archaeology has advanced to a stage when a systematic study embodying all the results from excavations is badly needed. This essay, while publishing for the first time the unique collection of beads in the Petrie Collection, aims at such a systematic study of one of the most important kinds of Egyptian antiquities.

Part I is designed to discuss the archaeological value of beads and the method employed in their study. The importance of the technique of bead-making for dating purposes is especially emphasised.

Part II is entirely devoted to this subject, consisting of a detailed study based on a critical examination of various statements contained in publications as well as the actual objects.

In Part III, various schemes for the classification of beads are examined and criticised. A new classification is proposed, which affords a better basis for the further advancement in the study of this subject. Based on this new classification, a corpus of beads is worked out, which is contained in 16 plates. It is the first comprehensive corpus to include Egyptian beads of all ages before the Arab Conquest.

The last part is a chronological survey. We take up in order the nine divisions or periods of Ancient Egyptian history. In relation to each period, we discuss the material, typology (including the technical peculiarities), use, arrangement and pictorial representation of beads. The characteristics of each period are pointed out, and the general development from one period to the next is traced. The contact of Egypt with foreign countries as shown by beads is also pointed out. Many wrong identifications of materials and mistaken datings are corrected; and some new facts are revealed for the first time.

The essay ends with a bibliography.

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**Part I**

**Introduction**

As Sir Flinders Petrie remarked in his *Handbook of Egyptian Antiquities*, beads with pottery constitute the alphabet of archaeological research.<sup>1</sup> The importance of beads as archaeological evidence arises from their being so common and at the same time so multifarious as to make them especially useful for dating.

Ancient Egyptians, such as modern primitive peoples, were very fond of beads and used enormous quantities of them for various purposes. It is by no means exceptional to find many thousands of beads upon a single mummy.<sup>2</sup> Because of their enormous quantity and almost indestructibility, beads and potsherds form the bulk of archaeological material from every excavation. Even in the disturbed tombs, a few beads usually eluded the attention of plunderers, as the string on which they were threaded had decayed in most cases. Like other small personal ornaments, they often escaped the ruin and breakage which destroyed the large objects.

Quantity alone does not help us very much if all of them are more or less the same through ages. Fortunately, beads have an enormous variety of form, material, decoration and technical difference, due to the change in fashion or technique and availability of materials. Although certain kinds of beads, especially those of unspecialized form made of natural material, may be represented by a few isolated examples in periods other than their own, the general fashion of each period is quite different. Even Sir Leonard Woolley, who regards beads as not very satisfactory material for dating, admits that we can distinguish a very real difference between the general fashions of different phases of culture.<sup>3</sup> But the change in technique is, for our purpose, much more important than the change in fashion.

Bead-makers of different periods may produce similar types incidentally in following their whim, but they rarely, if ever, produce them by the same technique. When a new technique is proved to be superior to the old one, it almost always supersedes the old one. Usually, the beads of various periods have a superficial similarity and can be distinguished only by their subtle difference in technique. The difference in material also has its significance. Besides the change in fashion and in technique, the use or disuse of certain material may be due to new exploitation or exhaustion of resource of natural material, acquisition (either by invention or by borrowing) or loss of certain methods of manufacture of artificial material, opening up or interruption of communication with some foreign land.

Another advantage of beads as evidence is their portability. Because of their small size and durable material, they are easily spread by trade through a long distance and thus serve to reveal a contact, otherwise unknown, between two cultures in widely separated regions. If one of these cultures belongs to the Prehistoric period and is undated, this contact will show its contemporaneity with a culture of known date and thus gives it an absolute chronology. The notable examples of this kind are the etched carnelian beads from Sumerian sites and Prehistoric Mohenjo-Daro in the Indus valley<sup>4</sup> and the segmented faience beads from Egypt and Prehistoric Britain.<sup>5</sup> This is a very fascinating subject, but must be based on an examination of actual objects. Because of pressure of time and difficulty of circumstance, I could not undertake this task, except to a very limited extent, in this essay.

While accepting the advantages of beads as archaeological evidence, we should not overlook their limitations. In common with other simple antiquities, when we trace their diffusion by trade, we should take into consideration the possibility of independent invention. Since all beads

<sup>1</sup> Petrie, *Handbook of Egyptian Antiquities*, p. 15.

<sup>2</sup> Carter and Mace, *Tomb of Tutankhamen*, I, p. 159. This fondness of beads can be traced back to the Badarian Period, e.g. five to six thousands of beads were found in a single grave at Mostagedda, see Brunton's *Mostagedda*, p. 52.

<sup>3</sup> Woolley, *Ur Excavation*, II, p. 372.

<sup>4</sup> Marshall, *Mohenjo-Daro*, pp. 104–105, 515–516.

<sup>5</sup> Beck and Stone, *Faience Beads*, pp. 233, 252.

serve the same function, that is, to be strung or sewn as an ornament or amulet or both, it is bound to happen that such simple forms, such as discoid, spheroid, barrel shaped or cylindrical, may be made quite independently by peoples of any period and any region, if suitable material is available. Even more specialized forms and decorated beads were sometimes invented independently, but the probability decreases in proportion to their complexity. Sometimes, the forms are conditioned or suggested by the materials which are common to both regions. They are the result of parallel development, not of diffusion. As to technical differences, they are very useful for chronological purposes within the limit of a cultural region, because there prevails usually only one or two ways at a time for the manufacture of certain kinds of beads, and the use of a new technique usually inaugurates a new era for these kinds of beads. But certain technical problems can be solved only by a limited number of methods, and it is bound to happen that some techniques, especially the primitive ones, are invented independently in different regions. On the other hand, materials of beads are useful for tracing diffusion when its natural occurrence is known to be limited only to certain places or when it is an artificial material made by a complex process. In such a case, both the identification of material and the statement of its source must be carefully ascertained. Beck states that "in French Dolmen are found a number of beads made of callais, a species of turquoise which is supposed to have been imported from China".<sup>6</sup> Although a certain variety of turquoise found in French Dolmen was called by early archaeologists "callais", a term taken from Pliny's work, and still retained in the literature of archaeology, it is now generally agreed that this Prehistoric "callais" is certainly not the callais referred to by Pliny and has never been found after the Bronze Age.<sup>7</sup> The source of Prehistoric "callais" is still unknown, while that of Pliny's text is as follows, "It is found in the countries that lie at the back of India among the Phycari, namely, who inhabit Mount Caucasus, the Sacae, and the Dahae".<sup>8</sup> All these cautions in the use of beads for tracing cultural contact also hold true for other antiquities.

There is one serious objection to the use of beads for dating. It is their frequent survival through a long time. For example, Woolley regards beads as not very satisfactory for dating because of their being often reused and takes no notice of them in trying to work out the chronology of the graves at Ur.<sup>9</sup> Martin Conway says that a chronology of beads was complicated by the survival of beads through

many generations.<sup>10</sup> R. A. Smith points out the difficulty of giving even limiting dates as to their manufacture.<sup>11</sup> But when we speak of the survival of old types of beads in a new period, we should distinguish two kinds of them: survival as fossils and survival as living specimens. In the biological field, there are very few living species surviving from the remote geological period, although there are all sorts of ancient species preserved as fossils. So in our field, due to the caprice of fashion and the improvement in technique, very few types of beads were continuously made through a long time without change. As a whole, their manufacture was always more or less limited in date. Therefore, the second kind of survival is extremely rare and may be left out of consideration. What we have frequently to deal with is the first kind of survival, namely old beads reused but no longer manufactured. This kind of survival may be either continuous such as treasured both as heirlooms and for their amuletic virtue or discontinuous such as derived from robberies of ancient tombs or picked up from ancient sites. Mackay says that many of the Arabs of today in Mesopotamia and Egypt wear beads that they have picked up from ancient sites.<sup>12</sup> This practice is said to be very common among the "Merovingian" and the Lombard invaders in the Middle Ages<sup>13</sup> and among the modern peasants in Morbihan, France.<sup>14</sup> Although the practice of reuse happens occasionally to other antiquities also, it is much more common in the case of beads. Unlike pottery which is fragile, and valueless when broken, beads are usually made of durable materials that are almost indestructible and so always useful; nor like tools and weapons which are vitally important to the life of communities, beads are purely ornamental, and the old types are just as effective as the new ones, if they are preserved in good condition, nay, they are even regarded as more effective in amuletic virtue. Their abundance increases the chance of their being reused. So it is with some justice to regard beads as possessing less value for dating purposes.

It is, however, possible to over emphasize these occasional reuses at the expense of the more fundamental phenomenon of the use of beads of their own times. Even in the case of reuse, they are almost always mixed up with contemporary ones. Although we must be always on our guard against mistaking reused beads for being contemporary, yet with due cautions, we can use beads as one of the criteria for dating purposes. Signs of wear and tear may indicate that the

<sup>6</sup> Beck's article "Beads", in *Ency.Br.* 14th ed. III, p. 254.

<sup>7</sup> Dechelette, *Manual d'Archaeologie*, I, p. 621.

<sup>8</sup> Pliny, *Nat. Hist.* XXVII, Chap. 3 (Trans. Bostock & Riley).

<sup>9</sup> Woolley, *Ur Excavation II*, p. 371.

<sup>10</sup> *Archaeologia*, vol. LXXVII (1927), p. 75.

<sup>11</sup> *Ibid.*, p. 75.

<sup>12</sup> Marshall, *Mohenjo-Daro*, 516, footnote 6.

<sup>13</sup> Eisen, *Eye Beads*, pp. 19-20; also Eisen, *Louts-and-Melon Beads*, p. 38.

<sup>14</sup> Granciere, *Les Parures Prehistoriques*, p. 48, 84.

beads have been reused,<sup>15</sup> but they do not occur on all reused beads, nor are they limited to the reused one. Another and better guide is whenever some isolated specimen of a bead type, which is characteristic of an earlier period as proved by bulk of evidences, occurs in a later period, some times after a long interval, in association with bulk of proper later bead types among which they look out of place as shown by their obsolete technique or form, they should be always suspected of being reused. A general principle for the dating of a string of miscellaneous beads is to date it not earlier than the known upper limit of the latest beads, unless there is strong evidence from associated object that renders it necessary to alter the upper limit of date range of the latest bead type. For in the dating of a Torah, as stated by Brunton, “a safer plan is to take every possible criterion in conjunction: tomb-type, altitude of bodies, pottery, seal-amulets, beads, and other objects, and to date a burial by the consideration of all those together”.<sup>16</sup> In another place, Brunton says “I have seen predynastic beads on the neck of a Roman mummy, and a predynastic polished red pot in position with half a dozen ptolemaic ones”.<sup>17</sup> Theoretically, there is always a possibility of reuse of a whole string of old beads out; actually, it is extremely rare, at least in the case of ancient Egypt. Mr. Brunton told me that he met with half a dozen cases of definite reuse during his excavation of cemeteries at Qau, including that one on a Roman mummy alluded to adore, out all of them are mixed string and do not consist entirely of the old reused beads.<sup>18</sup> Therefore, so far as Egypt is concerned, beads can be used advantageously if with due caution, for the dating of graves as actually done by our foremost excavator, Sir Flinders Petrie.<sup>19</sup>

A more serious obstacle which hinders the study of beads is the intrusion of later beads in older context. (For the sake of brevity and clarity, the word “intrusion” is used throughout this essay in this narrow sense and the word “reuse” for the reuse of earlier bead period although the latter case is also called “intrusion” by some authors.)<sup>20</sup> It is generally recognized that the emergence of a new bead type is more important for our purpose than the occurrence of reuse or survival of old types. But owing to the small size of beads, incidental intrusions happened much more often than with other objects and thus led sometimes to a wrong

chronology. At dwelling sites, beads of upper and thus later layers may work down into the lower and earlier layers through earth erosion or by burrowing animals. In disturbed tombs, beads may be dropped by the plunderers either from their own bodies or from their spoils from other tombs, and a reburial may be cleared out by them except for a few overlooked beads which may be mistaken for having come from the original burial. All these intrusions can be detected if the field records are detailed enough. But there are more difficult cases of intrusions. Excavators, as human beings, could not be infallible. During excavation, beads may fall down from the side or top of a trench and then be trodden into the bottom layers,<sup>21</sup> and they may be dropped by the workers<sup>22</sup> or misplaced unintentionally by them from other tombs.<sup>23</sup> All these may pass without being noticed at the moment and will be regarded as found in position afterwards. After excavation, it may occasionally happen that odd beads of one lot stray into another lot of other tomb groups, either during their transportation from camp to the museum or in the long storage at the museum, especially when they are loosely wrapped up with brittle paper or strung with fragile threads. Labels attached to the strings may become loose and misplaced on other unlabelled string. When they are not properly labelled or labelled but not detailed enough, they may be attributed to a wrong provenance in the museum register especially if the registration takes place long after their acquisition of the museum. Even after being exhibited in showcases, misplacing may sometimes happen.<sup>24</sup> Since this research is based on specimens in the museum, we must be careful in drawing conclusions from isolated examples. When beads of very specialized form, complex decoration or peculiar material, occur long before their proper time in single or very few specimens, the circumstances of their find should be always carefully re-examined and verified. For these crucial cases, we cannot rely upon some disturbed finds. Even if the tomb is recorded as intact, but these crucial examples have not been specially noted in the field record, they should always be suspected of being possibly intrusive. It seems better, at this stage of growth of our knowledge of beads, to leave the question open and wait for future excavation to decide the issue. As for the surface finds and those strings bought from tomb

<sup>15</sup> For example, some carnelian beads from “pan-grave” were regarded as reused ones because of their being much chipped, see Wainwright, Balabish, p. 23.

<sup>16</sup> Brunton, Mostagedda, p. 104.

<sup>17</sup> Brunton, Qau I, pp. 5–6.

<sup>18</sup> One of them (Tomb 3712) is recorded as such in Qau, III, p. 8.

<sup>19</sup> For example, the various graves in the cemeteries of Coshen are dated by amulets, beads and posts, see his *Egyptian and Israelite Cities*, P. 36, and see also his “Note on Dating” in Brunton’s *Qau*, I, p. 78.

<sup>20</sup> For example, in Eisen’s articles, it denote footnote 13, above.

<sup>21</sup> Cf. Beck’s remark on a polychrome glass bracelet from a Prehistoric site at Bampur, see *Glass before 1500 B.C.*, pp. 12–13.

<sup>22</sup> *Ibid.* pp. 17–18, his remark on some transparent red glass beads found in a layer dated before 1600 B.C. at Ur, which are suspected of coming from the local modern bazaar.

<sup>23</sup> of. Lucas’s remark on a Prehistoric glass amulet from Nagada, see *His Anc. Eg. Materials*, p. 117.

<sup>24</sup> For example, in Beck and Stone *Faience Beads*, p. 232. footnote, footnote, it is suspected that a segmental bead from an English source has become misplaced with Egyptian beads in the Devezes museum.



robbers or antiquity dealers, they are useless for our purpose, because they are usually derived from various sources and so deprived of any dating value.

Besides the case of reuse and intrusion, another factor contributing to give an impression of longevity of duration of certain bead types is our failure to distinguish the superficially similar bead types of various types by their subtle differences. Such descriptive terms as “carnelian beads” or “ring beads” along convey no meaning for dating purposes, because they are found through all ages. But if they are classified according to some essential differences in their form, material, colour, decoration and technique, then each type will be found to fall, respectively, within the limits of certain dates. Even such specialized types as etched carnelian beads have to be subdivided, if we wish to use it as a criterion for dating. When this type was found in the remains dated to the early part of the third millennium B.C. at Mohenjo-Daro and at Ur, it was said that “thousands have been found in excavations at Greek, Scythic, Parthian, and Kushan sites throughout the north-west of India”.<sup>25</sup> But

Beck’s research shows that these two groups of different dates could be distinguished by their quite different patterns of decoration.<sup>26</sup> We shall find that most of the bead types have a date range within the reasonable limits, when we can detect and leave out the reused or intrusive specimens and divide the remainder into true types according to chronologically significant differences. Both these detecting and classifying works require and merit further researches.

The various bead types are of unequal value for dating purposes. Generally speaking, the more specialized a type is, the narrower its date range. But there are many exceptions to this rule, and the details have to be carefully worked out. However, even for those comparatively long-lived types, they are still very valuable as a check for dating arrived at by other objects.

This rather lengthy section is not only an attempt at finding justification for the undertaking of this study of beads, but also forms a methodical discussion on the logical basis on which some of the conclusions in the following main text will be relied.

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<sup>25</sup> Marshal op. cit. p. 583; and Woolley, op. cit. p. 374.

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<sup>26</sup> Beck, *Etched Carnelian Beads*, pp. 384–398.

This study of ancient Egyptian beads is based on the Petrie Collection in University College, London, with the addition of those materials as can be gathered from a perusal of various publications as well as a rough examination of specimens in the Ashmolean Museum and the Cairo Museum. Due to the special circumstances under which I am working, I am unable to study other equally valuable collections. But it must be said that the Petrie Collection provides ample material to cover all the periods of ancient Egypt. As early as 1891, Sir Flinders Petrie conceived the plan to make up a great standard collection of dated beads, type specimens and strings of all the more usual varieties.<sup>1</sup> With his sagacious selection and his unrivalled chance of acquiring new specimens, this Collection certainly is one of the best representative collections.

Moreover, the majority of specimens came either from excavations of his own or from excavations of other members of his school. The careful way in which the beads were extracted gives us a sound basis to work upon. In his report of the Nagada excavation, he gave us the following interesting account “Where any beads were noticed, the workmen always left them for me to clear out myself. If the find was important the boy was generally sent over to look for me, and show me the sample of what had been already disturbed. Then I used to lie down with my eyes close to the ground, and begin searching for the undisturbed part of the beads in the dust. By blowing gently it was often possible to uncover half a dozen at once and so to note the pattern and arrangement of them. An anklet of very small beads occupied about two hours to pick out and secure”.<sup>2</sup>

The word “Egyptian” is used here in a wide sense, including not only the beads made in Egypt, but also those of foreign origin discovered in Egypt. On the other hand, geographically, the word “Egyptian” is used here in the historical sense, not in the modern sense. Anciently, Egypt

was separated from Nubia at Aswan near the first cataract, but it almost always included Sinai. While so far as I know, we have not got any beads from excavations in Nubia in this Collection, there are some strings from Petrie’s excavation at Sinai.

The periods covered by the term “ancient” should include the Roman–Coptic period, in consideration of the great burst of new types of glass beads which are well represented in this Collection. Accordingly, the beads corpus will include these later types. But due to pressure of time, I have to leave them out except for a very brief reference in the text.

According to the Oxford Dictionary, the definition of beads is “a small perforated body, spherical or otherwise, of glass amber, metal, wood, etc., or sewn upon various fabrics”.<sup>3</sup> In this broad sense, the word “beads” can include both amuletic beads which are worn about the person as a charm against evil or disease and pendants which are either special kinds of beads with their perforation out of centre or ordinary beads but specially strung so as to form a loose hanging part of anything. Thus, the distinction between common beads and amulets or amuletic beads is purely subjective. A common bead can be used as an amulet because of its shape, material, colour or even simply because of the subjective attitude of the wearer.<sup>4</sup> In modern Egypt, necklaces of ordinary blue beads were worn as charms against the evil eye.<sup>5</sup> Archaeologists, due to the nature of the subject of their study, have to depend almost entirely upon objective rather than subjective criteria. For our purpose, it seems better to use the term “amulets” for those amuletic beads which take the form of amuletic beads which take the form of natural objects. Amulets in this narrow sense form a subject quite distinct from common

<sup>3</sup> Murray, a new English dictionary.

<sup>4</sup> Beck, *Beads and Magic*, pp. 14–16.

<sup>5</sup> W. S. Blackman, *Fellahin of Upper Egypt* (London, 1927) p. 49, 221.

<sup>1</sup> Petrie, *Seventy Years in Archaeology* (London, 1931) p. 128.

<sup>2</sup> Petrie *Nagada and Ballas*. p. x.

beads, with its own principle of classification and its own line of development. Since the amulets of this type in the University College Collection have been adequately published by Petrie in 1913, they are excluded here. But some of them have such simple or debased forms that they may be dealt with again under the heading of beads. Such overlapping is sometimes not only unavoidable, but also desirable. On the other hand, pendants are preferably treated together with ordinary beads, except those amuletic pendants which form an important part of method of threading usually uncertain amulets. Since the method of threading because of the decay of the string, only those pendants which can be shown to such by their perforation are called here as pendants. Throughout this essay, the term "beads" is used in this qualified sense, that is, it includes ordinary beads and pendants, but excluding amulets.

Such objects as scarabs, cylinder seals and button seals were frequently threaded on the same string as the beads. But since it is perfectly obvious that their main purpose was not merely for ornamentation, it seems better to regard them as something other than a bead. To include them in beads,

as Beck did in his article,<sup>6</sup> seems contrary to usage; therefore, it is not followed here.

While due attention will be paid to the technical side so as to ascertain the method used in the manufacture which usually can afford criteria for dating, the aesthetical criticism is deliberately avoided, because it lies beyond the scope of this study.

As to the pictorial representation of beads on ancient monuments, they form a very interesting subject, and ancient monuments, they form a very interesting subject, and are worth a detailed study. It was originally intended to include it in this essay, but due to lack of time, this plan had to be abandoned. This subject will be touched on only to a very limited extent. Since it forms a separate subject distinct from the study of actual specimens of beads, it may be left in the hands of others who may be interested in this subject. Even within the limits thus assigned, the subject still covers a wide field. I cannot treat this subject fully in all its ramifications. I can only try to establish a general framework, which, it is hoped, will be amplified, corrected and eventually superseded by some other later works.

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<sup>6</sup> Beck, Classification, p. 1, 39.

When I started work on beads, the first task was to register over a thousand strings of them in the Petrie Collection. At that time, I did not know what I might need in the later stage of my work, let alone what other people in the field or museum might require for their purposes. The obvious course naturally resorted to is to follow some system or other with certain modifications. As stated by Beck, “to describe a bead fully it is necessary, to state its form, perforation, colour, material, and decoration”.<sup>1</sup> But for the registration of whole strings of beads, there is some other information which should be recorded as well. Accordingly a registration form of card catalogue was designed that followed mainly the scheme as embodied in Brunton’s *Bead Register and Corpus* in his *Qau and Badari II*, but with certain modifications. It is described below just to show the method I used for obtaining the main body of information so that the reader may form for himself an idea of the likelihood of accuracy or error therein; I have no intention of recommending it to him. A more satisfactory of registration will be given in [Chap. 14](#) by the use of a new comprehensive corpus.

These registration cards include the following eight items for each string of beads-registration number, provenance, date, use, reference, remarks, drawing and photograph number-and the following six items for each type of bead on that string: form, perforation, colour, material, decoration and number. The details for registering a whole string call for no special comment as a more or less similar form is generally used in up-to-date museums and field camps. When I was working on the beads, the register book of the Petrie Collection was still in the process of being built up, and most of the beads had not got the museum number. For the sake of convenience of reference, I gave each string a provisional number, starting from no. 1, and put the museum number, when they were known, with the mark

“U.C.” within a bracket after the provisional number, e.g. 37 (U.C. 9598).

As to the details for each type of bead, a few words of explanation may be needed:

1. Form. Although various corpora of beads have been published in reports of excavation, all of them cover only a certain limited period. Different corpora are made for different periods. This serves well for excavation reports, because their main function is to give information about what sorts of beads have been found in the remains of a certain period. But for a monograph on beads, where to people may look up for dating of some undated beads, it is necessary to have a united corpus covering all periods of ancient Egyptian beads. So I adopted Beck’s system for typing of form of beads. His system as expounded in the article “Classification etc.” is very attractive, because besides being comprehensive, it looks systematic and clear-cut. I typed first 600 strings according to the original system, usually accompanied with sketches of beads on the same card. Then, a provisional corpus was made, mainly following O. H. Myers’ advice, to rearrange Brunton’s drawings under Beck’s division.<sup>2</sup> I found it desirable to introduce two modifications. Firstly, Beck’s divisions were regrouped under a decimal system, using three Arabic numerals instead of four symbols, so as to save up the Roman numerals for indicating subclasses, while another small figure for varieties if required. Secondly, in Brunton’s drawings, some of the types differ from one another only in some almost indistinguishable difference in size. I introduced a conception of “basic dimension”. Since in Beck’s system a standard bead is defined as one in which the length is more than nine-tenths and less than one and one-tenth times the diameter,<sup>3</sup> it was decided to regard only those with a difference of linear measurement of one-fifth from

<sup>1</sup> Beck, *Classification*, p. 1.

<sup>2</sup> Myers and Mond, *Armant I*, p. 70.

<sup>3</sup> Beck, *Classification*, p. 6.

one another as worthy of a separate existence in the corpus, except in the extreme cases where a difference of 1 mm and 5 mm were regarded as minimum and maximum, respectively. Thus, a lot of Brnton's drawings could be omitted. The remaining strings were typed according to this provisional corpus. Since it will be superseded by a new final corpus which will be explained in the next part, I think it is unnecessary to give the details of this provisional corpus.

2. Perforation. It was typed according to Beck's Perforation Corpus which has eleven types, some of them with subtypes.<sup>4</sup> Later on, it was found desirable to add two subtypes. One was named "VII, c" which was hollow the hollow perforation usually met with in metal spheroid beads. Another was named either "II, c" or "IV, c" for those stone beads which had their ends cut with a groove before being perforated. Now, it seems to me that Beck's system ought to be reorganised. His first seven types are classified according to technical differences, while the remaining types are classified according to the position of perforations in relation either with the general shape of the beads or between themselves in the cases of multiple perforations. All of the latter can be subdivided according to the technical methods used in obtaining individual perforation. All of them except type Xa are not of frequent recurrence, and when they do occur, they are always regarded as a particular type of bead and have separate drawings represented in the bead corpus. So they can be omitted from our Perforation Corpus, which will be limited to individual perforations according to technical differences. Beck's type VII (tubular) can be incorporated with type VI, because it is simply a kind of "large perforation", when applied to cylindrical beads. Then, three new types have to be added. Besides the two new types referred to above, natural perforation is also regarded as a separate type technically. Arabic numerals are used to indicate these nine types in the new system in order to distinguish them from Beck's original one. They are illustrated on Plate IA. When a perforation possesses characteristics of both type 8 and one of the other types, it should be typed always as the former, not as the latter one.
3. Colour. Although it is possible to analyse and define quite accurately the colour of any object under a given illumination in terms of "relative intensities and wavelength of light", yet few people if any will take such a troublesome process, even if they have the leisure. The usual course is to describe a colour in comparison with those in some colour charts. The most notable and widely used of these are the "Colour Standard" of Ridgway and Ostwald, the "Repertoire des Couleurs"

of Dauthenay and collaborators, the "Dictionary of Colour Standards" of British Colour Council and the recent "Horticultural Colour Chart" by the same society and the Royal Horticultural Society.<sup>5</sup> So far as I know, the first archaeological report resorting to a colour chart is Mohenjo Daro, in which A. L. Coulson described colours of beads according to R. Ridgway's Colour Standards and Nomenclature.<sup>6</sup> Recently, O. H. Myers used Messrs, Winsor and Newton's Specimen Washes of Artists' Colours together with the equivalent Ostwald notation in his description of colours of beads,<sup>7</sup> and, I believe, he is using Ostwald Plates alone in his forthcoming report of the Armant excavation. For the convenience of Egyptologists, it seems better to follow one already adopted previously in some Egyptological work. Ostwald Colour Plates contain 680 different colours, which can be increased by introducing intermediate colours. Since only approximate accuracy was attempted in the record cards, the colours used for description were limited to those shown on the Ostwald Plates. For patinated glass and faded faience, the best preserved part was used for this purpose, and the degree of change was usually remarked. For transparent and translucent beads, the colour was ascertained by reflected light, not by transmitted light.

From my experience, this recording of colour can be simplified to a certain extent without involving serious loss of accuracy. Firstly, some kinds of stone have their colour implied in their names, such as lapis lazuli, rock crystal, etc., and their range of variation is very small and seems immaterial. Even for those stones like amethyst, a qualifying term such as pale or deep will serve our purpose quite well. Secondly, some of the materials such as glass, faience, etc., have a greater variety of colour, and therefore, their colour should be indicated. But the differentiation in Ostwald Plates seems to be too subtle for our purpose. Their various colours should be incorporated into a few broader classes. This grouping should be done according to some mathematically defined "constant rate of change" of hue, tone and intensity between adjacent colours, but according to some practical difference which is regarded as sufficiently distinct by normal eye, and of which the chronological and technical significance is likely to be borne out by our study. For faience beads, colour is important only when the original colour is preserved.

<sup>4</sup> Ibid. pp. 51-52, pl. IV.

<sup>5</sup> Book Review by S. Clay on the last book in Mature, March 11th, 1939.

<sup>6</sup> Marshal, Mohenjo Daro, p. 535.

<sup>7</sup> Myers, Armant, I, pp. 73-74, pl. VII.

4. Material. For the nomenclature of material, I generally followed Lucas' authoritative book.<sup>8</sup> Since that book is indispensable to Egyptian archaeologists, and should be possessed by every one of them, it is considered as unnecessary to repeat what he has already said there. Only a few words are needed to state what I think about certain problems of nomenclature and how I have dealt with them during the process of recording.

While quite agreeing with the principle that for the purpose of Egyptology, many of the finer distinctions of the geologist may be disregarded<sup>9</sup>; it seems to me that on the other hand there are distinctions of another kind which are immaterial or even non-existent for the geologist or chemist, but are significant for dating purposes, and so it is desirable to distinguish them. Since we are dealing with material used by the ancients, their viewpoints should be taken into consideration. But the concept of each variety of various materials should be clear and rigid. Sometimes, even a coinage of some new term is allowable, but it should be limited to a few absolutely necessary cases. Coinage of a new term is preferable to the practice of using some term taken over from other sciences or industries to indicate something quite different from its original meaning and thus causing confusion. Whenever a name of a stone happens to be used both by geologists and by archaeologists, but in different ways, it seems better to follow always the nomenclature of geology.

With respect to the method used in identification of materials, only very simple ones were used in this preliminary recording work. Physical tests used were those recommended by Lucas, i.e. examination with a lens, determination of hardness and observation of the nature of fracture.<sup>10</sup> As to chemical tests, only the test of reaction with acid was used to ascertain calcium carbonates, such as oriental alabaster, limestone, marble and shell.<sup>11</sup>

Although standardization of nomenclature has been attempted in this recording, there may be still some discrepancies. Also there may be some mistakes in identification, due to my inexperience, especially in the early stages of the work. It was originally intended that they should be corrected and standardized during re-examination after this preliminary recording. Also there are some materials which were given only tentative identification, while others remained unidentified. It was

originally intended to submit them to experts later on. Unfortunately, it is impossible for the time being to carry out the original plan because of the war. I have put together all these materials for which a few words of explanation seem required in a list, which will be given in Chap. 5.

5. Decoration. Although decorated beads only form a small portion of the total number of beads, yet they are very important for our purpose, because most of them are more limited in time range, and so can be more accurately dated than a great majority of undecorated beads. In the description of decoration, both the pattern and the technique of applying patterns should be noted. Sometimes, the technique is even more important than the pattern itself for dating purposes.

For the nomenclature of decoration, those used and defined in Beck's article were generally followed.<sup>12</sup> For some unknown reason, he left out some kinds of decoration in the section on decoration. Some of these can be supplemented from the section on classification in his article, such as granulated decoration on metal beads (p. 26), folded scabble glass beads (p. 47), frit beads with raised ring eyes and ring and dot frit beads (p. 44), while others missed from his article should be added, like silvered glass beads which are very similar in technique to gilded glass beads and seem to be an imitation of pearl. Following Beck's example, beads of those polychrome stones, which afford various patterns according to the direction in which they are cut, were regarded in the record cards as decorated beads, such as cats' eye bead and zone bead of onyx or sardonyx, ring and spot bead of agate. But beads of those polychrome stones, such as speckled diorite, porphyry or breccia, which may give a decorative effect, but never afford a regular pattern, were regarded as undecorated beads. This conventional distinction will be kept throughout this essay. In the bead corpus, the former will be shown together with their pattern in the section of decorated beads, while the latter will be simply included in the ordinary undecorated beads.

With respect to the techniques used in applying decoration, some of them require further examination. Beck regards both filigree and granulated decoration on metal beads as being soldered together.<sup>13</sup> But Heins thinks it is impossible by soldering to keep the work as delicate in appearance with as much of the surface of grains left free as it is possible by fusing,<sup>14</sup> and a granulated cylindrical case dated to the Middle kingdom is described as by

<sup>8</sup> Lucas, *Anc. Eg. Materials*, 2nd ed., for our purpose see especially, Chaps. V, VII, XII, and XIII.

<sup>9</sup> *Ibid.* pp. 355–356.

<sup>10</sup> Lucas, *Antiques, their res. and Pre.* (1932 London) pp. 221–224.

<sup>11</sup> *Ibid.* p. 226.

<sup>12</sup> Beck, classification, pp. 55–71.

<sup>13</sup> Beck, *op. cit.* p. 26, 59.

<sup>14</sup> William, *Jewelry*, P. 36.

fusing, not by soldering.<sup>15</sup> Beck states that the moulded ring-and-dot pattern on some faience beads is also sometimes painted with a darker glaze so as to increase the effect.<sup>16</sup> But some of this darker colour seems not due to the application of a darker glaze, but due to the thickness of glaze on the depressed moulded pattern, just as the different shades of colour of enamel on the famous Royal Gold Cup in the British museum. More will be said on this kind of technical problem in the following chapters.

6. Number. For our purpose, beads fall into three categories. Firstly, there are rare beads, such as iron beads from the Predynastic tombs, which are very interesting, but only happen to very few lucky excavators. Secondly, there are characteristic beads, which are limited in a narrow time range, but are fairly or very common at that period. Thirdly, there are ordinary beads which are comparatively long-lived, but usually show some fluctuation in their popularity. Numerically, they are not so rare as those in the first category, and some of them are even commoner than those in the second category. In cases of the reuse of beads, the reused beads are always very few in comparison with the number of those in their proper period and usually separated from the latter by some interval. Thus, the number of beads is not without some significance. Here, each string was counted and the number of each type of bead on that string was recorded. It is hoped that by tabulating the actual number of each type of bead as well as the frequency of their occurrence in tombs of a period, certain facts may emerge from the intractable mass of material. But it takes up much time. Perhaps Brunton's system is sufficient for ordinary recording, especially when time is not available for such detail. According to his system, up to a certain number, say half a dozen or so, actual number is recorded. For those over that number, only a rough estimate is given, such as "a few", "short string" and "long string", which can be further abbreviated into "F", "S.S." and "L.S."<sup>17</sup> It is obvious that some of these items enumerated above can be relegated to the corpus, and all we have to put down in the register are corpus number and number of beads in each type, in some cases with addition of description of colour or material. But as stated above, there exists at the present moment no corpus which covers the whole history of ancient Egyptian beads. The preparation of such a corpus is purposely postponed until a later stage of work when I may be more acquainted

with the nature, problems and difficulties of my subject. For this preliminary work, such kind of detailed registration seems required. From my experience, the method of manufacture should be added to each type of bead, as suggested by J. L. Myres in his criticism of Beck's system.<sup>18</sup> Although the method of manufacture reveals itself to a certain extent in its form, perforation and decoration, yet there are other aspects of manufacture, like the actual process involved, which if it can be reconstructed should be put down in the register. The only trouble is that it is sometimes almost impossible to ascertain the actual process of manufacture, although we can discern their technical difference by examination. Wrong information in this respect is much worse than an omission. But we can always leave this item blank, when it could not be ascertained.

I am aware that there are some much more elaborate systems for registration of beads. For example, in the register of beads from Armant, O. H. Myers added the following items: "Finish of Surface", "Finish of Ends" and "Note on perforation", besides the types of perforation of Beck's system. Both the finish of surface and that of ends are described there separately for each type of bead as "rough", "dull", "smooth" or polished. In the note on perforation, the perforation of beads is described as "reamed", "rough ground", "dull ground", "smooth ground" or "chattered".<sup>19</sup> It seems to me that the finish of the surface is significant only for certain kinds of beads, probably for stone beads only. Although a remark was sometimes put under the description of form for those beads with extremely rough surfaces on my record cards, it was not regarded as a regular item. It may be included in the description of manufacture, because the finish is a stage, usually the last stage, of manufacture. As to the finish of ends and the "note on perforation", the information derived from them seems not significant for dating and thus does not repay the labour involved in examination and recording of them.

Another scheme of register has been brought forward by Petrie in 1914. It combines register and corpus into one.<sup>20</sup> The result is the graphic representation of form is not adequate to serve the purpose of a corpus, while the space for the register is not enough for more than one entry for each type of bead, and all duplicates have to be omitted. Probably due to these defects, this scheme has not been resorted to again by Petrie in his reports of later excavations, nor by anybody else.

<sup>15</sup> Ibid. p. 48 (No. 1 in the Catalogue).

<sup>16</sup> Beck, *op. cit.* p. 70.

<sup>17</sup> Brunton, *Bad. Civ. P.* 27, also his *Qau*, II, p. 17.

<sup>18</sup> Beck, *Classification*, p. 75.

<sup>19</sup> Myers, *Armant*, I, pp. 101–116.

<sup>20</sup> Petrie, *Tarkhan*, II, p. 13, Pls. XLIV–XLV.

After the preliminary work of recording, the next step is the rearrangement and improvement of the provisional corpus as well as the working out of a new classification, upon which the arrangement of the corpus will largely depend. This will be discussed in more detail in the next part of this essay, because it occupies an extremely important position in our studies.

Next comes the problem of the mode of treatment. Originally, it was intended to prepare a catalogue of beads in the Petrie Collection in order to make that invaluable collection available to Egyptologists, and to give the results of the study as an introduction to that catalogue. But due to special circumstances, this work of registration was interrupted before being completed. Although the registration was already over 1700 strings, yet most of the post-dynastic beads had to be left out, and even for the dynastic ones, it could not be claimed to be complete. Moreover, the ones already registered require to be checked over. All photographic work remains to be done. All the strings are assigned provisional numbers merely in the order of working routine. The original plan to arrange and renumber them more or less in a chronological sequence has to wait until the completion of the whole registration. Furthermore, as expected from the detailed method of recording, the contents of the record cards are too bulky to be included here. So only a rough catalogue in abbreviated form will be given in an appendix. The compilation of a general catalogue has to be postponed for the future.

In the main text, it will be attempted to present the subject in such a manner as to avoid the character of a merely descriptive catalogue. Instead of a minute description of every detail of individual pieces or strings of beads, a general survey is usually endeavoured. After bringing together all related data from the Petrie Collection, the result is usually presented in a tabulated form, from which a generalization is extracted. Objects from other sources are also added, when they can shed further light on our subject. Due attention is paid to the technical aspect. The methods of manufacture are described so far as they can be traced and

certain problems concerning technique are discussed when they are not beyond my capacity. Individual pieces or strings of beads are pointed out only when they possess special interest or offer particular problems. Some of these problems cannot be solved without new evidence, and some may remain unsolved for ever. But the direction of further research will be indicated whenever possible.

Then arises another problem in the mode of treatment. In dealing with the history of any particular class of objects, two methods are usually used: either to arrange them in the chronological order first and then discuss within each period the various types in turn or to arrange them in the typological order first and then trace the development of each type from its first occurrence to its disappearance. Here the first method is adopted. Unlike tools and weapons, nor objects of daily use, both of which have been published by Petrie with the second method, beads form a more or less coherent and homogeneous group and serve the same function. Usually several types are required to form a string. So it seems better to present the beads of each period as a whole rather than to divide them along the typological line across all periods. Moreover, since the corpus is arranged typologically and the time range of each type is indicated there, it seems better to approach the subject from another viewpoint in the hope that more information may be revealed. So the mode of treatment in the main text will be chronological, dealing with each period in turn.

The problem of division of period has now to be considered. Small objects, such as beads, changed continually. Some new types came, and some old ones disappeared. Usually, there are certain transitional periods during which the changes were more abundant and distinctive, due to various causes, such as the introduction of a new technique or new material, invasion or peaceful influence of foreigners, besides the change of fashion. These periods of transition usually spread over a certain duration not necessarily coincident with the change of dynasties. Moreover, most types of beads are only dated to a more or less long period and are not limited precisely to any particular reign. So the



chronological divisions must be sufficiently broad, and the demarcating line is not necessarily the same as the change of Dynasty. But it still requires further research to define the various stages of history of ancient Egyptian beads; it therefore seems better to follow more or less the chronological division usually used in Egyptological work, but with due regard to the above-mentioned facts.

For the sake of brevity, Roman numerals are used for the dynastic numbering. But Brunton's practice of using vii–viii and ix–x for the Early and the Late First Intermediate period is discarded here. Dynasties are historical realities and cannot be used in this case because we know so little of the actual history of this period.<sup>1</sup> Another convention in Brunton's reports is to indicate two or more dynasties by one numeral, e.g., viii for vii–viii<sup>th</sup>, ix for ix–x<sup>th</sup><sup>2</sup> and xxii for xxii–xxiv<sup>th</sup> Dynasties.<sup>3</sup> This is purely a matter of convenience and is not subject of very serious objection if due explanation is always given. The only disadvantage is that there will be no means of distinguishing objects dated vaguely to the xxii–xxiv<sup>th</sup> Dynasties and those dated accurately to the xxi<sup>st</sup> Dynasty. Since shorthand names are desirable for the convenience of writing in certain cases, such as the indication of dates in the register or corpus, perhaps it would be better to employ, as Reisner and Firth have done for certain periods in Nubia,<sup>4</sup> a series of abbreviated terms for all these broad periods and reserve the Roman numerals for dynastic numbering alone. The following table is a list of such abbreviated terms of dates used in this work. (Their use will be limited to a few necessary cases):-

- (I) PH (Prehistoric)
  - (A) NL (Neolithic), including FY (Fayum Neolithic), MR (Merimidian) and perhaps also TS (Tasian).
  - (B) CL (Chalcolithic), including (i) BD (Badarian) and (ii) PD (Predynastic) which is subdivided into (a) AM (Amratian) or EP (Early PD), (b) GZ (Gerzean) or MP, (c) SM (Semainean) or LP.
- (II) ED (Early Dynastic), from S.D. 76 to the end of I<sup>st</sup> Dynasty.
- (III) OK (Old Kingdom), III–VI<sup>th</sup> Dynasties.
- (IV) FI (First Intermediate), VII–X.
  - (A) EF (Early FI), equal to Brunton's VII–VIII.
  - (B) LF (Late FI), equal to Brunton's IX–X.
- (V) MK (Middle Kindom), XI–XII.

(VI) SI (Second Intermediate), XIII–XVII. PN (Pan-grave) culture occurred in Egypt in SI period but is specifically named as PN.

- (VII) LT (Late period), XXII<sup>nd</sup>–XXX<sup>th</sup>.
  - (A) EL (Early LT), or Bubastite Period. XXII–XXIV.
  - (B) ML (Middle LT), or Saite Period. XXV–XXVI
  - (C) LL (Late LT), or Persian Period. XXVII–XXX
- (VIII) P-R (Ptolemaic-Roman)
  - (A) PT (Ptolemaic)
  - (B) R-B (Roman-Byzantine), including (i) RM (Roman) B.C. 30–A.D. 395, and (ii) BZ (Byzantine), or Coptic Period, A.D. 395–640.

Some of these terms may require a few words of explanation. For the prehistoric period, it seems better to follow the usage of European prehistory to designate the culture by place names. In Egyptological literature, it is used sometimes to indicate the whole Chalcolithic period, including the Badarian period.<sup>5</sup> Since the term Chalcolithic is here adopted, the term Predynastic is limited to the narrow sense. Whenever possible, the term Predynastic is avoided, and the name of that particular culture is used. Semainean is probably only a later stage of the Gerzean culture, but is retained here for convenience. The Early Dynastic period is from S.D. 76 downwards, as proposed by Petrie.<sup>6</sup> This term is adopted instead of "protodynastic" because of its facility of being abbreviated without confusion. The III<sup>rd</sup> Dynasty is transferred from Early Dynastic to Old Kingdom in the light of discoveries at Saqqarah. The term "Early XVIII<sup>th</sup>" is used for the period down to Thutmose III's Eastern Campaigns. The beads from this period have more in common with the Middle Kingdom rather than with the New Kingdom. In the Cairo Museum, the XXII–XXIII<sup>rd</sup> Dynasties are included in the New Kingdom instead of the late period.<sup>7</sup> But the objects from the XXII<sup>nd</sup> Dynasty show a radical change from the New Kingdom and inaugurate the whole late period as pointed out by Petrie<sup>8</sup> and reaffirmed by Brunton.<sup>9</sup> The abbreviations "E.M." and "L" may be prefixed also to other periods to indicate "Early", "Middle" and "Late" parts, respectively.

As to the method of dating, with a few exceptions, all those so far registered are derived from excavation, and most of them have been dated by Petrie. Otherwise, a novice such as I would dare to launch forth on this task. But as explained above in Section I, there are many pitfalls in

<sup>1</sup> Brunton: Qau, I, p. 7; but see Frankfort's criticism in JEA, XVI, p. 268 and also T. I. C. Baly's criticism in J. E. A. XVIII, p. 173.

<sup>2</sup> Brunton, op. cit. II, p. 3, 7.

<sup>3</sup> Brunton, Lahun, II, p. 36.

<sup>4</sup> See their various reports on the Archaeological Survey of Nubia.

<sup>5</sup> e.g. Lucas, Anc. Eg. Eaterials, p. 4.

<sup>6</sup> Petrie, Prehistoric Egypt, p. 2.

<sup>7</sup> Cairo Museum, Principal Monuments (1938), p. 8.

<sup>8</sup> Petrie, Illahun, p. 26.

<sup>9</sup> Brunton, Lahun, II, p. 36.

the dating of beads unless checked up with associated objects. Unfortunately, most of the strings in the Petrie Collection are now separated from their tomb groups, and such a check is impossible in many cases. Unless there is

decisive evidence that compels me to change the dating, the original one is always followed. In a case where a change seems necessary or some doubt is cast upon the original dating, the reasons are usually given in detail.

A general discussion of this problem has been included in [Chap. 3](#) under the heading “Materials”. As stated there, some names of material require a few words of explanation. They are arranged alphabetically in a list. For the sake of easy reference, this list is taken out to form a separate chapter and is given here. (When a name is composed of a general term with a qualifier, see under the general term.)

**Agate.** Only this particular kind of chalcedony with more or less concentric bands will be here called agate. The flat banded varieties are called onyx (white and grey or brown) and sardonyx (white and red or brownish red) according to their colours.<sup>1</sup> Sometimes, the dark brown band of onyx may thin out towards the white band and becomes reddish brown. Only those with red or brownish red bands, but free of grey or brown bands, will be here called sardonyx. There is another similar kind of stone which is red or brownish red clouded with a few darker particles or small irregular patches, but not banded. It is sometimes called agate also, but is here called “carnelian A”, i.e. variety of carnelian. It is just an inferior quality carnelian and was used with the latter indiscriminately during certain periods by the ancient Egyptians; while agate usually affords various patterns according to the direction in which the stone is cut. There is another kind of white translucent chalcedony with small dendrites of green chlorites. It is called moss-agate and has been used for beads, but is not common.

**Alabaster.** This term when used alone without a qualifier designates the gypseous alabaster in all geological works, but it is here used as an abbreviation for “oriental alabaster” which is calcareous, not gypseous kind.

**Amber.** Amber is a translucent fossil resin. Lucas states that a characteristic feature of amber is its very slight solubility in ordinary organic solvents such as alcohol and acetone.<sup>2</sup> Since none of them here recorded has been thus

tested, it is better to call all earlier ones simply resin. But those of the Roman–Coptic Period seem almost certain to be amber and are recorded as “amber”. There is another kind of resin which is dense, opaque black and brittle, easily reduced to very dark brown powder. It has been analysed by W. Doran who suggests that it is apparently a bituminous material of the nature of asphalt, or possibly a kind of ozokerite.<sup>3</sup> Here, it is called “ozokerite”.

**Anhydrite.** There is one kind of stone very similar to calcite in most physical properties (white translucent, sometimes with greyish or purplish tinge, hardness about 3), and it is often mistaken for calcite until tested with acid. It is suspected to be one kind of anhydrite, but no positive test for our specimens has been carried out. It is not certain whether all of them belong to be the same mineral or not.

**Bone.** Bone is frequently confused with ivory. In some cases, it is rather difficult to distinguish them. But usually the long bone used for beads retains its natural hole which sometimes is very large while ivory is generally perforated with some implement. Also long bones often retain in their cross section the natural form, roughly triangular or oval.

**Bronze.** Both bronze and copper beads are usually heavily corroded and are impossible to distinguish without chemical tests. Here, all of them are called copper for the sake of convenience.

**Calcite.** Mineralogically, calcite will include common calcite, Iceland spar, limestone, marble, and oriental alabaster. All of them show effervescence when tested with hydrochloric acid. But the term is here used to indicate common calcite alone, which is translucent to opaque, usually in good crystals. The colourless translucent variety is called Iceland spar, which shows strong double refraction. Limestone is a general term for carbonate of lime when occurring in extensive beads; while all true marbles are metamorphosed and so recrystallized limestone. Here, the term limestone is used for massive variety of calcite, which

<sup>1</sup> Mineralogical terms and information are mostly taken from Rutley’s *Elements of Mineralogy* (23rd ed. 1936, London).

<sup>2</sup> Lucas, *Eaterials*, pp. 337–338.

<sup>3</sup> ....

may be dull and compact, coarse or fine granular. Marble is here used for those limestones, metamorphosed or not, which are capable of taking a polish. All of them here recorded have been tested with acid.

Carnelian. It is here divided into several varieties: (A) carnelian A, see under agate and (B) mineralogically, a brownish variety of carnelian is called sard. But this term has been used by some Egyptologists for a “bright almost orange red” variety.<sup>4</sup> In order to avoid more confusion, this brownish variety is simply called carnelian B (Brown). (C) Carnelian proper is called carnelian C (Common). (D) A bright, orange-red variety is sometimes called by Egyptologists sard, a term used by mineralogists to designate the brownish variety, as mentioned above. Perhaps, it would be better to call this bright red one by a new term “noble carnelian”. Here, it is called carnelian D (Red). (J) Mineralogically, jasper is a silica, which is opaque even at the thinnest edges. But a semi-translucent variety of carnelian (opaque in the thick part, but always translucent at the thin edges) is sometimes called by Egyptologists also red jasper. It is here called carnelian J (Jasper-like). When such a distinction is unnecessary, the general term carnelian is used to include all these varieties.

Chalcedony. See below under quartz.

Clay. Clay is a tenacious earth retaining enough moisture to be plastic. Beads have been made from it by modelling. They are usually of a grey colour, but sometimes painted black and polished, or painted red. When they are baked like pottery, they will be called pottery beads which are usually of a red colour. There is another kind of bead called “red clay beads”.<sup>5</sup> The discoverer told me that it is made of a red soft earthy rock, probably red ochre. If so, its technique will be quite different from ordinary clay beads. Even if it proved to be clayey, it seems better to call them beads of clay stone or clay rock.

Copper. See under bronze.

Coral. The terms “pipe coral” and “white coral” call for no special comment. The term “noble coral” is used for the red solid kind (*Coralium nobile*).

Diorite, speckled. The diorite used for beads is a coarse-grained black and white speckled rock, but not the “Chephren’s diorite”. It is sometimes called black and white porphyritic rock by Egyptologists. This term is not only clumsy, but seems better reserved for another kind of stone which has white conspicuous crystals scattered throughout a block homogeneous matrix. Petrologically, diorite shades into its more acid or more basic neighbours (i.e. syenite or gabbro) without hard and fast lines. All three are generally similar in crystalline structure and contain similar minerals,

but with different kinds of feldspar. For our purpose, the term speckled diorite may be used to cover all these three when they could not be distinguished by the naked eye.

Durite. It is a new term coined by Petrie and is meant as originally defined: “indurated mud or ash”, which is of the composition of the slate, but without a slaty fracture”.<sup>6</sup> Geologically, it may be tuff (consolidated volcanic ash) if its volcanic origin can be ascertained, hornfels if it is proved to be partially or wholly recrystallized by contact metamorphism, greywacke or indurated mudstone according to the size of their quartz grains. In the field, those having quartz grains over 0.025 mm are usually called greywacke or grit, but the term greywacke is sometimes used for certain geological formations regardless of their petrological difference and thus includes schist, mudstone, hornfels, grit and conglomerate.<sup>7</sup> When they show slaty (foliated but not recrystallized) or schistose (recrystallized and foliated), then they will be called slate or schist, respectively. Except the last two kinds, usually, it is almost impossible to distinguish them from a rough examination of small polished objects with a low-power magnifying glass, although their appropriate geological names can be ascertained by submitting a thin section to a petrologist for microscopical examination. The term durite seems to serve well the purpose of Egyptology, because it has a distinct meaning while remains non-committal to the finer geological distinctions.

Electrum. It is an alloy of gold and silver, usually showing a silver content varying from 20.3 to 29.0 %.<sup>8</sup> Here, it is called simply gold, but the recording of colour will more or less show its silver content.

Faience. It is quartz frit with an outer coating of coloured vitreous glass.<sup>9</sup> Glass is a vitreous material transparent or opaque but always more or less uniform throughout. It is chemically essentially the same as the ancient glaze.<sup>10</sup> But faience is modelled or moulded cold in a plastic state before being baked and glazed, while glass is used in a fused state when hot. Frit is here used for any composition which is used cold in a plastic state and may be baked, but always remains unglazed. Beck defines frit as “a partially mixed material, consisting of unmelted substances held together by a cement”.<sup>11</sup> The blue quartz frit is rather common. But there are frit-like substances of other colours (yellow, brown, or red), but it is not certain whether they are quartz frit or not. Some of them may be covered originally with glaze which has decomposed or perished, while others may

<sup>6</sup> Petrie, *Amulets*, p. 8.

<sup>7</sup> G. Andrew, *The Greywacke of the Eastern Desert of Egypt*, in *Bull. de l’Inst. e.g.* XXI (1939) p. 154, 165, 168, 175, 188.

<sup>8</sup> ....

<sup>9</sup> *Ibid.* p. 101, also his article in *J.E.A.* XXII (1936) p. 142.

<sup>10</sup> Lucas, *Materials*, pp. 115, 126–127.

<sup>11</sup> Beck, *Classification*, p. 54.

<sup>4</sup> Brunton, *Qau*, II, p. 20.

<sup>5</sup> Brunton, *Mostageddon*, p. 51.

be naturally consolidated materials such as ochre. They are here called “frit”.

Felspar, green. See under amazonstone.

Frit. See under faience.

Glass. See under faience.

Glaze. It is a vitreous thin coating applied to a core of another substance. For glazed quartz frit, see under faience.

Gold. See under electrum.

Ivory. See under bone.

Jasper. It is an opaque silica, opaque even at its thinnest edges. Its colour may be red, green, brown, black or yellow. As stated under carnelian, the semi-translucent variety of carnelian is sometimes taken for red jasper. Another red stone mistaken for red jasper will be discussed below under pyrophyllite. Various fairly hard green stones have been wrongly identified as green jasper.

Limestone and marbles. See under calcite.

Mother-of-pearl. See under shell.

Ochre, red, brown or yellow. They are the earthy variety of oxide of iron, mixed with considerable clay and sand. As stated above under faience, there are artificial mixtures of this kind, called here “frit”. It is rather difficult to determine whether a particular specimen of mixture was natural or artificial. For the sake of convenience, all those used cold in a plastic state are here called “frit” while those used as a non-plastic stone are here called “ochre”. This distinction can be more or less ascertained by an examination of the general features and perforations of beads.

Olivine. See under serpentine.

Ozokerite. See under amber.

Onyx. See under agate.

Paste. This term has been used loosely for various materials, especially for frit, opaque glass and faience. (“glazed paste”) in Egyptological works. Its use has been strongly objected to by both Lucas,<sup>12</sup> and Beck<sup>13</sup> and accordingly discarded here. See under faience.

Porphyritic stone, white and black. See under diorite.

Pottery. It is used for baked clay beads, but neither for faience beads, nor for unbaked clay beads.

Pyrophyllite. There is a red opaque compact stone, identified as red jasper by the discoverer,<sup>14</sup> but found to be very soft, easily scratched by a penknife. It is very similar to a specimen of the massive variety of pyrophyllite in a showcase in the Natural History Museum, South Kensington. Pyrophyllite is a clay mineral, similar in physical properties to talc, with a hardness of 1–2. But our stone may

be so-called porcelain jasper, which is merely clay or shale altered or baked by contact with a hot igneous rock.<sup>15</sup>

Quartz. Quartz is a crystalline variety of silica, different from chalcedony which is amorphous to the unaided eye. The coloured varieties of chalcedony are here called by their special names, such as agate, carnelian, flint, jasper. The colourless and the purple varieties of quartz are also designated by their special names as rock crystal and amethyst. For a worked piece like a bead, or a rounded pebble, it is usually difficult to determine whether it is originally crystalline or not. For the sake of convenience, their colour and transparency are here used as criteria, the transparent and colourless one is called rock crystal, the translucent and white or greyish white with a waxy lustre and often with a slight bluish tinge is called chalcedony, and the light yellow, smoky yellow or brown, milky white one, ranging from translucent to nearly opaque, are called quartz. They are sometimes glazed or burnt. When their original features can still be discerned, they are called by their proper terms. But when they are entirely covered with an opaque layer, so that their original nature is obscured, and then they will be called here glazed or burnt quartz. A quartz pebble of milky white with a brown stain is called white and brown quartz. But there is another kind of white and brown pebble which has a fibrous texture and will be discussed below under wood opal.

Resin. See under amber.

Sard. See under carnelian.

Schist. The so-called green schist has been discussed under *durtie*. Another schist also met with in Egyptological works is talc schist. Geologically, talc schist is a foliated rock composed chiefly of schistose talc generally associated with quartz and feldspar. For small objects such as beads, what we have to deal with is not the extensive rock composed of various minerals, but the individual mineral which is a component of the rock. It should be called schistose talc rather than talc schist. Talc used for beads is usually the massive variety called steatite, which will be discussed below, but rarely the schistose variety which is easily separated into plates or leaves, a characteristic shared by all schists, and seems not suitable for making beads.

Serpentine. There are two kinds of serpentine: a common opaque serpentine and a translucent variety called “noble serpentine”. The latter is more frequently used for beads. Lucas’ remark that Petrie calls olivine serpentine seems due to some misunderstanding<sup>16</sup>. So far as can be ascertained from the Petrie Collection, those from Petrie’s excavation are serpentine of the noble variety, not olivine. Although olivine sometimes alters into serpentine, yet they are two

<sup>12</sup> Lucas, *Materials*, p. 127.

<sup>13</sup> Beck, *Classification*, pp. 54–55.

<sup>14</sup> Brunton, *The Badarian Civilization*, p. 27.

<sup>15</sup> Rutley, *op. cit.* p. 313.

<sup>16</sup> Lucas, *Materials*, p. 351.

distinct minerals and can easily be distinguished by a test of their hardness (olivine 6–7, serpentine 3–4).

Shell. There are two kinds of shells used for beads: one is the eggshell of the ostrich, and other is various mollusc shells. Ostrich eggshell beads usually retain a brownish layer which is the surface of the original egg. For the sake of brevity, it is called ostrich shell. Mollusc shells when used as complete shells are generally regarded as amulets. But they are also cut and worked into ordinary beads. Pearl shell is a kind of mollusc shell with a nacreous coating and is sometimes called mother-of-pearl,<sup>17</sup> seashell,<sup>18</sup> or simply shell.<sup>19</sup> Strictly speaking, mother-of-pearl is the smooth, shining iridescent substance forming the inner coating of pearl shell, while besides pearl shell, there are other seashells used for beads. Here, the term pearl shell is adopted.

Slate. See under durite.

Soapstone. See under steatite.

Steatite. It is a massive variety of talc, and its synonym is soapstone. It is white, grey, greenish, reddish, brown or black. Although the foliated variety of talc is very soft, with a hardness of 1, yet some of the other varieties are somewhat harder. Steatite of a hardness of 2.5 has been recorded,<sup>20</sup> which is very near to the hardness of calcite or limestone, which is 3. This harder variety is often mistaken for limestone. The burnt or glazed steatite is much harder, some reaching a hardness of 7, that is, as hard as quartz.<sup>21</sup> Some of them are difficult to distinguish from glazed opaque quartz from a simple examination, except by their difference in methods of manufacture, because the technique for making soft stone beads is usually different from that for hard ones, and the steatite beads were usually manufactured as soft stone before being finally glazed or baked. Some of the glazed steatite turns white because of entire loss of glaze, but it is not certain whether all of these white ones have been once glazed. They may be simply hardened by baking in order to be made more durable for wearing. They are here called burnt steatite unless they show some trace of glaze, which will be called glazed steatite. Glazed steatite usually shows a laminated texture under the magnifying glass, or even to the unaided eye.

But some are not so, and the finely glazed beads from the Badarian period are sometimes very difficult to distinguish from turquoise.<sup>22</sup> Among the Badarian beads here called glazed steatite, there may be some made of turquoise.

Syenite. See under diorite.

Talc. See under schist and also under steatite.

Tuff. It is consolidated volcanic ash. See under durite.

Turquoise. See under steatite.

Volcanic ash. Tuff (consolidated volcanic ash) is sometimes called simply “volcanic ash”. See under durite.

Wood opal. As stated above under quartz, there is a kind of white pebble with rusty brown stains showing a fibrous texture. It is usually called white and brown quartz. H.B. Maufe examined a specimen from Armant and suggested “possibly wood opal” by examination of its various physical properties. The same specimen has since been analysed by H. E. Cox, who also thinks that it is wood opal.<sup>23</sup> Geologically, wood opal is a hydrated silica, usually derived from a wood in which the cavities have been filled and the tissues replaced by silica. But our specimen is not the silicified wood found plentifully in some parts of Egypt. Its texture seems more similar to bone or ivory rather than to wood, but its chemical composition is a hydrated silica as proved by Cox’s analysis.

Sometimes, one term is just as good as another. But even so, it is always better to adopt one of them and keep to it consistently. So the nomenclature as contained in the above list with some additions from Lucas’ book is not only applicable to my own recording, but is applied also to those occurring in quotation from others’ works as far as possible. The originally used terms are retained in the quotation, but their equivalents or corrected ones are usually put in brackets after them. When the equivalent is not very certain, a question mark is used immediately after the equation sign. But even in my own recording, there might be some discrepancy in nomenclature and mistakes in identification, because the system was only gradually evolved in the course of actual investigation. Since the original objects are not available to me for the time being, only a few corrections have been made in this respect, when they can be recollected from memory.

<sup>17</sup> e.g. Wainwright, *Balabish*, p. 20, and Lucas, *Materials*, p. 39.

<sup>18</sup> e.g. Brunton, *Qua*, III, p. 7, and *Mostageddon*, p. 125.

<sup>19</sup> e.g. Petrie, *Diospolis*, p. 45.

<sup>20</sup> E. H. Kraus, and W. F. Hunt, *Mineralogy*, (New York) p. 299.

<sup>21</sup> F. A. Bannister and H. J. Plenderleith, *Physico-Chemical Examination of a Scarab of Tuthmosis IV*, in J. E. A. XXII (1936) p. 4.

<sup>22</sup> Brunton, *Badarian Civilisation*, p. 27.

<sup>23</sup> Myers, *Armant*, p. 89, 93.

## Technical Methods of Bead-Making

This part will be limited to the task of description only, and will touch the chronology of various methods only by accident. The discussion of their time range is purposely postponed until a later part, when a chronological survey will be attempted.

A distinction should be made between the technical feature and the technical process. The differences in the technical feature will be here called simply 'technical differences', which are those features discernible on beads due to some differences in the technical process. They are the result of technical process, usually unintentionally, but at the same time they are sometimes the only indication from which the technical process can be deduced. Technical features are realities which can be verified by anyone who will take the trouble to examine them, but the technical process involved is usually only a reconstruction which ranges from a mere probability to an almost certainty.

Besides these technical differences discernible on the finished objects themselves, some information on the technical process may be derived from other sources. So far as ancient Egyptian beads are concerned, no contemporary treatise on their manufacture has been found yet. Pictorial representations of bead making are few, and only give information both incomplete and vague. Unfinished beads are of great value for our purpose and have been

found in Egypt on several occasions, some of them now being in the Petrie Collection. But the instruments used for bead making are very rarely reported, probably due to the difficulty of identification. Analogous cases from other lands, both ancient and modern, have been quoted here whenever they can shed light on our problem. But, just as heat can be produced either by a physical friction of a chemical reaction, so a similar technical feature on two beads derived from different sources does not necessarily mean that they result from the same technical process, still less probably from a process identical in every detail.

Therefore, although various technical processes are enumerated here and some of them are used to explain technical difference found in our examples, these explanations are mostly tentative proposals only. They may be proved wrong and superseded by a better explanation, but that would not affect the fact of existence and chronological significance of various technical differences.

As stated in [Chap. 3](#), the importance of the technical aspect was realized only in the later stage of my work. It is almost certain that some of the important technical differences have been overlooked by me. I am sure that their utility is far from being exhausted, and it is a profitable field worthy of further research.

## 6.1 Section I: Manufacture of Glass Beads<sup>1</sup>

Technical methods for the bead-making are different not only according to material, but also according to the state of material during the process of manufacture. Semple distinguishes three states of glass: firstly, as a very hard, brittle and solid substance, which, like stone, can be cut into any form by cutting instruments; secondly, as a liquid substance, which, like molten metal, can be cast; and thirdly, as a soft, very plastic, tenacious and ductile substance, which, after cooling off, will retain unchanged the form which it obtains in the soft state.<sup>2</sup>

Most glass beads were made neither in a solid state nor in a liquid state, but in a viscid one. As a viscid substance, glass is able to stick together (tenacious), capable of being drawn out into wire (ductile) and fashionable into any form by moulding or modelling (plastic) and may be blown into a hollowness.<sup>3</sup> Glass objects, including beads, could be regularly manufactured only when people realized and duly took advantage of some of these properties of glass. This is perhaps the main reason why its regular production on a large scale only dates from the New Kingdom in spite of early invention of the process of glazing.

The chief methods of manufacture of glass beads are as follows:

1. Modelling Method. By taking advantage of its plasticity, glass was rolled into a ball or cylinder, or pressed into a bar, or modelled into various shapes by some instrument. The perforation was obtained either by piercing a hole through the solid bead when reheated or by drilling when cold. The surface of this kind of glass beads is often rather dull. This method was rarely

employed. But beads made at first by other methods might be retouched afterwards so that traces of their manufacture were erased, and thus, they may be easily mistaken for beads made entirely by modelling.

2. Folding Method A. By taking advantage of its flexibility and tenacity, glass can be made into a bead by folding. A small strip of glass was bent over to make both ends meet, which would be fused together either by themselves when they were sufficiently hot or by slightly reheating. It could be further shaped into any particular form by modelling with some instrument. Beads made by this method usually still show the trace of the junction.
3. Folding Method B. Another method was to prepare a slab of glass roughly round. While it was still plastic, a rod was pressed through the centre of it perpendicularly to the face, and then, the whole edge of the slab was folded up so as to join together and enclose within it the rod which would be withdrawn later on. Beck mentions a similar method, which, however, started with a slab of glass roughly square and ended by bending up the two ends of the strip. Glass beads made by this technique usually show a single conical perforation and also some trace of folding at the large end of the hole.

Theoretically, folded glass beads, made either by method A or by method B, can be cut and ground to shape, as stated by Beck. But actually, this kind of lapidary technique seems to be very rarely practised for glass beads. Except some amuletic pendants, all the folded beads I have examined were fashioned into shape simply by modelling (including rolling on flat surface, pressing with some instrument), not by cutting and grinding.

4. Multiple-strip Method. This is essentially similar to the folding method A, except that two or more strips were used instead of one. The method of building up was either by placing the strips around a rod and pressing them into shape, as described by Beck for the double-strip beads, or by joining strips together into a large slab

<sup>1</sup> Beck, *Classification*, pp. 60–62. (All the references given immediately after the heading of a section are the general ones which are freely utilized in the text of that section, usually without any particular indication or footnote.)

<sup>2</sup> Kisa, *Das Glas im Altertume*, p. 259.

<sup>3</sup> Dillon, *glass*, p. 7.



and folding it in the same way as for the ordinary folded beads. This method was commonly used for the mosaic or millefiori beads. Usually, each strip formed a single-pattern cut from a columnar mosaic and had to be joined together in order to repeat the pattern so as to produce a bead of multiple pattern or millefiori. Beads made by this method usually show some trace of the junction.

5. Wire-winding Method. This is the commonest one used for the manufacture of early glass beads, because it is the most suitable technique for this material before the invention of glass-blowing. As described by Petrie, the process is mainly as follows: a lump of glass of suitable size, being heated to soften, was laid on a flat surface and rolled by a bar worked diagonally across it. The rods thus produced were now drawn out to form a solid thin cane, or, if previously rolled flat, a thin ribbon. These threads were wound round a metal wire which was withdrawn when contracted on cooling. Beads made by this method usually show a small point at each end where the thread of glass broke off, but this projection is absent from some beads because it was fused with the body of bead by reheating. Another way to detect this technique is by the direction of the streaks and bubbles in the clear structure of the glass. Beads thus made can be pressed into a flattened bead or decorated with pattern afterwards.<sup>4</sup> There are several specimens of unfinished beads of this kind in the Petrie Collection, some with the metal wire still stuck in them.
6. Drawn-out Method A (blown hollow cane). After the invention of glass-blowing, beads can be produced in bulk by utilizing this new technique. Modern Venetian bead-makers make the common undecorated beads in the following way: taking a lump of molten glass (so-called fondant) and producing a small bubble and then cupping the fondant to prepare the orifice that will later on run through every cane and every bead. (According to Dillon, a rod of iron is attached to the further end of the bubble and is seized by a boy who runs with it at full speed.) After being reheated, the fondant is drawn out into a long hollow tube. It is said that "so ductile is the fondant that a mass the size of a loaf of bread can be stretched for a distance of about 300 yards. Even when the fondant is pulled out to the thinness of a cambric needle it remains a pipe or a tube". These tubes are cut into canes of about one yard in length, which are chipped into the bead lengths. Then, the hole of these small sharp-edged sections is filled with a composition of charcoal and lime and then mixed with a quantity of sea sand and reheated in a

revolving crucible in order to eliminate the sharp edges. After cooling, grinding materials are sometimes used for polishing and lustration.<sup>5</sup>

The majority of glass beads of the Byzantine (Coptic) Period were certainly made in a more or less similar way.<sup>6</sup> The main differences are as follows: firstly, these early beads are larger in size than the modern Venetian ones; secondly, these early beads show the longitudinal bubbly striations more distinctly; thirdly, the quality of early glass is inferior, usually full of small bubbles; and lastly, the variety of colour is more limited, especially the absence of the translucent bright pink glass. The quality of early glass was probably responsible for the large size of canes and the prominence of bubbly striations, the latter perhaps also due to the omission of the polishing process. Examples of both the ancient and modern beads may retain their sharp edges without being reheated and rounded.

7. Drawn-out Method B (hollow cane not blown). Beads made from a drawn-out hollow cane have been found from the period before the invention of glass-blowing. In some New Kingdom glass factories at Amarna, Petrie found this kind of drawn glass tube, and he says that "how these were made first is uncertain, probably by heavy rolling of the rods, so as to make them hollow inside".<sup>7</sup> Beck describes them as being folded around a wire and then drawn out into small tubes which were broken into beads.
8. Blowing Method. A small bubble of glass could be blown into a bead either as a smooth ball or else by blowing into a mould. They were sometimes constricted at the middle to form a double spheroid bead. The hole at the end further from the blowpipe was obtained either by piercing with some instrument or by breaking through the constricted neck between two parts of a double bead.
9. Moulding Method. By taking advantage of its plasticity, glass was pressed into a mould. This method seems more suitable for objects with decoration in relief or with body in certain particular form rather than for common beads, for which it was rarely employed.
10. Miscellaneous Methods. Under this heading will be included all other methods not mentioned above. They were either so rarely practised that so far, they have not been found used for the ancient Egyptian beads, or so obscure in their manufacturing process that they may be proved in future to be merely a variety of some

<sup>4</sup> Petrie, *Tell el amarna*, pp. 26–27; Petrie, *Arts & Crafts*, pp. 121, 125.

<sup>5</sup> Anonym, *Bead-making at Murano and Venice*, pp. 605–607; cf Dillon, *Glass*, 185–186.

<sup>6</sup> Petrie, *Tell el Amarna*, p. 27; Kisa, *Das Glas*, pp. 118–119.

<sup>7</sup> Petrie, *Tell el Amarna*, pp. 26–27.

well-known method. For example, there is one class of cylindrical beads cut from some hollow cane which seems never to have been drawn out and which shows no trace of folding. Isolated glass beads too decayed to show any trace of their manufacturing process may also be included here.

## 6.2 Section II: Decoration of Glass Beads<sup>8</sup>

The body of these decorated beads is either a matrix on which the decorative elements were applied or an assemblage of these elements without any matrix. In either case, one of the methods enumerated above was used for the building up of the body, and there is no need to repeat them here. Also, since we are dealing with the technical process, not the pattern, of decoration, the latter will be touched only accidentally. We shall be concerned mainly with the method of the making of decorative elements and the method of incorporating these elements into a bead. Those decorative elements which depended mainly upon a contrast of colour for their decorative effect were either left raised up from the general surface of the beads (raised or horned beads) or pressed into the same level as the surface (flush beads).

The chief methods of decoration are as follows:

1. Homochromous decoration. Decoration in relief or sunken relief can be made on beads by moulding, modelling, carving or stamping. It was rarely employed for glass beads, if we exclude those examples which fall within the category of fancy form rather than that of decoration.
2. Decoration by simple elements on a matrix. Simple decorative elements, such as crumb, spot eye, ring, spiral, stripe, chevron and wave, were made by applying a drop or a strip of glass of different colours on a bead. Complex pattern was produced by the combination of various simple elements.
3. Decoration by simple elements without a separate matrix. Some beads were made of two or more kinds of glass of different colours, which were melted together and so manipulated as to produce various patterns. For example, blotched pattern could be produced by pressing together broken fragments of various colours, and swirled pattern by stirring numerous lines of a different coloured glass. They were modelled or moulded into shape afterwards.
4. Decoration by stratified element on a matrix. The process of making decorative elements in this class was more complex. The common ones were stratified eye, stratified spiral and spiral thread. Stratified eye was made by superimposing one coloured glass on another. It was made either separately and then affixed the eye to a matrix or directly on the matrix by impressing one layer after another. Stratified spiral was made either by twisting two glasses of different colours so as to make a spiral or by inlaying a spiral on a disc of different colours. Spiral thread was made either by winding together two glasses so as to make a thread or by winding one around another which was in the shape of a straight rod. Sometimes, a strip of striped or zigzag pattern made by the stratified method was applied to a matrix of bead.
5. Decoration by a stratified element without a separate matrix. Stratified eyes may have been cemented together without a separate matrix. But stratified glass bar or sheet was made by placing various narrow bands either side by side or in layers and then rolled into the required thinness. A sheet of them was made into bead by the folding method A, the stripes on the sheet either remaining parallel or running in various directions so as to form a pattern at the junction. A bar of stratified glass with longitudinal or zigzag stripes could be made into bead by simply perforating a hole with some instrument.<sup>9</sup> Gilded or silvered glass beads could be made by a similar method. A glass core was overlaid with some gold leaf or powder and then covered with a protective layer of transparent glass either by blowing over the bead a thin film or by dipping it into a liquid glass.<sup>10</sup>

A special kind of stratified cane bead is the so-called cane chevron bead or aggrary bead. A hollow cane was built up of concentric layers of coloured glass. It consisted of three main layers (usually an opaque red one between two blue or green), which were divided by thinner ones of opaque white. The dividing surface had been worked into a series of chevrons or zigzags, so as to present a starlike pattern on a cross section. The extremities were faceted or rounded to a pyramidal or conical form so as to bring out the chevron pattern to the lateral surface of the bead.<sup>11</sup>
6. Decoration by cut-off rod on a matrix. A mosaic rod of glass was made either by dipping a slender glass stick in successive baths of liquid glass of alternating colours or by fusing together numerous minute sticks placed on end. The cross section of such a mosaic rod usually

<sup>8</sup> Cf. Beck, *Classification*, pp. 59–60, 62–69; Kisa, *Das Glas*, pp. 118–138.

<sup>9</sup> Eisen, *Eye Beads*, p. 5; Eisen, *Glass-blowing*, pp. 138–139.

<sup>10</sup> Kisa, *Das Glas*, pp. 127–128, 834; Wooley and Mac Iver, *Karanog the Roman-Nubian Cemetery*, p. 76.

<sup>11</sup> Brent, *On Glass Beads with a Chevron Pattern*, in *Archaeologia*, vol. LV (1880); Dillon, *Glass*, pp. 188–189; Kisa, *Das Glas*, pp. 134–136; Otto Tischler, *Ueber Aggraryperlen und ueber die Herstellung farbiger Glaesur im Alterthume*, 3–4.

represented some definite pattern, such as eye with rings, chequer, flower or human face. These mosaic rods were cut transversely in section and affixed on a matrix of bead. In order to diminish the size of the pattern and consequently the size of the section, they were sometimes drawn out into a thinner rod before being cut off.<sup>12</sup>

7. Decoration by cut-off rod without a matrix. These cut-off sections from mosaic rods were sometimes made directly into beads either by simply perforating a hole or by being folded into a tube. But the more usually employed method was by cementing together and pressing into shape (i.e. the multiple-strip method).
8. Decoration by dragging (or wire-drawing). A thread of glass was wound around the matrix of bead either in a circle or in spirals and then reheated until it was thoroughly plastic so that when a wire or a comb was dragged along it, various patterns could be obtained. The common patterns made by this method are scallop (when the dragging was towards one end of the bead only), chevron (dragged to both ends, the chevron with approximately straight sides) and feather or ogee pattern (dragged also to both ends, but the pattern with curved shaped sides).<sup>13</sup>
9. Drawn-out stratified cane. It is similar to the drawn-out method A for the ordinary beads. The only difference is that the original bubble or cup was superimposed with layer or strip of glass of different colours before being reheated and drawn out into a thin long tube.<sup>14</sup> Gilded or silvered glass beads could be made by this method too. Just as for the stratified gilded beds mentioned above, they consisted of a core of glass tube, overlaid with a gold or silvered leaf, and finally covered with an outer layer of transparent glass. The process of drawing out was carried out before the overlaying of metal and

repeated after the overlaying of the outer layer of glass, or the outer layer was made of a drawn-out glass tube, but slightly larger. Then, the stratified cylinder was contracted by pinching with some instrument to form a continuous row of beads which were finally broken off into separate beads. They are distinguished from the ordinary stratified gilded or silvered beads by the presence of striation along the bead.<sup>15</sup>

10. Simple gilded or silvered beads. Gilded or silvered beads could be made by a simpler method than the method 5 or 9 mentioned above. A hollow bead was made by the blowing method and then gilded or silvered by depositing the metal on the inside of the bead. Another way was to fuse the gold leaf on the outer surface of the bead.

Sometimes, beads of a similar pattern were made by quite different methods which can be ascertained only by a close examination. Take eye beads for example. They were made by the impressed ring (method 2), the stratified eye (method 4) or the cut-off mosaic eye (method 6). In the first case, the eye-spot is of the same colour and quality of glass as the matrix, and the rings sometimes have fallen out. In the second case, the eye-spot differs generally from the bead matrix, but each of them is lighter at the edges than in the centre; the rings are generally very irregular, but the outline always soft and frequently wavy; and the numbers of rings from various eyes on the same bead are not all the same. In the third case, all eyes of the same colour from the same lot of beads usually possess the same number of rings; the eye-spot is equally thick in the centre and at the margins; these eyes are very often seen to possess a perspective depth, like a rod immersed in water; and an eye sometimes consists of an irregular fragment.<sup>16</sup> In such cases, it is not the pattern of decoration, nor the form of beads, but the technique of bead-making, which serves the purpose of dating.

<sup>12</sup> Eisen, *Eye Beads*, p. 6.

<sup>13</sup> Eisen, *Glass-blowing*, p. 135.

<sup>14</sup> Dillon, *Glass*, p. 186; Anonym, *Bead-making at Murano and Venice*, p. 608.

<sup>15</sup> Eisen's account in William, *Gold and Silver Jewellery*, p. 44.

<sup>16</sup> Eisen, *Eye Beads*, p. 24.

### 7.1 Section I: Hard Stone Beads<sup>1</sup>

The technical possibilities and difficulties offered by hard stone to the bead-maker are quite different from glass. The essential processes involved in the manufacture of beads of hard stone are as follows: firstly, roughly shaping into the required form; secondly, surface treatment by smoothing or polishing; and thirdly, perforation.

Although we do find beads made of a shapeless stone or a naturally shaped pebble, most beads were required first to be roughly shaped into the desired form. Large blocks of stone had to be broken up into small pieces suitable for beads. These pieces were then roughly shaped by rolling between stones or bruising<sup>2</sup>, or by carefully pressure-flaking. The skill of chipping gained by the manufacture of stone implements, the earliest industry of mankind known to us, could be easily utilized for chipping beads. An unfinished carnelian barrel bead in the Petrie Collection (No. 407) shows an excellent technique of pressure-flaking.<sup>3</sup> On the finished beads, the trace of chipping was usually erased by the final smoothing process and could be ascertained only on the unfinished specimens, such as the above-mentioned one, and those from Hierakonpolis<sup>4</sup> and from Memphis.<sup>5</sup> Some examples from these two sites are in the Petrie Collection (Nos. 124A, 1164).

The rough surface left by this preliminary process had to be smoothed. The methods used may be classified into three classes: (1) by longitudinal grinding; (2) by rotary grinding;

and (3) by grinding at random direction. They are revealed by the direction of striae when examined under a magnifying glass or microscope, but these striae may be due to wear in some instances. Some methods of grinding are more suitable for certain forms of beads than others, but probably, the ancients did not always employ the most suitable method for their beads.

The longitudinal grinding is more suitable for the flat-edged discoidal and cylindrical beads and some faceted beads. Faceted beads were smoothed on a flat surface, but those with a circular section were done either by rubbing the bead on a flat surface or by grinding in a groove of a gritty stone. But it should be noted that a flat surface would be soon turned into a grooved one by constant use. The ancients would utilize the advantage of a groove, but they might not purposely prepare the groove beforehand. The beads were either rubbed separately one by one or strung together on a thread or stick before being rubbed. Petrie suggested that the barrel-shaped and conical beads could be produced by the latter method. If there was any slack in the tightness of the thread which held the beads together, the beads could rock more or less and so acquire a sloping edge.<sup>6</sup> Myers raised the objection that this method is feasible for some cylinder and disc beads, but that the perfectly symmetrical barrel, pear-shaped, spheroidal and other beads could not have been made in this way.<sup>7</sup> Another difficulty, as pointed out by Mackay, is that the interiors of the holes of the unfinished beads are very sharp and would tend to cut any thread passed through them.<sup>8</sup> Perhaps a stick or rod was used in such cases. There are several flat grooved slabs of stone (I cannot remember the actual number) together with a lot of unfinished stone beads in the Petrie Collection. Their provenance is unknown, but probably, they are also from Memphis. This kind of grooved stone for grinding

<sup>1</sup> Cf. Reisner, *Kerma*, IV, pp. 92–94; Mond and Myers, *Armant*, I, pp. 74–79; Vernier, *La Bijouterie et al Joaillerie*, pp. 135–141.

<sup>2</sup> Reisner, *Kerma*, IV, p. 93.

<sup>3</sup> This bead has been illustrated in Mond and Myers, *Armant*, I, pl. XXXVII, Fig. 5, together with a grooved grinder, but these two were not found together according to Petrie, see his *Prehistoric Egypt*, p. 42, Sect. 105.

<sup>4</sup> Green and Quibell, *Hierakonpolis*, II, p. 12, Sect. 31; illustrated in Mond and Myers, *Armant*, I, pl. XXXVII, Fig. 1, but without giving their provenance.

<sup>5</sup> Petrie, *Memphis*, I, P. 11, Sect. 33.

<sup>6</sup> Petrie, *Prehistoric Egypt*, p. 42, Sect. 105.

<sup>7</sup> Mond and Myers, *Armant*, I, pp. 74–75.

<sup>8</sup> Mackay, *Bead-making in Ancient Sind*, p. 9.

beads has been found in some bead factories of other ancient sites, for example, some of coarse sandstone at Chanhu-Daro, Pakistan,<sup>9</sup> and one of basalt from ancient Fara, Palestine,<sup>10</sup> and is still used by modern primitives, e.g. among the American Indians,<sup>11</sup> and the natives of Nigeria, Africa [1]. Certain grooved stones found in some Predynastic tombs at Naqada are supposed to be emery grinders for polishing stone beads by the finder.<sup>12</sup> They have a hardness of about 5 (Mohs' scale) and thus could not be emery. Probably, they are fine sandstone. They were used either as a bead grinder as suggested by Petrie or as an arrow-shaft smoother. Sandstone rubbers with a groove for smoothing the shafts of arrows have been found in the tombs of the Bronze Age in England in association with bracers (bowman's wrist guards) and also occur in Asia Minor (at Hissarlik), Hungary, Spain, France, Western Germany and Denmark.<sup>13</sup> As to the pictorial representation of this polishing process, there is one in the tomb of Aba at Deir el Gebrawi.<sup>14</sup> Two men are figured as rubbing carnelian beads on a bead grinder. The bead seems to be of a cylindrical shape and rubbed by a longitudinal grinding along the axis of its perforation (see Plate I, Fig. B). But Myers suggests that the man is rubbing down the end of a disc bead, which is much enlarged by the draughtsman to make it readily apparent.<sup>15</sup>

The rotary grinding is suitable for all beads with a circular section. For the spheroidal, barrel and pear-shaped beads, a better result could be obtained by this method than by the longitudinal method, and for the perfectly symmetrical kinds of them, this was probably the only way to be employed, as pointed out by Myers.<sup>16</sup> Bicone beads could be rubbed in such a way that only one half of the length was in contact with the surface at a time. When this half of the bead had been ground, the other was done.<sup>17</sup> The junction between the two halves usually shows a prominent ridge running evenly around the axis of the perforation. A bicone bead could be transformed into a barrel bead by erasing this ridge and thus

obtaining a smoothly curved profile. A rotary motion could be produced by rolling the beads with the hand on a flat gritty surface. But some primitive mechanism was almost certainly used, especially for the perfectly symmetrical beads. It was probably done by one of the following methods: either the bead was attached to a spindle and rotated by a bow drill against a stationary polisher or it was held on a stick and applied to a rotary polisher and treated half at a time.<sup>18</sup> Myers suggests the former method and says that the ancient Egyptian beads were probably done by attaching the bead to the end of a drill and then turning it in a cup or recess by rotating the staff.<sup>19</sup> But the latter method is also possible as suggested by Woolley for the ancient Sumerian beads,<sup>20</sup> and actually practised by the modern bead-maker at Cambay, India.<sup>21</sup> At Cambay, the bead is held in the workman's hand and pressed against the outer surface of the polishing disc as it revolves. So far as ancient Egypt is concerned, the one suggested by Myers is more probable to be the case, but this cannot be definitely proved.

The method of grinding bead in a random direction is suitable for the faceted beads and the rough spheroidal beads. With method, only a small part of the bead was smoothed for a time. For the spheroidal beads, this process would leave flat places on the visually curving surface. The modern bead-maker at Cambay polishes his carnelian beads by dragging the leather bag containing beads and emery dust in the last stage of the polishing process.<sup>22</sup> The Indian beads thus finished often show a superficial polish over an uneven surface, if they are not perfectly shaped beforehand.

In order to obtain the high polish, such as is seen on some Egyptian stone beads, especially the royal beads of the Middle Kingdom, a polisher of fine texture and an abrasive of finer quality were required after the preliminary smoothing process. Platt states that it is possible that the ancient Egyptians covered their rubbers with thick folds of linen and used the fine powder produced by the previous grinding after freeing it from grit [2]. Myers says that wood was almost certainly the solid body in or against which the bead and its abrasive were turned. The final stage of the modern polishing method is to use water and oxide of tin on an iron "rubber" covered with thick felt,<sup>23</sup> or to use first felt and pumice and then leather and oxide of tin.<sup>24</sup> The problem of the abrasive will be dealt with after finishing the discussion of the drilling process.

<sup>9</sup> Mackay, *Bead-making in Ancient Sind*, p. 4, Fig. 12. Pl. II.

<sup>10</sup> Mac Donanl, *Beth-pelet*, II, p. 19 (probably for grinding ostrich egg-shell beads alone.).

<sup>11</sup> Orchard, *Beads of American Indians*, p. 34.

<sup>12</sup> Petrie, *Naqada and Ballas*, pp. 44, 45; Petrie, pp. 41–42, Sect. 105. One of the two specimens in the U.C. Collection has been illustrated in Mond and Myers, *Armant*, I, pl. XXXVII, Fig. 5, and described as "quartzite" on p. 75. Another two of them are now in the Ashmolean Museum, one of which has a depressed cup mark and called "fragment of a corundum vase" in the official guide (see the Summary Guide, Department of Antiquities, 4th ed. 1931, p. 40).

<sup>13</sup> British Museum, *Bronze Age Guide* (1920), p. 87, Fig. 86.

<sup>14</sup> Davies, *Deir el Gebrawi*, I, p. 20, pl. XIV.

<sup>15</sup> Mond and Myers, *Armant*, I, p. 75.

<sup>16</sup> *Ibid.*, pp. 74–75.

<sup>17</sup> Cf. Mackay, *Bead-making in Ancient Sind*, p. 5.

<sup>18</sup> Woolley, *Ur Excavation*, II, *The Royal Cemetery*, p. 373.

<sup>19</sup> Mond and Myers, *Armant*, I, p. 75.

<sup>20</sup> Woolley, *op. cit.*, p. 373.

<sup>21</sup> Arkell, *Cambay and the Bead Trade*, p. 297.

<sup>22</sup> Arkell, *Cambay and the Bead Trade*, p. 297.

<sup>23</sup> Platt, *op. cit.* p. 182.

<sup>24</sup> Mond and Myers, *op. cit.* p. 76.

It should be noted that usually, the final surface treatment was done after the drilling, probably for the following reasons: (1) against the risk of breakage during the drilling process and (2) providing a hole to be used in fixing the bead on a shaft, stick or string for grinding. Both the above-mentioned unfinished barrel bead, of unknown provenance, and the unfinished disc beads from Hierakonpolis<sup>25</sup> show clearly that the drilling was done immediately after the rough chipping. But the bead-maker of the Egyptian colony at Kerma bored the beads after smoothing, but before polishing.<sup>26</sup> In other ancient countries, the boring was sometimes the last operation even after the polishing, although one of the above procedures was also practised at the same time according to the shape of beads or the locality of manufacture. For example, in regard to the Sumerian beads found at Ur, Woolley states that “the beads were first chipped roughly to shape; in the case of carnelian ring beads, the hole was then pierced and the polishing was the last operation, but in other shapes the final shaping by grinding and the polishing was done first and the piercing last”.<sup>27</sup> The Prehistoric beads from Mohenjo-Daro were also reported as being probably polished first and pierced last, and Mackay suggests the explanation that the translucency of the polished stone would naturally help the lapidary to see whether his drill holes were running straight.<sup>28</sup> But the stone beads from Chanhu-Daro, of the same culture as those of Mohenjo-Daro, were done in a different way and were described by Mackay as follows: “After a preliminary grinding, the process of boring took place. Then the beads were given a final polish and were ready for market”.<sup>29</sup> I am not sure whether the ancient Egyptians always performed the polishing after the piercing or not. Due to the scarcity of evidence, it is not certain whether the information derived from a few unfinished beads could be applied to all cases or whether the difference in procedure between the beads of Hierakonpolis and those from Kerma was due to chance or to some significance in respect to date, locality or shape of beads.

The piercing of hard stone perhaps presented one of the most difficult problems which the ancient bead-maker had to face. The various solutions of this problem have a chronological significance, so far as the ancient Egyptian beads are concerned. This significance has received little attention from the Egyptologist, probably due to the fact that it emerges only when the beads of hard stone are grouped together and isolated from those of soft stone or other

materials. The following six types of perforation have been found on the Egyptian beads of hard stone (see Plate I, A): type 1, double cone; type 2, double parallel, type 3, single cone; type 4, plain; type 8, grooved; and type 9, natural. These terms have been explained in Chap. 3. Stone beads with a natural perforation were very rare. A string of 26 natural flint pebbles from the Predynastic period (Badari 3165) is in the Cairo Museum.<sup>30</sup> They appear to be silicified shells of fruit or seed with natural cavity. A bead from the Neolithic Fayum (N135/15) described by the discoverer as “of dark brown concretionary stone” seems to be of the same kind of stone.<sup>31</sup> All of them had a natural cavity, which was turned into a perforation by breaking through the wall at the two ends by grinding or chipping. The beads which required drilling were usually prepared with a flat platform in order to facilitate the drilling. The number of such platforms was one for the types 2 and 4, which were pierced from one end, and two for the types 1 and 3, which were pierced from both ends. These platforms were often erased by the final polishing, but seem to be always present on the unfinished Egyptian stone beads and also can be seen on many of the finished ones. The drilling from opposite ends was a method employed almost universally during certain periods. It is due to technical as well as artistic reasons. For the long bead of hard stone, it is necessary to drill from both sides because of the difficulty in drilling deep holes with the primitive drill. In the early period when an extremely tapering flint drill was used, this method was preferable even for the short or disc beads. Moreover, as pointed out by Woolley,<sup>32</sup> when the hole was drilled from one end only, there was a danger of the drill forcing off the end of the bead and thus deforming its shape. It was only when the technique of drilling was well advanced and also when the artistic consideration gave place to the industrialization that the method of drilling from one end was generally adopted. Whether the perforation was conic or parallel was due to the shape of the drill point used in the drilling and had also an important chronological significance. The type 8 was prepared with a groove or a cross-like double groove in order to facilitate the starting of drilling. In the early period, the centre of the platform previously prepared was almost certainly roughed first before the starting of actually drilling so that the drill should not slip.<sup>33</sup> To be practical for the bead-making, the technique of cutting a groove on hard stone must be accurate and quick. This technique was probably perfected in other branch of stonework and then taken over by the bead-maker. The groove could be erased by the final polishing.

<sup>25</sup> Green and Quibell, *Hierakonpolis*, II, p. 12, Sect. 31.

<sup>26</sup> Reisner, *Kerma*, IV, p. 93.

<sup>27</sup> Woolley, *op. cit.* p. 373.

<sup>28</sup> Marshall, *Mohenjo-Daro*, p. 511, 526.

<sup>29</sup> Mackay, *Bead-making in Ancient Sind*, p. 8.

<sup>30</sup> Brunton, *Badarian Civilisation*, p. 46, pl. XLVII, 6.

<sup>31</sup> Caton-Thompson, *The Desert Fayum*, p. 32.

<sup>32</sup> Woolley, *op. cit.*, p. 373.

<sup>33</sup> Cf. Mackay, *Bead-making in Ancient Sind*, p. 5.

Some cylindrical beads of lapis lazuli (the hardness of which is intermediate between the hard and the soft stone, about 5–5.5 in Mohs' scale) have the perforation made in a special way<sup>34</sup>: they were shaped into a solid cylinder, which was then either sawn into two parts and jointed together again by a thick layer of cement or sawn just over halfway through and the gut was filled up with the cement. In both cases, the cement did not fill up the space for the threading hole which was left in the centre of the bead. The cement is a blue pasty material, probably the ordinary blue frit.

For the examination of the type of perforation, the only difficulty which we do meet is to distinguish the type 2 from type 4, when the hole is small and the stone is opaque. In my registering, it was usually ascertained by testing the hole with a pin. If the pin touched something on the wall about the midway, it was regarded as of the type 2. This is based on the presumption that when the perforation is from both sides, there will be always something at the midway, due to either a slight deflexion between the two borings or some remnant of the screen separating the two borings just before being finally forced through. But the hole through its length may have been finally levelled and smoothed, although this was rather rarely done in ancient Egypt. A more satisfactory method of examination is by means of X-ray, as done by Orchard for the American Indian beads. At the Metropolitan Museum of Arts, New York, X-ray has been employed to detect the beads and their perforation inside the intact Egyptian mummy-wrapping.<sup>35</sup>

As to the instruments used in the drilling,<sup>36</sup> we may first discuss the drill point and then the apparatus used for moving the drill point. Two or possibly three kinds of drill point seem to have been employed by the ancient Egyptian bead-maker. Flint drill point was certainly used for piercing beads. Some flint borers have been found with the unfinished beads at Hierakonpolis,<sup>37</sup> and similar flint borers were also found in early sites of bead workshop in other parts of the East, e.g. at Ancient Fara (the Wadi Ghazze), at Palestine,<sup>38</sup> and at Chanhu-Daro, Pakistan.<sup>39</sup> A lot of similar flint borers, unworked agates and cornelians, and numerous crystals of quartz found in the Predynastic settlement at Abydos were probably also used for bead-making, although

they are not recognized as such by the finder.<sup>40</sup> Flint is as hard as any of the hard stone used by the ancient Egyptians for beads, except beryl and its noble variety emerald, which were never used before the Ptolemaic period.<sup>41</sup> The sharp point of flint can pierce with more or less patience most of the stone beads even without the help of some abrasive, but I think that some kind of abrasive was probably always used for facilitating the work. The only disadvantage of flint is that due to the nature of its material, the drill point made of it could not be very minute nor very long. For a small, long and nearly parallel hole, a solid point of soft material was almost certainly employed, such as a thorn, a rod of wood, copper or bronze. But here, some abrasive of hard material was absolutely necessary. The cutting was not actually done by the drills, but by the powder which was rubbed on the stone with the drill. McGuire states that "soft copper, from its tendency to bed the sand, is a better material for the drill point than a point of greater hardness would be, upon the same principle that the modern lapidaries use the softest iron in connection with sharp sand or emery to cut the hardest stones".<sup>42</sup>

Some bronze points found at Kerma are regarded by Reisner as being possibly bead borers.<sup>43</sup> They are rarely reported, because metal was always highly valued, and so it was unlikely to be cast away as the flint borer. Moreover, unless found in the bead workshop, they would be identified as something else. Metal borers have been found from the Badarian period onwards, and some of them might be used as drill.<sup>44</sup>

Tubular drill point made of copper, bronze or reed could be used to perforate the beads of hard stone if accompanied with abrasive of hard material. Vernier states that glass and stone will be broken by the use of a solid drill point in most cases and suggests that for that purpose, the ancient Egyptians used a tubular drill which possesses many other technical advantages over the solid one.<sup>45</sup> The archaeological evidence rather indicates that both kinds were used by them. There are numerous evidences of the use of tubular drill for boring monuments of hard stone,<sup>46</sup> and Myers has found evidence of it on a haematite bead dated to the Middle Kingdom.<sup>47</sup> A supposition of the early use of

<sup>34</sup> For example, no. 1232 in the Petrie Collection; cf. Petrie, *Nebesheh* p. 24, Sect. 23.

<sup>35</sup> Orchard, *Beads of the American Indians*, p. 41; Figs. 29–37, 71; pls VIII–IX; Winlock, *A Discovery of Egyptian Jewelry by X-ray*, in *B.M.M.A.*, XXXI, pp. 274–278, Figs. 1–3.

<sup>36</sup> Cf. Petrie, *Tools and Weapons*, p. 39, Sects. 102–105; and Brunton, *Badarian Civilization*, p. 56, Sect. 118.

<sup>37</sup> Green and Quibell, *Hierakonpolis*, 11, p. 12, Sect. 31.

<sup>38</sup> Mac Donald, *Beth-pelet*, 11, p. 3, 8; pl. XXII.

<sup>39</sup> Mackay, *Bead-making in Ancient Sind*, p. 6.

<sup>40</sup> Peet, *Cemeteries of Abydos*, 11, pp. 3–4; pl. 111, Fig. a, upper half.

<sup>41</sup> Lucas, *Anc. Egypt. Material*, p. 339.

<sup>42</sup> McGuire, *A Study of the Primitive methods of Drilling*, p. 672; cf. Orchard, *Beads of the American Indians*, pp. 39–41.

<sup>43</sup> Reisner, *Kerma*, IV, pp. 93–94.

<sup>44</sup> Brunton, *Badarian Civilization*, p. 33, pl. XXVI; and Petrie, *Tools and Weapons*, p. 52, Sect. 144; pls. LXII, LXV.

<sup>45</sup> Vernier, *La Bijouterie et al joaillerie égyptiennes*, pp. 137–138.

<sup>46</sup> Lucas, *Anc. Egypt. Materials*, pp. 64–66.

<sup>47</sup> Mond and Myers, *Armant*, 1, pp. 77–78, pl. XXXIX, 1.

“jewelled” tubular drill by the ancient as advocated by Petrie has very little probability, as already pointed out by Lucas,<sup>48</sup> but a solid drill tipped with some hard precious stone (not necessarily diamond) was probably used for drilling such hard stone as beryl from the Ptolemaic period onwards. From the Late period onwards when the use of iron became more and more common, iron was presumably also used for drilling beads. Petrie found several iron drill points in the Assyrian group of tools of about 670 B.C. at Thebes. One of them is a scoop drill with an S-section, and two are drill with a scraper at each side of a central peg.<sup>49</sup>

The rapidity with which the drill revolves and the pressure applied to the drill are also important factors governing the length of time required to perforate any stone. The ancient Egyptian drill may be classified according to the method used to move the drill into three kinds: hand drill, bow drill and pump drill. Except some of the flint point, all the drill points were probably always set in the end of a wooden shaft. Some metal borers provided with a short handle were possibly used as a hand drill.<sup>50</sup> Hand drill was either revolved between the extended palms of the hand or turned round with the thumb and finger of one hand while holding the bead with the other. With the palm method, the bead had to be fixed somehow, such as being gripped between the great and the first toes of the operator as done by the native of Nigeria [3], or by being inserted firmly into some crack or hole of a wooden board or bar, or by the use of some sort of primitive vice. The thumb and finger method was certainly employed in the Old Kingdom. In a picture in the tomb of Ti, a man bores a cylinder—seal with a stout point set in a wooden handle—and both cylinder and tool are held in the hand [see Plate 1, Fig. C(1)].<sup>51</sup> In the tomb of Aba at Deir el Gebrawi, there is a picture of two men drilling carnelian bead with a hand drill of similar kind.<sup>52</sup> But here, the method of operation is a little different. The operator holds the long drill point with one hand and drives the handle with the other [see Plate 1, Fig. C(2)]. The disposition of the latter hand seems to me to represent a motion to turn round the drill, but a rather unsuccessful attempt on the part of the artist. Davies states that the action rather suggests a “jumping” blow, and Myers, while rejecting Davies’ explanation, gives several equally unsatisfactory suggestions.<sup>53</sup> The bead in question is on the

ground, and there seems to be nothing to support it, but it is possibly held by the toes of the operator or by some contrivance either not clearly shown or simply omitted by the artist.

The hand drill is certainly not so efficient as a bow drill which increases greatly the velocity of the revolving motion. At Beni Hasan, a hieroglyphic sign in the inscription represents a man working a single bow drill. In his left hand, he holds the black stone cap or a drill and works the drill by means of the bow in his right hand.<sup>54</sup> Both bow and drill shaft of the XIIIth Dynasty have been found at Kahun, the latter consisting of two pieces, a stock with a thinned end and a cap with rounded cavity. Those of the XVIIIth Dynasty are practically the same, as shown both by the specimen from Gurob and by the specimen from some pictorial representations.<sup>55</sup> But the pictorial representation of drilling beads with a bow drill is known only from the New Kingdom [see Plate 1, Fig. C(3) and (4)]. All the examples which are accessible in publication show that the workman operates simultaneously several drills by one bow.<sup>56</sup> The number of shaft in these multiple bow drill ranges from two to three in the XVIIIth Dynasty (Tombs 39–75, 100, 181) and from four to five in the XIXth Dynasty (tomb 178). As remarked by Davies, it seems not practical to use a multiple drill which will confirm to the pictures and also to the known conditions.<sup>57</sup> It seems to me that perhaps here we are faced with an exaggerated representation of workman’s skill, just as the representation of a man piercing two fishes with a double-pointed spear at one stroke or a cat catching three birds simultaneously at one jump.<sup>58</sup> The increase in the number of drill shaft indicates probably a progress of the painter’s inclination for exaggeration rather than a real advancement of the workman’s skill in manipulating the bow drill. The work is shown as being done on a little bench. In the picture of the tomb No. 39, there seems to be some sort of vice for holding firmly the bead, but its detail is not clear. A bowl, presumably containing abrasive powder and water, is shown either on or beside the little bench in the pictures of the tombs Nos. 75, 178 and 181. An object the handle of which protrudes out of the bowl is

<sup>48</sup> Lucas, *op. cit.* pp. 67–69.

<sup>49</sup> Petrie, *Tools and Weapons*, p. 39, Sect. 105; pl. LXXVIII, M19, pp. 24–25.

<sup>50</sup> *Ibid.* p. 52, Sect. 144; pl. LXV.

<sup>51</sup> Steindorff, *Grab des Ti* (1913), pl. 133; see also Newberry, *An unpublished scene from the Tomb of Thy*. In *P.S.B.A.* XXVII (1905), p. 286.

<sup>52</sup> Davies, *Deir el Gebrawi*, 1, pp. 78–79.

<sup>53</sup> Mond and Myers, *Armant*, 1, pp. 78–79.

<sup>54</sup> Griffith, *Beni Hasan*, 111, pl. V, 80; p. 26.

<sup>55</sup> Petrie, *Tools and Weapons*. P. 39, Sect. 103; pls XLIII, and XLVIII.

<sup>56</sup> Theban Tombs, Nos. 39, 75, 100, 178, and 181; see Wreszinski, *Atlas*, 1, pls. 154, 242, 313, 73, and 360; see also the publications of individual tombs by Davies. According to Davies, the drills are shown also in the tomb No. 95, besides these five (see his *Tomb of Puyemre*, 1, 75).

<sup>57</sup> Davies, *Tomb of Puyemre*, vol. 1, p. 75. Myers also regards it as “a very difficult feat”, see Mond and Myers, *Armant*, 1, p. 76.

<sup>58</sup> For fish-spearing, see Wreszinski, *Atlas*, 1, pls. 70, 77, 106, etc.; for the famous picture, *British Museum 37977* (bird-hunting with cat), see various publications, e.g. Wreszinski, *Atlas*, 1, pl. 423.



probably a ladle. Pump drill of the Roman period has been found at Hawara, but is not known before that period.<sup>59</sup> Whether it was sometimes also used for drilling beads or not is uncertain.

As stated above, some sort of abrasive was probably always used for drilling the hole and for grinding the surface of stone beads. As pointed out by Lucas, abrasive powder can cut a substance as hard as itself.<sup>60</sup> For the abrasive used by the ancient Egyptians, sand has been suggested by Lucas, Petrie, Quibell and Green, emery by Petrie, pumice by Reisner, and Myers adds to this list the crushed chert or flint, and the chip and dust from the bead itself.<sup>61</sup> Emery is a very efficient abrasive because of its high hardness and was largely used in such country where it occurs in great abundance. But since there is no evidence of its occurring locally in Egypt, it was unlikely employed industrially for abrasive by the ancient Egyptians.<sup>62</sup> Pumice is found in small quantity on the northern shore of Egypt and is occasionally found in ancient sites.<sup>63</sup> But it has only a hardness of 5.5,<sup>64</sup> and so is too soft for abrading the hard stone. However, it is possible that pumice might be occasionally used for the final polishing to obtain the high polish of hard stone and for the drilling and grinding of soft stone, although we have no positive evidence to prove it. Quartz sands are abundant in Egypt and are aptly hard for most cases. Their use as abrasive has been proved by some clear evidence in a large limestone boring at Sakkara,<sup>65</sup> and also by their presence as abrasive material in the workshops of stone vase both at Hierakonpolis and at Memphis.<sup>66</sup> Flint or chert has hardness equal to quartz sand, but is not so brittle as quartz sand, the latter being easily broken by crushing along the direction of perfect cleavage in the crystal. I wonder whether lumps or chips of flint or chert were even purposely crushed for this purpose when the more suitable material, quartz sand, was certainly always available. Myers' allegation is based on the fact that in a dead hole in a steatite bead, there was a thin whitish coating firmly adhering to the surface. The grains of this coating are neither pure silica (quartz crystal), nor corundum, but are mostly of a crypto-crystalline variety of silica, probably a crushed chert or flint, according to the investigation of Kirkaldy.<sup>67</sup> Since carnelian and agate are

also crypto-crystalline variety of silica, and become white in colour when crushed into powder, it seems to me that the material in question is probably not a crushed chert or flint, but the dust of carnelian or agate gathered from the drilling and grinding of beads and conveniently utilized as an abrasive. Another possibility is that ordinary desert sand, unlike the pure sea sand, does not consist entirely of quartz crystal, but usually mixed with all sorts of impurities, including naturally crushed flint and chert. Abrasive powder derived from such a source gives occasionally the same result as reported by Kirkaldy, especially when the specimen examined is of very small quantity. Bead-maker among the native of Nigeria mixes with water a powder produced by the grinding process and uses it as a lubricant for the final polishing [1]. But I think that finely ground sand was the general material used for abrasive by the ancient Egyptians. Abrasive is nowadays also glued on cloth or paper, or bonded with cements in the form of grinding wheels or hones for the grinding purpose, but the ancient Egyptians seemed to use it always as a loose powder, unless we regard the flat or grooved sandstone grinder also as an abrasive, that is, abrasive in block form.

Hard stone beads were rarely decorated.<sup>68</sup> The following four methods of decoration have been found from ancient Egypt. (1) Cameo decoration. The form of bead of variegated stone as agate and onyx was usually so cut as to give some specially decorative effect. The word "cameo" is here used in a broad sense, including such beads as barrel beads of onyx, which, although not a piece of relief-carving, does show a definite pattern by utilizing its colour layers. Their technical method is the same as that for the monochrome or patternless variegated stones. (2) Carved decoration. Beads were sometimes carved with a pattern. Except the pattern of dots and circles for which solid and tubular drills might be employed, all the other patterns were probably done by engraving with a sharp point, a chisel or a gouge. Straight line might be carved by means of a metal saw and an abrasive powder.<sup>69</sup> (3) Etched decoration. Design in white colour had been chemically produced on carnelian bead by etching and heating [4]. A few beads of this kind have been found in Egypt (several in the U.C. Collection), but they were probably imported as finished goods from foreign countries, both from the pattern and technique of their decoration. This technique is still known to the Indian bead-maker at Sindh, who produces the white pattern by soda treatment and heating [5]. (4) Grazed decoration. This will be discussed in the section on "Beads of Grazed Stone".

<sup>59</sup> Petrie, *Tools and Weapons*, p. 39, Sect. 102; pl. XLIII, M5.

<sup>60</sup> Lucas, *Anc. Egypt. Materials*, p. 70.

<sup>61</sup> Mond and Myers, *Armant*, 1, p. 79, and the references quoted there.

<sup>62</sup> Lucas, *op. cit.* pp. 70–73, 219.

<sup>63</sup> Lucas, *op. cit.* p. 71.

<sup>64</sup> *Ency. Brit.* 14th ed., vol. 1, p. 62.

<sup>65</sup> Lucas' information, quoted in Mond and Myers, *Armant*, 1, p. 79, Footnote 1.

<sup>66</sup> Petrie, *Tools and Weapons*, pp. 45–46.

<sup>67</sup> Mond and Myers, *op. cit.* pp. 79. 93–94.

<sup>68</sup> Cf. Beck, *Classification*, pp. 55–57.

<sup>69</sup> Cf. Vernier, *La bijouterie*, p. 139.

## 7.2 Section II: Beads of Soft Stone

Beads of soft stone were probably made in the same workshop as those of hard stone. Since the latter has already been discussed at considerable length, our discussion here will be limited to those points of the technical methods, which are particular to the soft stone due to the nature of material.

Firstly, the method of roughly shaping was probably different. Most of soft stone could not be shaped by chipping because of their brittleness, nor by pressure-flaking. But by taking advantage of their softness, most of them could be easily shaped by cutting, as already suggested by Myers.<sup>70</sup> Many unfinished calcite beads and unfinished scarabs in steatite, roughly blocked out, have been found in the bead workshop at Memphis.<sup>71</sup>

For the disc beads and short cylinder beads derived from long cylinders, the perforating of their hole seemed to be done before the final shaping of their form by slicing. The evidences of their being sliced from long cylinders are as follows: firstly, as pointed out by Brunton, the general appearance of their longitudinal section strongly suggests this process. Steatite beads often have their ends not at right angles to the axis, although their sides are parallel to each other, so that their longitudinal sections are often wedge-shaped or rhombic. Their length also varies very much.<sup>72</sup> Secondly, the appearance of the surface of their ends also sometimes reveals this process. Myers gives as an evidence for slicing a photograph of the ends of two steatite beads. He says that “the perforations are clearly truncated. Dr. Mackay tells me that in India he has found still clearer evidence in beads with saw marks running at varying angles as the craftsman turned the bead round to cut it”.<sup>73</sup> The evidence of the slicing process being after the perforation is that the latter is frequently at an angle to the axis of bead even for thin disc beads. It seems due to the fact that the drilling was done when the bead was still in the form of long cylinder and so the slight deflexion of direction of the drill was almost bound to occur. Myers has noticed it on some steatite beads, but he suggests that “might this not be due to the use of three shafts simultaneously with the bow-drill”<sup>74</sup> Since we only know the use of the multiple bow drill from some pictorial representations of the New Kingdom, but almost all of the disc beads of soft stone are derived from the Predynastic period, I think it is unlikely to be the case. The ends of the disc bead are usually left rough,

while its sides are very smooth or polished. This is probably due to either that the final smoothing was done on a grooved grinder with the beads strung end to end or that the slicing was done after the sides of long cylinder had been smoothed and polished.

For the smoothing and polishing of soft stone, a grinder of some substance slightly softer than sandstone could serve the purpose equally well, and the abrasive powder was not indispensable. But the employment of the same grindstone and abrasive powder as those for the beads of hard stone would shorten considerably the length of time required for the work and therefore were probably preferred by the craftsman. The method of operation was also essentially the same, but the striae left by the smoothing process were almost always erased by wear, and new striae were often added by rough use, unless being protected by glaze or hardened by burning. Mackay states that at Mohenjo-Daro, the steatite bead had been bored, though its form was left unfinished, and he suggests that “it must be remembered that owing to the tendency of steatite to split along the cleavage planes, it was perhaps necessary to do the boring first in order to avoid waste of time if breakage should occur”.<sup>75</sup> Since the ancient Egyptians seemed to do the final polishing always after the drilling for the beads of hard stone, as stated in the last section, the same might be the case for those of soft stone.

As to the drilling process, both the instruments and the operation were probably also essentially the same as those for hard stone. But since the soft stone can be readily perforated by other slightly harder substances, the drill points were probably found to cover a much wider range of vegetable, animal and mineral material, including wood, thorn, reed, bone, ivory, metal and flint. Abrasive powder, though not an absolute necessity, was sometimes used to facilitate the work. Myers found an abrasive powder of silica on a dead hole of a steatite bead, as already referred above. For the bead of hard stone, tapering hole was prevailing in the early period, due to the use of a V-shaped drill point of flint, and the occurrence and prevalence of the small parallel perforation represented an advance of technique, probably due to the introduction of the use of a metal point accompanied with an efficient abrasive powder. But the bead of soft substance was used from very early period. Steatite beads from the Badarian period already show a regular bore of cylindrical shape.<sup>76</sup> Therefore, any conclusion derived from a study of the beads of hard stone cannot be applied to those of soft stone with equal validity, at least so far as the type of perforation is concerned.

<sup>70</sup> Mond and Myers, *Armant*, 1, p. 75.

<sup>71</sup> Petrie, *Memphis*, 1, p. 11. Sect. 33.

<sup>72</sup> Brunton, *Mostagedda*, pp. 51–52.

<sup>73</sup> Mond and Myers, *Armant* 1, p. 75; Pl. XXXVII, Fig. 6.

<sup>74</sup> *Ibid.*, p. 80.

<sup>75</sup> Marshall, *Mohenjo-Daro*, p. 526.

<sup>76</sup> Brunton, *Mostagedda*, pp. 51–52. Sect. 64.

Myers states that some steatite beads have ends with double sine curve and suggests that probably, in this soft stone, the shoulder of the flint point quickly cut down into the end of the bead; but Hart thinks that this effect may have been produced by wear.<sup>77</sup> Since beads of other soft materials as serpentine (e.g. no. 286) and shell (e.g. nos. 398, 402) sometimes have this kind of end too, the glazed steatite beads which were pierced before being hardened by the glazing process always have smooth flat ends, so I am inclined to Hart's suggestion that this kind of end has been produced by wear, not by the drilling process, and therefore has no technical significance.

Beads of soft stone were rarely decorated, if we exclude the glazed one which will be discussed below. The banded limestone of red and white may be regarded as naturally coloured decoration. Carving technique was also sometimes employed for decoration.

### 7.3 Section III: Beads of Glazed Stone<sup>78</sup>

Beads of glazed steatite were very plentiful, and those of glazed opaque quartz (including milky quartz) and rock crystal were also not uncommon in ancient Egypt. Glazed beads of serpentine,<sup>79</sup> carnelian,<sup>80</sup> quartzite,<sup>81</sup> and chert<sup>82</sup> have been reported too. But the last two kinds of stone (quartzite and chert) are probably opaque quartz inaccurately identified and require further confirmation.

The purpose of the addition of glaze to the hard stone seems to be primarily artistic, giving a brilliant blue or green colour to the buff, white or colourless stone. But for soft stone as steatite, the glazing process served both an artistic and a technical purpose. From the technical point of view, glazed steatite had the advantage of both the hard stone and the soft stone. Before being glazed, the stone remained soft and was easily perforated by drilling, but once it was hardened by the glazing process, it was not easily worn away by use. Therefore, the glazed steatite beads were much more abundantly used than the glazed beads of opaque quartz or rock crystal. It is difficult to explain why carnelian bead was glazed, since the ancient

Egyptians were always very fond of the red colour of carnelian. It should be noted that some carnelian beads have a white patination over part or all of their surface, mostly produced by accident,<sup>83</sup> and are very similar to the genuine glazed stone beads with their glaze rubbed off by wear. Sometimes, this kind of patinated carnelian bead was even partially stained green by contact with some associated copper object or decayed faience. Moreover, the glazed opaque quartz is almost impossible to be distinguished from a glazed carnelian in most cases. Both stones are silica, having most of their physical properties in common except the colour. But the surface of carnelian will be patinated white after being burnt and glazed, and its red colour cannot be seen except by a broken surface of the unaltered core. So there is a great probability of mistakes, if the identification is by appearance only.

Except the addition of glazing process, the technical methods of the glazed stone were essentially the same as those of the unglazed stone which have been discussed in the last two sections. As remarked by Reisner, for the hard stone such as quartz and rock crystal, the chief technical difficulty is that of fixing the colour and the glaze to the stone, especially when the surface of the stone is highly polished.<sup>84</sup> Therefore, some glazed stone beads appear never to have been smoothed at all, but while still in the roughly bruised form, they were pierced and glazed, while others were smoothed but not polished.<sup>85</sup> Beck states that the Mesopotamian beads of glazed quartz appear to have been first ground to shape and then to have had the surface hammered so as to cover it with conchoidal fractures before being perforated and finally glazed.<sup>86</sup> For the bead of soft stone, some have a very rough base of steatite with coarse marks resembling file marks showing through the glaze, the marks being either parallel or at a certain angle to the axis.<sup>87</sup> These "file" marks seem to be the result of the smoothing process by the use of a very coarse abrasive or grindstone and to be retained because the stone being hardened by heating and protected by the glaze. For the ordinary unglazed bead of soft stone, this kind of mark, even if ever present, would be certainly erased by wear, but it is equally possible that these marks were purposely retained, or even purposely put on, so as to make the surface rough and the glaze more firmly fixed on the surface. Steatite becomes completely dehydrated when baked at a high temperature (900 C for 1 h), and its hardness increases from 1 up to 7 [6]. The hardness of opaque quartz or rock crystal is also 7,

<sup>77</sup> Mond and Myers, *Armant I*, pp. 79–80, and Footnote 1.

<sup>78</sup> Cf. Beck, *Notes on Glazed Stones*, pt. 1, in *Ancient Egypt*, 1934, pp. 69–75; pts. II–III. In *Ancient Egypt*, 1935, pp. 19–37.

<sup>79</sup> Mond and Myers, *Armant I*, p. 72, 89. It is identified by Maufe as "probably glazed serpentine".

<sup>80</sup> *Ibid.*, pp. 72, 89, 91, (*Predyn. beads*). For some green-glazed carnelian beads found in a Nubian tomb, see Reisner, *Kerma IV*, p. 14, 49, 53.

<sup>81</sup> Reisner, *op. cit.* IV, Chap. XXIV, and also pp. 49–50, 52–53; and Beck, *op. cit.*, pt. 11, p. 19, 23.

<sup>82</sup> Beck, *op. cit.* pt. II, p. 19, 23, 29.

<sup>83</sup> Beck, *op. cit.* pt. III, p. 35–36.

<sup>84</sup> Reisner, *Kerma*, IV, p. 49.

<sup>85</sup> Reisner, *Kerma*, IV, p. 93.

<sup>86</sup> Beck, *op. cit.* pt. II, pp. 25–26.

<sup>87</sup> *Ibid.*, pt. I, p. 73.

and thus, it is rather difficult to distinguish the glazed bead of soft stone from that of hard stone by the test of hardness. But the distinction between them can be seen by an examination of their perforation. The glazed steatite bead seems to have been drilled always as a soft stone before being baked.

Besides this technical consideration of the facility of drilling for the soft stone, there are other evidences to indicate that the glazing process was always done after the drilling. Firstly, the glazed bead usually has the glaze in the hole, especially that of hard stone with large tapering perforation, as already noticed by Reisner.<sup>88</sup> Secondly, the beads were glazed, as shown below, probably by being dipped in a liquid solution of glaze, and the possession of a hole would greatly facilitate the dipping and drying process by giving the advantage of being strung together in great number.

As to the method of glazing, Beck says that all the Egyptian specimens appear to have had an already made glaze (or else the ingredients to make a glaze) powdered up and applied to the surface and then to have been fused.<sup>89</sup> But he leaves out the problem of how to apply the glaze powder to the bead. Reisner states that the glazing of beads which occurs in large numbers must have been a difficult matter if the dipping process was not used.<sup>90</sup> The glazing process was probably as follows: the glaze mixture was first fused in some manner and then powdered. Some liquid, perhaps a gum solution, was poured on the powder which was stirred up so as to be suspended in the liquid like muddy water. It is a mechanical, not a chemical, solution. The unglazed beads were strung on some thread and dipped in the mixed glazing solution. After the glaze had dried, the final step was firing, which was carried out in a closed chamber of some sort.<sup>91</sup>

Except the glazed steatite bead of the Badarian period, the glaze on the stone bead was the same as that of faience bead. H. Jackson examines spectroscopically an Egyptian chert or quartzite (quartz) bead and finds that a sodium glaze coloured with copper was used, in fact an ordinary blue copper glass.<sup>92</sup> The glaze on the ordinary steatite bead is also a clear glaze, sometimes with a few crystals. But the glaze of the Badarian steatite bead has a large number of crystals which almost entirely fill it. These crystals have been identified by Dr. Thomas of the Geological Survey as mullite, a silicate of alumina. Beck suggests that “two possible explanations are either that the stone used is not a

steatite, or else that a feldspathic glaze has been used, which would make a true porcelain and account for the great hardness”. But Lucas thinks that it may be simply due to either a high alumina content in the raw materials of the glaze or a high temperature at which the glaze was melted or maintained. This mullite glaze has not been found on the later beads except very few Predynastic beads the bulk of which have an ordinary clear glaze with a few crystals.<sup>93</sup>

Glazed stone beads often lost part or all of their glaze, either by rubbing off or by decay. In the latter case, the green or blue colour entirely disappeared and only a yellow soft film containing copper can be found in the hollows and portions protected from abrasion. The probable cause of decay is the presence of alkaline chloride.<sup>94</sup> The fusion of glaze on the opaque quartz or rock crystal partly dissolved the surface, and even after the glaze has been lost, its effect can be seen by the surface having the appearance of water-worn marble or sugar candy.<sup>95</sup> It is unlikely that the ancient Egyptians would purposely bake the hard stone except for bringing out the bright red colour of carnelian or for decorating the etched carnelian bead. The so-called burnt pebble which was occasionally used for pendant in ancient Egypt seems never to have been burnt.<sup>96</sup> It is a white pebble with rusty brown natural stains and has been discussed above in [Chap. 5](#) under the heading “wood opal”. Beck illustrates a carnelian pendant, stated to have come from Egypt. It is described as having a brilliant glazed surface but retaining the original bright colour of the stone. It seems to me never to have been glazed, but to be made of a sand-polished pebble. Beck regards the sand polish theory as improbable, because firstly “it shows spots very suggestive of glaze, and secondly if it was sand-polished it must have been done before the perforation”. Beck seems to overlook the possibility of its being made of a sand-polished pebble. Another possibility is that the perforation would be filled with sand to the level of the surface and so could not be polished by the blown sand. Anyhow, as admitted by himself, he has been quite unsuccessful in producing a highly polished glazed surface without damaging the colour of the stone.<sup>97</sup> But for the soft stone as steatite, I think it is possible that baking alone might be applied in order to harden it so that it would be more durable for wearing. As stated above in [Chap. 5](#) under the heading “steatite”, the hardened whitish steatite will be called “burnt steatite” unless it shows some trace of glaze.

<sup>88</sup> Reisner, *Kerma*, IV, p. 94.

<sup>89</sup> Beck, *op. cit.* pt. II, p. 21.

<sup>90</sup> Reisner, *op. cit.* p. 49.

<sup>91</sup> Cf. [7].

<sup>92</sup> Beck, *op. cit.*, pt. II, p. 23.

<sup>93</sup> *Ibid.*, pt. I, pp. 74–75; and also Brunton, *Mostagedda*, pp. 60–61 (containing both Beck’s remarks and Lucas’ comments).

<sup>94</sup> Bannister and Plenderleith, *op. cit.*, p. 5.

<sup>95</sup> Petrie, *Arts and Crafts*, p. 107; see also his *Prehistoric Egypt*, p. 43.

<sup>96</sup> Beck, *op. cit.* pt. III, p. 36.

<sup>97</sup> *Ibid.*, pt. III, Pl. V, 5; p. 36.

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### 8.1 Section I: Faience Beads<sup>1</sup>

As defined by Lucas, “Egyptian Faience” is meant glazed quartz frit (powdered quartz) ware. The body material consists of sharp angular grains, prepared from quartz rock, rock crystal, quartz pebble, sand or sandstone, by fine grinding. It was held together with some binding medium, almost certainly an alkali (probably natron) or salt, while being shaped and glazed. The glaze is essentially a sodium (or potassium) calcium silicate without any lead compound except the variant F. The glaze mixture was first fused in some manner and then powdered very finely. The powder was probably mixed with water to the consistency of thin mud, and then, either dip the beads to be glazed in the “mud” or run the liquid over the beads. The beads were afterwards dried and fired. The firing was carried out in a closed chamber of some sort. Lucas classifies faience into ordinary faience and the following six variants: A, faience with extra layer; B, Black faience, usually with dark core; C, Red faience, usually with red core; D, Faience with hard blue or green body; E, glassy faience, with a core similar to D, but without any separate coating of glaze; F, Faience with lead glaze.<sup>2</sup>

Reisner notices that the colour of the beads corresponded to the colour of the body. The same blue glaze could produce fine blue, fine green or grey green beads according to whether the body material was white, yellow or grey. Black faience beads had either a dark grey body material covered usually with black glaze, but sometimes with the mixed black blue glaze, or a hard purplish black body covered with a thin glaze of the same colour or a pure uncoloured glazing solution.<sup>3</sup> Beck has examined microscopically some faience beads from Qau and Badari. A black bead consisting of a mass of quartz particles and a manganese vitreous substance

mixed uniformly throughout the bead is considered by him as probably made by mixing powdered sand and powdered glaze with some binding matter and then fired until the glaze was melted. Some black beads show a colourless core with a thick layer of manganese glaze outside, while others consist of three layers: a transparent core, a very thin layer of dense colour (probably of iron and manganese), and a colourless glaze outside. The blue glaze on the blue faience bead is either full of powdered quartz or entirely free from quartz crystal, but the core in both cases consists of powdered quartz and a vitreous material. The colour used for the glaze is usually copper for the blue, iron for the brown and manganese for the black.<sup>4</sup> Petrie states that the presence of iron even in traces would produce a green tint on the glaze. He also says that the blue if exposed to damp fades white and the green changes to brown owing to the decomposition of green silicate of iron and the production of brown oxide of iron.<sup>5</sup> But as pointed out by Reisner, the green colour in some cases was definitely due to either a yellow body underneath the blue glaze or an addition of a yellow slip between the body and the blue glaze.<sup>6</sup> There is in the U.C. Collection one string (no. 914) of unglazed faience, labelled “Tell-el-Amarna” It is made of finely ground white silica and is so soft that it can be rubbed away by finger.

Such features as the microscopic structure and the colour of the core, the presence or absence of an extra layer, the microscopic structure and the chemical composition of the glaze are important for the study of faience, but unfortunately, they can be detected only with broken objects, and some of them involve complicated method of examination. On the other hand, the various technical features discernible on the intact beads, while supplying us with equally important information, are more easily ascertained by a rough examination, although the technical process deduced

<sup>1</sup> Cf. Reisner, *Kerma*, IV, pp. 90–92.

<sup>2</sup> This paragraph is based on Lucas’ *Glazed Ware in Egypt*, in *J.E.A.* XXII (1936), pp. 141–160.

<sup>3</sup> Reisner, *Kerma* IV, p. 90.

<sup>4</sup> Beck’s report in Brunton, *Qau and Badari*, II, pp. 23–24.

<sup>5</sup> Petrie, *Arts and Crafts*, p. 116.

<sup>6</sup> Reisner, *op. cit.* pp. 141–142.

from these features is only a probability. The chief methods employed for the shaping of beads seem to be as follows:

1. Ordinary Modelling Method A. This method was employed for making various beads of small perforation. Petrie states that “beads were commonly made on a thread, dried, and the thread burnt out; they were then dipped in glaze-wash, and fired. In early times small beads were rolled between the thumb and finger on the thread, producing a long, tapering form like a grain of corn”.<sup>7</sup> From a study of faience beads from Kerma, Reisner amplifies Petrie’s suggestion and describes the process as follows: A thread or some other axis was coated with the body paste to a depth of 1–5 mm and perhaps rolled on a board while still moist. This long cylinder was cut with a knife into sections, short for the ring beads and disc beads and long for the tubular beads. These were then dried and baked without removing from the axis. For the barrel beads, the pendant beads and the ball beads, the sections were modelled with the fingers to the desired forms and trimmed at the end, i.e. around the axis, with a knife. Beads with a rectangular section could have been done very simply by pressing the coat of body paste, while on the axis, against a board or other hard flat surface. After being shaped, the beads were then glazed, dried and fired a second time. Certain lots of small ring beads were gathered together in irregular clusters by the interfusing of the glaze, probably due to the fact that these particular beads were fired en masse in the oven.<sup>8</sup>
2. Ordinary Modelling Method B (with perforation about 1/2 of the diameter of the body of bead). This was employed for making various beads of large perforation. The process was mainly the same as the method A, except that the axis used was much larger in diameter. This is probably due to the fact that the axis used was no longer a thread, but a rod of some other materials, such as metal, reed or straw. Hamza says that in the faience factory of the XIV–XXth dynasties at Qantir, bronze bars were used to pierce a hole in the beads.<sup>9</sup> Beck and Stone suggest that some faience beads were formed on hollow reeds or straw, which, on firing, would disappear without leaving a trace, in much the same way as is still done by natives in West Africa.<sup>10</sup> The body paste of the beads made by this technique is usually rather thin and hard. This technique, although only slightly different from the method A, is purposely given a separate existence, because the size of perforation here is of the highest importance for the dating purpose, as shown

below in the chronological survey. Eisen suggests that the creases and lobes of some melon beads were probably, in many cases certainly, produced by rolling the beads over a creased plate, and the wide bore permitted a heavy rod to be used as core handle, thus giving greater security in handling.<sup>11</sup>

3. Special Modelling Method C (modelling with a wooden “butter pat”-like tool). This was employed for most of the segmented beads and also some spheroidal beads. The size of their perforation varies, but usually larger than that made by the method A. Beck and Stone have successfully made the normal segmented faience beads by means of a wooden tool like a “butter pat” and say that “the careful use of such a tool enables the material to be moulded into either segmented or spiral beads and other forms. The Wiltshire beads process different-shaped grooves between the segments and these can all be reproduced by this method”.<sup>12</sup> Contemporary with this kind of segmented beads, there were certain separate spheroidal beads which seemed to have been made by the same method. A cylinder was formed around some axis, then grooved into a segmented bead by the same technique, each segment being roughly spheroidal, and finally cut into individual beads with a sharp knife. The characteristics of this kind of beads are as follows: firstly, the profile of the bead changes from a convex to a concave curve when approaching the end, due to the existence of concave grooves before being cut, and secondly, the concave curves stop before they reach the perforation openings, and the ends have a flat surface due to the cutting.
4. Special Modelling Method D, with the perforation by piercing. This method was employed for certain ball beads, especially the large one. Reisner has noticed that some of the larger ball beads from Kerma were not made on an axis, but pierced. This was done by thrusting with a slender point first from one side and then from the opposite side, while the body material was still soft. The instrument used may well have been a blunt-ended, stiff wire or even a bone or a bronze awl.<sup>13</sup> But many of the ball beads were pierced from one side only, as shown by the fact that they have one end of the perforation much larger in diameter than the other. They are usually cracked around the smaller end, the end where the piercing instrument made its exit. Brunton describes this type of beads as “a special form generally puckered round the hole as if moulded by the fingers”.<sup>14</sup> But the crack was certainly due to the push of the piercing

<sup>7</sup> Petrie, *Arts and Crafts*, p. 119.

<sup>8</sup> Reisner, *Kerma IV*, pp. 91-92.

<sup>9</sup> M. Hamza, *Excavation at Qantir*, in *A.S.*, XXX (1930), p. 52.

<sup>10</sup> Beck and Stone, *Faience Beads*, p. 211.

<sup>11</sup> Eisen, *Lotus-and Melon-beads*, p. 26.

<sup>12</sup> Beck and Stone, *Faience Beads*, p. 210.

<sup>13</sup> Reisner, *Kerma IV*, p. 91.

<sup>14</sup> Brunton, *Qau and Badari II*, p. 19.

instrument. Part of the body material which previously occupied the space of the hole was driven and pressed by the instrument until it burst open the wall at the end of exit. Some modelling tools, perhaps fingers, were used to repair the spoilt end by slight modelling, which caused the bead slightly pear-shaped, tapering towards the cracked end. Plastic material, such as the body paste of faience, could be modelled into ball bead, especially the large one, much more quickly and satisfactorily by rolling a lump of paste between two palms of the hand rather than by modelling it with fingers on a thread. This made the piercing of the perforation a necessity, which was done after the shaping, but its advantage recompensed the disadvantage of the piercing technique of perforation. The piercing technique was not a suitable one for obtaining a perforation in the plastic material and was very rarely employed for faience beads shaped by the moulding or other modelling methods, for which some more satisfactory devices were used to obtain a perforation.

5. Moulding Method. The technique of shaping beads by means of a mould was an advanced technique and seemed to be invented only in the late part of the history of faience manufacture. Reisner states that all the Middle Kingdom beads and amulets from Kerma had been formed with the hand, not moulded.<sup>15</sup> I have not seen any definitely moulded bead earlier than the New Kingdom. Red pottery moulds have been frequently found, but none of them dated earlier than the New Kingdom. Even at the period when the moulding technique was prevalent, the common simple beads, such as disc beads, ball beads, barrel beads and cylinder beads, were still made by modelling, not by moulding. The ancient moulds used are open moulds and are suitable for making the pendant with one face flat, and the beads with decoration in relief, but unsuitable for these common simple beads. Although the common simple beads always formed the bulk of the beads found in excavation, I have not noticed any pottery mould which could be employed for their manufacture. Various faience beads and pottery moulds were found in the remains of faience work at El-Amarna by Petrie<sup>16</sup> and at Qantir by Hamza.<sup>17</sup> Part of Petrie's finds is in his collection at U.C. London. Hamza's finds are in the Cairo Museum, where I have seen a part of them in the showcase. Both of them dated from the New Kingdom, and their technique of bead-making was mainly the same. The common simple beads, including the ring beads, were made by modelling

around some axis. The pendant was shaped by pressing a lump of the body paste into the mould, the surplus being cut off with a sharp knife. The moulded pendant, when quite dry, could be glazed and baked. As pointed out by Petrie, a ring bead was usually attached at the top (and often at the base) of the pendant by means of a touch of glaze fused on.<sup>18</sup> Bronze bars were found at Qantir and were certainly used to obtain a hole, but not necessarily by piercing, nor necessarily employed for all perforation, as alleged by the discoverer.<sup>19</sup> Besides the bronze bar, thread or rod of other material may also have served as axis. As argued in the last paragraph, it is unlikely that the piercing method was used to obtain a perforation in the moulded beads and pendants. This conclusion is confirmed by an examination of specimens of beads from both finds. Moreover, some of the pottery moulds from Qantir show clear evidence that some method other than piercing was employed for the perforation, some of them have horizontal grooves on the opposite sides of the edge so that an axis could be held there horizontally, while others have a small pit in the centre of the mould so that an axis could be fixed in the pit vertically. The axis was probably a bronze bar as those actually found there and would be finally withdrawn from the moulded bead and so left a hole there.

For the decoration of the faience bead, the following methods were found on ancient Egyptian beads:

1. Moulded Decoration. The process was the same as that for ordinary moulded beads. The pattern of decoration was in raised or sunken relief. According to Beck, the ring-and-dot pattern was also painted with a darker glaze so as to increase the effect of decoration.<sup>20</sup> But even the glaze of the same colour would appear darker on the depressed lines, because the glaze there would be thicker.
2. Incised Decoration. This was made by cutting out the desired pattern in grooved lines on the bead, while it was still soft and moist. The tool used was probably a knife for the grooved lines with V-shaped bottom and a gouge for those with U-shaped bottom. The bead was then glazed and fired. Reisner found at Kerma some black faience beads with incised lines filled with blue glaze.<sup>21</sup> But usually, both the body and the incised lines were covered with the same glaze.
3. Painted Decoration. The common type was a blue faience bead painted with black lines. Reisner states that "the black lines were drawn over the blue ground before firing" and that "the deep violet tinge often observable in the

<sup>15</sup> Reisner, Kerma IV, p. 91.

<sup>16</sup> Petrie, Tell el Amarna, pp. 25, 28, 29.

<sup>17</sup> Hamza, Excavation at Qantir, in A.S. XXX, (1930), p. 52.

<sup>18</sup> Petrie, Tell el Amarna, p. 29, sec. 67.

<sup>19</sup> Hamza, op. cit. p. 52.

<sup>20</sup> Beck, Classification, p. 71.

<sup>21</sup> Reisner, Kerma IV, pp. 90, 138.



black seems to be due to the influence of the blue and of the glazing process, not to the character of the black colour, which is a carbon, not a ferrous black".<sup>22</sup> Some of them may have been drawn with the black colour on a white core, and the whole bead then covered with a blue glaze. Some incised beads were filled with paste of another colour to the level of the surface of bead before being glazed and are difficult to be distinguished from the painted one except in the broken specimens. The same may be said of another variety of decorated beads, in which the two colours are not confined to the surface, but go through the core of the bead. As suggested by Beck, the colours must have been mixed with the quartz separately, and then, the two materials must have been "swirled" together and shaped into a bead. Most of them are black and white, and usually, a glaze of another colour seems to have been added, which may have been originally blue and faded white, as they mostly show traces of blue.<sup>23</sup>

4. Crumbed Decoration.<sup>24</sup> The common type of the crumb beads was made of a grey body paste, usually painted with black colour, and then rolled while still soft in crumbs of white or brownish white quartz (perhaps crushed steatite was also sometimes used). The crumbs adhered mainly in the centre. The bead was then covered with a translucent light blue glaze, which gave an effect of light blue crumbs against a bluish black background. In the well-preserved specimen, the glaze always forms a continuous layer over the whole bead. Both the crumbs and the body may take other colour besides the typical one, due to various degrees of the decay of glaze, the difference in the original colour of the crumbs or the body material or the absence of the layer of black paint.
5. Inlaid Decoration. Some faience beads were inlaid with coloured stone. A necklace at the Cairo Museum (J. no. 47809) contains some blue faience pendantlike spacing beads which have a circular depression at the centre of one face. A roughly chipped carnelian disc was inlaid in the depression, probably by means of glue or gum. This kind of decoration is very rare for the faience bead.

## 8.2 Section II: Beads of Other Pasty Materials

Beads of blue frit, "frit" of other colours, pottery, clay and vegetable paste were also made by the ancient Egyptians, but were not so popular as the faience beads. They were

shaped into beads, mostly by modelling, while they were still moist and soft. Their technique of shaping was essentially the same as that for the faience beads, because all of them belong to the same class of material, namely a pasty material. Since the method of shaping has been discussed in considerable length in the last section, there is no need to repeat them here. Only, a brief description is here given for some special points which are particular to each of them.

The blue frit used for making beads was the same material as the powdered glaze mixture which was used with a flux to glaze objects and the Egyptian blue paint which was used with gum or white of egg for painting.<sup>25</sup> Some blue frit is gritty and hard and was probably made by shaping the mixture into the desired form around some axis, just as for the body material of faience, and then heated until the mass was half fused, but not so far as to become vitreous. The fine blue frit looks powdery, usually rather soft, and was probably cemented together by being baked slightly, but I am not sure about this point. Blue frit is of uniform colour through the bead from the surface to the core and was never glazed. Incised decoration was sometimes made by cutting out grooved lines, while the bead was still moist and soft.

"Frits" of various colours have been found and are called "paste" in some reports. They were probably made by the same method as the blue frit except the employment of a different colouring matter which was probably various kinds of ochre. They are presumed to be shaped into beads in a pasty state and never to be glazed. But as pointed out in Chap. 5 (on the identification of material), some specimens may have been made of natural mixture, shaped by grinding and pierced by drilling, while others may have been faience with glaze entirely lost. Unless there is some clear evidence of the employment of a technique for soft stone beads or of a previous existence of glaze, they are here called "frit" beads. It is also uncertain whether their main component is quartz or not, although they are certainly not limestone as proved by the acid test.

Pottery beads were made by modelling clay around some axis while still moist and then baked by a heat sufficient to drive off the chemically combined water and so became durable beads unacted upon by water thereafter. They are usually pink or red in colour like common pottery vase.

Clay beads are different from the pottery bead in that they were either never baked or baked very slightly that they become plastic again if wetted. They were mostly modelled on some axis which was either withdrawn or burnt out afterwards. In the latter case, the heat applied should be sufficient to burn out the axis (a thread or reed), but

<sup>22</sup> Ibid, pp. 138, 139.

<sup>23</sup> Beck's report in Brunton, Qau and Badari II, pp. 24–25.

<sup>24</sup> Cf. Brunton, Qau and Badari II, p. 20; and also p. 24. Beck's Report.

<sup>25</sup> For the manufacture of the glaze mixture and the blue paint, see Petrie, Arts and Crafts, p. 117.

insufficient to turn clay into pottery. One kind of clay beads is found to be still sticking on the thread. A bundle of these strings with the clay beads stuck on them was frequently used as plait of hair for the wooden doll. The quality of clay used for beads ranges from the coarse, porous mud, full of impurities, to the fine compact clay. The bead made of the

fine compact clay was usually painted black and burnished. Clay beads were sometimes painted with red colour, probably red ochre. Occasionally, a clay bead may have an irregular pricked decoration all over it.

Spheroidal beads of vegetable paste were made also by the modelling technique. They are brown, porous and very soft.

### 9.1 Section I: Manufacture of Metal Beads<sup>1</sup>

Beads of gold (including electrum), silver, copper (including bronze), iron and antimony have been found used by the ancient Egyptians. Gold beads were the most generally used one among them. The following description of the methods of manufacture and decoration of metal beads is mainly derived from gold beads, although some of them were also employed for the beads of other metals. Most metals have the following physical characteristics which can be utilized to advantage for the manufacture of beads: They can be hammered out into thin sheets (malleable), easily drawn into wire (ductile), bent without breaking when thin sheet (flexible) stuck together when heated sufficiently (tenacious) and finally melted and casted into any form. The main methods of the manufacture of beads are as follows:

1. Cut-sheet method. A lump of metal was hammered out into thin flat sheet and then cut into a large disc which was made into a bead simply by piercing a hole. It is sometimes called “wafer bead”.
2. Rolled-sheet method, A (not joined). Another simple method was by cutting the thin flat sheet into a small rectangular plate which was bent into a circle after the manner of rings. Some of them had the ends overlapping and not soldered, others had the ends butted together and also not soldered.<sup>2</sup> Reisner suggests that “it is possible that some of these beads may have been made by rolling a long strip of gold about a solid core (or axis) of metal or wood, and then dividing the long tube thus formed into sections”.<sup>3</sup> This method was employed for the beads of gold, silver, copper and iron, and was a very common one. A variety of it was that made of a thick strip,

rectangular in section, which was bent round until the ends touched.<sup>4</sup>

3. Rolled-sheet method B (joined). This was made by the same method as the above one (Method A), except that the joint was afterwards soldered (by means of some kinds of more fusible metal, alloy or mixture), or fused (by means of intense heat alone.) Soft solder was unknown till Roman times,<sup>5</sup> although one instance of hard solder (consisting largely of silver used to join together copper) has been reported.<sup>6</sup> The ancient soldering seems usually to have been effected by a mixture of a flux and some small fragments of the same metal as the object to be soldered. The flux promoted fusion, but the joint would not leave any great difference of colour. Vernier describes some beads of this kind in the Cairo Museum as soldered,<sup>7</sup> but Reisner describes some from Kerma as “fused together by heat”.<sup>8</sup> Perhaps both of them are right for their respective specimens, because both methods seem to have been practiced by the ancients. It should be noted that sometimes it is rather difficult to ascertain whether a particular specimen was joined by fusing or soldering. This remark is equally applicable to all cases whenever a question of the method of the joining of metal arises and will not be repeated below.<sup>9</sup>
4. Joined-halves method. A circular disc cut from a flat sheet of gold or silver was beaten into a die with a semi-spherical depression; and the halves were jointed together at the edges of the wide bases to form a ball bead or a bicon bead. The joint was rubbed or smoothed afterwards. The threading hole was pierced by an instrument

<sup>1</sup> For general reference, see William, *Gold and Silver Jewellery*; Vernier, *La Bijouterie et la joaillerie*; and Vernier, *Cat. Gen., Bijoux et orfèvreries*.

<sup>2</sup> Brunton, *Mostagedda*, pp. 51–52; Brunton, *Qau and Badari II*, p. 21; and also p. 22 (Beck’s report).

<sup>3</sup> Reisner, *Kerma IV*, p. 282.

<sup>4</sup> Brunton, *Mostagedda*, pp. 51–52, Sect. 64.

<sup>5</sup> Petrie, *Arts and Crafts*, p. 103.

<sup>6</sup> Lucas, *Materials*, p. 173.

<sup>7</sup> Vernier, *Cat. Gen.*, p. 21.

<sup>8</sup> Reisner, *op. cit.*, p. 282.

<sup>9</sup> For the method of soldering, cf. Vernier, *Bijouterie*, pp. 68–71, and William, *Gold and Silver Jewellery*, pp. 35, 38–39.

of round section; the jagged edges of the torn sheet may be seen inside the hole. The method of joining is described as soldered by Vernier,<sup>10</sup> and Mrs. William<sup>11</sup> but as fused by Reisner.<sup>12</sup>

5. Plating-on-core method. A sheet of gold was hammered into a very thin gold leaf, and then plated on a core of some other material. A common type had as core a grey or blackish pasty material, which is described by Petrie as “a paste of carbonate of lime”. Petrie gives the process of manufacture as follows: to beat out thin gold tubes carefully turned over to a flat end, and then filled with the paste in order to keep them from being crushed.<sup>13</sup> But probably more than one kind of pasty material was (used) employed for this purpose. Beck states that the thin gold leaf was mounted on “a core made of a mixture of a kind of resin and powdered crystal, quartz being used in one case, and calcite in another”.<sup>14</sup> For some barrel-shaped or spheroidal beads with small perforation, the paste core was probably shaped first, and then plated with gold leaf when it became hard after drying. The joining together of the gold leaf was regarded as by means of soldering by both Beck<sup>15</sup> and Vernier<sup>16</sup>; but for some of them, Vernier states that pressure alone was sufficient to make the gold leaf adhere on the core because of the thinness of the leaf.<sup>17</sup> The trace of the joint is usually not visible, and Orchard suggests that burnishing might have been done after fusion to obliterate overlapping joints and uneven places.<sup>18</sup> Some wooden beads were also plated with very thin gold leaf; the wood was usually first covered with a layer of special plaster (gesso) to which the gold was attached by means of an adhesive, probably glue.<sup>19</sup> Metal beads as bronze, copper and electrum were also gilded “by fusing gold leaf on the surface”.<sup>20</sup> Some hard blue frit beads were also plated with gold leaf, for example some beads in the Cairo Museum, No. J. 68317. For the sake of convenience, gilded beads of other materials, such as wood, other metal, blue frit or stone,

will be regarded as beads of that material decorated by gilding; and only the gilded beads either with a core of that particular pasty material as referred above, or with a core of some material entirely covered up and unidentifiable will be regarded as gold beads made by the plating on-core method. Beads of other material cupped with gold cups also will not be regarded as gold beads, but as beads of that material decorated with gold cups

6. Casting Method. The unpierced hour glass-shaped beads of gold on a bracelet from the tomb of Zer is described by Petrie as “doubtless cast, being solid”.<sup>21</sup> But they may have been shaped roughly by hammering, and then finished by grinding with some instrument, just as for the associated amethyst beads of the same form. A doubtless example of cast beads is some antimony beads found by Petrie at Illahun.<sup>22</sup> Some of them are in the Petrie Collection (no. 945) and show clearly a seam around the bead, due to the employment of a composite mould. The form of these antimony beads is rather un-Egyptian, and they were probably imported as finished beads from a foreign country.
7. Solid beads made by hammering and piercing method. Vernier describes some solid gold beads as being ground after having been hammered into rough form first, and being finally pierced for perforation,<sup>23</sup> and some olive-shaped gold beads as being cut into small pieces and pierced with a drill.<sup>24</sup> Certain kind of spacing gold beads was made by shaping a solid bar with rectangular section, and then piercing it with a series of holes; some of them was further cut or chiselled into a multiple bead which has a false appearance of being joined together from a series of separate beads.<sup>25</sup> Some solid gold beads used by the American Indians are described by Orchard as possibly made by a similar method: a piece of gold was drilled and put on a revolving axis; while revolving, the bead was hammered into the desired form, and the hammer marks were afterwards removed with some abrasive material.<sup>26</sup> Some solid gold beads mentioned by Petrie,<sup>27</sup> and one solid ring bead mentioned by Brunton<sup>28</sup> were probably also made by this technique.
8. Wire-winding method. Metal wire was wound spirally to form barrels or cylinders.<sup>29</sup> The method of making gold

<sup>10</sup> Vernier, *Cat. Gen.*, pp.13–14.

<sup>11</sup> William, *Gold and Silver Jewellery*, p. 67.

<sup>12</sup> Reisner, *Kerma*, IV, pp. 282-285.

<sup>13</sup> Petrie, *Prehistoric Egypt*, p. 27. His early view that the bead was made “by beating out a thin tube, and then drawing down the ends over a core of limestone” (*Arts and Crafts* p. 84) seems to have been modified.

<sup>14</sup> Beck’s Report in Brunton, *Qau and Badari II*, p. 22.

<sup>15</sup> *Ibid.* p. 22.

<sup>16</sup> Vernier, *Cat. Gen.*, pp. 272, 273.

<sup>17</sup> Vernier, *Cat. Gen.*, p. 45.

<sup>18</sup> Orchard, *Beads and Beadwork of the American Indians*, p. 55.

<sup>19</sup> Vernier, *Cat. Gen.*, p. 272; and Lucas, *Materials*, p. 189.

<sup>20</sup> Reisner, *Kerma IV*, p. 283.

<sup>21</sup> Petrie, *Arts and Crafts*, p. 86.

<sup>22</sup> Petrie, *Illahun, Kahun and Gurob*, p. 25, Sect. 47; Pl. XXIX, p. 56.

<sup>23</sup> Vernier, *La Bijouterie*, p. 89.

<sup>24</sup> Vernier, *Cat. Gen.*, pp. 13–14.

<sup>25</sup> *Ibid.* p. 18.

<sup>26</sup> Orchard, *Beads & Beadwork of American Indians*, p. 56.

<sup>27</sup> Petrie, *Prehistoric Egypt*, p. 27, Sect. 62.

<sup>28</sup> Brunton, *Qau and Badari II*, p. 21, Sect. 32.

<sup>29</sup> *Ibid.* p. 21.

wire is considered by Petrie as by hammering, not by drawing.<sup>30</sup> But it is questionable whether all of them were made by hammering. Vernier thinks that the fine wire such as used in the Dahshur crown could be manufactured only by draw plate.<sup>31</sup> The difficulty of Vernier's theory is that the drawing method as practiced by modern jeweller requires a greater mechanical power than available to the ancients to pull the gold wire through the hole of the draw plate. Heins suggests a more practical method: a strip of gold may be twisted, forming a spiral in cross section, the interstice of which are gradually diminished as it is drawn through the holes of the draw plate until the wire becomes solid.<sup>32</sup> But whether the actual method used by the ancients was one as suggested by Heins or not is uncertain.

## 9.2 Section II: Decoration of Metal Beads<sup>33</sup>

The methods of the decoration of metal beads are as follows:

1. Cast Decoration. The pattern was made in the mould so that all beads cast from it had the same pattern on them.
2. Carved or Chased Decoration. The surface of a solid or thick bead was carved with a pattern by means of some suitable instruments, probably a sharp chisel.
3. Repousse Decoration. Beads made by the Joined-halves method or pendant made of a fairly thin metal were decorated with a repousse pattern by pushing out into relief from the reverse side. Two methods were used for this purpose: (a) by punching the bead with small tools, and (b) by pressing (either hammering or burnishing) the sheet of metal on a stamp or a model which was engraved with the shape and the pattern of the bead. Instead of the method b, Beck mentions another method by pressing or stamping the thin metal (one half of the hollow bead) to shape between two tools which had on them the shape and pattern that were required on the bead.<sup>34</sup> But the second stamp is not only unnecessary, but also offers the technical difficulty of engraving it to fit exactly into the corresponding part of pattern on the first stamp, especially when the metal to be stamped is very thin.
4. Burnishing-on-core Decoration. Gold beads made by the plating-on-core method were decorated with grooved spiral or other pattern. The pattern was probably made either by burnishing a plated plain bead while the pasty core was still moist and soft and able to receive impressions, or by burnishing the gold leaf on to a spirally grooved core when the latter had dried and hardened. Broken beads of this kind, when the core was lost, look very similar to the fragment of the bead decorated by the repousse technique, but some trace of the pasty core usually still adheres to the gold leaf.
5. Inlaid Decoration. Beads with a depressed pattern were inlaid with other material of a different colour. The depressed pattern was produced by carving, stamping or soldering on the surface with small wires or thin ribs. The common inlaid material was coloured stone or blue frit.
6. Gilded Decoration. Base metal such as copper was covered with gold leaf which was adhered to the core by soldering or gluing (or gumming). For the gold bead made by the plating-on-core method, see method 5 of the last section.
7. Filigree Decoration. Thin metal wires were either joined together to form open-work beads without a separate matrix, or fixed on a matrix to form some decorative pattern.<sup>35</sup> The method of making metal wire has been discussed in the last section under the heading of the wire-winding method. For other technical details, compare the description of the granulated decoration given below.
8. Granulated Decoration. Metal globules were either joined together by themselves without a separate matrix, or fixed on a matrix to form a certain pattern. For the former kind of beads, the gold or silver grains were placed together in tiers, probably around a central core of some non-fusible material such as clay, to hold them in place while being permanently brought into an inseparable mass either by fusing or by soldering. The core was removed afterwards, leaving a clear perforation.<sup>36</sup> For the latter kind of beads, the gold grains were arranged into pattern on the surface of a gold matrix and held temporarily by some adhesive matter such as the ordinary flux, borax and finally fused or soldered to their ground. Heins thinks it impossible by soldering to keep the work as delicate in appearance with as much of the surface of the grains left free as is possible by fusing.<sup>37</sup> The metal grains were made either by pouring molten metal through a screen and allowing it to fall from a great or less height into water or by means of a blowpipe flame. In the latter method, a block of non-fusible matter such as asbestos or charcoal was used, on

<sup>30</sup> Petrie, *Arts and Crafts*, pp. 84, 85, and 90.

<sup>31</sup> Vernier, *La Bijouterie*, pp. 58–62; and also his article in *B.I.F.A.O.*, vol. XII (1916), pp. 40–42.

<sup>32</sup> William, *Gold and Silver Jewellery*, pp. 39–44.

<sup>33</sup> Besides the general references given in the footnote (1) of Section I, see also Beck, *Classification*, pp. 57–59.

<sup>34</sup> Beck, *Classification*, p. 58.

<sup>35</sup> Petrie, *Arts and Crafts*, p. 94; Vernier, *Cat. Gen.*, pp. 225–226.

<sup>36</sup> Orchard, *Beads and Beadwork of American Indians*, p. 49.

<sup>37</sup> William, *Gold and Silver Jewellery*, pp. 33–38, especially p. 36.

which some small pieces of gold could be reduced to a molten state, by directing a blow-pipe flame upon them and as soon as they reached that state, they assumed a globular form which they retained after cooling.<sup>38</sup>

9. Coloured Decoration. Some gold beads were coloured with a rose pink film, which was intentionally put on, probably by being dipped in a solution of an iron salt and then heated. Thin film of other colour, such as dull yellow, grey, red brown, red or purple, is also found on the surface

of some gold beads, due to either a chemical change of the contained impurities in the exposed part, or a staining of the gold by organic matter.<sup>39</sup> They are fortuitous and will not be considered here as coloured decoration.

10. Miscellaneous Decoration. So far as ancient Egypt in concerned, we have not noticed any metal bead decorated with the etched method, nor with any one of various kinds of the enamelled method (simple enamelled, *champlevé*, *cloisonné*).

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<sup>38</sup> Orchard, *op. cit.* p. 48; William, *op. cit.*, p. 34; Vernier, *La Bijouterie*, pp. 126–130.

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<sup>39</sup> Lucas, *Materials*, pp. 190–191; cf. William, *Gold and Silver Jewellery*, p. 31.

Besides the various materials given in the last four chapters, others were also used by the ancient Egyptians for beads. But they were either very rare, or numerous but limited in number of type of beads. The most important of them are bone, coral, ivory, resin (including amber), reed, shell (including mollusc-shell, ostrich-shell, and pearl-shell), and wood. The technique of bead-making for most of these materials were rather simple, and were mostly similar to that for the stone beads. A few remarks may be given for some special points which are peculiar for each of them:-

1. Bone. The bones employed for beads were usually the long bone (femur, ulna, or radius) of birds or small mammals. Usually it was not cut off entirely by scoring, but was broken off when the cutting was carried far enough to insure easy breaking. In the finished beads, the jagged edges had been smoothed probably on a sandstone slab.<sup>1</sup> Some of them may have been sawn into sections. The natural cavity of the bone serves as perforation, usually rather large. The surface of the bead was sometimes smoothed, but the cross-section was generally left in the natural form, namely, nearly cylindrical with a tendency to the prismatic or elliptical form. Some spacing-beads were made from the fragment of the long bone of big animals, which were cut, pierced and smoothed as a hard wood. Bone beads were occasionally decorated with incision, probably by means of a sharp point or chisel. Some glazed beads are recorded as perhaps of bone,<sup>2</sup> but they are more likely to be glazed steatite. Some small disc-beads called “bone”<sup>3</sup> seem to be made of shell.
2. Coral. Pipe coral was broken up into separate tubes which could be threaded directly as beads because of being naturally hollow. Noble coral was shaped,

perforated, and smoothed by the same technique as for the soft stone.

3. Ivory. Ivory is not so brittle as stone, but is similar to the harder wood in consistency. It was worked with much the same tools and methods as woodwork.<sup>4</sup> It was splitted and divided into small solid pieces, probably by an adze or saw. The small piece was shaped into the desired form, and then drilled and smoothed. Ivory contains an oily or waxy solution which contributes to the beautiful polish. In the Byzantine (Coptic) period, ivory beads were frequently shaped by the lathe which was commonly used for the woodwork at that period. Ivory beads were decorated by the incised, pattern, which was sometimes filled with black colour. The un-cised pattern was made either by the free-hand, or by the lathe; in the latter case, the incised line goes around the bead nicely and evenly. Dot and ring pattern was made by a sharp point and a tubular drill. Beck states that some beads from Armant “appear to be either bone or ivory, and used as cores for metal beads”,<sup>5</sup> but his identification of material in this case requires further confirmation. Some early beads recorded as “ivory”<sup>6</sup> seem to be made of long bone as shown by the size of their perforation and the form of their cross-section.
4. Resin (including amber). Amber and other resins were made into bead by the same method as that for the soft stone. Many of the amber beads of the Roman-Byzantine period are in lumpy form,<sup>7</sup> and it seems that an amorphous piece of amber, naturally smoothed, was made into bead simply by piercing a hole. This is probably due to the fact that amber was worn more for its supposed magical and medical properties rather than for its

<sup>1</sup> Cf. Orchard, *Beads and Beadwork of American Indians*, p. 29.

<sup>2</sup> Junker, *Kubanieh-Nord*, p. 88.

<sup>3</sup> Carter and Carnarvon, *Five Years' Explorations at Thebes*, pp. 79, (nos. 47, 49), p. 80 (no. 53), p. 81. (nos. 55, 59), p. 85, no. 78, and elsewhere; Pl. LXXIII, 53, 78.

<sup>4</sup> Reisner, *Kerma IV*, p. 127, 249.

<sup>5</sup> Mond and Myers, *Armant I*, p. 83.

<sup>6</sup> For example, two beads from Mostagedda 2913, see Brunton, *Mostagedda*, p. 29; Pl. XXXIX. 76B (cross-section not shown); another one in Brunton, *Badaria, Civ.*, Pl. XLIX, 79 Pl. 3.

<sup>7</sup> Brunton, *Qau and Badari III*, p. 27.

decorative effect, and therefore there was no need of shaping it into an agreeable form. But some of them were shaped into regular beads, and some were even decorated by carving or incising.

5. Reed. Reed bead was very rare, and was probably only used for votive purpose, because this material is rather fragile. Naville found at the temple of Deir el Bahari a curious form of bead made of small pieces of reed bent into shape.<sup>8</sup> Some of them are in the Petrie Collection (no. 1,157). It was made from two sheets of reed, each 1 cm, by 3 cm, which were folded into a flat and square bead.
6. Mollusc shell. Since the complete mollusc shell is considered as belonging to amulet proper, it is excluded from discussion here. But some thick mollusc shells (perhaps including the internal shell of cuttle-fish) were broken up into small pieces for making ordinary beads. For the disc-bead, the process was probably similar to that one practiced by the native of the South Sea, which is as follows: shells are broken up into small pieces by stone hammer chipped into rough discs, ground flat and smooth with grinding stone on sunken holes of flat wood, pierced with a hole by flint or chalcedony drill, and finally the edge is smoothed by grooved stone.<sup>9</sup> For the long beads, such as cylinder-bead and barrel-bead, they were cut or chipped into shape, pierced with a hole, and finished by smoothing, all probably by the same technique as those for the stone beads.<sup>10</sup> The only exception was the bead made from dentalium shell which was made into cylindrical bead simply by cutting into sections. Junker describes some disc-beads as glazed mollusc-shell substance.<sup>11</sup> They are probably glazed steatite wrongly identified. The chemical composition of shell is mainly calcium carbonate; and it is extremely unlikely that such a substance would be used as a core for glazing, because the heat used in the glazing process, about 900 C.,<sup>12</sup> would convert calcium carbonate into quicklime, a substance which would crumble to dust by a slight touch.
7. Ostrich shell. Ostrich shell is a very suitable material for the disc-bead. It is fairly soft, and thus facilitates the labour of both the smoothing and drilling process. It has a thickness of about 2 mm., and is fairly flat when

broken in small pieces, so the work of shaping is limited to the task of rounding and smoothing the edge only. In Africa where this material is available, it has been used for making beads from very early period, even before the Neolithic times. Ostrich-shell beads were made as early as the Middle Capsian period at Tunis,<sup>13</sup> and were found extensively used at Kharga Oasis by the Capso-Tardenoisian people.<sup>14</sup> Some unfinished beads in various stages of manufacture were also found in the Neolithic Fayum, and show that they were made as follows: They were first broken into suitable size and chipped along the edge to a roughly discoidal form, then were pierced with a hole, and finally were peripherally rubbed probably in a grooved bead-rubber.<sup>15</sup> At ancient Fara in Palestine, several sites, of bead workshop have been found. In the Site M, fragments of ostrich shell were found together with flint boring-tools and fragments of various semi-precious stones. At the Site H, a sandstone grooved bead-grinder was also found; and the circumstances of the ostrich-shell beads which were manufactured in the site were found to conform exactly with the grooves, but here no flint bead-borer was found.<sup>16</sup> Since ostrich-shell is rather soft, borer of other material softer than flint was probably used for perforation in the latter site. Although the material of shell is soft and the bead is thin, the perforation was usually from both sides, mostly with conical holes. This was done probably with the intention to avoid the breakage of bead during the drilling. Due to its thinness and brittleness, it was very easily broken, as shown by the abundance of broken pieces with perforation half way through at various sites of workshops.

8. Pearl shell. Strictly speaking, pearl shell is simply one kind of mollusc shell. But due to their technical peculiarity, beads made of pearl shell form a separate class. Pearl shell was and is still prized for its beautiful lustre of its inner layer. It was broken and cut into small thin plaques, with the dull black or white outer layer of shell ground away. The edge was smoothed by grinding, and holes were made by drilling. Beads of pearl shell were usually so strung that the pearly surface, not the dull edge was facing the spectator.
9. Wood. Wood beads were not common. They were made by the same tools as those for other kind of woodwork. Wood was cut into small pieces by adze or saw, and then shaped into beads by chisel or knife. They were perforated by drill and finally smoothed on some stone slab.

<sup>8</sup> Naville and Hall, the XIth Dynasty Temple at Deir el Bahari, pt. III, pp. 17, 26; Pl. XXVII. 6.

<sup>9</sup> Woodford, Manufacture of the Malaita shell bead money of the Solomon Group, in *Man*, vol. VIII (1908), no. 43.

<sup>10</sup> Cf. Orchard, *Beads and Beadwork of American Indians*, p. 26.

<sup>11</sup> Junker, *Kubanieh-Sud*, pp. 100, 102–103, 108–109.

<sup>12</sup> As shown by the complete dehydration of the bulk of the glazed steatite objects, see Bannister and Plenderleith, *Physico-chemical examination of a scarab*, in *J.E.A.* XXII (1936), p. 5.

<sup>13</sup> Menghin, *Weltgeschichte der Steinzeit*, p. 181; Pl. XX; 18–19.

<sup>14</sup> Caton-Thompson, *Prehistoric Research Expedition to Kharga Oasis*, in *Man*, XXXII (1932) no. 158, p. 132 and Fig. 3.

<sup>15</sup> Caton-Thompson, *The Desert Fayum*, p. 34.

<sup>16</sup> MacDonald, *Beth-pelet*, II, p. 8; Pl. XXII; p. 12; Pl. XXIV, 45; Pl. XXV, 52; and Pl. XXVI, 54.



Wood beads were sometimes carved with pattern, or plated with gold leaf. In the Roman-Byzantine period, the lathe may have been employed for shaping the bead as well as for incising some linear pattern.

Ancient Egyptians also used complete mollusc shell<sup>17</sup> claw of animal,<sup>18</sup> teeth of animal, crocodile, or shark,<sup>19</sup> thoraxes and femora of beetle,<sup>20</sup> vertebrae of fish,<sup>21</sup> seed

and stones of plant.<sup>22</sup> Most of these materials only required the drilling process to make a hole without any further trouble, and for some of them even the drilling was unnecessary because of their possession of a natural hole. But since these objects belong to the amulet proper, and are here not regarded as beads, their technique and other considerations are excluded from this work.

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<sup>17</sup> e.g. Pettrie, *Amulets*, pp. 27–28. Sects. 107–122.

<sup>18</sup> e.g. *Ibid.* p. 13, Sect. 24 k.

<sup>19</sup> e.g. *Ibid.* p. 13. Sect. 25.

<sup>20</sup> e.g. Mond and Myers, *Armant I*, p. 92.

<sup>21</sup> e.g. Brunton, *Badarian civilization*, Pl. L, 86z.

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<sup>22</sup> e.g. Mond and Myers, *op. cit.* p. 92; and Moellers and Scharff, *Abusir-el-Meleq*, p. 60, stone of grape.

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**Part III**

**Classification and Corpus**

Classification and corpus are closely related, but they are two separate subjects. A classification must be systematic and based on some definite criteria, but it can deal with the broad divisions only. On the other hand, corpus may be compiled just in the order of working routine or in the chronological order of objects themselves without any systematization, but it must be more detailed and fully illustrated in order to facilitate identification. But usually, the arrangement of corpus is largely based on the classification, perhaps with certain modification for the sake of easy reference.

In consideration of abundance and multifariousness of beads, their classification offers a serious problem. In common with other sciences, a true classification should attempt firstly to be a convenient and intelligible arrangement and secondly to afford a summary exposition of our knowledge of the subject. This second object is more important than the first, but also more difficult to achieve. An arbitrary arrangement may serve the purpose of convenience, but will form a perpetual bar to the advancement of our knowledge. On the other hand, a scientific classification may not be easy to learn and may require perpetual modification and adjustment, but inasmuch as it represents the existing state of knowledge, it will aid in the understanding of the subject and form a base for the progress in future.

But a classification of beads has also its own particular requirement. In any discussion of this problem, we must keep in mind the following two points: firstly, a satisfactory classification of beads must be based on some criteria that are significant for dating purpose; secondly, it ought to be easily converted into a corpus of beads with some ramification and certain modification. Although it is not practical to use a single criterion for the whole system, a sound classification should as a rule be based primarily on one criterion, and the classes so formed should be subdivided by secondary criteria, as proposed by T. E. Peet for classification of Egyptian pottery.<sup>1</sup> This primary criterion must be the essential, not accidental characteristic of beads, and

should be distinctive so that the main divisions can be clear-cut.

Now let us consider some classifications of beads at present in vogue. The first one which comes to our mind is Beck's classification in his monumental essay on beads.<sup>2</sup> Beck classifies beads into four divisions: regular rounded beads, regular faceted beads, special type beads and pendants, and irregular beads and pendants. Regular beads are subdivided according to their form, mainly form of imaginary geometrical nature, entirely regardless of material or technique. For the special types, if we exclude amulets, scarabs and seals, the principle of Beck's system is multiple. It is sometimes based on form (e.g. Group XVII multiple beads, Group XIX special faceted beads), sometimes on technique (e.g. Group XXIV filigree beads, Group XXV granulated beads) and sometimes on pattern of decoration (e.g. Group XLVI spot and eye beads, Group XLVII zone beads, etc.)

Beck's classification, especially that part dealing with regular beads, looks extremely systematic and very attractive. So it was adopted in the first stage of my work, as stated above in [Chap. 3](#). But from my experience, this system, though systematic, is far from scientific. If one proposes to classify snakes according to their length first and diameter second as they come to maturity, it would not be regarded by any zoologist as scientific in spite of its being systematic. Although beads are not so complex in structure as snakes, yet they do possess, besides the external form, certain characteristics in technique and material for various periods. The fault of Beck's classification of regular beads is that too much attention has been put upon the accidental features instead of the essential ones. It is probably due to the fact that Beck intends to make his system "applicable to the beads of all countries". In order to be applicable for all countries and all periods, it has to

<sup>1</sup> Peet, *The Classif. Of Eg. Pottery*, in *JEA*, XIX (1933), p. 62.

<sup>2</sup> Beck, *Classification*, in *Archaeologia*, LXXVII (1928).

leave out most of those features which are peculiar to a certain place at certain period alone. Although this system can serve the purpose of pigeonhole, it is almost useless for dating purpose so far as regular beads are concerned. A method of classification must be suggested by the objects themselves, not by the pure imagination of systematist. In this case, we are dealing with archaeological evidences, i.e. tangible works of the hands of men in the past. We must pay attention, not to the imaginary geometrical form, but to the feature which is expressive of the activity of hands or brain of men. It must be approached mainly from the technical viewpoint, while material and form are considered only in so far as they will either limit or reflect the exercise of human hand or brain. A classification of beads according to the imaginary geometrical form alone is too artificial to have any chronological value. Any elaboration of such a system only tends to obscure rather than clarify the nature and relation of various true types and thus defeats its own object.

Beck's classification of special beads is more acceptable. But as stated above in [Chap. 2](#), scarabs and seals should be excluded. Amulets may be included, but should form another main division separated from beads and pendants in the narrow sense. As amulets are excluded from this essay for the reasons given in Chapter II above, there is no need to consider their classification here. For the remaining groups, although it is not practical to make a classification on one single principle, yet it must be decided which principle should be given a preference. Any exception to the general rule should be plainly stated. As to the details, it is also capable of being improved. This part of Beck's system, after being modified and adjusted, will be assimilated into the new classification.

As to various classifications designed and used by excavators for Egyptian beads, the most important ones are those of Engelbach and Brunton,<sup>3</sup> Reisner,<sup>4</sup> and Junker.<sup>5</sup> For the regular beads, these systems are more practical than Beck's system, because they are derived from the study of actual objects, not from the exercise of abstract imagination. Unfortunately, technique receives far less attention than it deserves. This is probably due to the following two facts: Firstly, all of them are originally designed for the publication of beads from a certain period only. The technique of bead-making does not show great change within a single

period. The difference and the chronological significance of technique are revealed only by a comparative study of beads of various periods. Secondly, all of them use the form of beads as a primary principle for classification and describe the materials of beads under the heading of various forms. Technique of bead-making is differentiated usually according to material, not form. Each class of materials has its own peculiar technique, which develops along different route. Only by grouping together the beads of the same material, but of different dates, we may expect to discover the peculiarity of technique for various periods. But a grouping together of the beads of same form, but of different materials, will make the form only an abstract geometrical conception, deprived of all peculiarities which are limited to certain material by certain technique, and so it hinders the revelation of difference and chronological significance of technique. As to the special beads, since these systems are designed for the publication of actual finds from a single excavation, they could not be comprehensive, because these beads are always comparatively scarce. Their data are not sufficient for any systematization on large scale. This part of their classification is less satisfactory than that in Beck's.

Now let us consider these systems separately. Engelbach-Brunton system, while keeping to the same principle, shows some variations in its application to different periods. We may take that one set forth in *Qau and Badari II* as typical example, because here this system is at its best. There are four main classes: cylinder, barrel, spheroid and ring. (In *Harageh, Gurob* and *Lahun II*, those ring beads with straight profile are called disc beads and form a separate class). Decorated beads are classified into fancy cylinder, fancy barrel and fancy spheroid, but crumbed beads are grouped together regardless of their form. Other classes of special beads are prism, flattened barrel, drop, pendant and spear. It seems to me that decorated beads are better classified by pattern and technique of decoration rather than by form, as already pointed out by Beck.<sup>6</sup> The principle for subdivision is multiple, including form, material and technique. Certain attention has been paid to technique in this classification which is better in this aspect than other systems, but it seems to be still insufficient.

Reisner's classification of ordinary beads is similar to Brunton's system and includes four classes only: barrel, cylindrical, ball, ring and disc (In Kerma IV, ring and disc beads form two separate classes, the former being smaller in diameter than the classes, the former being smaller in diameter than the latter). They are subdivided according to material. Painted spiral beads are included in various classes of ordinary beads according to their form in Kerma, but

<sup>3</sup> Engelbach, *Harageh*, pp. 5-6, pls. XLIX-LIV; Engelbach and Brunton, *Gurob*, p. 5, pls. XLII-XLV; Brunton, *Lahun II*, p. 36, pl. LXII; *Bad. Civ.* pp. 27, 56, pls. XLIX-L; *Qau and Badari*, I-III, passim; *Mostagedda*, passim.

<sup>4</sup> Reisner, *Kerma IV*, pp. 106-127; *Naga-ed-Der*, I, p. 118; III, pp. 142-153.

<sup>5</sup> Junker, *Kubanieh-sud*, pp. 104-108, 184-190, Text Figs. 57, 58 and 86; *Kubanieh-nord*, pp. 89-90, 120-121, 148-149, pl. 10.

<sup>6</sup> Beck, *Classification*, p. 2.

form separate class in Naga-ed-Der III. Other classes are established for beads of special form, decorated beads and one for beads of special material (ivory beads form a separate class in Kerma IV). The general criticism stated above may be applied to Reisner's system with equal validity.

Junker's classification of ordinary beads is according to the profile and length of beads: I beads with straight profile (e.g. cylindrical beads); II short beads with curved profile (e.g. ring beads, ball beads); III long beads with curved profile (e.g. barrel beads); and IV beads with pointed curve, that is, with broken curve (e.g. bicone beads). Each of them is subdivided according to the length and general feature of beads. Beads of special forms or decorated ones have their own class, but some of them are included in the ordinary beads (e.g. drop beads under III, melon beads under II). Besides those defects pointed out in general criticism, the primary principle of this classification is neither clear-cut nor significant. It is sometimes very difficult to decide whether the profile of a small bead is curved or straight, nor is it easy to distinguish a barrel bead from a bicone bead in certain cases. Sometimes, the profile of beads has no significance at all. In a string of faience ring beads, some of them may have curved profile, some straight profile and an accidental feature resulted from the glazing process.

There are other classifications designed by excavators for the publication of finds from sites in Nubia,<sup>7</sup> or in other countries.<sup>8</sup> Since they are more or less similar to those criticized above, there is no need to retain us any further.

It is now obvious that for a monograph on ancient Egyptian beads, all the prevalent classifications seem to be unsatisfactory. We may approach from another angle the problem of how to construct a new classification. In the field of Egyptian archaeology, the first worked out and widely used classification is that one for the Predynastic pottery. It is first classified into nine classes, mainly according to material and decoration; then, within each class, a corpus of forms is made, arranged in a consecutive order of shapes.<sup>9</sup> T. E. Peet has criticized it relentlessly and suggested that "a sound classification of pottery should as a rule be based primarily on one principle, preferably that of material, and the classes so formed should be subdivided by secondary principles".<sup>10</sup> But even in Petrie's original system, it is recognized that pottery should be first classified by some primary principles, mainly material and decoration, before

being classified according to variation in form. Now, the objects included in the term "beads" are much more heterogeneous than pottery. It belongs to the same category as the term "vase". All vases serve the same purpose as container, but they are made of various materials, mainly metal, faience, glass, pottery and stone. Although certain forms of vases are common to all of them which often show mutual influence in this respect, yet nobody would suggest to classify "vases" firstly according to their form regardless of material. The same ought to hold true for the classification of beads.

Although a classification of beads may get some suggestions from those of other antiquities, yet the details need separate consideration. Does here material also hold a position of paramount importance. Various criteria for differentiating and thus classifying beads are of unequal value. As pointed out above, difference of technique or difference of form due to technique is extremely valuable for the dating purpose. But techniques are different according to material, because they belonged to different crafts and evolved along different routes. Technical consideration of beads is impossible without having them classified first according to material. It seems to me that material should be used as primary principle of classification of beads. It has another advantage of being so clearly differentiated that the resulted divisions will be very clear-cut.

As a matter of fact, material is generally recognized as important for the description of beads and does enter into consideration in some systems of classification. But almost all systems relegate it to a secondary position if not totally ignore it. The only exception, as far as I know, is one used by Petrie for the registration of the beads from Tarkhan and another by Reisner for the beads from Samaria, Palestine. Petrie classifies the beads from Tarkhan into eight classes for the convenience of being represented in eight diagrams. Here, material is used as one of the primary principles. Classes 1–3 and 5 are glazed pottery (faience), 4 and 6 are carnelian, 7 amethyst and 8 garnet.<sup>11</sup> In Petrie's original system, it is difficult to extend it so as to include all kinds of beads. What we have to differentiate is group of materials, not individual material. Otherwise, the main divisions of beads classified according to material will be too numerous to be controllable, besides losing their significance by such minuteness of division. Reisner uses for the beads from Samaria a classification, the primary division of which is still nearer to what I have in mind. He classifies them into six classes of the beads proper, namely variegated glass, plain glass, faience, stone, bone and coral, and one class of pendant.<sup>12</sup> But if we take into consideration the facts as set

<sup>7</sup> For example, in Steindorff, *Aniba I* (1935), p. 47; *Aniba II* (1937), p. 93; Emery and Kirwan, *Excavations and Survey* (1935), pp. 533–539. Figs. 483–491.

<sup>8</sup> For example, in Marshall, *Mohenjo-daro*, pp. 510–517, pls. CLXV–CXLVII; Wooley, *Ur Excavation II*, pp. 366–369; Starkey, *Beads of Beth-Pelet*, 6 plates in Duncan, *Corpus of Palestinian pottery* (1930).

<sup>9</sup> Petrie, *Naqada* (1896); also his *Corpus of Prehistoric pottery* (1918).

<sup>10</sup> Peet, *The Classif. Of Eg. Pottery*, in *J. E. A.*, XIX (1933), p. 62.

<sup>11</sup> Petrie, *Tarkhan 11*, p. 13, Pls. XLIV–XLV.

<sup>12</sup> Reisner and Fisher, *Harvard Excavations at Samaria*, pp. 379–382.

out in part II (Technical Methods of Bead-making), certain modification seems still necessary.

It seems to me that materials should be grouped according to technical processes involved in their manufacture for beads, and consequently, the following seven groups are suggested for the main divisions:

1. Glass G. It is used in a fused state when hot.
2. Hard stone H. It is unglazed stone with a hardness above 5.5 in Mohs' scale, that is, harder than an ordinary knife blade.
3. Glazed stone L. It will include both hard and soft stones which show evidence of being glazed or baked.
4. Metal M. It is malleable and fusible.
5. Pasty materials (including faience) P. They are modelled or moulded cold in a pasty state.
6. Reminders R. This group is rather heterogeneous and includes all materials that do not fall in other groups, but are either very rare or numerous but very limited in number of type of beads so that it seems unjustifiable to give a separate existence to any one of them.
7. Soft stone S. It is unglazed stone with a hardness up to 5.5 in Mohs' scale.

It is obvious that each of these groups, except the Group 6, includes materials of similar nature, manufactured mostly by workmen of the same craft, and the resulting beads have the form which reflects the nature of material and the technical process involved.

Each group, when necessary, will be subdivided into two subgroups: undecorated and decorated. Decorated beads in each material form a subgroup separated from the ordinary undecorated one, because they usually afford new criteria for subdivision in classification as well as being more numerous in type and more characteristic for the dating purpose. For the sake of brevity, each group is represented by one letter (as given after the name of material) and each subgroup by two letters (suffixed with letter N or D), for example the letter G for glass beads, GN for glass beads not decorated and GD for glass beads decorated.

The groups thus formed should be subdivided by the technical difference, and for the decorated beads, both the pattern and the technique in applying pattern should be taken into consideration. Then, and only then, the form should be brought in to complete the task. And even then, we can deal with the main type only. As to the slight variations in shape and size, or in the minute details of pattern of decoration, those features which may be helpful for facilitating identification, but otherwise seem to be of much less chronological significance, may be safely relegated to corpus rather than to overburden the system of classification.

After the principle of classification has been settled, we may proceed to the task of working out the details of a new classification and afterwards to the problem of transforming classification into a workable corpus.

While the principle of classification set out in the last chapter seems to be fairly sound, the detailed scheme given here is just a tentative proposal to show how the principal can be put into practice. This detailed scheme is not pretended to be perfect and final and is certainly capable of being improved or modified by later discoveries.

The main structure of this scheme is as follows:

1. Gradation. Three grades are given in this classification: (1) group, according to the group of material; (2) family, a subdivision of group whenever possible according to the method of fabrication; (3) class, the smallest unit of this broad classification according to the form and decoration. A secondary grade may be formed by dividing each of them whenever necessary and will be called subgroup, subfamily and subclass, respectively. In Beck's classification of beads, the various grades are also called group, subgroup, family and class.<sup>1</sup> These terms and their relative position are retained, but they have new meaning. Just as in palaeontology, the length of time range of each group, each family and each class varies, but the time range of a class falls naturally within that of a family and that of a family within its group. This latter fact here is quite logical, because chronologically, it is only within the period when a certain material was used that one of the methods of making beads from that material was practiced, and it is only within the still narrower time range that beads of any form or decoration made by that technique from that material were manufactured. On the other hand, the gradation in a classification based entirely or primarily upon the form of beads is entirely artificial and devoid of any really chronological significance. Moreover, as in the classification of animals and plants, when we attempt to characterize divisions of beads, we find that in advancing from the smaller to the larger combination, many of the most obvious but superficial features

become of less avail, and we are compelled to seek for more constant and comprehensive signs; in our case, signs derived from techniques. Another advantage of this kind of gradation as adopted here is that, owing to the consideration of forms being relegated to the last step, the misunderstanding or mistake will be less serious if we type two almost identical beads to two classes but the same group and the same family than to type them to two different groups or families widely separated. It seems unavoidable that sometimes beads of an identical form may be typed to different classes, because some beads have such a shape that it is difficult to assign them definitely to one class instead of another.

2. Subdivisions within each grade. In regard to the number of subdivisions within each grade, there are seven main groups as given in the last chapter, but the number of family varies considerably, depending upon which group they belong. Some classes are placed directly under group when there is no subdivision into families in that group. The number of class also varies according to family or group. New family and new class will be added by later discoveries.
3. Order in the arrangement. As stated by Eisen, "a systematic arrangement in the same sense as that used by naturalists is not possible in regard to beads, because, unlike plants and animal, they have not always been derived from one another, but from the artisan's fancy, which, however, was often induced by the technique".<sup>2</sup> In the grouping together of classes into a family, due attention has been given to the techniques. As to the order in the arrangement of subdivisions within each grade, it is inevitable to be somewhat arbitrary, but an effort has been made to aim at easy reference whenever possible. The order of groups is according to the alphabetic order of their symbols, but that of families in each group is arbitrary, arranged in the order as given in

<sup>1</sup> Beck, *Classification*, p. 8.

<sup>2</sup> Eisen, *Lotus beads and Melon beads*, p. 29.

the part on the technical methods. The order of classes is also arbitrary, but usually follows that one given in Beck's classification. Whenever possible, the classes which are topologically nearest to each other are placed together. A plate will be given to show the order of the key forms of class regardless of material.

4. Terminology. Each class has a specific name, e.g. segmental beads, and a "full class name" by addition of the group name and family name, e.g. glass segmental beads by the wire-winding method. These specific names are taken from current archaeological literature. As stated by the authors of the report of Gurob, "it is admitted that some of the names are not very happy",<sup>3</sup> but since English is a foreign language to me, all I can hope for is not to make the situation still worse. Each kind of beads should be

described by the full class name, not merely the specific name alone. For the sake of brevity and convenience, the full name can be represented by a set of symbols. It is suggested that capital letters are used for the group name, Arabic numerals for the family name and small Roman numerals for specific class name; for example, GN5xiii.

The advantage of this new classification for the dating purpose will be shown in Part IV when a chronological survey is attempted. There it will be seen that when the full class name of a bead is known, we usually can give a more or less definite date for that bead. It is hoped that this new classification will afford a convenient basis for a summary exposition of our knowledge of the chronology of ancient Egyptian beads; in other words, it is hoped to serve to express most, if not all, generalizations in that chronology.

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<sup>3</sup> Brunton and Engelbach, Gurob, p. 5, sect. 10.



The business of the corpus is still more tentative and less perfect than details of the classification. Any essential alteration in the latter will affect the former, because a corpus is based upon the broad classification. Moreover, certain conventions are introduced when the classification is transformed into a corpus, and some of these conventions may be not sound and require certain alteration and improvement. The details of a corpus are themselves also perpetually subject to addition and small modification.

Before we come to the details of this new corpus, the general principles of a bead corpus should be first discussed. As pointed out by Myers, “if Egyptology is to become an exact science, it can do so only by the fullest application of the basic idea of *corpora* introduced by Petrie into Egyptology”.<sup>1</sup> But some of the basic principles require to be clarified.

As stated at the beginning of Chap. 11, although a corpus is usually based upon the classification, there are certain differences between them. The first requirement of a corpus is the convenience for reference as well as for quotation. As pointed out by Petrie, the main use of a corpus is “to record discoveries and especially groups of objects rapidly and in a small compass”.<sup>2</sup> A corpus should be designed in such a way that the object to be identified can be easily found in the corpus if it has been discovered before and also can be expressed with a notation which is simple in form but comprehensive in information.

In order to achieve these purposes, pictorial representations drawn to scale are freely used to illustrate all known types, and a set of symbols is employed to represent these types. Both of them are not so essential for a classification. The main aim of a scientific classification is a systematization of our knowledge regarding the subject, while that of a corpus is an index for ready reference. A manual of natural history may arrange the animals according to the

alphabetic order of their names and group together those with the same initial letter, which will serve the purpose of an index, but not a classification. The main reason why a corpus usually adopts some classification as a basis is that the latter is always very systematic and thus will facilitate the task of identification in the use of the corpus. For the sake of ready reference, the unit of a corpus may be an individual object (as in a corpus of Greek painted vases), and it may include all varieties, whether essential or not; but for a classification, the unit must be a class of individuals, not an individual, (although it may happen that a class is represented by a single specimen), and all non-essential varieties should be ignored, otherwise a summary exposition on the subject is almost impossible, and thus, the very object of a classification is defeated. For the same reason, a classification is usually arranged systematically in grades like a pyramid, based upon various essential criteria, not limited to the shape and decoration alone. For a corpus, certain points of the classification have to be modified in order to give a ready reference and a simple notation. Among the various essential criteria used in the classification, the shape and decoration will occupy a disproportionately predominant position in the system of a corpus, owing to the fact that the latter is always represented by means of drawings. As to the notation, the running numbers are usually given for the whole series of types in a corpus. In the current corpora of Egyptian pottery, the running numbers used are from 1 to 99. It is admitted that the distinctiveness of the types are not equal. Some of them form a distinctive class by itself, while others can be amalgamated into one class. These classes can be grouped together into a broad class, and the process can be repeated until they are finally reduced to a few main divisions. This kind of grouping is necessary if a classification is attempted; but for a corpus, the prevalent mode seems preferable because the running number gives a simpler notation. Again taking the pottery corpus for an example, Petrie and his school have drawn every vase they have found and divided them into ninety-nine types according to the shape of pot, except the

<sup>1</sup> Mond and Myers, *Armant* 1, p. 49.

<sup>2</sup> Petrie, *Methods and Aims in Archaeology*, p. 124.

prehistoric pottery, which is divided into main classes first. Peet criticizes this system and says that “unfortunately, material and technique have received far less attention than form.”<sup>3</sup> But its defects are not so serious, if we regard it as a corpus, not as a classification (whether even for a corpus it is capable of being improved or not is another question for the ceramographer to decide.) It seems to me that if a corpus is designed not merely as an index for the recording of the form and decoration alone, but also as a summary exposition of our knowledge on the subject in its various essential aspects, the corpus should adopt a scientific classification as a basis and keep to it as close as allowed by the consideration of ready reference.

Now come to the essential conditions of a satisfactory corpus. Firstly, the arrangement of the drawings should be clear and not overcrowded so that they can be searched for in the shortest time. Secondly, the notation should be as simple as possible for the convenience of quoting and recording. The order of types is better to follow some principles which may be arbitrary but can help to a certain extent to arrange the types in certain order. The types should be sufficiently distinctive, and their number should not be too numerous so as to unnecessarily overcrowd the corpus, but sufficiently numerous to enable one to make identification easily, (but for a short corpus, the number can be reduced to a bare necessity). Brunton’s bead corpora seem to give too many sub-types. In them, it is sometimes very difficult or even impossible to distinguish the peculiar features of each of them. Some neighbouring sub-types do not show any perceptible difference from one another, and in such cases, it may be quite intelligible to the compiler, but of little value to the reader.<sup>4</sup> Some of the information given in short descriptions seems better to be relegated to a register sheet so as not to distract the eye when we search for the desired form among the drawings.

As to the notation, the use of the running numbers (1–99) to indicate the main type and an addition of a small letter to indicate the sub-type if any seem rather convenient and may be adopted. In some exceptional cases, a part of the notation may consist of symbols derived from the abbreviation of class names; and after being memorized, they will facilitate the task of reference and registration. But it should be limited to the exceptional cases, and the symbols used should be capable to be easily and accurately remembered. In Beck’s notation for the regular beads, four or five symbols are given for the description of the form alone; in all cases, the same symbol has the same meaning.<sup>5</sup> Since his symbols are

chosen entirely arbitrarily, even when they are more or less memorized after a great effort, the illustrations in his article have to be looked up each time in order to avoid mistakes. Moreover, his system of notation seems (to be) too lengthy for the purpose of a corpus. At least four symbols have to be employed for designating a regular bead. For example, the four symbols ID2b are used for a cylinder bead; the symbol I stands for its cross section being circular, D for its being a long bead, 2 for its having a straight profile, and b for the fact that its profile does not meet the perforation at either end. It seems to me that a simpler and more natural way is to use one symbol for each kind of the regular beads, say class 75 for the cylinder bead, as actually done by Brunton in his Corpora.<sup>6</sup> Even Brunton’s system of notation seems to be capable of being further simplified. In his system, every kind of beads is represented by one drawing, but designated by three symbols. For example, one kind of barrel beads is designated 78B4, because 78 is used to indicate a barrel bead, B to indicate its being long with a flat curve, 4 to indicate its actual size and slight variation in shape (and its perforation).<sup>7</sup> But as for the types in a pottery corpus, all these features can be expressed by one single symbol placed besides the drawing. This sort of hierarchical organization is useful for a classification but seems better to be avoided for a notation of corpora if possible. In his discussion of an ideal pottery corpus, Myers proposes to use a system of notation which partly follows the line as suggested by Beck for the notation of beads. For example, a Predynastic “decorated” pot would have the following long set of symbols in Myers’ proposed corpus: D9aK (Dec. Pf 13a); the symbol D is used for its material (the Desert Ware), 9 for its general shape, the first “lower-case” letter a for the feature in the direct progression of subdivision of type (e.g. from the largest to the smallest), the second letter K for subdivision not in this progression (e.g. the steepness of the side, the presence of an outcurved rim) and for the presence of handles, Dec. for its being decorated, P for the method of decoration by painting, f for the subject of the decoration (floral) pattern. 13 for the type of decorative patterns, a for the sub-type of decorative patterns.<sup>8</sup> Even this is still not sufficient and at least one more symbol seems required to give some necessary information on the handle besides the fact of its being present, e.g. its general shape and number, the presence or absence of a perforation, the position of the perforation (horizontal or perpendicular) and the position of handle on the pot. But as a matter of fact, Petrie’s system, although much simpler, is as comprehensive as Myers’ proposed one. The “Decorated Ware” of the predynastic pottery is always meant a Desert

<sup>3</sup> Peet, *Cemeteries of Abydos II*, p. 64, footnote 2.

<sup>4</sup> There are abundant examples of this kind, especially among Class 86 (Ring beads), in his *Qau and Badari II*.

<sup>5</sup> Beck, *Classification*. pp. 8–9.

<sup>6</sup> e.g. in Brunton, *Qau and Badari II*, p. 17, Sect. 25.

<sup>7</sup> Brunton, *Qau and Badari II*, p. 18, Pl. CI.

<sup>8</sup> Mond and Myers, *Armant I*, pp. 50–53; pl. XXXV.

Ware decorated by painting, which is indicated by the symbol D in Petrie's system, and the type number (usually one symbol, but occasionally two if it happens to be a sub-type) gives all necessary information on the shape (including the handle) and decoration, if you trace out the drawing in Petrie's corpus by following the corpus number.<sup>9</sup> Artificial systematization not based upon essential criteria is not a scientific system, as pointed out above in the criticism of Beck's classification. The alleged advantage of being easily memorized is either untrue if the whole set of symbols is meant because it will involve a superhuman power of memory or an enormous time unnecessarily wasted in the memory work or very slight if a part of the notation is meant because you have to look up the corpus for the meaning of the remaining symbols, but the drawing on the corpus will give you all the information on the shape (including the handle) and decoration of the object at one glance. Moreover, a corpus is designed to be looked up for reference, not to be memorized. Although certain philosophers such as the Taoistic School of Chinese thought, advocate that the best law is one which renders its own very existence absolutely unnecessary, the same remark seems not to be applicable to a corpus. The work of typing according to corpus is a tiresome business, and any elaboration of the notation without giving a corresponding advantage is unjustifiable. The notation of a corpus should be kept as simple as possible. There is no need to give a lot of symbols when one symbol is quite sufficient for the purpose. It is suggested that so far as the shape, size and decoration are concerned, that is, the features which can be expressed by a scale drawing in the corpus, they should be represented by one symbol (which may consist of more than one numeral), preferably the Arabic numerals. In order to limit the number of types below 100, the sub-type may be represented by the addition of a small letter which is dispensable for the types without sub-type. This seems to be one of the basic principle of Petrie's system of the notation of corpora and may be retained.<sup>10</sup> But other sets of symbols (or short description in words) may be added to give some essential information on the aspect not expressed in the drawings.

In order to give more complete and more satisfactory information on the essential features of each type, it is proposed, as already suggested above, to add a register sheet which should face the corresponding drawing sheet for the sake of easy reference. This may serve to release the drawing sheet from being overcrowded with the short descriptions on the material, colour, provenance and date, which are usually given in the prevalent system of corpus,

and it also affords more space which can be utilized to give other essential information such as the techniques. But they should be limited to the essential ones and given in a clear way within a small compass.

On the drawing sheet, certain conventions may be used so that the drawing can be reduced to a certain extent and thus to further facilitate the task of reference but without seriously diminishing the advantage of easy identification. For example, Emery in his corpora of the Nubian beads gives the drawings of cross section, whether circular or not, to every type of beads.<sup>11</sup> But the representation of the circular cross section seems to be unnecessary, because it is common to the bulk of the types of beads (and of pottery also) and can be omitted to save the space, as actually done in Brunton's corpora of beads, and also in all corpora of pottery. Of course, the beads with a non-circular section or with a special pattern of decoration or other special features on the ends should be represented by drawings. Take the perforation of beads for another example. It is very important for the dating purpose, especially in the beads of hard stones. But since most of the various forms of the beads of hard stones possess more than one type of perforation, it will unnecessarily overcrowd the drawing sheet if we draw every bead of the same shape but of different perforation. In the proposed new corpus, various forms of the hard stone beads are drawn and numbered from 1 to 99, but without any representation of their perforation. The types of perforation are shown at the bottom (or top) of the same drawing sheet and numbered from 1(00) to 9(00). A bead will be typed first according to the shape, and then, a hundred number is added to indicate its perforation type.

It seems to me that if possible certain degree of elasticity may be provided in the corpus so that one may make his own choice within the limits assigned according to the time available to him. For example, non-significant varieties may be incorporated in the main type and typed together, or they may be separated by the addition of a specific variety number. As to the technical methods, they are important, but may not be identifiable due to the poor condition of preservation or other causes, and can be left out. In regard to the description of colour and the record of number, a rough idea is sufficient for our purpose in most cases, although there is no objection to a rigorous accuracy if one can afford it. The important point is that the minimum limit should be given as a necessary condition of any useful records.

For a corpus which will embody the result of a more comprehensive research work, not merely the result of a single excavation, there are other points which need to be

<sup>9</sup> Petrie, *Corpus of Prehistoric pottery*.

<sup>10</sup> Petrie, *Methods and Aims in Archaeology*, pp. 124–125.

<sup>11</sup> Emery and Kirwan, *The excavations and survey between Wadi-es-Sebua and Adindan*, pp. 533–540; Emery, *The Royal Tombs of Ballana and Qustul*, Pl. 43–44.

taken into account. For the publication of a single excavation, the time range of the corpus may be limited to a definite period, because the main purpose of such a publication is to show what types of objects have been found in the remains of that period, and the material from a single excavation usually does not cover all the periods. But for the purpose of the dating of a new-found antiquity, this system of different corpora for different periods is extremely inconvenient. It means either that you must know the date before you look up the corpus for a narrower dating or that you must look through carefully over half a dozen corpora before you feel tolerably certain that your bead is dated to such and such a period or it has never been recorded before. But before to attempt the compilation of a comprehensive corpus, one serious difficulty has to be overcome first. Under the prevalent system of corpus, some characteristic features, subtle but perceptible on the actual object, are usually not shown on the corpus, so that definitely different types of different periods will merge into one in the new comprehensive corpus. The result would be worse than the system of different corpora for different periods, because in the latter case, the difference of these types is at least shown by the fact that they are in different corpora. For example, the undecorated common glass beads of the Dynastic period can be distinguished from those of the Roman-Byzantine period by anyone who is sufficiently familiar with the ancient Egyptian beads. Yet we cannot see any difference between them from the prevalent corpora, such as given in Brunton's *Qau and Badari III*. It is not due to the fault on the part of draughtsman, but due to the defect of the scheme of corpus. Mrs. Brunton's drawings, as rightly praised by Kirwan, are "as good as humanly possible to make them".<sup>12</sup> This kind of technical difference which cannot be expressed clearly by the drawing, but have important chronological significance should be given on the regular sheet. In the proposed new corpus, a glass bead will have a drawing with its specific type number, say 23, on the drawing sheet according to the form, but may have a full type number 523 or 623 on the register sheet according to the technical difference, and the dating is given according to the full type number.

In a comprehensive corpus, owing to the accumulation of material, it becomes possible and necessary to cut down the number of varieties to the essential ones and raise the standard of a main type to a higher level. All needless multiplications of types should be avoided. As stated by Petrie, "strictly, no vase is perfectly like another, and we must put together all those which may reasonably have been

intended to be alike. To separate them detracts from the value of the ranges of types in date".<sup>13</sup> This consideration is still more urgent for a comprehensive corpus.

In the prevalent system of corpus, the provenance (either the place of finds such as tomb number or bibliographical reference) of the specimens of each type is given besides the drawing. But for a comprehensive corpus, especially after the number of the types has been reduced as suggested above, the column of provenance would become in many cases too bulky to be included in the corpus. It is suggested that it is better to be taken off not only from the drawing sheet, but even to be excluded from the register sheet of the corpus. The frequency of the occurrence of a type at each period will be indicated by certain markings added to the name of date given in the register sheet. Both for the recording and dating, which are the main uses of a corpus, this general indication of the frequency of occurrence seems quite sufficient for the purpose. A separate register list should be prepared which gives the provenances of the specimens of each type under the type number, arranged in the same way as in the register sheet of the corpus, but it does not necessarily form a part of the corpus proper. This list gives the evidences upon which the corpus has been built up, so that if any question arises, the evidence can be checked up at once. Its uses are quite different from that of the corpus proper, and they may be even published separately.

The remarks given above are applicable to the system of corpus in general. But for a bead corpus, there are some other particular considerations owing to the nature of object. We have several times taken the pottery corpus for an example, because it is the first-formed corpus of Egyptian antiquities and also the most widely used one. But as pointed out by Petrie, a pottery corpus will serve to show the actual working of a corpus, but for each different subject, the details will need separate consideration.<sup>14</sup> There are at least the following differences between a corpus of beads and one of pottery:

1. There practical use. As stated by Petrie, the practical use of a pottery corpus is by the grave side. Pots of the common type, especially those of a large size, are sometimes not kept by the excavator, but immediately returned to the grave and covered in after being typed and recorded.<sup>15</sup> But ancient beads, being small in size and welcomed by museums, are almost always kept by the excavator. The practical use of a bead corpus is not by the grave side, but at the camp or in the museum, where more leisure is available. Therefore, the primary consideration

<sup>12</sup> Kirwan, Book Review in J.E.A. vol. XXV, p. 109.

<sup>13</sup> Petrie, *Corpus of Prehistoric Pottery*, pp. 5-6.

<sup>14</sup> Petrie, *Methods and Aims in Archaeology*, pp. 124-125.

<sup>15</sup> Petrie, *Corpus of Prehistoric Egypt*, p. 5.

for a bead corpus is not merely the rapidity of registration at the expense of accuracy, and so devoid of most of the essential information, but a registration of all essential facts in the quickest way and in smallest compass.

2. The content of corpus. The number of varieties of beads is much more numerous than that of pottery. This is due to the following facts: firstly, beads were made of various quite different materials, each of which was manufactured into beads by various methods; therefore, almost countless varieties were produced in beads. Secondly, the number of beads is very numerous and thus increases the chance of slight variation. This latter fact, the large mass of the number of beads and their abundance of slight variation, makes it unpractical to treat the varieties of beads in exactly the same way as the pottery is treated in a corpus. Brunton reports that some 2,400 pots were dealt with during the excavations at Qau and Badari and the different type number 750.<sup>16</sup> Is it possible to deal in the same way with the beads, thousands of which are sometimes found in a single tomb. The content of a bead corpus has to be limited to the essential ones, and the slight variation should be ignored. On the other hand, the first fact, the existence of many essential varieties due to material and technique, makes it more urgent for a bead corpus than for a pottery corpus to include the criteria of material and technique in the corpus for differentiating types (either given in the register sheet or in the drawing sheet according to the circumstance), but they also should be limited to the significant ones.
3. The form of corpus. For the sake of easy identification, the drawings in a bead corpus may be on the scale of natural size, which would be too large for a pottery corpus. Due to the small size of beads, even this scale is not sufficient for some of the tiny beads which require an enlarged drawing to show their particular features. This enlarged drawing may be given, with the scale indicated, besides the ordinary one of natural size, whenever necessary. The small size of bead gives another support to the arguments for the necessity of removing all the short description in words from the drawing sheet to a register sheet, because otherwise the tiny drawing would lose in the bulky crowd of words which surround it. As to the indication of the actual size, Petrie states that the difference in size may be largely ignored in a pottery corpus.<sup>17</sup> But for a bead corpus, the difference in size, when beyond a certain extent, is significant, especially when it involves a certain technical difficulty due to size. But the variation within a certain limit is mostly accidental and may be ignored in the corpus. This principle of "basic

dimension", as explained in the next chapter, will solve this problem to a certain extent.

4. Arrangement of the types in the corpus. In the prevalent pottery corpora, the principle of the arrangement of the types is from the most open to the most closed; because pots are mainly used as a container, the steepness of their side forms a useful index for the arrangement of the types. But, unfortunately, it is not the case with the beads. I fail to find such a single criterion for the arrangement of them in a continual series. The arrangement of the types of beads is inevitable to be more or less arbitrary, although an effort has been made to place those typologically nearest to one another as closely together as possible. It is hoped that the drawing sheet in the proposed new corpus will be reduced to a couple of sheets for each group or sub-group of beads, and thus, the task of reference will be much facilitated. A plate of the order of the key forms of beads regardless of material will be given and may be helpful in this respect also.
5. Trying in group. Due to their great profusion and also to the fact that many of them are threaded together on one string groups of similar beads are sometimes typed together in a summary way which seems not to have happened in the typing of pottery. In general, more latitude should be allowed for the typing of beads in group than the typing of single specimen. But there are some special cases deserved of particular consideration. For example, a string of beads may consist of beads of the same form but graded in size. Some archaeologist prefers to type them as of one type, although they are regarded as of definitely different types in the corpus. A more satisfactory way is, as used by Brunton, to give the largest and smallest types alone, bracketed.<sup>18</sup> In our new corpus, they will be in most cases, regarded as non-significant varieties within the limit of a single type. Strictly speaking, the fact of being graded, just as the arrangement of beads of different types into a pattern, does not fall within the scope of a corpus which is designed for the typing of individual beads alone. But this fact is significant, because these graded beads seem to have been purposely so threaded by the ancients. It is suggested that they may be typed as one or more types according to the extent of their variation and then suffixed with a bracketed letter "v" after the type number, say, GNI32(v). Sometimes, the variation in size, length or diameter seems due to mere chance, as shown by the fact that the variation is not graded and the degree of variation is usually slight. A letter "w" may be used to substitute the letter "v" for this kind of variation (unimportant or unintentional variation); or, they may be

<sup>16</sup> Brunton, Qau and Badari II, p. 3, Sect. 3.

<sup>17</sup> Petrie, Corpus of Prehistoric Pottery, p. 6.

<sup>18</sup> Brunton, Qau and Badari II, p. 17, Sect. 24.

simply ignored without any special indication, especially when the variation is slight. Another case for special consideration is the occurrence together of beads which are really of the same kind, but of different facies, some showing a generalized and undifferentiated form, while others a specialized form with some particular characteristic features. For example, glass beads on the same string may be identical in every aspects except that some show a small protrusion on each end and some not. Again, a string of tiny blue faience ring beads, such as from the pan-grave, has some in an irregular wedge-shaped form and others in the ordinary regular form. In the prevalent system of bead corpus, they are regarded, when individually, as of different types, and accordingly thus represented in the corpus; but when met in group, they are typed sometimes as of different types and sometimes as of one type, (mostly of the type of the specialized form), although not explicitly stated so. In the proposed new system, the problem will be solved in two ways: (a) In some cases, when the particular features present on the specialized form are accidental trace derived from the technical method, their presence or absence is simply ignored and not regarded as a criterion for the differentiation of the types of form, although it is taken into consideration in the determination of the technical method. They will be regarded as one type whether they occur individually or in group. (b) As to the variations which are as yet not attributable to any particular technical method, but are significant for the dating purpose, such as the pan-grave ring beads referred above, the generalized and the specialized forms have to be regarded as separate types in the corpus, where the generalized form which is less characteristic has a wider time range in the dating. It is proposed that when met in group, they may be typed as one type, indicated by the type number of the specialized form, but with that of the generalized form given immediately after, prefixed with a plus sign and bracketed. As to the description of individual material, colour and the record of number and date, they are simply regarded as a single type, thus P123 (+134) blue (L.S.). Of course, there is no objection to their being typed separately as two types even when occurring together, but that would give the same result

except involving more time in the record work and more space in the register. On the other hand, the presence of the type of the generalized form may be simply ignored, and all beads of that kind are typed as of the type of the specialized form and registered accordingly.

After this lengthy discussion of the general principles of a corpus, it is obvious that we badly need a new and comprehensive bead corpus which should be based upon a more satisfactory system of classification and a fuller application of the basic principles of corpus. Although there are many classifications of beads, as having been enumerated in Chap. 11, and all of them are accompanied with some illustrations, yet few of them are detailed enough to be entitled a corpus in the narrow sense. The few exceptions are the Engelbach–Brunton system for the Egyptian beads,<sup>19</sup> and those designed by Emery, Mackay and Starkey for the beads found outside of Egypt.<sup>20</sup> Besides some defects in the conventions used in the corpus as occasionally pointed out above, all of them suffer from the fact that they are based upon some unsatisfactory system of classification as criticized in Chap. 11. Petrie's system for the registration of beads from Tarkhan seems not to be intended for a corpus, not only because the beads are represented in diagrams, not in individual drawing, and therefore, the graphic representation is not clear enough for easy identification, but also because there is no system of notation whatever for the purpose of quotation or registration in a separate register.<sup>21</sup> As stated by Myers, for a new scheme of bead corpus to be of value, it must bear the approval of a large body of archaeological opinion, and it is for the Committee of the International Corpus of Egyptian Pottery to consider any plan for an extension of their work into other field.<sup>22</sup> But the results achieved by the C.I.C.E.P. are, to say the least, not very encouraging, and the prospect of a bead corpus undertaken in the same way is rather gloomy because international congress is out of fashion nowadays. It is perhaps excusable to present the Egyptological world with a *fait accompli*. It is hoped that the reader should not be misled by the word "new" in the title. This new corpus, just as the new classification, is based both in principle and in details upon the foundation laid down by others previously working in this field.

<sup>19</sup> Engelbach, Harageh; Engelbach and Brunton, Gurob; Brunton, Lahun II, Qau and Badari I–III, The Badarian Civilization Mostagedda.

<sup>20</sup> Emery's system in Emery and Kirwan, The excavations and survey between Wadi es-Sebua and Adindan, pp. 533–540, and Emery, The Royal Tombs of Ballana and Qustul, Pls. 43–44; Mackay's system in Marshall, Mohenjo-daro; Starkey's system in Duncan, Corpus of Palestinian Pottery.

<sup>21</sup> Petrie, Tarkhan II, p. 13, Sect. 29; Pls. XLIV–XLV.

<sup>22</sup> Myers, Mond and Myers, Armant I, p. 71.

This chapter is designed for the practical purpose during the actual use of the new corpus. There will be certain repetitions of statement for the sake of easy reference, but for the same reason, all arguments which have been given in the previous chapters will be entirely omitted.

### 14.1 Section I: General scheme of the New Corpus

- (I) The unit of corpus is here called a “type”, as distinguished from the “class” which is the unit of the broad classification. Usually, a class possesses several types, but some class may consist of a single type. In the latter case, the class and the type is the same thing but viewed from two aspects. Subtype is different from the main type only in a slight variation, but it has definite chronological significance. Variety differs from a subtype in that it seems to be devoid of any chronological significance.
- (II) Types are arranged according to the order in the classification, but are numbered in a running number from 1 to 99 regardless of the boundaries of class. The family number will be prefixed to the specific type number as the number of hundred. Whenever there are subtypes, a small letter will be added to indicate the subtype. Varieties are given in the drawing sheet of the corpus to show the extent of variation within the type or subtype, but not numbered. Just as in the case of the class name, although each type has a specific number (1–99), the full type number, which combines the specific types number, the family number, and group number, should be employed in preference to the specific type number.
- (III) The corpus consists of two parts, a drawing sheet and a register sheet. The corresponding sheets of them will face one another for easy reference.
  - (a) The drawing sheet. It has heading of its group name, and, if required, also a drawing of various technical features used in the identification of the technical methods which serve the purpose of classifying beads into families. Various types are drawn on a scale of natural size, unless otherwise stated. They are arranged from 1 to 99 and numbered accordingly but with some necessary intervals for the future additions. Subtypes and varieties follow immediately their own main type. The number of a type or subtype is given at the left upper corner of the drawing. An enlarged drawing is sometimes added to show the particular features of that type. It follows immediately the ordinary drawing of that type, connected by an arrowhead, and has its scale given at the right lower corner. The transverse section (cross section) is generally omitted, unless it is non-circular or has special feature or decorative pattern at the end when it will be shown besides the longitudinal section, connected with it by a broken line. In order to avoid needless multiplication of varieties due to slight variation of dimension of beads, all the regular beads are drawn in the “basic dimensions”, namely starting from 0.5 mm, only and increase of one fifth but with 0.5 and 5 mm, as the minimum and maximum are regarded as sufficient different to entitle a separate drawing. Some of them are further amalgamated into one variety, shown by a drawing which best represents its group. It is the standardized dimensions of beads, not their actual dimensions, which are given in the corpus. For the decorated beads, more latitude is allowed for the variation of length, diameter or size; and a certain degree of latitude is given to the unessential slight variation in the minute details of the decorative pattern. But the general feature, main decoration and rough proportion of length to the diameter are given according to an actual specimen which is most representative, that is to say, in which the characters of its type or variety seem to be best exhibited and most evenly balanced.

(b) The register sheet. It has also the group name as its heading, under which there are in some cases certain remarks on the principle of the description of the material and colour in that group, and on the classification of families. The type numbers are arranged from 1 to 99, and each of them will be prefixed with a hundred number to indicate the family number if the latter is known. After these numerals, the individual material and colour may be given if required, but can be omitted in most cases either when unnecessary as for the beads in the group of glass beads or by the use of certain convention which will be clearly explained under the heading of the group name, for example, unless otherwise stated all the beads into the group of beads of pasty material are blue faience beads. The nomenclature of materials is according to that given in [Chap. 5](#), which should be looked up if there is any difficulty in this respect. Ordinary colour terms are used in most cases, but when a more accurate description of colour is required for some special cases, the notation of Ostwald's system will be added after the ordinary colour term, always in brackets. Both the material and colour are sometimes given in an abbreviated form which will be explained in the Abbreviation List. Finally, the time range of each of the types or subtypes is given for each of them. These time ranges are mainly based upon the specimens in the Petrie Collection with the addition of some examples from other collections or from reports and catalogues. They are indicated either by the number of dynasty (in Roman numerals) or by the abbreviated form of period (as given in [Chap. 4](#)). The frequency of each type of beads in each period is indicated by adding certain markings to the period name, as will be explained below in Section II, B. (7), (c), and is obtained by the statistic method based almost entirely upon the specimens in the Petrie Collection, only supplemented with those from other sources in exceptional cases. The evidences both for the time range and for the frequency in each period of each type or subtype of beads are relegated to a separate "register list" according to the types which is excluded from this thesis because of its being too bulky, but some of the evidence will be given under each period in the part on the chronological survey.

(IV) This corpus will be used as illustrations of the text in this work, and it is hoped that it may serve for the registration of the Petrie Collection when the detailed

catalogue is prepared. I would consider my work, not in vain, if it can fulfil these ends. But if the dates given for each type is fairly accurate and the whole system is regarded as fairly convenient, this corpus may serve our colleagues both in the field and in the museum for the dating as well as for the recording purposes. If this corpus is more or less generally accepted as a workable one and worthy of the trouble of improving it by the inclusion of informations derived from future discoveries, it is suggested that certain general rules should be followed in the revision of this corpus in order to avoid discrepancy and confusion. They will be given in the following two sections.

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## 14.2 Section II: How to Use the New Corpus

A. Some preliminary remarks:

- (1) It is presumed that the reader who wishes to make use of the new corpus has already made himself acquainted with the general ideas contained in the last few chapters (namely, [Chap. 5](#), Materials; [Chaps. 6–10](#), Technical Methods; and [Chaps. 11–13](#), Classification and Corpus), and, of course, the last section just given above. After spending some time to do, this preparatory work, which it is hoped, will repay the trouble; the actual working is not more difficult or tiresome than the other systems, especially after a short time of practice, although it looks a little involved. But for a satisfactory use of the corpus, a certain amount of the practical knowledge of beads is required which can be obtained only by the handling of the actual objects.
- (2) For the use at the excavation camp. As stated above, this corpus is not designed for the use by the grave-side, but for the use at the camp or in the museum. Mr. Brunton tells me that for the recording by the grave-side, all one can do is to put down the word "yes" on the "bead" column of the tomb card to indicate their occurrence and their position on the body of the dead, if known, and extremely rarely their arrangement, but all the other details have to be filled up at the camp afterwards. If this new corpus is used at the camp, the details of each string of beads may be either written down on the tomb card (either on the column of "Beads", or at the back of the tomb card if the details will occupy too much space) or relegated to a separate "object register" (either a card catalogue or a register book, or both), as will be described below for the use in the museum; and all we have to do with the tomb card is to fill in the



register number of the string of beads found in that tomb. As to the position of the beads on the body of the dead, the arrangement of beads and the materials of thread, they should be recorded under the column of "Beads" on the tomb card, but a bead corpus seems to have nothing to do with them and is certainly not designed to serve these purposes. Nevertheless, the arrangement of beads can be expressed in the term of the corpus, for example, the register of beads is (a) GN253 blue (9), (b) H637 (18), (c) H463 garnet (9), and the register of their arrangement is a (3) b (6) c (3) a (6) b (12) c (6).

- (3) For the museum registration as stated above, this can be used also in the excavation camp for the object registration which will facilitate the work of the preparation of material for the publication of the result of excavations. For the compilation of card catalogue or register book, it is suggested that each string of beads may be given one card (in the card catalogue) or one column (in the register book) in which each kind of beads on the string is recorded by the use of the notation of the new corpus as will be described below. Then, the information on the whole string such as the register number (and also the accession number if they are not the same), provenance (and the name of the excavator and the year of the excavation), date (including the evidence of dating), use (that is, their position on the body of the wearer, or other uses), reference of publication, present location, remark (the arrangement of beads and the material of the original string may be given here, because they are only very rarely ascertained), and the photograph number. A photograph on a small scale may be attached and will be found very useful later on for the identification of the string. For a new type not already figured in the corpus, a scale drawing of it is better given, because the photograph of the whole string is usually too small for the representation of individual beads. Several kinds of indices may be prepared for easy reference, such as index of provenances, of dates, of types, so that one can find out the desired string or strings within the shortest time. A duplicate set of this kind of object register will be sufficient to guarantee it against accidents, and there is no necessity of publishing it in full, if the cost of publication cannot be afforded. The duplicate set of card catalogue may be arranged in different ways: for example, one set is arranged according to the provenance or date which can substitute one of

the indices suggested above and another according to the register number if there is no separate register book. The index of types is prepared in the same way as the "register list according to the types" made in the process of the compilation of the new comprehensive corpus and will involve much time, but will be extremely useful when finished.

B. Directions for recording and dating beads by means of the corpus.

- (1) Make sure which of the seven group your bead or beads belong to. The symbols for the seven groups are as follows: G (glass), H (hard stone), L (glazed stone), M (metal), P (pasty materials), R (remainders) and S (soft stone). Some groups are subdivided into two subgroups by suffixing a symbol D (decorated) or N (non-decorated). It is hoped that these symbols can be memorized without any difficulty.
- (2) Find out the drawing sheet or sheets of that group or subgroup to which your bead or beads belong. These sheets are arranged according to the alphabetical order of the symbols of the group and thus can be easily found out.
- (3) Look up the form of your bead among the drawings of the required sheet or sheets. The drawing sheet of "the order of the key form of beads regardless of material" also can help the business if necessary. It should be noticed that the type form on the drawing sheet is in most cases that one which is nearest to your bead in all the essential features, but not necessarily identical. More latitude should be given in the typing of beads in group than in the typing of individual specimen, especially when the differentiation of the types or subtypes is based upon a continuous quantitative variation, not the discreet qualitative variation, and their boundaries are wholly arbitrary and artificial.
- (4) Special cases. Beads on the same string may be of one kind, but of varying dimension, whether intentional or not, type them as one or more types or subtypes according to the extent of that variation, but with more latitude than allowed by the typing of the isolated individual bead. Beads on the same string may be of the same kind, but of the different facies, some showing a generalized and undifferentiated form, while other a specialized form with some characteristic features. Although both forms may be found in the corpus where they are regarded as of different types or subtypes because they individually possess different values

for the dating purposes, but for the typing of beads in group, it is preferable to regard them as of one type, namely of the type of the specialized form. For the broken beads, type them according to the most likely reconstruction which is based upon some similar but unbroken beads either on the same string or different string but from the same tomb; when no such instance is available, reconstruct them according to your experience and common sense, and when there is some uncertainty, regard it as a doubtful identification of type.

- (5) Doubtful identification of type. Due to either the poor condition of preservation or other causes, the identification of type may be impossible to be very certain. They should be regarded as doubtful cases.
- (6) For the registering purpose:
  - (a) Write down the symbol of the group of the symbols of the subgroup, leave one blank space and then give the type number of the main type or subtype as shown besides the type-form on the drawing sheet (the zero sign 0 is added as the ten number for the numerals below 10). No separate number is required for the varieties which will have the same corpus number as the type or subtype to which they belong. It is suggested that if necessary, they may be referred for quotation by the corpus number of the type or subtype suffixed with one or more apostrophes according to their position, although the practice of quoting the variety seems to be unnecessary and better to be avoided.
  - (b) If a family number is required as indicated in the explanation immediately below the heading of the group name, examine the technical features of your beads and give the hundred number before the type number on the blank space left beforehand. If the technical information is not required for that group or required but cannot be ascertained on your beads, leave the hundred number blank.
  - (c) Special cases. For the special cases enumerated above under (4), a symbol "(v)" may be put after the corpus number if the graded variation seems to have been intentional, but either the symbol "(w)" or no special indication at all if the variation of dimension seems unintentional and unimportant. The specific type number of the generalized form may be bracketed and put after the type number of the specialized form if they are typed together as one type, but may be

left out entirely. No special indication is given for the broken beads, unless their identification of type is questionable. A query should be put after the type number whenever its identification is doubtful due to one reason or another.

- (d) Give the name of the individual material and colour of your bead when required, but leave them out when unnecessary as indicated in the instruction under the heading of group name on the register sheet. If there is any doubt on the identification of material of your bead, a query should be given after the material name. The ordinary colour terms are sufficient for the most cases, but the notation of the Ostwald system may be added for some special cases when a more accuracy is required. Transparency and translucency may be indicated in certain cases. For the transparent or translucent beads, their colour is ascertained by a reflected light, not the transmitted light. If the colour is a faded or altered one, a remark to this effect is better given; if not sure on this point, a query is added to the remark.
  - (e) Give the number of your bead in order to show its frequency, put it in brackets to avoid its confusion with the corpus number. A rough estimate seems enough for most cases. It is suggested that the exact number may be given for those below ten and either a rough estimate prefixed with the symbol "c" or an abbreviation (F, for "a few", s.s. for "short string", and l.s. for "long string") for those at or over ten. The abbreviation is the method used in Brunton's *Qau and Badari II* and some of his other reports. A more accurate recording can be obtained by a rough estimate which is derived by the following method: Count the number of the beads in one section of the string, which is a unit of measurement (e.g. one centimetre or one inch), then measure the length of the whole string of beads, using the same unit of measurement and finally multiply the two results to obtain the rough estimate of the number of the beads on the whole string. If a slide rule is used, it would not take much time even for a Badarian girdle of glazed steatite beads which usually amount to several thousands.
- (7) For the dating purpose:
    - (a) After obtaining the full type number of your bead, look up the register sheet opposite the drawing sheet. Under each group name, the

type number is arranged from 1 to 99 (sometimes followed by a Roman letter to indicate a subtype), regardless of the hundred number which is added afterwards, and thus, the order is 101, 301, 102, 202, 103, 303, etc.; therefore, try to find out on the register sheet first the type with the ten number and unit number (and the Roman letter if it happens to be a subtype) corresponding to your bead and then the full type number prefixed with the same hundred number (namely, the same family number) as your bead. At this stage, it is usually already possible to give a rough estimate of the date of your bead, as given after the full type number on the register sheet.

- (b) If there is under that full type number, some example with the same individual material and the same or similar colour as your bead, it is possible to give a still narrower limit of the time range, which is also given on the register sheet.
- (c) As explained above, the value of the dates given after each type number varies and is indicated by the addition of the following markings to the period name: (1) ordinary one without any special mark; (2) specially abundant, the period name underlined; (3) very scarce, the period name within brackets; (4) doubtful occurrence, within brackets with a query; (5) extremely doubtful occurrence, same as above but with two queries; and (6) definitely wrongly dated cases, within brackets with the mark x. It is suggested that, in general, only the period names given (1) and (2) are used for dating your bead. But other considerations, such as the number of your beads of that type, the condition of the tomb (disturbed or not) where your beads were found, the dates of other objects found associated with your beads in that tomb, etc., should also be taken into account.
- (d) Special cases. The symbols for the special cases, such as “(v)”, “(w)”, and the symbols of the specific type number of the generalized form in brackets do not effect the dating at all, and so can be safely ignored here. But the query given after the type number or material may seriously diminish its value for the dating. The dates derived from some bead of which the identification of type or material is indicated as doubtful are at least questionable and may be entirely wrong. It is unsafe to draw from them any conclusion on the dating.
- (e) If several kinds of beads have been found in a tomb, the narrowest time range which the dates given for each of the types of beads have in common will be the date of that tomb. If there is any contradictions, take into consideration the possibility of the reuse of old beads and guard against the intrusion of later or even modern beads (see the remarks given above in Chap. 1).

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### 14.3 Section III: How to Revise the Corpus

- (1) In any attempt to make additions or small alterations in the corpus, the general scheme of this corpus as given above in Section I should be kept, so as to avoid discrepancy and confusion, unless a thorough revision of the whole system of corpus is attempted.
- (2) It is unlikely that there is any need to add a new group besides the seven groups already given, although a series of subgroups may be introduced to differentiate chronologically significant subdivisions of material within the existing group. But for the number of family, it is hoped that more will be added by future discoveries, because a particular technique for making beads of a certain kind of material usually possesses a chronological significance. If a new one is discovered, a new family should be created within the group. Spare family number has been reserved in most of the groups in this corpus, and one of them may be used to indicate the new family. If the number of family within one group exceeds nine, two numerals (one hundred number and one thousand number) may be employed. The technical characteristics of the bead made by this technique should be described in details. The family number and the time range of this new family are inserted in the proper place in the register sheet, and a drawing, if possible, should be added to the others showing the characteristics of family on the drawing sheet.
- (3) Addition of a new type: light variation from the established types should be ignored. For the new type or subtype, a drawing should be inserted in the proper place on the drawing sheet and numbered accordingly. Spare type number has been reserved, and in case of necessity where no spare type number is available, the new type may be indicated by the number of an established one with the addition of a decimal point and a decimal number, and the subtype of this new type will be indicated by a small Roman letter just as other subtypes in an ordinary type, for example, 24 Ia. When the twenty-five Roman letters (the letter o should be excluded to avoid its confusion with the zero sign) are all used, two letters instead of one may be employed,

for example 18aa. On the register sheet, the type number and the time range of the new type (with the family number, the name of the individual material, and of colour, if required, as indicated under the heading of the group name) are inserted in the proper place.

- (4) There are other kinds of additions or alterations which affect the register sheet alone, such as beads of an established form but of a different technique and consequently of a different family, beads of a same corpus number (including the family number) but of a different individual material or a different colour or both. They should be inserted in the proper place, with the name of the individual material and colour if required, but always give the time range if possible. The new colour which is added as representing a new kind of beads should be sufficient different from the established colour already given and should be not merely the accidental one such as due to decay or stain, that is to say it should be limited to those likely to have a chronological significance. Ordinary colour term is sufficient for most cases, but for some particular cases when a more definite description of colour is required, the notation given in the Ostwald colour plates may be used.
- (5) Indication and modification of the time range: All indication of time range in the addition stated above under (2–4) should follow the general rules as given above in Section II, B, (7) (c). Sometimes an alteration of time range alone is required for an established type, and it should be done in the same way according to the general rules for the indication of time range. Any extension of the time range from the established one should be limited to the well-dated cases; otherwise, the value of the time range of type would be seriously detracted. The first occurrence of a type is always important and should be verified carefully in each case. But the sporadic occurrence of a type long after its proper time may be due to the practice of reuse of old beads; if there is some reason to be suspected so, it is better to be ignored. Some of the dates given in this corpus may be proved to be based upon wrongly dated beads. Most of these wrongly dated cases can be detected and confirmed by those having an opportunity to work on the actual specimens of beads in the Petrie Collection. If any mistake is discovered in these datings, it should, of course, be corrected accordingly.

## Chronological Survey

As pointed out by Petrie, 'these two methods of work (the corpus and the arrangement of material in the chronological order) may prove to be, for archaeology, what the balance and atomic theory have been for chemistry,—the necessary foundation for systematic knowledge and exact theory'.<sup>1</sup> After having worked out the bead corpus, we may proceed to a chronological survey of the ancient Egyptian beads.

This chronological survey will be based mainly upon the Petrie Collection. However extensive this Collection of beads may be, it is certain that some types are not represented and others represented but not in all their main periods, still less in all the periods in which they did occur. It has been attempted to supplement the specimens of this Collection with those from other sources, mainly from various publications. But the information given in the publication are sometimes useless for our purpose because of the uncertainty of typing due to the deficiency and vagueness of the description and representation. Sometimes the information are quite definite and accurate in appearance, but are wrong in reality, and the result is even more disastrous than that of in the case of deficiency and vagueness. For example, the type of perforation of the bead of hard stone may be wrongly represented. This is because that the type of perforation, although usually shown in the drawing of corpus, is in most cases regarded as a very unimportant feature. When beads of the same form and same size are found on the same string, especially if they are of a great number, they are typed as all of the same type of perforation so as to save the trouble of making separate drawings. The material and the technical method of the beads may be wrongly identified, because an archaeologist is not necessarily at the same time the expert on material and technology. Therefore, this kind of information should be used with caution, and most of them could not be used as an evidence in the critical case, unless verified by a re-examination of the actual object.

Another source of error is the mistake of dating. This kind of mistake may happen to some strings in the Petrie

Collection too. It is very often that the date of a tomb is obtained by taking into account all objects found there except beads, and then the beads are dated by the tomb. The result is that the time range of certain types of beads has to be unnecessarily extended a great deal. On the other hand, if we take into consideration the known time range of the beads together with those of other objects for the dating of the tomb, the result in some cases may be quite different, because the date of the tomb then may fall within the known possible time range of all objects, with that of the beads on the margin, or may be a compromise between them. In the latter case, the time range of certain objects has to be adjusted, but not at the expense of that of beads alone. This practice of excluding beads in the dating of a tomb, but dating the beads by the date of the tomb will produce a disastrous result if it is applied to a disturbed tomb which sometimes contains objects of various dates with some intrusive beads of very late age or even of modern times. As to the museum specimens, they are usually separated from their associated finds and in many cases it is very difficult to verify their datings and we have to regard them as questionable if they are in conflict to the conclusion derived from a great number of well-dated specimens. As to the specimens bought from antiquity dealers or tomb robbers, they should be left out at the first stage of our work, because they can be dated only by a comparison with the well-dated specimens.

Besides the fact of the occurrence of a type of beads in certain periods, the frequency of its occurrence should be also indicated if possible. It is not the isolated specimens, but the whole lot of them, that can be safely used for the dating of new-found beads. Isolated specimens of a type may be due to some mistake on our part, therefore a new-found specimen should be dated to the period in which this type commonly occurred, unless there is some strong evidences pointing otherwise. For the study of their frequency, we should take into consideration both the number of lots (i.e. the number of tombs in which the beads are found), and the number of beads found in each lot. For the frequency of lots, certain information can be obtained from some detailed reports of excavation; but in order to

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<sup>1</sup> Petrie, *Methods and Aims in Archaeology*, p. 122.

save the trouble of re-typing the published material, the statistic table given here is based upon the Petrie Collection alone unless otherwise stated. As to the frequency of the number of specimens, we have to depend almost entirely upon this Collection, in which most strings have been counted or estimated and a statistic tabulation is possible. These two kinds of frequency (the actual number of beads, and the number of lot), will be shown by a distribution table of various types of beads in each period. The information given in the next few chapters will be partly based upon this table, but the table itself will be delegated to the appendix because of its bulkiness.

The justification of this kind of statistic treatment of research is based upon the Law of Statistical Regularity, according to which a moderately large number of items chosen at random from among a very large group are almost sure, on the average, to have the characteristics of the large group.<sup>2</sup> Due to the nature of archaeological evidence which is usually a change survival from ancient times, it is impossible to use the whole mass of date as existed in their times, and we have to depend upon a certain number of samples. It is admitted that the number of samples from a single collection is not large enough, and the results derived from them could not be used to draw far-reaching conclusions. Therefore, our results are given here only as a tentative basis for further work, not as a final conclusion. But the results achieved seems to be, at least, very suggestive. It is hoped that some other equally important collections of beads may be worked out by a similar method, in order to check up, prove, or disprove, the tentative conclusions given here.

In this connection, it is desirable to give some idea as to whether the Petrie Collection of beads can be regarded as a fairly representative samples or not. In the following table, both the number and the percentage of specimens of each period are given. Of course, it includes only those which I have registered. Many strings of the beads of the Roman-Coptic period as well as a few of the other periods have not been registered because of the lack of time. Most of the bought specimens were purposely excluded from the register. Even so, the total number of the registered beads is 1,760 strings. (The terms of period have been explained above in [Chap. 4](#)).

Table of the Number and Percentage of Beads in Each Period in the Petrie Collection (according to the Incomplete Register), made by the author. (See [Index \(3\)](#)).

Period	No. of Strings	Percentage (%)
Prehistoric	225	12.8
Early dynasties	113	6.5
Old kingdom	105	5.9
First interperiod	180	10.2
Middle kingdom	275	15.6
Second interperiod	73	4.2
New empire	401	22.8
Late period	173	9.8
Greek-Roman	155	8.8
Undated	60	3.4
Total	1760	100.0

<sup>2</sup> W. I. King, *The Elements of Statistical Method*, (1924), p. 28.

### 15.1 Section I: Neolithic Period

Beads have been found in Europe from the Upper Palaeolithic period onwards, some even claiming an antiquity as early as the Chellean or Acheulian period.<sup>1</sup> But in Egypt, no bead has been found in association with the Palaeolithic implements. The earliest known beads of Egypt are dated to the Capso-Tardenoisian period which belongs to the Mesolithic period or the end of the Palaeolithic period. They were discovered by Caton-Thompson at the Kharga Oasis. They are disc beads made of ostrich shell and were extensively used there in that period [1].

The Neolithic Culture of Fayum also produced ostrich shell beads. The discoverer regards them as pointing to the infiltration of Capsian elements.<sup>2</sup> The ostrich shell beads were used in other parts of northern Africa as early as the middle Capsian period, and a great number of them were found in some later (Capsian) stations.<sup>3</sup> Besides their shell beads, some 17 specimens of stone beads were also found in the Fayum Neolithic Settlement. One is a white disc bead of soft stone (Corpus S2), probably white anhydrite, certainly not limestone as given in the report. As to the beads of hard stone, their materials are as follows: 10 of amazonite, 4 of durite (volcanic ash), 1 of grey microcline feldspar and 1 of concretionary stone. Their forms are rather primitive and unspecialized: 4 disc beads (Corpus H24, H60), 3 barrel beads (Corpus H15-16), 1 flattened barrel bead (H33), 6 roughly drop-shaped pendant (H77, H38) and 2 disc beads with a plano-convex section (H3). The particular form of the last type may be due to the fact that it has to be weathered during its exposure on the surface of the ground. Their technique is also rather primitive: the surface is usually either very rough (H1000), or naturally smoothed

(H7000), and the perforation is mostly large biconical type (H100), except two disc beads which have single conical perforation (H300) and one large barrel bead which has a natural cavity utilized by an additional perforation (H900).<sup>4</sup>

The discoverer of the Fayum culture considers the broken amazonite bead as evidence in favour of the theory of local manufacture, because it is more probable to be broken during the process of boring rather than during the time of use if we take into consideration the hardness of the stone.<sup>5</sup> But in fact, amazonite is very easily broken along its cleavage plane in spite of its high hardness. Whether the beads were manufactured locally from imported nodules or imported ready-made, it is certain that the appearance in the Fayum of amazonite is very important. As pointed out by the discoverer, it not only proves distant contacts, but also shows the antiquity of the high esteem paid by the ancients to this stone.<sup>6</sup> Amazonite beads and pendant were used also by the Mesolithic (the Natufians) and Neolithic people of Palestine.<sup>7</sup> But amazonite has been found in Egypt in small quantity, at Gebel Migif in the eastern desert.<sup>8</sup>

Another Neolithic culture has been discovered at Merimde on the desert edge of the Western Delta.<sup>9</sup> As pointed out by the discoverer, the Merimde people in general were not very fond of ornament, and the few preserved beads

<sup>1</sup> Dechlette, *Manual d'archeologie*, I, pp. 207–211; G. B. Brown, *The Art of the Cave-Dweller* (1928), p. 35, 170.

<sup>2</sup> Caton-Thompson, *The Fayum Desert*, p. 34, 90; for illustration, see *The Journal of the Royal Anthro. Insc.*, vol. LVI (1926), pl. xxxvi.

<sup>3</sup> C.Ren\_hin, *Weltgeschichte der Steinzeit*, p. 181.

<sup>4</sup> This paragraph is based upon the specimens in the U. C. Collection; of Caton-Thompson, *The Fayum Desert*, p. 32, 40, 45, 90, Pls. XXXL, XLVII.

<sup>5</sup> Caton-Thompson, *op. cit.*, p. 85, 90.

<sup>6</sup> *Ibid.*, p. 90.

<sup>7</sup> In the Palestine Archaeological Museum, there are one pendant from the Natufian remains at Mugharet el-Wad (Exhibition no. 215), and several disc beads from the Neolithic layer at Jericho (Exh, No, 265). They are of amazonite, but wrongly identified as nephrite in the *Gallery Book of that Museum* (1937 edition).

<sup>8</sup> J. Ball, *The Geog. and Geol. of South-Eastern Egypt*, p. 272.

<sup>9</sup> Only the following original reports are available to me: Junker, *Westdelta Expedition* (1928), Junker, *Merimde II* (1930), *Merimde III* (1932).

show very simple form.<sup>10</sup> They are made of bone, stone and clay. Some roughly drop-shaped pendants of the type H88g are identified as slate, and three irregular beads of the type 1160a are made of some bluish greenstone.<sup>11</sup> One cylindrical bead is made of a yellow stone. Cylindrical and thick disc beads (R29, R33c, R33f) are made of bone.<sup>12</sup> Several pendants (R37, R451) are also made of bone (Cairo Museum, J58005-7). Clay barrel beads (PNI6u) were also found, some with a lenticular section (PN29n) (Cairo Museum, J57990, 58004). The clay beads are always burnt black and originally well polished. Miniature axes of stone were pierced to serve as amulets.<sup>13</sup>

A third Neolithic culture is that Asian culture was found at Deir Tasa in Middle Egypt. Among the fifty-one tombs excavated by Brunton, only four tombs produced some beads.<sup>14</sup> Almost all of them are made of bone. The two decorated beads are described by the discoverer as ivory, but the perforation type (a large straight hole) suggests that they are probably made of bone too. The forms of the beads are as follows: 1 cylindrical (R33k), 1 barrel shaped (R32r), 5 spheroid (R32b) and a few thick discoid (R31b), besides two decorated cylindrical beads which were scratched with a criss-cross pattern (R40g). The discoverer remarks that the complete absence of any stone beads or pebble pendants is striking, but possibly the discovery of richer graves in the future will show that these were occasionally used.<sup>15</sup> When in 1929 Sami Gabre made excavations at the same site (Deir Tasa), stone beads were found in a tomb (no. 37) containing a typical Tasian stone celt. They are a string of small disc beads (S6c) made of black steatite (identified as “granit noir” by the discoverer) and flesh brown steatite (Cairo Museum J53516). In another tomb (no. 32), a barrel bead (Cairo Museum J53513) was found, which is described as serpentine [2].

This detailed survey shows that the Neolithic people of Fayum, Merimde and Tasa used natural material alone for their beads: stone, bone, ostrich shell and clay. The material chosen indicates certain local specialization: ostrich shell, amazonite and volcanic ash (durite) at Fayum; bone, slate (durite) and clay at Merimde; and bone and steatite at Tasa. Both the form and the technique are rather primitive, a reflection of the rudeness of their culture. It is the absence of the more elaborated form and the more developed

technique, not the presence of any particular form or technique, which is the characteristic of these Neolithic beads. Some types can be paralleled in the North African Capsian and the Naturian of Palestine. It may be interesting to compare these conclusions with those drawn by G. Childe from a general survey of all aspects of the Neolithic culture of Egypt. He says that the Neolithic cultures of Fayum, Merimde and Tasa differ in many particulars, but they may be descendants of an earlier single culture, only specialized locally upon divergent lines. Some features can be paralleled in the North African Capsian and the Natufian of Palestine.<sup>16</sup>

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## 15.2 Section II: The Badarian Culture

The Neolithic people of Fayum and Merimde disappeared, probably due to the deterioration of climate and the advance of the desert. But the Tasians, who dwelt on the bank of the Nile, have the Badarians as their cultural heir. In the use of beads, as in other cultural aspects, the Badarians show a great advance over the Tasians, but in the main just an elaboration of the latter.

Besides bone (and ivory), stone, clay and ostrich shell, several new materials were added by the Badarians. Glazed steatite and copper beads appeared for the first time and are the earliest indication of the knowledge of the glazing process and metal in Egypt. There is a single specimen of tiny blue faience ring bead which I found among many beads of glazed steatite and other stones on one string (Bead no. 271). I am not sure whether this is a misplacing specimen or not, because not only has it not been recorded in the original report, but it is also expressly stated there that “the most striking feature of the bead is the absence of faience or glazed frit”.<sup>17</sup>

As to the stone employed for beads, many new kinds were added. Of the hard stone, there are carnelian, green jasper, diorite (Porphyry), smoky quartz, flint and quartzite. The soft stones are white anhydrite, Egyptian alabaster, white and red breccia, calcite, pink, white and buff limestone, banded white and red limestone, serpentine black, flesh brown and greenish grey steatite, and a kind of red clay stone (pyrophyllite). The proportion between the hard and the soft stone beads (glazed stone excluded) in the U.C. is 12.3–87.7. This dominance of the soft stone is due to the difficulty of the boring of the hard stone. Red jasper, “red porphyry”, obsidian-like stone, “slate”, green and yellow calcite, black, green and grey limestone, and hard red clay have

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<sup>10</sup> Junker, Merimde III, p. 81.

<sup>11</sup> Junker, Westdelta, pp. 21, 50, Pl. XVII. The identification of one of the green stone as probably amethyst is certainly a mistake. The sole characteristic which distinguishes amethyst from other member of quartz group is its purple color.

<sup>12</sup> Junker, Merimdel, pp. 60–61, Pl. XI, 4–7.

<sup>13</sup> Junker, Merim III, p. 82.

<sup>14</sup> Brunton, Mostagedda, p. 29, Pl. XXII, 41, 50, and Pl. XXXIX.

<sup>15</sup> Brunton, Mostagedda, p. 29.

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<sup>16</sup> G. Childe, *New Light on the Most Ancient East*, pp. 61–63.

<sup>17</sup> Brunton, *Badarian Civilization*, p. 27; the absence of faience from this period is confirmed in Brunton, *Mostagedda*, p. 5.



also been recorded,<sup>18</sup> but some of these identifications have been proved to be wrong. For example, the so-called red jasper turns out to be either a red soft stone (pyrophyllite) or a red soft calcareous material (mollusc shell or coral) (nos. 272, 268). Several steatite beads are wrongly identified as grey limestone (no. 260), flint, (no. 273) and slate (no. 282). A black pendant is called limestone in one place but soapstone in another in the same report.<sup>19</sup> Therefore, we should use the ordinary information on material with certain caution whenever the recognition of that material presents some difficulty. Turquoise is suggested by Brunton for some beads of a material similar to the fine glazed steatite, and some beads in his finds at the Ashmolean Museum have been identified definitely as turquoise.<sup>20</sup> Among the thousands of Badarian glazed steatite beads in the U.C., a few may turn out to be turquoise. Of the miscellaneous materials, resin (amber), coral and mollusc shell were also used for the first time. The resin bead has been wrongly recorded as stained ivory. (np. 1597), one piece of white branched coral was pierced for pendant (no. 273), and one bead (no. 272) is made either of red mollusc shell or of coral (but wrongly identified as jasper as stated above). Organ coral (pipe coral) has also been reported.<sup>21</sup>

Typologically, short cylindrical and thick ring beads are by far the commonest types. Among the over eleven thousand Badarian beads in the U.C., only thirty-two beads are not of these types. But the shape of beads is largely influenced by the material and technique. Therefore, the following discussion is divided according to the material group.

The technique of working hard stone was still very primitive in this period. Most of the beads and pendants of hard stone show the minimum of shaping, and some of them are pebbles naturally shaped and polished (H7000). When artificially smoothed, the surface is still dull and uneven in most cases (H1000). The perforation is biconical with large openings (H100), or is natural cavity utilized by an additional boring (H900). Long cylinder beads have not been found, probably also due to the difficulty of the boring process. The ring beads usually have round edges, probably because they were smoothed separately one by one. Ring beads with flat edges and barrel beads are rather rare for this material group. Both the roughly spheroid beads and drop pendants are naturally shaped pebbles. One ring bead of carnelian from Badari 5111 said to be carefully formed<sup>22</sup> looks similar to our specimen from Badari 5132 (no. 259),

both being of the type H5d (ring bead with sharp edges). The green jasper bead of biconical form on the string no. 271 is remarkable, but its material is only tentatively identified as jasper. I have not tested its hardness, and its colour is quite different from green jasper of the Middle Kingdom period.

As to the beads of soft stones, most of them are thick ring beads with flat edges (S6). Some of these flat-edged beads have sides that are not parallel and seem to have been cut up from a long cylinder. The flat edges were probably smoothed by stringing the beads together on one thread and grinding the whole string on a grooved stone. The perforation is more various in type (types 1, 2, 4 and 6), and some of the large perforations are due to being worn by use. The difference in perforation is not significant for the soft stone. Because of the softness of material, there is no difficulty in either boring or grinding; therefore, large beads with a well-finished surface are not uncommon, one alabaster barrel bead having a length over 50 mm (S15P). Ring beads with sharp edges (S4b), biconical (S5h), spheroid (S7f) and short cylindrical (S18n) beads are also found, but rather rare. Pendants are simple in form (e.g. S51b, 52h), but many of them are made of banded limestone (S54c, 55f, 60d, 60e) or breccia (S56f) and show a decorative effect. Decoration was also made by carving or scratching, but the pattern is rather simple, either chevrons (S80) or criss-cross (S85).

Glazed stone beads possess the merits of both hard and soft stone. They can be easily shaped and bored in the manufacturing process before being glazed, but are hard enough to resist wear after glazing. The glazing process adds another desirable quality, the beautiful blue colour. Therefore, they are very numerous. Among about 11,200 Badarian beads in the U.C., about 94.7 % belong to this group. Their body material is limited to steatite, and glazed quartz has not been found and probably unknown in this period. Their typology is also very limited, all of flat-edged thick ring beads with very slight variation in size and length (L50, c, L16a, I; about 1 % of very short cylinder, L160.j), except about 2 % of ring beads that have round edges (L20, f). The perforation is small, straight and regular (type 4). Brunton says that "the regularity of the piercing can only have been effected by a metal tool".<sup>23</sup> But steatite is very soft before being hardened by heat during the glazing process, and such kind of regular boring can be made by a fine pin of any material harder than steatite, e.g. bone, ivory, hard wood and thorn. The use of copper tool is possible, but not necessary. The manufacturing process of glazed steatite beads seems similar to that of soft stone. Some beads have ends not in parallel, and their length also varies very much. These features seem to indicate that they were probably sliced from longer cylinder as suggested

<sup>18</sup> Brunton, *Badarian Civilization*, p. 27; Mostagedda, p. 51.

<sup>19</sup> Brunton, *Mostagedda*, Pl. xxxiv, 89E10, text p. 37 (limestone); but "soapstone" in Sect. 64, pp. 51–52.

<sup>20</sup> Caton-Thompson, *The Desert Fayum*, p. 53.

<sup>21</sup> Brunton, *Mostagedda*, p. 51.

<sup>22</sup> Brunton, *Badarian Civilization*, p. 27; Brunton's corpus no. 86T10.

<sup>23</sup> Brunton, *Mostagedda*, Sect. 64, pp. 51–52.

by Brunton.<sup>24</sup> In comparison with the Predynastic glazed steatite beads, the core of the Badarian beads is more regular, and the glaze is finer in colour (fine blue, Ostwald 2IIe) and does not break away so much in grinding. According to Beck, the Badarian glaze is composed entirely of crystals which are identified as mullite by a geologist.<sup>25</sup>

A few copper beads have been found, but none of them is in the U.C. According to Brunton's original report, they are either ring bead (M3) or short cylinders (M121, 12t). The cylindrical beads were made of thin rectangular sheet metal bent round (over a rod of some kind) so as to make the sides overlapped. The ring beads are made either of copper ribbon wound up spirally, or a thick strip of copper, rectangular in section, bent round in a flat circle till the ends touched, but not overlapped.<sup>26</sup>

For the beads of pasty materials, no faience beads have been found, except a single ring bead (P2b), which is almost certainly due to a misplacement as stated above. Half of barrel bead of black clay is very large in size (PI8y). Whether it was used as beads or not is uncertain, but a very large bead of a similar form made of Egyptian alabaster (S15p) has been found in a Badarian grave.

Among the beads of miscellaneous materials, one resin bead (R12g) is a barrel bead with flattened cross section, similar to a feldspar bead from Fayum (H331) and a shell bead from Badari (R5g). Bone beads are usually made of a segment of long bone, worked into a barrel form with a cross section either roughly round or elliptical according to the original feature of the bone. The natural cavity of the bone serves as the perforation for threading. The technique of ivory carving is highly developed in the Badarian period, as evidenced by the ivory human figure, ivory spoon, etc. This technique is applied to the bead making too. A segmental bead (R39) may have been intended for subdivision, as suggested by the discoverer. Another decorated ivory bead is a carved "melon" bead (R41). Ostrich shell beads are all of the ring beads with flat edge (R52). Thick ring beads (R52m), barrel bead (R57h) and barrel bead with flattened section (R59) are made of mollusc shell. A spacing bead (R70) is made of shell according to Brunton, who rightly regards it as remarkable and quite unexpected at this early period.<sup>27</sup>

As to the use of beads, we have to depend upon the original reports of the excavators.<sup>28</sup> All shells and beads are more commonly found with children than with men or

women. They were usually worn as necklaces by women and children; men wore a single long bead only at neck in the graves at Badari. Bracelets and anklets are less usual; anklets are mostly of shell only, very rarely a mixture of shell and beads. Several children had girdles of shells or beads round the waist. Six males (three each at Badari and Mostagedda, five adults and one child) had masses of beads running round and round the waist, all of green glazed steatite. Quantities of glazed steatite beads were found in another grave over the body (Tomb 592) at Mostagedda, where they were associated with the shell spacing bead mentioned above. One child had a circlet of two rows (of two rows) of shell. And in another grave, a female had one string of beads in the hair running from back to front over the head. In a few cases, beads were found beside the body.

Beads were threaded on cow's hair, and flax thread has been identified. In one case, the thread is of some vegetable fibre, and eight strands could be counted. In most cases, the beads seem not to have been arranged in any order so as to form some definite pattern. Glazed steatite beads were threaded in a band, staggered in one case and were threaded in three rows each running into each hole of the spacer in another case. The shell and coloured beads were sometimes more or less alternated.

Beads were also used for inlay in ivory bracelets and perhaps also in slates.

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### 15.3 Section III: Predynastic Period

As is now well known, the so-called "Predynastic people" consists really of two people, namely the Amratians and the Gerzeans. They are also called the early and the Middle Predynastic people, respectively, according to the sequence of occurrence of their culture in Upper Egypt. The Late Predynastic (or Semainean) people seem only to represent a later stage of the Gerzean culture. Comparatively speaking, the Amratians show many similarities to the Badarians in their cultural traits, whereas the Gerzeans introduced many novelties. Since many objects, including beads, are designed only vaguely as "Predynastic", the Amration and Gerzean beads will be discussed together in this section, but the peculiarities of each will be pointed out whenever possible.

The materials used for beads in the Badarian period were also used by the Predynastic people, but many new materials were added. The most important of the new editions is faience, which plays so dominant a role in the later history of the Egyptian beads. Faience first occurred in the Amration period; some dated to S.D.31.<sup>29</sup> But it was comparatively rare, if we take into consideration its extraordinary

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<sup>24</sup> Ibid.

<sup>25</sup> Beck's report in Brunton's Mostagedda, pp. 60–61; cf. the remarks given above in Chap. VII, Sect. III, Method of Bead making, Beads of Glazed Stone.

<sup>26</sup> Brunton, *op. cit.*, Sect. 64, pp. 51–52.

<sup>27</sup> Brunton, Mostagedda, Sect. 64, pp. 51–52.

<sup>28</sup> Brunton, *Badarian Civilization*, p. 27, Sect. 57; Brunton *Mostagedda* Sect. 65, p. 52.

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<sup>29</sup> Petrie, *Prehistoric Egypt*, p. 42, Sect. 108.

abundance in the historic times. Of the 31 strings of Amration beads in the U.C. Collection, there are only five faience beads in all. The total number of the Predynastic faience beads in the same collection is 1,634 which is about 10.3 % of the total Predynastic beads. Most of the faience beads of this period are green or blue, but there are also 185 black faience beads in the U.C. Collection, of which came from a single grave dated to S.D. 65–76, and the other two are without S.D., and therefore, they may be all of the beginning of the Early Dynasties. The black paste beads found at Badari<sup>30</sup> are made of mud, not of black faience as stated in the report. Other plastic materials are the following: coarse mud, fine clay either plain (white or grey in colour) or painted black and polished, and also reddish pottery (that is, baked clay). The proportion between these materials is mud 43 %, clay 31 %, faience 25 % and pottery 1 %. Some clay beads painted red, both cylindrical and globular, have been reported from El Mahasna, dated to S.D. 60.<sup>31</sup>

Like the Badarian people, the Amrations used a greater number of soft stones than the hard stones for the manufacture of beads. The proportion between them in the U.C. Collection is 87.7 to 12.3 for the Badarian, and 68.8 to 31.2 for the Amration, but 32.1 to 67.9 for the whole Predynastic period. Hard stones are certainly the more suitable material for beads because of their durability and so they are preferable to the soft stones after the technical difficulty of boring and finishing has been overcome. For soft stones, besides those already used by Badarian, a few new kinds were added, namely gypsum, rock salt, pink or red steatite, and a certain kind of yellow stone. The “grey and pink limestone ring-beads” in Brunton’s reports<sup>32</sup> are almost certainly not limestone, but steatite, as proved by some examples in the U.C. Collection. Only the red clay stone (pyrophyllite) seems no longer to be used. As to the hard stones, many new additions were made: garnet, haematite, yellow quartz, amethyst, chalcedony, lapis lazuli, moss agate, obsidian, olivine, onyx, rock crystal, smoky quartz and wool opal. The first three kinds made their first appearance as early as the Amration period. Emerald has been reported,<sup>33</sup> but there is probably some mistake in identification, because it is too hard for being perforated by the primitive drilling method available at that period. Malachite,<sup>34</sup> green feldspar or amazonite,<sup>35</sup> hallflint,<sup>36</sup> chrysoprase, “anorthite”, “diopside”,<sup>37</sup> quartzite,

“limonite”, “wood”,<sup>38</sup> and green and yellow fluorite<sup>39</sup> are also reported.

For the glazed stones, glazed steatite was still used, but was inferior to that of the Badarians both in quality and in quantity. Glazed rock crystal and opaque quartz were introduced for the first time, the earliest one dated to S.D. 35–48.<sup>40</sup> Glazed carnelian and serpentine were also reported.<sup>41</sup> The stone covered by the glaze are often wrongly identified. Wainwright reports some beads of “glazed limestone” from Gerzeh,<sup>42</sup> but some specimens of them from Gerzeh 55 are in the U.C. Collection and turn out to be glazed steatite. Junker identifies some Predynastic beads as glazed shell beads (mollusc shell or ostrich shell), but this is again probably due to some mistake.<sup>43</sup> They are almost certainly to be either glazed (glazed) steatite or glazed opaque quartz. The heat used in the glazing process will reduce limestone or shell into lime powder.

Gold, silver and iron were also used besides copper which made its first appearance in the Badarian period. The miscellaneous materials included brown resin, bone, ivory, ostrich shell, mollusc shell and pipe coral. All of them had been used before the Predynastic period. A black bead from Qau 122 has been identified as “resin” in the report but is probably obsidian, judging by the actual object in the U.C. Collection. Pearl shell pendants were also used.<sup>44</sup> Amber beads have been reported from a tomb at El Mahasna.<sup>45</sup>

Concerning the material of the beads used in this period, Petrie says that “the material used before S.D. 40 last on through all the time; while one group (lapis lazuli, serpentine, haematite, and silver) came in at S.D. 40 and disappear about 60; and another group (turquoise, amethyst, obsidian, porphyry and gold belong to the fifties. This implies a growth in resources up to about S.D. 60, and then a rapid decline; exactly what is seen in the styles of the pottery”.<sup>46</sup> He attributes the appearance of the first group of materials (silver, lapis lazuli, serpentine and haematite) at S.D. 38–40 as due to the influx of a rather different people (the Gerzeans) who, brought in silver, lapis lazuli and haematite, all of them being Syrian products.<sup>47</sup> His statement requires certain revision and amplification according to the knowledge gained by recent excavations. For instance, serpentine,

<sup>30</sup> Brunton, *Badarian Civ.*, p. 56, Sect. 118.

<sup>31</sup> Ayrton and Loat *El Mahasna*, p. 19, Pl. xix, 4.

<sup>32</sup> Brunton, *Badarian Civ.*, p. 48, Sect. 100; p. 56, Sect. 118; *Mostagedda* p. 85, Sect. 105.

<sup>33</sup> Junker, *Kubanieh-sued*, p. 102, 107.

<sup>34</sup> Petrie *Naqada and Ballas*, p. 10; Brunton, *Mostagedda*, pp. 85–86.

<sup>35</sup> E.g. one from tomb 127 at Qau, see Brunton, *Badarian Civ.*, p. 56.

<sup>36</sup> Moellers and Scharff, *Abusir*, p. 59.

<sup>37</sup> Mac Iver and Mace, *El Amrah*, pp. 48–49.

<sup>38</sup> Peet, *Cemeteries of Abydos*, p. 15.

<sup>39</sup> Mond and Myers, *Armant I*, p. 90.

<sup>40</sup> Cf. Petrie, *Prehistoric Egypt*, p. 42, Sect. 109.

<sup>41</sup> Mond and Myers, *Armant I*, p. 72, 89 and 91.

<sup>42</sup> Petrie and Wainwright, *Labyrinth, Gerzeh*, p. 22, Sect. 32.

<sup>43</sup> Junker, *Kubanieh-sued*; p. 103.

<sup>44</sup> Junker, *op. cit.*, p. 107.

<sup>45</sup> Ayrton and Loat, *El Mahasna*, p. 17.

<sup>46</sup> Petrie, *Diospolis Parva*, Sect. 43, Pl. iv.

<sup>47</sup> *Ibid.*, p. 29, Sect. 46.

turquoise and blue-green glazed stones have been used as early as the Badarian period, but amethyst did not appear until about S.D. 64. A single bead made of a transparent stone of a pale purplish colour, now in the U.C. Collection, is dated by Petrie to S.D. 55 and has been wrongly identified by him as amethyst, but it is some kind of soft stone, probably calcite or anhydrite, certainly not amethyst. The earliest example of amethyst beads is some from El Amrah, dated to S.D. 56–64,<sup>48</sup> but its identification of material and the dating require reconfirmation. The earliest specimen of amethyst beads in the U.C. Collection is dated to S.D. 67–79. Serpentine of the noble variety and olivine have not been found before S.D. 43.<sup>49</sup> Garnet became common after S.D. 43; the earliest specimen seems to be those of S.D. 37.<sup>50</sup>

Glass beads have been reported from some Predynastic tombs. A blue translucent glass pendant has been found at Naqada, now in the U.C. Collection,<sup>51</sup> but it looks like the amulet pendant of glass of the XIXth Dynasty. A necklace of green, blue and yellow glass beads has been reported from a tomb dated to S.D. 30–50,<sup>52</sup> but yellow and green glass appeared rather late in the history of glass manufacture, only after the manufacture of blue glass had been well established. A glass bead in the Berlin Museum is said to be from Naqada 1480<sup>53</sup>, but it has not been recorded in the original report, and there was probably some misplacement of beads before it came to the Berlin Museum. I think that all of them are probably due to some mistake, as already suggested by Lucas.<sup>54</sup> Typologically, most of the beads of hard stones are ring beads either with a rounded edge (H2), or with a flat edge (H6), which make up 92 % of the total of the Predynastic beads of hard stones. The proportion between H2 and H6 is about two to one. The ring beads with a ridged edge (H5) are a variety of the type H2, the presence of the ridge due to the method of manufacture by being smoothed biconically (H6000). A large spheroid bead (101p) is dated to S.D. 33. A few smaller beads of the type H1 were also found. Long beads (H15, 20, 22) were rare in the Amration period. There were only one or two specimens which can be dated as early as S.D. 33–48 and may belong to the same post-S.D. 40 period as other definite Gergean long beads. The elliptical cross section of H24 and H27 is the original shape of the stone pebble. The type H19 is a variety of the ordinary barrel beads, with a ridge due to the

method of manufacture (H6000). A large ball bead (H5808) still retains the original shape of a carnelian pebble with a natural hole. Garnet beads seem to be limited to small ring beads (H2, 5, 6), many retaining their original surface and shape (H24-60). This is due to the fact that they were available only in small pebbles from gravels. Most of the pendants are drop-shaped pebbles without passing through the process of shaping (H71b, 73f, etc.). Some pendants are flat, due to the original form of the flake (H781, 80, 83). Some beads of peculiar shapes should be noticed: H131 ring beads with a lenticular section, H152c, faceted ring beads with ridged edge<sup>55</sup> both dated to S.D. 44–60; H233 I a flattened barrel bead dated to S.D. 68; H132n, a circular bead with a lenticular section perhaps also of the Late Predynastic period; H159p a cross-shaped bead, and H184 a moon-shaped bead, both dated to S.D. 39–44; H187f, an axe-shaped pendant of uncertain date; and H152a, a polygonal broad ring bead dated to S.D. 43–46.<sup>56</sup>

A polygonal cylinder bend (H54h) has also been reported.<sup>57</sup> Some of these special beads may have amulet significance. Technologically, all of the Amration and most of the Predynastic beads of hard stones have a biconical hole with a large opening (H100). This is due to the technique of piercing the hole with a small flint point. Among the 3,507 Predynastic beads of hard stones in the U.C., the only exceptions are the following: 27 long beads with a double parallel perforation (H200), which has a comparatively large opening in this period and is really a variety of the biconical perforation, modified as required by the length of long beads; 15 lapis lazuli and 6 turquoise beads with the single plain perforation (H400) but both materials have a hardness intermediate between the hard and the soft stones as defined by us (lapis lazuli 5–5.5, turquoise 5.5–6), so they can be occasionally treated by the same method of piercing as that for the soft stones; 2 beads with the single conical perforation (H300) seem to be some broken part of a long bead with an ordinary biconical hole; and three beads with a natural hole (H900). Another 180 beads (178 of lapis lazuli and one each of volcanic ash and of patinated flint) have a single plain perforation, but their Predynastic date is either questionable or uncertain. Although there are still many beads with a rough finish (H1000), the Predynastic beads of hard stones are, in general, better finished than those of the Badarian period. There were neither long and slender beads nor very small beads, due to the difficulty of long perforation and fine final finish for these kinds of beads in the case of hard stones.

<sup>48</sup> Mac Iver and Mace, *El Amrah*, p. 21.

<sup>49</sup> Brunton, *Badarian Civ.*, p. 56, Sect. 119.

<sup>50</sup> *Ibid.*

<sup>51</sup> Petrie, *Naqada*, p. 44.

<sup>52</sup> Mac Iver and Mace, *El Amrah and Abydos*; p. 54.

<sup>53</sup> Scharff, *Die Altertüemer*; pp. 106–109.

<sup>54</sup> Lucas, *Ancient Egyptian Materials*, pp. 116–118.

<sup>55</sup> For this type of beads, see also Petrie, *Naqada*, p. 44; Brunton, *Badarian Civ.*, p. 56, Sect. 119.

<sup>56</sup> Besides the bead in the U. C. (Bd. No. 36), see also Brunton, *Badarian Civ.*, p. 19, Sect. 101, tomb 141.

<sup>57</sup> Moellers and Scharff *Abusir*, pp. 58–59; F8.

Among the 36 beads of glazed quartz in the U.C., 35 are ring beads with a rounded edge, and the remaining one is a roughly drop-shaped pendant. All of them have a biconical hole just as the unglazed beads of hard stones and have a rough surface, perhaps purposely so finished for the attachment of the glaze. All of the beads of glazed steatite have a much better finish than that of glazed quartz and usually have a single plain perforation (about 27 %), a phenomenon also happening to the unglazed soft stones. The forms of the unglazed steatite beads are as follows: ring beads with flat edge (L5, 16a, 16i), 71.3 %; ring beads with a rounded edge (L2, 7.9, 22.1 %); ring beads with a ridged edge (L4, 0.6 %), biconical ring beads (L8b, 1.3 %); barrel beads (L12, 14, 0.6 %); cylinder beads (L16, 4.0 %); beads with a non-circular section (L23, 30, 0.10 %). The glaze of the Predynastic glazed steatite is not so good as that of the Badarian period.

Metal beads are rarely found, probably due to the activities of ancient tomb robbers. Gold beads were made either by rolling up a small sheet of metal (M300) or by plating a very thin sheet over a core of some white plastic material, probably a lime paste (M600). According to Petrie, this plating-on-core method began by S.D. 47, and it continued to the Roman time.<sup>58</sup> But a string of beads containing one or two beads coated with gold foil is dated to S.D. 46.,<sup>59</sup> and gold beads described as “may have been originally formed on a body of clay or some composition” are dated to “before SD 41”.<sup>60</sup> The beads made by the rolled sheet method are usually cylindrical (M12), but those made by the plating-on-core method have various forms according to the shape of the plastic core, e.g. spheroid, M1, M5; cylindrical 1, M12; barrel-shaped M8; pear-shaped M11 and two of them even have a spiral decoration, M53f.<sup>61</sup> Some barrel beads found at Abydos are described as of wood covered with gold foil “or” of wood (or bone) with gold foil covering<sup>62</sup> may be also beads of this kind of plating-on-core method. A drop pendant of gold is described as solid and dated to S.D. 51–56.<sup>63</sup> Another pendant made of a sheet of gold with a decoration of punched dots is dated to S.D. 59.<sup>64</sup> There are also ring beads (M7a) and barrel beads (M9f) of copper and spherical hollow beads (M5d) and barrel beads (M9h) of silver. Cylindrical beads both of silver and of copper have also been reported.<sup>65</sup>

There are three iron beads made by beating the metal (probably of meteoric origin) into a sheet and then rolling it up into a cylindrical form (M9m, 12n). They were found at Gerzeh dated to S.D. 53–63 and have been much discussed.<sup>66</sup>

Due to the nature of material, the beads of plastic materials are more varied in form. The 5 green faience beads of the Amration period are either ring beads (PN1b, 6g) or roughly spherical beads (PN1i). At Mostagedda where many Amration tombs were excavated by Brunton, only a single cylindrical bead was made of faience.<sup>67</sup> Taking the Predynastic period as a whole, the distribution of various forms is as follows: ring beads with a flat edge (PN6) 33.6 %, ring beads with a round edge (PN2) 33.3 %, cylindrical beads (PN22) 22.4 %, spherical beads (PN1, 8, 9) 6.0 % and other forms 4.7 %. The last includes 17 barrel beads (PN16–18), 3 pear-shaped beads (PN11, 21) or ovoid (PN4, 32, and a flattened spheroid bead (PN28), as well as 25 ring beads decorated with a dental edge (PD17–18). One pendant in the shape of a grooved cone (PD86) has been found in Nubia.<sup>68</sup> The beads of mud and clay were not made into the ordinary ring beads as the faience, because of the fragility of material. Their common forms are biconical thick disc beads either concave or convex in profile (PN4, 10, 15) 45.7 %; barrel beads (PN16–18), 44.1 %; cylinder beads (PN22–23), 5.0 %; and spherical beads (PN8, 11), 4.5 %. The concave profile is due to the shrinkage of material during the process of drying. The conical long beads (PN 19) seem to be a broken part of some long and slender barrel beads. The segmental beads (PN64) are some beads of biconical type (PN15) accidentally adhered together. There are also some ovoid beads (PN33f), long pear-shaped beads (PN21) and biconical barrel beads (PN20p.). The mud beads are very coarse in texture, but the clay beads are rather fine, either remaining plain (grey or white in colour) or, more frequently, painted black and then polished. There are two clay beads decorated with pricked spots (PD45). The red pottery beads are either biconical (PN10c, 15c) or cylindrical (PN22). The red colour of the beads is due to the oxidation of iron contained in the clay after being baked.

<sup>58</sup> Petrie, *Prehistoric Egypt*, p. 27. xxx.

<sup>59</sup> Mac Iver and mace, I Amrah, p. 18.

<sup>60</sup> Ayrton and Loat, *El Mahasna*, Pl. xiii, 3; from tomb H17.

<sup>61</sup> Petrie and Wainwright, *Labyrinth, Gerzeh*, pl. v, no. 55; incorrectly described as “stone example of a segmental bead with a gold plating” in A. Evans, *the Palace of Minos II*, p. 179, note 11.

<sup>62</sup> Peet, *Cemeteries of Abydos II*, pp. 15–16.

<sup>63</sup> Ayrton and Loat, *El Mahasna*, pl. xvi, 3, from tomb h. 41.

<sup>64</sup> Petrie, *Naqada*, p. 15, Sect. 34, pl. lxxv, 10.

<sup>65</sup> Brunton, *Mostagedda*, p. 86.

<sup>66</sup> Petrie and Wainwright, *Labyrinth, Gerzeh*, pp. 15–19, Pl. iv, Fig. 2; see also the following references: (a) Wainwright, *Iron in Ancient Egypt*, in *Cairo Scientific Journal*, Aug. 1914; (b) Petrie’s article in *A.E.* p.20, 1915, part 1. (c) C; H. Desch’s article in *Journal of the Iron and Steel Institute*, vol. cxx (1929) p. 343. (d) Report of the Committee on Sumerian copper, *British Association*, 1928, (e) T. A. Rickard, *Man and Metal*, p. 850, 854. (f) Lucas, *Ancient Egyptian Materials*, pp. 193–197.

<sup>67</sup> Brunton, *Mostagedda*, p. 85, Sect. 105.

<sup>68</sup> Junker, *Kubanieh-sued*, p. 103, 107.

For beads of miscellaneous materials, a bead of brown resin is a spherical bead dated to S.D. 34 (R1) and one black resin (or obsidian) bead is polygonal in cross section (R19). Bead of long bones of small animals and birds are made into cylindrical beads (R33, 36), and dated to S.D.57. A bead made of a piece of a rectangular plaque (R37) is either of bone or of ivory. There are several pendants of ivory carved with a spiral decoration (R47), dated to S.D. 40.<sup>69</sup> Ivory pendants either plain or carved with a net pattern (R46d, 49b) and barrel beads of ivory have been also reported.<sup>70</sup> Due to the thinness of material ostrich shell can be made only into ring beads, with their edge either flat or rounded (R51-52). Their total number in the U.C. is 217, but some of them may be made of mollusc shell. Some kinds of mollusc have a thick wall, which can be made into thick ring beads (R51g, 51h, 54) or barrel beads (R57). Some cylinder beads (R58) have a very thin wall with a large perforation which seems to be natural, and they may be made of some cylindrical mollusc shell like dentalium. But the beads of "dentalium shell" from Badari 1664,<sup>71</sup> which are now in the U.C., are made of pipe coral, not of dentalium. Cylindrical beads made of pipe coral have been found several times, but the "coral" beads reported from Badari 4604,<sup>72</sup> now in the U.C., are made of long bones of small animals or birds, but not of coral. Two rhombic small beads of ostrich shell (R47c) have been found in Nubia.<sup>73</sup> A pentagonal ring bead (R67d) may be made of either shell or limestone. When decayed, a shell bead is often very difficult to be distinguished from a limestone bead. The convex biconical ring bead (R62) is interesting. It has one groove on each side for stringing instead of a perforation. There are 18 of it in the U.C., all from one tomb at Diospolis Parva, unfortunately without a S.D.

Like the beads of hard stones, most of those of soft stones (79 %) are ring beads, but the proportion between the type S2 (with a rounded edge) and S6 (with a flat edge) is 42–58. This is due to the method of manufacture; ring beads of soft stones are usually made by cutting up cylindrical beads or/and being smoothed finally by stringing together on a thread, so they easily get a flat edge, whereas those of hard stones were usually made one by one and then smoothed separately, so they usually get a rounded edge. Besides the ring beads which occupy 78.9 % of the beads of soft stones, other common types are the following: S18, cylinder beads, 11.8 %; S13-15, barrel beads, 3.6 %; and S5 ring beads with a ridged edge, 2.3 %. There are also several spheroid beads S1, 7, 8) flattened barrel beads (S22-24, 27),

one convex biconical ring bead dated to S.D. 44–60 (S4), one concave cylinder bead made of serpentine dated to S.D. 64 (S12)<sup>74</sup> and one lenticular ring bead dated to S.D. 56–70 (S25). A conical bead (S11) is made of calcite and is probably a broken part of the ordinary barrel bead (S14-15). Type S39 is probably a degenerated form of beetle amulet.<sup>75</sup> There are 23 pendants of soft stones in the U.C.: mostly drop shaped (S51b, 52), one with the lower ends pointed (S52m), the remaining pendants being 3 of the type S57, dated to S.D. 56–70, which is classed by Petrie as an amulet, probably a claw<sup>76</sup>; one of the type S60i, made of a small rectangular flat plaque, dated to S.D. 57; 5 of the type S53g; and 1 of the type S62d, both types probably being amuletic, the former a mollusc shell, the latter an axe. There are examples of the type S51d in the U.C., which has been called by Brunton as "*bulla*-pendant", and the earlier one is dated by him to S.D. 48–53.<sup>77</sup> Pear-shaped beads (S17f), truncated pyramidal pendant (S59b), pendants made of lenticular or rectangular plaques (S56d, 60j), and spacing plaque (S43) have also been reported.<sup>78</sup>

Glass beads have been reported from some Predynastic tombs, but they are almost certainly due to some mistake, as has been pointed out above in the discussion of the of Predynastic beads and need not detain us any mole for the discussion of their typology.

Two strings of beads in the U.C. (Bds. Nos. 347 and 353) are labelled (Naqada) 1858 and 388. If they really come from the named tombs, they would belong to the Predynastic period, S.D. 40 and 72, respectively. But I consider them as questionable and therefore exclude them from our discussion above. The first string contains, besides many genuine Predynastic beads, also several fine, small carnelian beads with a small parallel perforation (H200 or H400), which are probably intrusive. The second string consists of two beads only: one ball bead made of some greenish black material like slug and another ball bead of carnelian with a grooved perforation (H800), a peculiar kind of perforation which did not occur until the middle of the Late Period (about the XXVth Dynasty) in Egypt. The original place of the beads upon the dead is mostly unknown or unrecorded. For the strings which have their position recorded, the majority of them were used as necklace, and some as bracelets and anklets.<sup>79</sup> Sometimes, they were merely laid

<sup>69</sup> Cf. Petrie Naqada, pl. lviii, 10.

<sup>70</sup> Junker, Kubanieh, sued, p. 101.

<sup>71</sup> Brunton, Badarian Civ., p. 56, Sect. 119.

<sup>72</sup> Ibid, p. 56, Sect. 119 from tomb 4604.

<sup>73</sup> Junker, Kubanieh-sued, p. 105.

<sup>74</sup> Another one of the same kind found at Mostagedda is also made of serpentine, see Brunton, Mostagedda, Sect. 105, p. 85.

<sup>75</sup> Petrie, Naqada, p. 15, Sect. 35, pl. lviii.

<sup>76</sup> Petrie, Amulets, p. 14, pl. II, 24, d–f.

<sup>77</sup> Brunton, Mostagedda, p. 86, Sect. 105.

<sup>78</sup> Brunton, Badarian Civ. Corpus 38k3 c9015; and Mostagedda, pl. xxxix, 7503.

<sup>79</sup> Cf. Brunton Mostagedda, pp. 85–86, xxx 105 Petrie and Wainwright, Labyrinth and Gerzeh, p. 22. sed. 32.

in grave as string and not actually passed around the neck or wrist.<sup>80</sup> A mass of small green glazed stone beads in parallel lines was found on the fingers, with three large ovoids at Naqada, and is regarded by the finder as “apparently a beadwork mitten”.<sup>81</sup> A ring of small carnelian beads was found on one of the fingers in a tomb at Abydos, where there was found also a network of dark and light blue glaze beads, every two alternate diagonal lines being of a different colour, and this was probably a bead bag.<sup>82</sup> At Gerzeh, beads were worn also on the head, with bunches over the ears or as a fillet running round the forehead, and on one occasion, this fillet had a small loop hanging from the centre of it.<sup>83</sup> There is one diadem made of beads arranged in exquisite taste found at Abydos.<sup>84</sup> Also at Gerzeh, there is a string around the waist.<sup>85</sup> Some shell, ivory or bone ring beads were used as inlay on the zoomorphic palettes, ivory figurines or stone vases with human beads as eyes.<sup>86</sup>

The arrangement of beads on the string is mostly unknown. In the U.C., there are only four strings of Predynastic beads “in original order”. A few strings of beads in their original arrangement have been recorded in the reports of various excavations.<sup>87</sup> In some cases, the whole string consists either of beads of the same material and same form, or of beads of various kinds strung together

at random without any order. But a few strings have the beads of various kinds strung in certain order so as to show an artistic taste, such as to use alternately a series of ring beads of a light colour after another of a dark colour to show a colour contrast, or to use either a pendant or a large bead as a centre piece (*Mittelstuecke*) to give a keynote.<sup>88</sup>

The materials used for stringing the beads are various. In one occasion, individual beads were arranged on a thin leather thong separated from one another at a certain distance and kept in position by knots.<sup>89</sup> But usually, they were threaded on a cord either wound of many twisted strands or consisting of several parallel strands.<sup>90</sup> A coarse hair with circular section (giraffe’s) was used at Mostagedda where black-and-white parti-coloured cords were also used for treading. In some cases, the fibre may have been flax.<sup>91</sup>

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<sup>80</sup> Mac Iver and mace, El Amrah and Abydos, pp. 48–49.

<sup>81</sup> Petrie, Naqada, Sect. 44, p. 23 from tomb B50.

<sup>82</sup> Peet, Cemeteries of Abydos I, p. 15.

<sup>83</sup> Petrie and Wainwright, Labyrinth, Gerzeh p. 22, Sect. 32.

<sup>84</sup> Frankfort’s report in J.E.A., vol. xvi (1930), p. 214.

<sup>85</sup> Petrie and Wainwright, Labyrinth, p. 22, Sect. 32.

<sup>86</sup> Capart, Primitive Art in Egypt, p. 83, 99, 167, 174.

<sup>87</sup> E.g. Junker, Kubanieh-sued, pp. 108–109, Petrie and Wainwright, Labyrinth, Gerzeh, p. 22, Sect. 32, Pl. V.

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<sup>88</sup> Cf. Junker, Kubenieh-sued, p. 109.

<sup>89</sup> Ibid. p. 108 text Fig. 58a.

<sup>90</sup> Ibid. p. 109.

<sup>91</sup> Brunton, Mostagedda, p. 85, pl. xliii, 29–31.

The Early Dynastic period includes the I<sup>st</sup> and the II<sup>nd</sup> Dynasties and is equivalent to Petrie's S.D. 77–85. From the excavations at Tarkhan, Petrie assigns S.D. 77–76 to Dynasty O, S.D. 79–82 to Dynasty I and S.D. 83–85 to Dynasty II<sup>1</sup>, but the so-called “Dynasty O” seems to belong to the beginning of the I<sup>st</sup> Dynasty and should be included therein. As shown by the series of S.D., the Early Dynasties form a continuation of the later Predynastic culture, with some additions and amplifications which are probably due to the influx of an invading people who stimulated the creative power of the native people as well as brought in some new cultural elements from their fatherland. In the U.C., there are 113 strings of beads from the II<sup>nd</sup> Dynasty from excavations, though there are some published in the reports of excavations.<sup>2</sup> The discussion below is based almost exclusively upon the data preceding the II<sup>nd</sup> Dynasty.

The materials used for beads are mainly those already employed by the Predynastic people, but the proportion between various materials gives a quite different show. The percentage of various materials is as follows: Hard stones 20 %, soft stones 3.3 %, glazed stones 3.7 %, metal 0.2 %, faience 69.3 %, clay and pottery 0.3 % and miscellaneous 2.7 %. In comparison with the Predynastic period, the beads of hard stones and metal maintain their position, and faience increases from 10 to 70 %, while the other materials correspondingly decrease a great deal. This indicates a mastery of the art of faience-making. Both from the practical and artistic viewpoints, a well-made faience is superior to other materials except hard stones and metals, as soon as its craft develops to a certain advanced stage. The practical viewpoint for the choice of material should include both the facility for manufacture and the durability for wearing. This seems to be the reason why faience superseded in a great

part other materials except hard stones and metals in the Early Dynastic period.

Among the hard stones, carnelian beads are most numerous. About 61 % of the beads of hard stones are carnelian. The carnelian used in this period is often a rather distinctive coral-pink colour and only slightly translucent.<sup>3</sup> Garnet takes up the second place and occupies 32.9 %. Other hard stones are slate, amethyst, haematite, wood opal, rock crystal, milky quartz, green felspar, obsidian and turquoise. Other stones are also found in the reports of excavations: lapis lazuli,<sup>4</sup> malachite,<sup>5</sup> beryl, syenite, speckled stone,<sup>6</sup> “porphyry” olivine<sup>7</sup> and mottled limestone.<sup>8</sup> But the “beryl” in Reisner's report is almost certainly a mistake of other green stone, most probably a green felspar, while the “syenite” and “mottled limestone” are probably either an ordinary diorite or a white and black porphyry. Glazed steatite was used, but not so common as in the Predynastic period. For metal beads, gold, silver and copper are known.<sup>9</sup> Among the plastic materials, faience beads are extremely common. Other plastic materials are as follows: a few red pottery and a single bead of yellow paste (decayed faience). Majority of the faience is blue and green in colour. Black faience, mostly brownish-black, though appearing for the first time, is rather common. Some beads have a pale black or grey colour. White faience seems to appear also for the first time. Some greenish brown or bluish white faience is probably faded green or blue faience. As remarked by Petrie, the blue, if exposed to damp, fades white, and the

<sup>1</sup> Petrie, Tarkhan 1, p. 3.

<sup>2</sup> e.g. Petrie, royal Tombs, II, pl. xiv, 50–51.

<sup>3</sup> Brunton, Qau and Badari 1, p. 16.

<sup>4</sup> e.g. some from Abydos, see Petrie, Royal Tombs, II, pl. xxxviii, 10; and some from Turah, see Junker, Turah, p. 16.

<sup>5</sup> Some from Tomb W9 at Abydos, see Petrie, Royal Tombs II, pl. xxxviii, 16.

<sup>6</sup> Reisner, Naga ed-Der 1, p. 114, 118; for syenite, see also Junker, Turah, p. 16.

<sup>7</sup> Brunton, Qau and Badari 1, p. 16.

<sup>8</sup> Artiole in A.S. vol. xxxix(1939) p. 709.

<sup>9</sup> For silver beads see Reisner, Naga ed-Der II, p. 48.



green changes to brown owing to the decomposition of green silicate of iron and the production of brown oxide of iron.<sup>10</sup> But most of the brown (or brownish-black) and white faience identified here as such are made originally so, as shown by an examination of the glaze and the body material. There are two faience beads of a reddish colour (Ostwald 61g, 7ng.), but they have this colour as a result of the change of colour due to the oxidation of iron present in the original green-blue glaze and is quite different from the red faience of the later time, the latter having a red body material and a translucent reddish or almost colourless glaze. Many ring beads of faience from the Roal Tomb of Naqada have their colour either in blue or red, some half blue and half red, probably the result of the combustion of the tomb, as evidenced by other objects found in the tomb.<sup>11</sup> The red tiles from the step pyramid at Saqqarah have a dirty reddish glaze on white body<sup>12</sup> and therefore are merely ordinary faience, perhaps blue faience with the colour changed by burning or other cause and not the red faience in the strict sense. The use of the soft stones is limited to a few kinds: Egyptian alabaster, calcite, limestone (pink and white), serpentine and black steatite, with one or two examples of anhydrite, brown ironstone, brown and buff limestone and green steatite. The flesh-brown steatite, which was very common in the Predynastic period, seems no longer to be used now. For miscellaneous materials, resin and ivory were found once in the U.C., and bone has been reported.<sup>13</sup> Beads of mollusc shell, mostly cylindrical in shape, are comparatively common, but beads of ostrich shell became rare, only occurring on two strings in the U.C.

Generally speaking, unlike the Predynastic people who sometimes just picked up the pebbles from the desert or the riverside and worked them up for beads, the Early Dynastic people seems to be more careful in their choice of materials. They used artificial materials (such as faience) more than the natural materials; and among the latter, they used hard stones more frequently than other materials put together. The material is more limited in kind, but usually finer in quality.

Typologically, most of the beads of hard stones are ring beads, either with a rounded (H2) or a flat edge (H6), but the long beads whether barrel shaped (H14–16), drop shaped (H20) or cylindrical (H21–22) are far more numerous than in the Predynastic period. Spheroid beads, with the ends either rounded (H6) or flat (H9), became also more

numerous. The following table shows the tendency very clearly:

	Ring beads (%)	Long beads (%)	Spheroid beads (%)
Predynastic	93.8	2.9	0.07
Early dynastic	74.4	16.5	6.9

Although it indicates a change in fashion or artistic taste, yet in the case of hard stone, this change became possible only when the technique of stoneworking had reached a certain high stage of development. The long beads require an advance in the drilling process, while both the long and the spheroid beads require more skill in the shaping and the finishing of the beads. Moreover, the cylinder beads of the Early Dynasties are usually of a slender type (H21), whereas those of the Predynastic period are larger in diameter (H22). In the Early Dynastic period, there are 55 cylindrical beads or the slender type, but only 12 of the large type in the U.C., on the other hand in the Predynastic period, there are 31 cylindrical beads of the large type, but only 13 of the slender type. This is probably due to a technical necessity, because the hard stone beads of the Predynastic period usually possess a biconical perforation with a fairly large opening which demands a large diameter or the body of the beads. The few slender long beads (H21) of the Predynastic period in the U.C. all have their perforation in the types H200 and H400, which have a smaller opening, and are rather exceptional in that period, as already remarked in the section on the Predynastic beads.

The beads with a ridged edge (H5, H10, H15) are varieties of the ordinary beads, retaining the ridge due to their being smoothed biconically (H6000). The beads of the type H1 12 4h is a rough garnet bead retaining their original elliptical section and that of H60 is an irregular bead made of turquoise flake or pebble. Beads of peculiar forms are as follows: beads with a flattened or lenticular cross section (h27, 32, 33), button beads (H59b) and toggle beads (H59i). The first type is very popular in ancient Mesopotamia and occurred in Egypt in the period where there were strong eastern influence or connection, such as the epoch from the Late Predynastic to the Early Dynastic period and the XIIth Dynasty. The last two types (H59) seem to be peculiar to this period. The latter that is called by the finder as “the hourglass or dumb-bell beads” came from Qau.<sup>14</sup> There are several examples of amethyst beads on the bracelets found in the Tomb of King Zet at Abydos,<sup>15</sup> very similar to this type (H59i) but were fastened by a groove around the

<sup>10</sup> Petrie, *Arts and Crafts*, p. 116.

<sup>11</sup> Morgan, *Rechenches sur les origines de l’Egypte*, II, *Tombeau royale de Negadah*, p. 196, Figs. 722, 724, (Cairo Museum J14125).

<sup>12</sup> Lucas, *Note on red faience in J. E. A.* xxiv, (1938).

<sup>13</sup> *Ann. Serv.* vol.xxxix (1939) p. 769.

<sup>14</sup> Brunton, *Qau and Badari I*, p. 16.

<sup>15</sup> Petrie, *Royal Tombs II*, pl. 1 pp. 16–19.

middle instead of a hole (H57j). Spacing beads of hard stones (H62b, 65, 67) appeared for the first time. Except the type H62b, all of these spacing beads on one string found in the Tom of Mena at Abydos and show some peculiar forms which I have not seen elsewhere. For the pendants, the ball pendants with a neck (H71f), (H71 g) seem to be a type peculiar to this period. There are two examples of this form made of soft stone (S51d) from Naqada 1234, dated vaguely to the Predynastic period, but they may belong to the beginning of this period. There are several drop pendants (H73) and one slender cone pendant (H81f). Types H75 g and H85 may be debased forms of amulets, the former being a shell and the latter a beetle. The type H80b is an irregular piece of flake while the type H88b is made of an unshaped pebble in their original forms. The decorated beads of hard stones show the developed technique of stoneworking. They were carved either with a spiral pattern (h95b, 95j) or a double collar and parallel lines (h98b). The spacing beads of the type H65b, 65d are also decorated with a double collar in the middle. Stone beads capped with gold (h93b) also appeared for the first time.<sup>16</sup>

The surface of the Early Dynastic period beads is generally well smoothed, but not so highly polished as that of the Middle Kingdom. Majority of them (H8 1, 5 %) still show a biconical perforation (100), due to the use of flint drill, such as those found at Hierakonpolis together with some unfinished beads,<sup>17</sup> but the opening of the perforation is usually smaller than that of the Predynastic beads. Among the other 18.5 % hard stones of this period in the U.C., 17.8 % have a parallel double perforation (H200), most of them from a Royal Tomb at Abydos (the Tomb of Mena). There are three specimens with a single conical perforation (H300) and two specimens with a plain perforation (H400), but they are either a broken piece or a shorter cylinder beads reworked from some broken long beads, and they had originally either a biconical perforation or a double parallel perforation. The only exception is one roughly shaped spheroid bead of amethyst which occurs on a string only vaguely labelled "Gerzeh" (Tarkhan), most probably a surface find, and so this bead may be an intrusive one.

The forms of glazed steatite beads are very limited in the type. They are either the ring beads with a rounded edge (L2), or a flat edge (L5), or the cylinder beads (L16). The proportion between the ring beads and cylinder beads is 67.6–32.4. This shows the same tendency as that of hard stone beads, namely the increase of the long beads in the Early Dynastic period. The proportion between the rounded and the flat-edged ring beads is 13.3–86.7 in the

Predynastic period, but 74.8–25.2 in the Early Dynastic period; that is to say, there was an increase in the beads with a rounded edge in expense of those with a flat edge among the ring beads.

Metal beads have many new forms introduced in this period. The old types, such as ring beads, ball beads and barrel beads (M3b, 7a, 5f, 9f), were still used, either made of gold or copper. The toggle beads (M23) have the same form as that of hard stone (H59j) and seem to be limited to this period. Many kinds of the spacing beads of metal were invented, because the arrangement of beads in several rows on one necklace or bracelet became popular in this period. The spacers of metal have two or three holes, and the body was made by joining together several ring beads (M27c) or small ball beads (M26b). The end spacers (M36b) also first occurred in this period. The ball pendant (M40b) was made by putting a loop on a ball bead. The decorated beads are usually a barrel bead decorated with a spiral pattern (H53b, 53 m) and perhaps occasionally with vertical parallel lines (M62b). The latter is not quite certain and may be also a spiral pattern, because the photograph shown in the report is not clear in this respect.<sup>18</sup> Ten barrel beads with an egg-shaped cross section have a more complex pattern (M84). They have five groups of vertical parallel lines with a wave or indented pattern between each two of them.<sup>19</sup> Gold was also used for capping a stone bead, as already mentioned above (H93b). All these metal beads of peculiar feature are made of gold except the spacer M33b, which is a copper bar with four holes and has four glazed steatite ring beads still attached on it (Cairo Museum. J69682). Gold beads are made either of solid gold or of gold foil on a core of light cement (M600). Most of these gold beads are retained in the Cairo Museum after having been found and can be seen only at that museum.<sup>20</sup>

For the beads of plastic materials, all the beads of red pottery are barrel beads PN16–18, but the faience beads have a great number of forms. The general tendency of the increase in both the spheroid and the long beads also occurs to the faience beads. In comparison to the Predynastic period, ring beads (PN2, 6, 7) decreased from 68.8 to 41.6 % but spheroid beads (PN8–11) increased from 5.7 to 9.3 %, barrel beads (PN16–18) from 1.1 to 7.5 % and cylinder beads (PN22–23) from 22.7 to 35.4 %. Thus the long beads including the barrel and the cylinder beads make up 42.9% of the total number of faience beads and slightly surpass the

<sup>16</sup> Cairo Museumno. 52010, from the tomb of King Zer, see Petrie, Royal Tom 11, pl. 1, pp. 16–19.

<sup>17</sup> Quibell and Green, Hierakonpolis II, p. 12, Sect. 31.

<sup>18</sup> Reisner, Naga ed-Der I, p. 7.

<sup>19</sup> Ibid, p. 30, 143, pl. vi.

<sup>20</sup> e.g. the four bracelets from the tomb of Zet at Abydos (Cairo Museum Nos. 52008–52011); decorated gold beads from Naga ed-Der, (C. M. Cat. no. 53803); see Vernier's Catloge Gen. du Musee du Caire, and also Petrie, Royal Tombs II, pl. 1, pp. 16–19, Reisner, Naga ed-Der, I, p. 118, pl. 6–7.

ring beads which only form 41.6 %. Since the making of the long beads does not present much great difficulty as in the case of hard stones, the tendency of the increase in long beads manifested itself here with more force. About 44.7 % of the brownish-black faience beads are made into the spheroid beads, whereas there are only 4.7 % of the blue-green faience in the spheroid shape. Even in the absolute number, the former surpasses the latter in the U.C., namely 327 black beads but 254 blue beads of the spheroid form. Perhaps, these brownish-black beads were made as imitation and substitute of the dark garnet beads. These spheroid beads were usually made by modelling the clay into a ball, and then piercing a perforation from one end (PN400). The conical beads (PN12–13, 19, 14) were found either in the 1st Temple at Abydos or in a tomb at the same place, performing a part of a ceremonial whip, as in the case of the Middle Kingdom beads of the similar shape.<sup>21</sup> The concave thick ring bead (PN14b) is a variety of the short cylinder (PN22k), the slightly concave profile due to a shrinkage of material during the drying process. The barrel beads with an elliptical or lenticular cross section (PN28, 29 and 35) are similar to some beads made of hard stones, a form not uncommon in this period, but the cylindrical beads and drop-shaped beads with a flattened cross section, (PN3p–31.) may owe their flattened form to some accidents which flattened them during the drying or firing process, when the material as still soft and plastic. The type PN40 is shell shaped, similar to PN89h in form, but with the perforation in a different direction. The type PN49g is a barrel bead with a triangular cross section, and the type (PN54b) is a ring bead with a pentagonal section. Each of these two types has only a single specimen in the U.C. For the pendants, there are a ball pendant with a long neck (PN86e) and a drop pendant (PN87b). Both the types (PN89h and 97i) are probably amuletic, the former a shell and the latter an axe.

The decorated faience beads are still not very common. The ring beads with an indented edge which first appeared in the Predynastic period were continued in this period. Spiral pattern became popular now. Beads of this pattern are in the shape of either comical or cylindrical (PD9–11) with the pattern either carved or modelled on them. One kind of them is fairly large in size, sometimes with one and flattened like a snake head (PD11d). Crumb beads appear thrice among the beads of this period in the U.C., 8 in number, all in the form of a spheroid bead (PD46b), dated to S.D. 77–81.

For the beads of miscellaneous materials, the resin bead is pear shaped, but its identification of material is doubtful (R9.). The ivory bead is a drop pendant (R45k). Some white

cylinder beads (R33f) used in association with black steatite cylinder beads are identified as “bone”,<sup>22</sup> but they are probably made of mollusc shell or limestone. The thin ring beads of shell (R51c, 52f) are generally made of ostrich shell, but some may be of mollusc shell, certainly the pink ones. The thick ring beads (R51h) barrel beads and cylinder beads (R57–58) are made of mollusc shell but some may be of limestone. The number of cylinder beads surpasses that of ring beads, as shown in the U.C., where they are 132 and 110, respectively. These white cylindrical beads of the same form so as to make a string of alternating black and white beads, a characteristic of the Early Dynastic period.

Among the beads of soft stones, the ring beads (S2, 6) are mainly made of serpentine, 165 in number, making 96 % of total ring beads of soft stones, while the steatite ring beads which was popular in the Predynastic period have only four specimens for this period in the U.C. About 92 % of black steatite beads are cylindrical (S18), because, as mentioned above, they are usually threaded alternately with white cylinder beads to make a string of beads. Taking the beads of all soft stones as a whole, there appeared also a general tendency of an increase in cylindrical beads and a correspondingly decrease in ring beads, just as in the case of other materials. In comparison with the Predynastic period, the cylinder bead (S18) increased from 11.4 % to 24.7 %, but the ring bead (S2, 6) decreased from 19.1 to 63.8 %. The barrel beads which occupied 3.2 % of all soft stone beads of the Predynastic period now show a slight increase to 3.9 % in this period (S13–14). These barrel beads as well as a few spheroid beads (S7–8) and pear-shaped beads S17 are made of limestone (including calcite and Egyptian alabaster), steatite and anhydrite and serpentine. There is also one example of thick ring beads with an elliptical cross section (S20) made of a white substance covered with a black skin, probably a stained limestone, but also possibly some kind of plastic material. A spacing bead (S42c) recorded as made of black steatite<sup>23</sup> is very similar to the spacer of hard stones (H62b). For pendants, there are two pendants more or less drop shaped in the U.C. (S51b, 54f). One drop pendant with a pointed end (S52n) has been found at Abydos,<sup>24</sup> and a flat triangular pendant of serpentine (S60b), which may be intended for an axe-shaped amulet, has been found at Qau.<sup>25</sup> The types S538 and S62d are probably amuletic too, the former a shell and the latter an axe. Most of these pendants are made of limestone (including Egyptian alabaster), with two examples in serpentine.

<sup>21</sup> For a whip made of conical beads, but dated to the Middle Kingdom, see Winlock, Tomb of Senebtisi, pp. 15–16, Fig. 7.

<sup>22</sup> Ann. Serv. vol. xxxix, (1939), p. 769.

<sup>23</sup> Brunton, Lahun 11, pl. 1xiii, 58L.

<sup>24</sup> Petrie, Abydos I, p. 16, pl. xliv.

<sup>25</sup> Brunton, Qau and Badari I, p. 16 (Corpus (89n3)).

Beads of this period were mostly used for necklaces and bracelets. From a Tomb at Tarkhan (Tomb 36, dated to S.D. 78), some carnelian beads threaded in groups of five, sewn on to linen cloth, have been found, and the excavator says that “this is the first time such bead work has been found”.<sup>26</sup> Of the large cylinder beads with a raised spiral pattern (PD11), more than 1,400 were found in a heap in the Main Deposit at Hierakonpolis, and the finder suggests that “it seems most probable that they were intended to represent ringlets of hair, and were attached to the statue”.<sup>27</sup>

The arrangement of beads in the Early Dynastic period is performed with more skill, so as to present a more elaborate and more artistic pattern than those of the Predynastic period. The strings of alternating black and white cylinder beads are a characteristic of this period, as already remarked by Reisner.<sup>28</sup> Spacing beads became common and were used so as to have several rows of beads on the same necklace or bracelet. The four famous bracelets found in the Tomb of King Zer at Abydos are artistically designed and have been described in details by Petrie.<sup>29</sup> Another tomb of the 1st Dynasty at Abydos produced three strings of

necklaces: one string consists of white black cylinder beads arranged alternately with a black steatite pendant in the middle, and another one has three pendants in “mottled limestone”, with two black (obsidian) beads between them, and the rest of blue and green faience; and the last string has ring and barrel beads in carnelian 930).<sup>30</sup> There are also several strings found in their original order at Turah.<sup>31</sup> In the U.C., there is only one string labelled as “in original order” from this period. It consists of small ring beads of carnelian and large ones of faience, arranged two by two alternately.

The manner of wearing the necklace can be seen also on the figures found in tomb. There is an ivory figure of the 1st Dynasty found at Abydos, now in the Brussels Museum on the neck of this figure, a bead collar is shown.<sup>32</sup> Also found at Abydos was a fragment of a wooden statuette which has traces of the painting in red and black upon it, showing six necklaces which were probably of spiral gold beads and of stone ball beads.<sup>33</sup> This custom of painting or incising necklaces on the figures can be traced back to the Predynastic period.<sup>34</sup>

<sup>26</sup> Petrie, Tarkhan I, p. 22, pl.111, 5.

<sup>27</sup> Quibell and Green, Hierakonpolis, I, p. 8; pt. 11; pp. 30–39.

<sup>28</sup> Reisner, Naga ed-Der I, p. 117.

<sup>29</sup> Petrie, Royal Tomb II, pl. 1; pp. 16–19.

<sup>30</sup> Ann. Serv. vol. xxxix (1939), p. 769, pl. cxliva.

<sup>31</sup> Junker, Turah, p. 61.

<sup>32</sup> Petrie, Abydos II, p. 24, pl. 11,9.

<sup>33</sup> Petrie, Royal Tombs II, p. 28, pl. xii, 2.

<sup>34</sup> e.g. Petrie, Naqada, pl. lix, 1 and 7; Petrie, Prehistoric Egypt pl. 11, 4 and 6.

Egyptian culture reached its maturity in the Old Kingdom. This was achieved probably in the reign of King Zoser of the IIIrd Dynasty. The foundation of Egyptian culture in all its aspects was laid down in the Old Kingdom. After having reached its climax, the glory of the Old Kingdom began to decline. The Old Kingdom merged into the First Intermediate Period at the end of the VIth Dynasty. These general traits can be seen also in the history of beads.

The materials used in the Old Kingdom are those already found in the previous period, except black frit and blue frit. The tendency of the increase in the faience beads which already manifested itself in the Early Dynasties was continued, an increase from 70.1 to 84.8 % of the total number of the beads of each period, respectively. But the other materials did not follow the same direction, as shown in the following table:

	Hard stones (%)	Soft stones (%)	Glazed stones (%)	Metals (%)	Misc (%)
Early dynasties	20.0	3.3	3.7	0.2	2.7
Old Kingdom	3.2	0.3	4.9	4.7	2.1

There is a general decrease in the use of stone beads, the soft stones shrinking into an insignificant proportion. The increase in glazed stones is partly due to the prevailing of *usekh* collar which required a lot of cylinder beads made either of glazed steatite or of faience. According to Reisner, the cylinder beads of glazed steatite were prevailing at Naga ed-Der where there was a paucity of the cylinder beads of faience so common at Gizeh.<sup>1</sup> This local difference is probably due to either the taste of the local people, or the proximity of the resource of raw materials, or both. The increase in metal is due to the exploration of gold mines and the great accumulation of wealth in this period. The miscellaneous materials were rarer now than the previous periods. They

<sup>1</sup> Reisner, Naga ed-Der, III, p. 152.

consisted mainly of ostrich shell, with a few examples of mollusc shell, ivory, white coral and wood.<sup>2</sup>

About 87 % of the beads of hard stones are made of carnelian which only makes 56.3 % in the Predynastic period, and 61 % in the Early Dynasties. On the other hand, garnet that makes 32.9 % in the Early Dynasties became very scarce now, only making 0.5 %, and even these may be re-used ones from the Early Dynasties. The colour of carnelian is usually clear pink in the Vth Dynasty and darker in the VIth Dynasty.<sup>3</sup> Amethyst that was fairly common both in the Early Dynasties and in the Middle Kingdom was conspicuously absent, a fact already shown by the result of the excavation at Qau and Badari<sup>4</sup> and at Nage ed-Der.<sup>5</sup> At these sites, there was an absence of amethyst and garnet from the tombs of this period.

The rest of hard stones are as follows: chalcedony, green jasper, green felspar, lapis lazuli, quartz pebble, turquoise and a kind of blue stone. Haematite,<sup>6</sup> crystal,<sup>7</sup> quartz malachite, red jasper and beryl<sup>8</sup> were also reported. But the last one is probably some other kind of green stone wrongly identified, but not beryl. The soft stones are calcite, pink and white limestone, greenish grey steatite, black steatite and serpentine. The “black and green limestone” in Brunton’s reports<sup>9</sup> is a mistake of black and green steatite as proved by an examination of his finds in the U.C. The dark

<sup>2</sup> For “white coral” see Brunton, Qau and BaoariII, corpus 75 j18; for wood beads, see Brunton, Mostagedda, p. 106, corpus 89G15, 89G16.

<sup>3</sup> Brunton, Qau and Badari I, p. 72, Sect. 177–178.

<sup>4</sup> Brunton, Qau and Badari III, p. 20, Sect. 31.

<sup>5</sup> Reisner, Naga ed-Der III, pp. 106–107, 148–150.

<sup>6</sup> Petrie, Deshesh, p. 16; Brunton, Qau III, p. 20.

<sup>7</sup> Reisner, Naga ed-Der III, p. 148.

<sup>8</sup> Brunton, Qau III, p. 20 (some of the quartz beads in this report may be its colourless variant namely rock crystal); in the corpus of the same work, 78B18 (“malachite”); 86A3, 86Ki5, (red jasper); 75c26 (beryl), which is referred to as “perhaps beryl” in the Text, p. 17.

<sup>9</sup> Brunton, op. cit. p. 17.

“schist” used for cylinder beads reported by Reisner<sup>10</sup> is probably a black schistose steatite. Alabaster and breccia were also reported.<sup>11</sup> Beads of glazed stones are almost all of steatite, except a few specimens of glazed quartz found by Brunton.<sup>12</sup> Among the metal beads in the U.C., there are 39.5 % of gold, 17.3 % of copper, 0.7 % of silver and 42.5 % of copper plated with gold foil. Metallic lead is also reported, but it is probably “intrusive” as said by the finder.<sup>13</sup> Gold foil were also used to cover beads of blue frit and a kind of white paste.<sup>14</sup> The latter is probably what is meant by “limestone beads covered with gold foil” in another report.<sup>15</sup> But this white paste was made probably of a mixture of a kind of resin and powdered calcine or quartz, as suggested by Beck.<sup>16</sup> Of the beads of plastic materials in the U.C., 99.3 % of them are made of faience (blue–green, brown–black and white), and the rest are blue frit, black frit and black-painted clay. Among the faience beads, the percentage of differently coloured variants is as follows: green–blue 69.5 %, brown–black 28.8 % and white 1.7 %. The blue faience is either dark or pale blue. Brunton remarks that the pale blue is striking and seems to be limited to the IIIrd Dynasty or about that time,<sup>17</sup> and a very pale glaze occurred in the Vth Dynasty.<sup>18</sup> A single ring bead of greenish glass has been reported as from an undisturbed tomb of the VIth Dynasty,<sup>19</sup> but it is almost certainly either a faience bead wrongly identified or an accidental intrusion.

Typologically, the beads of hard stones show a great increase in long beads, both for the cylinder beads (H21–22) and for the barrel beads (H14–16), and a decrease in the ring beads (H2, 5, 6). The spheroid beads (H8–10) were still not very common. The percentage of these four kinds is 27.0, 18.1, 41.3 and 4.0 %, respectively. The fact that a large number of carnelian barrel beads were found from a cemetery of this period has been noticed by Reisner.<sup>20</sup> Beads of peculiar forms are as follows: barrel beads with either an elliptical or lenticular section (H27, H32); natural forms of pebble, (U37, H38, double ring beads H57h;

rhombic spacers, H64)<sup>21</sup> drop pendants H73d, H75f, some with a pointed end and a squared top, H74s and the shell-shaped bead, H75g. The type H38k occurs on two strings in the U.C., eight in number, all of a kind of quartz pebble which is granulated on surface, and partly stained greenish or brownish, Ball pendants with a neck, H71g, and barrel beads with copper caps H93c, have been recorded too<sup>22</sup> the former a type fairly common in the Early Dynasties, and the latter a type of decoration first appeared in the Early Dynasties too. Pendants in the shape of a spindle, an axe and a shell have also been reported.<sup>23</sup>

The surface of the beads of hard stones are in general well smoothed or polished, even better than those of the Early Dynasties, but still not so highly polished as some beads in the Middle Kingdom. From the Step Pyramid at Saqqarah, there are several tiny carnelian ring beads of the type H2a, very thin, polished bright, and also several minute barrel-shaped carnelian beads of the type H15b, showing the skill of working tiny stones.<sup>24</sup> The perforation is still mostly of the biconical type, but this type already shows a decrease from the Early Dynasties. It only occupies 66.3 % now, instead of 81.5 % in the Early Dynasties. The double parallel and the plain perforation (H200, H400) now increased. They occupied 21.2 and 12.5 %, respectively. For the short beads (H1–9), there are more beads of the biconical type of perforation than those of the other two types, namely, 83.1, 2.5 and 14.4 %, respectively. But for the long beads (H14–22), the biconical type was surpassed by the other two types when added together, their percentage being 48.5, 40.7 and 10.8 %, respectively. This indicated how the length of the long beads favours the double parallel type of perforation (H200). The plain type (H400) was probably made first as a double parallel perforation, and then the ridge in middle of the hole was eliminated by a further polishing process. Brunton says that “One felspar spheroid in grave 529 (IVth Dynasty) shows the cross-line on the end for centring the hole”.<sup>25</sup> This seems to be the perforation type 应该小写? H800, but I have not noticed any example from such early period.

Among the beads of glazed steatite, the percentage of various important types is as follows: cylinder beads L16–17) 60.6 %; ring beads with a flat edge (L5) 8.4 %; ring beads with a rounded edge (L2) 10.4 %; spheroid beads with flat ends or thick ring beads with a rounded edge (L7) 16.1 %; barrel beads (L12–14) 3.1 %; and other forms

<sup>10</sup> Reisner, Naga ed-der III, p. 107, 147.

<sup>11</sup> Brunton, Qau and BadariII, Corpus 86K3 (alabaster), 78B12 (Breccia). 与正文首字母大小写不统一

<sup>12</sup> Ibid, 75K24, 86C, 16.

<sup>13</sup> Brunton, Mostagedda, p. 105, Sect. 135; and p. 111; Sect. 144.

<sup>14</sup> Cairo Museum, J68317A, from Gizeh, G2004 All, dated to the Vth Dyn.

<sup>15</sup> Petrie, Diopolis Parva, p. 38, from Tomb N19 (dated to the VIth dynasty).

<sup>16</sup> Brunton, Qau II, p. 22.

<sup>17</sup> Brunton, Qau, p. 13, Sect. 46.

<sup>18</sup> Ibid, p. 72, Sect. 177.

<sup>19</sup> Brunton, QauII, p. 21, Sect. 32.

<sup>20</sup> Reisner Naga ed-Der III, p. 152.

<sup>21</sup> Another specimen in the Cairo Museum, also form this period, (J53842).

<sup>22</sup> Brunton, Qau II, Corpus 89E3, 78H4.

<sup>23</sup> Brunton, Monstagedda, pls. Ivii–Iviii, 89L3, 89H8 and 5606.

<sup>24</sup> Cairo Museum, J69670; see Firth and Quibell, The Step Pyramid, p. 43.

<sup>25</sup> Brunton, Qau II, p. 19.

1.4 %. In comparison with the Early Dynasties, this shows a great increase in cylinder beads in expense of ring beads. This fact will appear more striking, if we count the absolute number of individual beads. There are only 142 cylinder beads in the Early Dynasties, but 485 beads in the Old Kingdom in the U.C. As for the ring beads, like the Early Dynasties, there were more beads with a rounded edge than those with a flat edge, whereas in the Badarian and Predynastic period, the latter were more frequent than the former. There was also an increase in the thick ring beads with a rounded edge (L7) and the barrel beads (L12–14), both of them very rare in the Early Dynasties. The types (L4) and (L14) are varieties of the ordinary ring beads and barrel beads, retaining a ridge round the body of beads acquired during the manufacturing process. The cylinder beads with a square or rectangular cross section were, as a rule, of this period, especially of the VIth Dynasty<sup>26</sup> but with a few exceptions surviving into the First Intermediate Period. The type L38 is a cylinder bead with a roughly triangular section, and the type L57 is a pendant of a peculiar shape, both of them very rare. There are a few decorated beads of glazed steatite by incising or carving before being glazed. The simplest ones are cylinder beads scratched with a few lines around the body, but some have the scratches drawn more regularly so as to make a spiral pattern, L61, or horizontally parallel lines, L75.<sup>27</sup> Brunton reports one glazed steatite bead carved with a much more complex pattern, L79d,<sup>28</sup> but almost all beads of this kind of complex pattern are made of faience, and the linear drawing of that specimen in the Corpus represents a carving technique more appropriate to a material like faience rather than steatite. Is there some mistake in the identification of material? The date of the collared melon bead (L72) is questionable, as already pointed out by the excavator.<sup>29</sup>

Metal beads became more numerous now than the previous period. The specimens in the U.C. are all of the common forms. The percentage of them is as follows: cylinder beads (M12) 46.1 %, ring beads with a flat edge (M3) 26.2 %, round-edged ring beads of thin variety (M2) 3.7 %, round-edged ring beads of thick variety or spheroid beads (M7) 22.9 % and barrel beads (M9) 1.1 %. Most of them were made by rolling a sheet of metal until the ends butted together or overlapped (M300, 200). Some of them have their ends jointed either by welding<sup>30</sup> or by soldering,<sup>31</sup> namely M400. Some cylinder beads are made of

copper palted with gold foil (M12b, 12c). From Gizeh, there are several cylinder beads of blue frit also plated with gold foil.<sup>32</sup> The method of covering a white plastic core (probably a kind of crushed quartz or calcite powder) with gold foil, M600, which had been practised as early as the Predynastic period, was also continued.<sup>33</sup> Some cylinder beads were made of gold wire wound spirally, M900; and they will be regarded as a decorated bead, Type M52b.<sup>34</sup> The metal beads of unusual features (teatuiies) as known from various publications are as follows: M33b, spacers made of copper bar provided with four holes<sup>35</sup>; M27d, spacers made by jointing together five small ball beads edge to edge<sup>36</sup>; M34, spacer of a zig-zag shape and M36d, semicircular spacer, both of them made either of gold or of copper plated with gold<sup>37</sup>; M45d, gold pendant in the form of a reverted drop and M49g, a gold axe-like pendant, both found by Reisner<sup>38</sup>; M49, an axe-like pendant of copper<sup>39</sup>; M52b, M53d, M54, cylinder beads of spiral pattern, either by being of wound wire itself, or by being decorated with incised lines running around the body, the latter sometimes with double spirales so as to form a criss-cross pattern; M91b, M91d, gold pendants formed of several rings<sup>40</sup> and lastly M62d, a barrel bead of gold decorated with slanting incised lines.<sup>41</sup>

Beads of plastic materials are mostly made of faience, as already stated above. The exceptions are two barrel beads (PN171) of black-painted clay, two cylinder beads with a square cross section (PN52) of black frit and sixty-four beads of blue frit in the following forms: mostly cylinder beads (PN22), several ring beads (PN6d), barrel beads (PN17–18) and barrel beads (PN56). As to the beads of the faience, the percentage of various forms is as follows: ring beads (PN1, 2, 6), 79.0 %; spheroid beads (PN8, 9), 0.1 %; barrel beads (PN16, 17, 18, 20), 0.8 %; cylinder beads (PN22–23), 19 % and other forms, 0.4 %. In comparison with the Early Dynasties, this shows a great increase in the ring beads, probably due to the fact that the general use of amulets necklace took place in the Vth Dynasty,<sup>42</sup> and the spacing of amulets or large beads was usually done by

<sup>26</sup> Brunton, QauI, p. 72. Sect. 178.

<sup>27</sup> Brunton, QauII, Corpus 76M15, M18, M24, and 76Z3.

<sup>28</sup> Ibid. 76D12.

<sup>29</sup> Ibid. 80D3, and the remark in the text, pp. 18–19.

<sup>30</sup> Reisner, Naga ed-Der, III, p. 149.

<sup>31</sup> Beck's report in Brunton, QauII, p. 22.

<sup>32</sup> Cairo Museum, J68317, from Gizen G2004A11.

<sup>33</sup> Brunton, QauII, p. 21, 22.

<sup>34</sup> Ibid, Corpus, 76U6, U9.

<sup>35</sup> Firth and Quibell, The Step Pyramid, p. 35, no. 3.

<sup>36</sup> Brunton, Mostagedda, O. K. Corpus, 95F6.

<sup>37</sup> Cairo Museum, J72336, J72338, J72346, etc., see S. Hasan, GizehI, p. 44, pls. Ixxviii–Ixxix; and GizehII, p. 149, pl. Iiii.

<sup>38</sup> Reisner, Naga ed-Der III, p. 153, no. 15; and p. 106, pl. 39a.

<sup>39</sup> Brunton, Mostagedda, O. K. Corpus, 79G4.

<sup>40</sup> Brunton, QauII, Corpus, 76F15, F18; 76U. U9; 76M21M18; 73D3, D6.

<sup>41</sup> Reisner, Naga ed-Der III, p. 153, no. 12.

<sup>42</sup> Ibid, p. 41, 142.

groups of ring beads of faience, and at the end of the Old Kingdom, a whole string sometimes consisted entirely of green and black ring beads of faience.<sup>43</sup> The great increase in the spheroid beads is partly due to the almost entire disappearance of the small ball beads or pear-shaped beads of black faience, which were fairly common in the Early Dynasties. Cylinder beads were a very common type in the Old Kingdom and only show a decrease in the above percentage table simply because of the still greater increase in the ring beads. Unlike the cylinder beads over a hundred of which were sometimes used to make a collar, the barrel beads were almost always used only singly or a few in number for one string in the Old Kingdom. Obviously, it requires more beads to make the same length of string using ring beads than using long beads, whether cylindrical or barrel-shaped. Among the faience of various colours, the white faience occurs only on four strings out of 105 strings of this date in the U.C. Except a few cylinder beads (PN22), almost all these white faience beads are in the shape of ring beads (PN2, 6), many of them probably faded green faience. The beads of black faience are also almost exclusively of ring beads (83.2 %) and cylinder beads (16.4 %, usually in association with blue–green faience beads of the same type, strung in groups alternately).<sup>44</sup> The remaining 4.0 % consists of six barrel beads, three spheroid beads and three pear-shaped beads, and the following beads of peculiar forms: PN12, conical beads, probably used as pendants; PN21n, pear-shaped beads of black faience referred to above; PN21w, a broken long drop bead, which seems to be a later intrusive; PN23, 29, 31, 47 barrel beads and cylinder beads, both with an elliptical cross section, some seeming to be accidentally so shaped;<sup>45</sup> PN54c and PN57, ring beads and cylinder beads, both with a pentagonal cross section; and PN65b, a flattened double bead. As for the pendants, there is one ball pendant with a neck, dated to the IVth Dynasty, a type surviving from the Early Dynasties (PN86c). Several long drop pendants (PN67e) and several cylinder pendants made from ordinary cylinder beads by piercing a hole crosswise near one end (PN96); and a triangular pendant PN97 which Petrie regards as an amulet in imitation of arrow beads.<sup>46</sup> From Mostagedda, there are a cylinder bead with a rectangular section (PN52b), a necked drop pendant (PN71d) and a pyramidal pendant, (PN94b).<sup>47</sup> From Qau and Badari, there are a short cylinder bead with a

hexagonal section, made of blue frit, PN60; a reverted drop pendant, PN93d; and a segmental bead with four segments, PN621.<sup>48</sup> The last one is the earliest segmental bead of faience said to be dated to the V–VI Dynasty, although one made of ivory (R39) is definitely dated to the Badarian Period. But this is an isolated example, and there may be some mistake in its dating. There are several ring beads stuck together by the glaze to form multiple beads of two or three, but they are not intentional and should be separated from the real multiple beads of the type PN72b, c.<sup>49</sup>

Among the decorated faience beads (PD) of this period, the commonest one is the crumb beads, PD49–51, which are in the shape of barrel, drop, cylinder, flattened barrel and flattened ball.<sup>50</sup> The beads carved or modelled with various patterns were also common, such as PD8, PD10, spiral beads in the form of barrel beads or cylinder beads, some with a double spiral (or criss-cross) pattern, or a degenerated spiral pattern; PD21d, small melon beads; PD31. Melon beads with three collars; PD30–57, barrel beads with pattern of parallel lines either horizontal or vertical; and PD63, cylinder beads with a complex dots-and-lines-pattern. The melon beads with three collars were found at Qau in the filling of the Tomb3173 containing a pot burial. Brunton gives their date as probably of the VIth Dynasty.<sup>51</sup> But they may be of early Old Kingdom, or even of the Early Dynasties, because their form seems to be derived from some protodynastic objects which are regarded by Petrie as probably “toggle for fastening a dress through loop, like the frogs on a modern military dress”, but by Scharff as decorated beads.<sup>52</sup> The custom of pot burial was common in the IIIrd Dynasty.<sup>53</sup> The flattened barrel beads, PD58b, and 60b, and the pendant PD38e, all decorated with a linear pattern, may be degenerated forms of amulets in imitation of shell.<sup>54</sup> In the U.C. Collection, there are one cylinder bead of black faience decorated with a squared pattern, PD39, and one blue ball bead stamped with three ring and dot patterns, PD53b, both found on the string no.185, labelled “Zaraby 169”.<sup>55</sup> Although this string consists mainly of the Old Kingdom Beads, these two decorated beads are probably later intrusions of a much later date.

<sup>43</sup> cf. Brunton, QauI, p. 72, Sect. 178 and Qau III, p. 21, 22.

<sup>44</sup> 不知道原文脚注插在什么位置 Brunton, QauI, sect. 64; QauII, pls. II, Ixx; cf. a similar bead net-work with a cone pendant in S. Hasan, GizehII, p. 149, 150, pl. Iiii, 2.

<sup>45</sup> A flattened spherical bead PN38c published in Brunton, Mostagedda, O. K. Corpus 79S10. seems to be due to a misshaping too.

<sup>46</sup> Petrie, Amulets, p. 26123h.

<sup>47</sup> Brunton, Mostagedda, O. K. Corpus, 77F22, 89A6 and 89S8.

<sup>48</sup> Brunton, QauII, Corpus 77P3, 89P3, and 76L6.

<sup>49</sup> Reisner, Naga ed-Der III, p. 149.

<sup>50</sup> The last type is not represented in the U.C., but see Brunton, QauII, Corpus 94T6.

<sup>51</sup> Brunton, Qau II, pp. 18–19, Corpus, 80D4, D14, D16.

<sup>52</sup> These faience objects were found from the Temple at Abydos, see Petrie, Abydos II, p. 26, pl. vii, 141–145; and Scharff, Die Altertümer, p. 106.

<sup>53</sup> For the dating of the pot burial in Egypt, see Peet, Cemeteries of Abydos, III, p. 21, Quibell, El-Kab, pp. 9–10.

<sup>54</sup> cf. Reisner's remark in Naga ed-Der III, p. 153.

<sup>55</sup> This string is certainly from the Old Kingdom cemetery at Zaraby, see Petrie, Gizeh and Rifeh, p. 10.



According to Eisen, the monochrome ball beads of blue or green impressed with rings which were filled with pigment slightly deeper in colour, are dated to the XVIIIth Dynasty one from the palace of Amenhetep III.<sup>56</sup> Painted spiral beads in the shape of either barrel beads or cylinder beads (PD1b, 4c) were found, but they were rare in this period. The leaf-shaped beads, PD79, were also painted with blue and black glaze. The decorated beads of faience, except the crumb beads, were still rather rare in this period, and many types are not represented in the U.C., but only seen in various publications,<sup>57</sup> upon which part of the above information is based. Some cylinder beads of blue frit, PN22p, plated with gold foil have been referred above in the paragraph on the undecorated beads. A blue frit cylinder with gold caps at both ends, PD70, was found in a pot burial of the IIIrd Dynasty at El Kab.<sup>58</sup> A drop bead of blue faience is turned into a pendant by being equipped with gold mounts to imitate a vase, PD96.<sup>59</sup> Floral disc beads, PD35e and segmental pendant, PD89 have been found at Mostagedda.<sup>60</sup>

Beads of miscellaneous materials were comparatively rare in this period. For ivory beads, there are six spheroid beads with flat ends, R31b; a barrel bead with an elliptical section, R35h; and a drop pendant, R45g; all in the U.C. Collection. At Qau and Badari, there are several barrel beads R32j, a cylinder bead with a rectangular section, R37c, a cylinder bead carved with a spiral pattern, R40b; and a drop pendant, R45f, all of ivory.<sup>61</sup> A thin conical bead, R27f and several cylinder beads carved with a criss-cross pattern, R40, made of bone or ivory, have been found at Mostagedda.<sup>62</sup> Ring beads of ostrich shell, R51c, R52c, occur only on two strings, although their number is as much as 324. Several thick ring beads, R52f, 52h and barrel beads R57, are made of mollusc shell. Beads of unusual forms are the oval spacing beads of shell (R72b) and the ribbed pendants of wood, R88b.<sup>63</sup> A cylinder bead from Qau 4904 is recorded as of "white coral".<sup>64</sup> A disc bead of shell notched at edge R75 has been found at Mostagedda.<sup>65</sup>

Beads of soft stones are very rare in this period, and some of them are probably re-used beads from earlier periods.<sup>66</sup> There are large thick ring beads or spheroid beads with flat ends (S2r, 8c), barrel beads (S13–15), cylinder beads, either or ordinary type S18, or with a square cross section, S31 and one cubic bead, S32c. Flattened barrel beads, S34; pendants of peculiar shapes, S65d, S66f; drop pendant, S51i, S53d; cylindrical pendant, S59d; pointed pendant carved with horizontal parallel lines, S86; are also reported.<sup>67</sup>

The fluctuation of the popularity of beads during this period, as traced by Brunton, is as follows: the early beads of the IV–V Dynasties seem like odds and ends handed down from earlier times, but in the VIth Dynasty, a profusion of beads begins, and soon after that the bodies are decked in necklace after necklace swathed with strings as far down as the waist.<sup>68</sup>

The great majority of beads of this period were used for necklace and also a few for bracelets and anklets.<sup>69</sup> Three girdles of beads were found at Naga ed-Der.<sup>70</sup> From a tomb of the VI–VIIth Dynasty at Diospolis Parva, a girdle of beadwork was found around the waist, some ten inches broad, consisting of rows of blue and black faience and shell strung together irregularly, with an outer fringe of common shells. The finder says that "these rows of beads had been sewn on to some material, possibly leather, but this had been so completely rotted away by the damp".<sup>71</sup> The beads on the network Bd. no. 1522 in the U.C were found at the foot of the body in a tomb at Qau, dated to the VIth Dynasty, and are regarded as "apparently strung as a network in the case of long blue and black cylinder beads", and has been re-strung accordingly. A lot of conical beads found in the same tomb seem to have been hung from the bottom of this bead net dress.<sup>72</sup> In a mastaba at Gizeh, probably of the IVth Dynasty, the body was clothed with a robe worked with beads of faience, with cones of gilt bronze and faience suspended at the lower end.<sup>73</sup> This kind of robe of beadwork is shown also on a boating scene at the wall of a royal tomb at Gizeh, where the garment worn by the smaller woman was once painted to show that the dress was covered with a net of beadwork.<sup>74</sup>

<sup>56</sup> Eisen, *Characteristics of Eye Beads*, p. 6.

<sup>57</sup> See Brunton, Qau II, Corpus 76B3, B8, D6, D9, H9, K3; oB3, Bo, B9, B12, D4, D14, D16; and 94T6; and also Reisner Naga ed-Der III, p. 152, nos. 6, 7, and p. 153, no. 10.

<sup>58</sup> Quibell, *El Kab*, p. 10.

<sup>59</sup> Brunton, Qau II, 89A, 3.

<sup>60</sup> Brunton, Mostagedda, O. K. Corpus 58Z4 and 89N4.

<sup>61</sup> Brunton, Qau II Corpus 78B34, 77F9, 76K30 and 89C3; the last one is recorded in the Corpus as of "bone", but "ivory" in the Beads Register.

<sup>62</sup> Brunton, Mostagedda, O. K. Corpus, 58G9, 76F2, F4, F5.

<sup>63</sup> The former is in Brunton, QauII, Corpus 9506, and the latter is in Brunton, Mostagedda, p. 106, pl. Iviii, 39G15, G16.

<sup>64</sup> Brunton, QauII, 75J13.

<sup>65</sup> Brunton, Mostagedda, O. K. Corpus, 58G2.

<sup>66</sup> cf. Brunton's remark in QauII, p. 22.

<sup>67</sup> Brunton, QauII, Corpus 79T3, 89D3, B6; and Mostagedda, O. K. Corpus 89D9, 56D12, 89G10, 56C9.

<sup>68</sup> Brunton, Qau and BadariI, p. 74, Sect. 162. Naga ed-Der, III.

<sup>69</sup> cf. Brunton, QauII, p. 21, Sect. 33; Reisner, Naga ed-Der III, p. 108, and also various other reports, e.g. Petrie, *Diospolis Parva*, p. 37; Garstang, *Mahasna*, p. 30.

<sup>70</sup> Reisner, *Naga ed-Der III*, p. 108.

<sup>71</sup> Petrie, *Diospolis Parva*, pp. 40–41 (in the British Museum).

<sup>72</sup> Brunton, QauI, sed. 64; QauII, p. 22, Sect. 33, pl. Ii, and Ixx.

<sup>73</sup> Hasan, *Gizeh, II*, p. 150, pl. Iiii, 2.

<sup>74</sup> Boating scene from the Tomb of Queen MeresankhIII, in *Bull of M. F. A.*, vol. xxxvii. (1939), p. 64, Figs. 3–4.

As to the arrangement of beads on the string, Reisner says that “there was no fixed order by all persons, nor any fixed series of beads”. The same author gives the following four kinds as the arrangement in favour in this period,<sup>75</sup> the examples and the detailed discussion are taken from various other publications, not in Reisner’s original report: (a) The alternation of groups of similar beads of different materials was adopted already in the Predynastic period and was still continued in the Old Kingdom; for example, a string of blue ring beads of faience with carnelian beads here and there.<sup>76</sup> The practice of stringing groups of long beads of black steatite separated by cylinder beads of white shell between every group was very popular in the Early Dynasties as mentioned in the last chapter and survived in the early part of the Old Kingdom.<sup>77</sup> (b) Then, there is the alternation of groups of differently coloured beads of the same material. The robe of beadwork referred to above were strung of blue and black cylinder beads of faience alternately, and this kind of beadwork seems to be used first in the Old Kingdom. The string of small black and blue or white ring beads of faience arranged in groups alternately seems to start in the VIth Dynasty<sup>78</sup> and was very popular in the First Intermediate Period. (c) The spacing of amulets or large beads by groups of beads was very common in the Old Kingdom.<sup>79</sup> (d). The symmetrical grading of the members of the necklace was common in the Middle Kingdom, but rather rare in the Old Kingdom. There is one string consisting of 119 crystal ball beads grading from large to small ones, found in a tomb of this period at Naga ed-Der.<sup>80</sup> As remarked by Reisner, none of these four generally guiding rules was ever quite strictly carried out.

In many instances, a single cylinder bead, generally of steatite, was found at the neck of undisturbed tombs, mostly of the V–VIth Dynasties. Both Brunton and Murray suggest that these single cylinder beads are derived from the inscribed cylinder seal. The fashion was continued by the use of cylinder beads as centre pieces to necklaces of ring beads found in the VII–VIIIth Dynasties.<sup>81</sup> Barrel beads are also

found singly, generally of carnelian; and these are seen figured on the painted coffins of the First Intermediate Period.<sup>82</sup>

Among the better class of people, the beads were arranged more to the taste. Beads were threaded in several rows which were held by semicircular end-spacers so as to make a broad band. The band was divided into several zones by metal-spacing bars, either plain or zig-zag shaped. The beads on each strand or row were usually arranged in rows groups of differently coloured beads alternately. They were used for necklaces, bracelets and anklets.<sup>83</sup> A necklace of green and black short cylinder beads between flies and held by end-spacers was found at Denderah.<sup>84</sup> Another type of collars has the long beads arranged radially, for example, the necklace from Gizeh, now in the Cairo Museum (J68317A) dated to the Vth Dynasty; and another necklace from the tomb or Im-thepy at Gizeh.<sup>85</sup> The fringe of the collar is either plain or with pendants. The last two necklaces mentioned above have a row of beetle-shaped amuletic pendants but some of the necklaces have a row of leaf-shaped pendants, such as one from Denderah, now in the U.C.<sup>86</sup> The use of these usekh collars seems to start in the Old Kingdom, and through various fluctuations, was continued to the New Empire when the polychrome floral collars of faience were prevalent.

Now, we come to the strings used for threading beads. Gold wires were used to pass through the beads,<sup>87</sup> or to be attached to the semicircular end-spacers for tying.<sup>88</sup> Fine wires of copper with a few beads on them were used for necklaces, bracelets and anklets at Diospolis Parva.<sup>89</sup> But in most cases, the string is made of flax fibre, twisted, not plaited. At Qau and Badari, we also find coarse hair and what seems to be grass fibre. Usually the beads and amulets were strung together on the string, but examples were found in which amulets and large beads were spaced on a string by knotting the string on each side of the individual elements and wrapping the intervening string with thread.<sup>90</sup>

There are much more data for the study of the pictorial representation of beads from this period than the previous period. The garment covered with a net of beadwork painted

<sup>75</sup> Reisner, Naga ed-Der III, pp. 108–109.

<sup>76</sup> Brunton, Qau, II, from Tomb 554, of the Vth Dynasty.

<sup>77</sup> Reisner, Naga ed-Der III, p. 107, pl. 40c, from N650 of the III–IVth Dynasties.

<sup>78</sup> e.g. Bd. no. 129 in the U.C., see also Brunton, QauII, p. 21, Sect. 33, strings from Tombs 3232 and 7894 both of the VIth Dynasty.

<sup>79</sup> Brunton, Qau III, p. 21, strings from Tombs 3230, 1991 and 3160; Reisner, Naga ed-Der, III, p. 109. Examples nos. 1–3; Garstang, Mahasna, p. 2, Sect. 4; p. 29 (pl. xliii); p. 30 (pl. xxxvii).

<sup>80</sup> Reisner, Naga ed-Der, III, p. 109; Example no. 6.

<sup>81</sup> Brunton, Qau and BadariII, p. 32, Sect. 32; M. A. Murray, Some pendant Amulets, in *Ancient Egypt*, 1917, p. 56.

<sup>82</sup> Brunton, Qau II, p. 22, Sect. 34, and the Bead Register for the tombs 3157, 4828 both of the VIth Dynasty, also Petrie, Heliopolis, Kafr A mar, p. 9, Sect. 23.

<sup>83</sup> Hasan, Gizeh, vol. 1, p. 63, 44, pls. xlii, lxxviii, lxxxix, vol. II, pp. 149–150, pl. liii.

<sup>84</sup> Petrie, Denderah, p. 25, pl. xxii.

<sup>85</sup> See B. M. F. A. vol. XI (1913), pp. 59–60, Fig. 14 of the VIth Dynasty.

<sup>86</sup> Bd. no. 192 in the U.C. see Petrie Deshesheh, p. 21, pl. xxvi of the Vth Dynasty.

<sup>87</sup> Hasan, Gizeh II, p. 149, nos. 4–5, pl. liii.

<sup>88</sup> Hasan, GizehI, p. 63, pl. xlii, p. 44, pls. lxxviii–lxxxix.

<sup>89</sup> Petrie, Diospolis Parva, p. 37, see 55, from Tomb D8.

<sup>90</sup> Brunton, QauI, pl. xlviii; QauII, p. 22, see 34; Reisner, Naga ed-Der III, pp. 108–109, Example nos. 4–5.

on the wall of a royal tomb at Gizeh has been referred to above. Besides many painted reliefs on the wall, the Ka-statues of the dead also furnish many useful information. Complex usekh collars were already worn by women in the early IVth Dynasty, but the man wore the single-stringed necklaces, as shown by the famous statues of Ra-hetep and Nofret found at Meydum. Later on the usekh

collar was worn by man too.<sup>91</sup> Bracelets of threaded beads, in deep bands, about a diameter wide, are shown on the above-mentioned pair of statues, early in the IVth Dynasty. Zig-zag spacers used to divide the girdle into several zones were shown on a statue from Saqqarah (Cairo Museum J72379).

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<sup>91</sup> M. A. Murray, *Some Pendant Amulets, in Ancient Egypt*, (1917), p. 56.

After the fall of the Old Kingdom, there were internal disorder and foreign invasion in Egypt. Egyptian history passed a “Dark Age”, until the veil was uplift again by the rise of the Theban princes of the Middle Kingdom. The social disorder affected the skill of the craftsmanship, including the bead manufacture, but it also caused a prevalence of superstition and a general use of amulets and beads for the sake of like protection.

The materials used for the beads were more limited than in the previous periods. The percentage of various groups of materials used for beads is as follows: H (hard stones) 3.0 %; L (glazed stones) 0.6 %; M (metal) 1.5 %; P (plastic materials) 89.7 %; R (remainders) 5.2 %; and S (soft stones) 0.03 %.

In comparison with the Old Kingdom, the stone beads decreased only slightly, but there was a great decrease in both the glazed steatite and metal beads and an increase in both the faience and miscellaneous (mostly ostrich shell) beads. This tendency is still more conspicuous if we compare the early and late part of this period as shown below:

	H (%)	L (%)	M (%)	P (%)	R (%)	S (%)
Early F.	4.1	1.5	4.9	87.1	2.3	0.1
Late F.	2.3	0.4	0.04	92.3	4.9	0.03

In this table, it is shown that there are a noticeably larger number of stone beads compared to faience in the early part of this period, a fact already noticed by Beck.<sup>1</sup>

Among the hard stone beads, 99 % are of carnelian and the rest are crystal, speckled diorite, garnet, green feldspar, lapis lazuli, onyx, milky quartz and opaque quartz pebble. The colour of carnelian used for small ring beads is rather dark in the early part of this period, just as in the VIth Dynasty, but is pale in the late part of it.<sup>2</sup> Amethyst,

chalcedony, olivine, turquoise and red jasper are also reported.<sup>3</sup> Except carnelian, the other stones are very rare, and some of them seem to be limited to the beginning (e.g. turquoise, rock crystal), or the end, e.g. amethyst, garnet, lapis lazuli of this period. Glazed stones are mostly of steatite, with only 1.5 % of them made of quartz or crystal. A few pendants of glazed quartz, being not pierced, have a faience cap which has a hole for suspension. Metal beads are mostly of gold. Copper and silver are known, but very rare. About 99 % of the beads of plastic materials are made of faience. The remaining 1 % are of black painted clay, grey mud (a few of them painted red) and baked red pottery, all of them having been used in the Predynastic Period, but discontinued during the Early Dynasties and the Old Kingdom, except a few red pottery beads occurring in the Early Dynasties. This means a revival of the use of the cheap materials used in the ancient primitive period. Among the undecorated faience, 63.9 % are blue or green, 34.6 % black or brown, and 1.5 % white. There are also a few beads of grey faience (Ostwald 3ec) and one bead of red faience. The identification of the last as faience is doubtful, and their date is also questionable because it occurs on a string labelled “Dendereh NN” only, probably a surface find. Some of the black faience are mottled in appearance, with minute green speckles, probably due to decay. The decorated beads of faience are mostly with a blue or green body, except the crumb beads which are bluish black (Ostwald 16pn). Blue and black frits (or “paste”) have been reported, but are quite unusual in this period.<sup>4</sup> Miscellaneous materials are mostly of ostrich shell, which became popular again in this period. There are also some beads made of mollusc shell, some of pink colour (Ostwald 51e), and also a few made of ivory. Some little black spheroid beads found at Qau are regarded by Brunton

<sup>3</sup> Brunton, Qau II, p. 20; corpus nos. 7858 (chalcedony); 75Q15; 86C36, 86M12 (Olivine); 89M8, recorded as carnelian in the corpus, but as red jasper on pl. Ixxv, 4943.

<sup>4</sup> Brunton, Qau II, p. 22.

<sup>1</sup> Beck's report in Brunton, Qau II, p. 22.

<sup>2</sup> Brunton, Qau I, p. 73, Sects. 179–180.

as “probably some kind of gum”, but by Lucas as “of a secondary (i.e. artificial) material of the nature of a slag”.<sup>5</sup> Among the over sixty-eight thousand beads of this period in the U.C., there are only 21 beads made of soft stones. Most of them are calcite, 13 in number, and the rest are 3 white or grey limestone, 3 serpentine, 1 Egyptian alabaster and 1 anhydrite. Breccia, black, pink, and mottled black and white limestone are also reported,<sup>6</sup> but the “black limestone” is almost certainly a black steatite, and one of the so-called mottled black and white limestone from Qau 1735 is in the U.C. and turns out to be a speckled fluorite or gabbro, a kind of hard stones. The “black stone” in another report, found together with calcite beads, is probably also a black steatite.<sup>7</sup>

Glass beads are also reported. At Qau, there are five instances of glass beads, two from the early part and three from the late part of this period. There is no more than one in a grave. As remarked by the excavator, “no doubt the red glass must be ruled out as an accidental intrusion”.<sup>8</sup> May some or all of the other four solitary specimens also be accidental intrusions. Another possibility is that the glass bead was unintentionally produced in the manufacture of faience beads, probably due to the overdose of alkali in the mixture of the paste. A specimen of barrel beads of this period from Qau is said to be green faience in appearance and is found out to be a vitreous glass only after having been broken open and examined by a microscope.<sup>9</sup> A fish-shaped amulet or the Xth Dynasty from Sedment, now in the U.C., is described as “glass built of alternate layers of white and manganese black”.<sup>10</sup> Some variegated faience beads of black and white or blue are made by a similar process, namely “the colours must have been mixed with the quartz separately, and then the two materials must have been stirred or swirled together and shaped into a bead and fired”.<sup>11</sup> The problem of early glass in Egypt requires further study.

Typologically, the percentage of common beads of hard stones is as follows: ring beads (H1, 2, 5, 6,) 90.3 %; spheroid beads (H8–10) 6.1 %; barrel beads (H14–16) 2.6 %; cylinder beads (21–22) 0.3 %; and other forms 0.7 %. In comparison with the Old Kingdom, there is a great increase in ring beads and a great decrease in long beads (barrel and cylinder beads) especially the cylinder beads. Spheroid beads increased to a certain degree. If we compare

the beads of the early and the late part of this period, the increase in spheroid beads is still more conspicuous, as shown in the following table:

	Ring beads (%)	Spheroids (%)	Barrel-beads (%)	Cylinders (%)	Other forms (%)
Early F.	93.0	3.2	3.1	0.3	0.4
Late F.	85.9	9.2	2.5	0.3	2.1

This increase in spheroid beads in the expense of ring beads indicates the approaching of the Middle Kingdom. The beads of other forms in the U.C. are as follows: H20t a pear-shaped bead; H33m a barrel bead with a lenticular section; and H38e a spheroid bead with a semicircular section. Majority of pendants are drop pendants with a pointed lower end (H74, H79c), but the ordinary drop pendants with a rounded end (H73) are also known. Other types of pendants are as follows: H71, ball pendants with neck; H81, cone-shaped pendants; H88g, a pendant made from an irregular quartz pebble; and H88k, a naturally granulated quartz pebble already used in the Old Kingdom.

Since most of these stone beads are in the shape of ring beads, the biconical perforation is predominant in this period. Only 1.3 % of them are of the other types of perforation, namely 1 % of the double parallel (H200) or plain (H400) perforation, mostly for long beads, and 0.3 % of the single conical perforation (H300). The last consists of six beads only, namely four ring beads, a spheroid bead and a pendant. This kind of perforation (H300) is very rare, and some of the above examples may be late intrusion, or split halves of some beads with a biconical hole.

The beads of glazed quartz are either ring beads, L2, or drop pendants, L51, L53. All of them have a biconical perforation except the drop pendant L53g which has the upper end capped with a blue faience provided with a hole for suspension. One specimen of this peculiar type in the U. C. is from Denderah 502. Four glazed quartz pendants unpierced but provided with a similar faience loop have been found at Abydos by Frankfort and dated also to this period.<sup>12</sup> A glazed quartz pendant unpierced but mounted in a perforated piece of faience has been found at Nineveh and is said “probably not much more recent than 2900 B.C.”.<sup>13</sup> The two drop pendants with a pointed end (L51p) in the U. C. come from Qau. According to Beck, quartz pendants of this shape, but glazed with a colourless glaze, come from

<sup>5</sup> Ibid, p. 21, Sect. 31, and p. 25.

<sup>6</sup> Ibid. Corpus nos. 75K20 (breccia), 86C12, 88N3 (mottled limestone); 78D3, 86L2, 86K6 (black limestone) 86L18 (pink limestone).

<sup>7</sup> Petrie and Brunton, *Sedment I*, p. 11, Sect. 23, from Tomb 2105.

<sup>8</sup> Brunton, *Qau II*, p. 21, Sect. 32.

<sup>9</sup> Beck's report in Brunton, *Qau II*, p. 25.

<sup>10</sup> Petrie and Brunton, *Sedment I*, p. 6, Sect. 13, pl. xii, 13.

<sup>11</sup> Beck's report in Brunton, *Qau II*, pp. 24–25.

<sup>12</sup> See Frankfort's report in *J. E. A.* vol. XVI (1930), p. 217, pl. xxxiv, Fig. 3.

<sup>13</sup> Beck, *Glazed Stone*, in *A. E.* 1935, pp. 28, 33, pl. IV, Fig. 22.

Mesopotamia, together with pendants of same shape made of many different stones, and are supposed to date from very early times up to 2000 B.C.<sup>14</sup> As pointed out in the discussion of material, the glazed steatite became rarer in this period. The percentage of the main forms is as follows: ring beads (L2–5) 0.7 %; thick ring beads or spheroid beads (L7–8) 4.5 %; barrel beads (L11–14) 56.3 %; cylinder beads (L16–17) 28.5 %; and other forms 10.0 %. This shows that ring beads which were the predominant form for this material in the previous periods from the Badarian to the Early Dynastic Period, only yielding to the cylinder beads during the Old Kingdom, now fell into an insignificant position, whereas the barrel beads of glazed steatite which were rare in the previous periods now became the predominant form. The cylinder form which occupied the first place in the Old Kingdom now decreased to a certain degree and yielded its position to the barrel form. The percentage of these beads which can be dated to a narrower limit of time is as follows:

	Ring beads (%)	Spheroids (%)	Barrel beads (%)	Cylinders (%)	Other forms
Early F. I.	0.6	3.2	55.1	28.7	12.4
Late F. I.	1.1	10.0	61.1	27.8	0.0

It shows that there is little change within the period itself, except that the spheroid beads (or rather the thick ring beads with a rounded edge) increased slightly, and there was a more frequent use of decorated steatite beads in the early part of this period. The decorated beads in the U.C. are cylinder beads with a double spiral (or criss-cross) pattern L63 and ring beads with a notched edge, L66. There are several beads of the type L62, cylinders with a single spiral pattern, found at Qau,<sup>15</sup> but it is a type mainly made of faience and only rarely copied in glazed steatite.

Among metal beads in the U.C., both the beads of copper and of silver are ring beads, M2, M3, but the gold beads are of various forms, of which the percentage of common form is as follows: ring beads (M3, M7) 95.4 %; small spheroid beads (M1, M5) 0.6 %; barrel beads (M8–M10) 2.3 %; and cylinder beads (M12–14) 1.7 %. In comparison with the Old Kingdom, this shows a similar tendency as that of beads of hard stones, namely an increase in ring beads in the expense of cylinders, and also a slight increase in spheroid beads, except that here the barrel beads show a small amount of increase instead of decrease. There are a few decorated gold beads in the U.C., namely M53, M54, M80, cylinder beads

with a single spiral or double spiral pattern, or double parallel lines around the body near each end; M53b, a barrel bead with a spiral pattern; and M66b, a large barrel bead decorated with gold wire. Silver beads of the barrel form M9 and copper beads of both the cylinder and the barrel form, M12, M9, and copper pendant of an inverted drop shape, M45b, have been also reported.<sup>16</sup> The following types of gold beads have also been found: K27, spacing beads made of two or three ring beads jointed together; M5d, large spheroid beads; M52, cylinder and barrel beads made of a coiled wire; and M42, drop pendants.<sup>17</sup> Technically, the ring and cylinder beads are usually made by rolling a small sheet of metal until the ends butted together N300, but some having their ends overlapped, M200.<sup>18</sup> The barrel beads and the decorated beads are usually made of gold foils or thin plates on a plastic core H600. The plastic core is usually of a mixture of a kind of resin and powdered quartz calcite,<sup>19</sup> but in one instance is regarded as of clay core.<sup>20</sup> Some beads show the decorative effect by being made of a coiled wire, M900. The spheroid beads are sometimes made also by the plating-on-core method, M600, and sometimes made in two halves jointed together, M500. One ring bead found at Qau is a said “as of solid gold”, probably made by the hammering-and-piercing method, M800.<sup>21</sup> The pendants either have the loop made of a separate ring attached to the body, like M45b, or by thinning out the upper end into a wire and then bending the wire-shaped end into a ring, M42. The decoration was put on the body of the bead either by incising the thin plate with a sharp point, such as M53, M54, M62 and M80, or by fixing a gold wire on the body, like H66b besides the decorative beads made of coiled wire themselves, M52. The type M66b has the gold wire made into a tied-rope pattern first and then had it fixed on the body by a collar at each end, not by fusing the wire pattern on the body, as the filigree work of the Middle Kingdom and the Ptolemaic period.

As to the beads of plastic materials, beads of red pottery are mostly of short cylinder beads (PN22b), with one in a spheroid form (PN8d). All of the mud beads are more or less spheroid in shape, (PN8–9, PN15b), and five of them painted with a red pigment. Among the beads of painted black clay, there are 89.3 % of ball beads (PN89), 10.1 % of pear-shaped beads (PN11c, 21n, 21p) and 0.6 % of barrel beads (PN16m, 1c). The predominance of the spheroid form of mud and clay beads is due to the fact that about 95.1 % of these beads are of the X–XI Dynasties and the remaining

<sup>14</sup> Beck's report in Brunton, Qau II, p. 23.

<sup>15</sup> Brunton, Qau II, Corpus nos. 76H6, 76K6, 76K27.

<sup>16</sup> Ibid, 78H28 (silver); 75T6, 78P22, and 89P6 (copper).

<sup>17</sup> Ibid. Corpus nos. 82F16, F20; 95M3, M6; 76U3, 79P3; and 89M14.

<sup>18</sup> E.g. Brunton, Qau II Corpus nos. 76T3 and 75T3.

<sup>19</sup> Beck's report in Brunton, Qau II, p. 22.

<sup>20</sup> Brunton, Qau II, corpus no. 78K.

<sup>21</sup> Ibid, p. 21, Sect. 32.

4.9 % are undated, but almost certainly of the same date namely, either the end of the First Intermediate period, or the beginning of the Middle Kingdom. In regard to the faience beads which occupy 99 % of the beads of plastic materials, and 88 % of the beads of all materials in this period, the distribution of the main forms is as follows: ring beads (PN1, 2, 6) 97.2 %; spheroid beads (PN8–11) 0.8 %; barrel beads (PN16–18, 20) 0.2 %; cylinder beads (PN22–23) 1.7 %; and other forms 0.1 %. This agrees with the result of the beads of metals and of hard stones. In comparison with the Old Kingdom, there is an increase in ring beads in the expense of cylinder beads, and a slight increase in spheroid beads. If we compare the two subdivisions within this period, the later part of this period had less ring beads, but more spheroid beads than the early part, the spheroid beads being characteristic of the Middle Kingdom. Wafer beads (PN8i, 8j, 6j) are typical of the later part of this period.<sup>22</sup>

The undecorated beads of other forms in the U.C. are as follows: PN21, drop beads; PN25, flattened ball beads; PN33, olive-shaped beads with a transverse perforation; PN47, flattened cylinders; PN49b, ring beads with a triangular section; PN63a, segmental bead; PN65b, a double bead with an elliptical section; PN66c, a flattened ring bead with a groove; PN72d, 72h spacers made by joining several cylinder or ring beads together; PN80, ovoid spacers; PN81d, semicircular end spacers; and PN82h, leaf-shaped spacing pendants. The segmental bead, PN63a, is on the string no. 486 from Qau 1526, but in the report, there is no record of beads of this type,<sup>23</sup> and therefore, its occurrence at such early period is questionable. Two of the spacers of the type PN72h are from Qau 914 and have been remarked as “doubtful” in the original report,<sup>24</sup> and the other one is of the type PN72d, from Sedment 1680, and is probably also doubtful. There are other examples of this kind of spacers (PN72) from this period, but they are mostly a chance combination of ring beads, which have adhered in the process of manufacture, and should be distinguished from the real spacers of this form in the Late period.<sup>25</sup> The type PN80 has two holes, but was not used as spacers. Fourteen pieces of this type were strung end to end and flat round the ankles.<sup>26</sup> Some of the beads of unusual forms are probably debased amulets. For example, the type PN66c is regarded as “knuckle bones” and PN33 as “long mace-heads” by Brunton.<sup>27</sup> The type PH82 h is probably a debased beetle

amulet. As to the pendants, there are in the U.C. the following types: PN36f, 90, ball pendants with a neck; PN94f, a cone pendant; PN87, drop pendants; PN93g, 95b, 95f, inverted drop pendants, some with a shouldered neck; and PN93j, 93k. The last one may be regarded as a variety of the type PN97, probably a debased form of arrowhead amulets, which tend to become longer and narrower.<sup>28</sup> Flattened barrel beads (PN28d) and long drop pendants (PN88b) are also known.<sup>29</sup>

The proportions between the undecorated and the decorated beads of the plastic materials in the U.C. from the Predynastic down to this period are as follows (the figures given in the brackets are the number of beads in the U.C.):

	Predynastic	Early Dyn.	Old Kingdom	First Inter period
PK (undecorated)	100	100	100	100
PD (decorated)	4.1(27)	7.6 (46)	5.2 (71)	8.5 (514)

This shows that the decorated beads now become more numerous than in any of the previous periods, both relatively and absolutely. Among the decorated beads in the U. C., the most numerous one is the blue or black ring beads with a notched edge, PD18, which occupies 35.4 % and all dated to the late part of this period. The painted beads have a blue or white body with a black spiral, in the shape of a barrel, a ball or a drop, PD1–3. The crumb beads are also common, and their forms are barrel shaped, drop shaped or cylindrical, and one of them is barrel shaped with an elliptical section, PD48–51. The modelled or carved faience beads are as follows: PD1c, cylinder beads decorated with a spiral pattern; PD62b cylinders with short parallel slanting lines, probably a degenerated spiral pattern; PD63, cylinders with a dots-and-lines pattern; PD21, melon beads; PD8d, barrel beads decorated with a spiral pattern; PD29–30, barrel beads with horizontal parallel lines, some with a collar at each end; PD27, PD58, PD65, beads of a rectangular section carved with parallel lines, either horizontally or vertically, or with a netted pattern; PD58d, beads of a lenticular section decorated with vertically parallel lines; PD86, a floral conical pendant; and PD94, a drop pendant modelled with a dots-and-lines pattern. Some of these decorated beads are not in the U.C., but have been reported from the excavations at Qau.<sup>30</sup>

<sup>22</sup> Brunton, QauI, p. 73, Sect. 180.

<sup>23</sup> Brunton, QauII, pl. Ixxiv, Tomb 1526.

<sup>24</sup> Ibid. Corpus no. 95F3 on pl. civ.

<sup>25</sup> Ibid. p. 20, Sect. 30, corpus 95H3.

<sup>26</sup> Ibid. p. 20, Sect. 30, corpus 95C9.

<sup>27</sup> Ibid. corpus 73A, 73B.

<sup>28</sup> Ibid. p. 19, Sect. 30.

<sup>29</sup> Ibid. Corpus 79H9, 89B9.

<sup>30</sup> Ibid., Corpus 76D6, 80B8, 80D12, D18, 89B3.

Beads of miscellaneous materials are mostly of thin ring beads made of ostrich shell, R51–52, but the thick ring beads, like R51h, are made of mollusc shell, usually white in colour, but some of a pink colour. The type R67c has a roughly square cross section, but it is probably an unfinished specimen of the ordinary ring beads. According to Brunton, shell is the commonest material in this period after carnelian, glazed steatite and faience.<sup>31</sup> In the U.C. Collection, the shell beads occupy 5 % of the total number of the beads of this period, only second to faience. Beads made of ivory are either barrel beads, R32, or drop pendants R45. Cylinder beads of bone, R33c, are also known, but the pendants recorded in the report as “bone” are probably made of ivory.<sup>32</sup>

Beads of soft stones are very rare in this period. In the U.C., there are only one or two examples for each of the following common type: S2, S6, ring beads of calcite and serpentine; S13–14, barrel beads of calcite, serpentine and white limestone; S18, cylinder beads of Egyptian alabaster; and S51d, a drop pendant of grey limestone. Beads of peculiar forms are as follows: S4b, biconical ring beads; S21g, a large ring bead with an elliptical section; S29b, a barrel bead with a semicircular section; and S66d, a double drop pendant. From the reports of excavations, the following types have been recorded (some being of the same form as those already enumerated above), but made of a different stone: S8c, spheroid beads of calcite; S18, cylinder beads of serpentine, calcite and breccia; S2e, ring beads of pink limestone; S15, S2p, S6f, barrel beads and ring beads of “black limestone”<sup>33</sup>, but the last material is probably not limestone, but black steatite. Some of these beads of soft stones may be early beads reused in this period.<sup>34</sup>

In regard to the use of beads, there are in the U.C. Collection 50 strings labelled as necklace, 6 as bracelets and 5 as anklets. According to Brunton, the very long strings of faience ring beads of this period are found to extend as far as the waist, and sometimes, they are seen to cross over on the chest.<sup>35</sup> The girdle of beadwork from Diospolis Parva referred to in the last chapter, dated to the VI–VII Dynasty, may belong to the beginning of this period.<sup>36</sup>

As to the arrangement of beads, the long strings of alternately blue and black ring beads is a characteristic of the early part of this period, but became less common in the late part.<sup>37</sup> According to Brunton, some of the strings of this period show a tasteful arrangement, though others were

strung absolutely regardless of order. The common order is the alternation of groups of beads of similar form, but in different colours, either of the same materials or of different materials. The spacing of large beads by groups of ring beads is also a not uncommon order. But the symmetrical grading of the carnelian ball beads was rare, though not unknown, in this period, e.g. a string from Qau 4906, dated to the IX–X Dynasties. In many instances, a string consists entirely of ring beads with a cylinder bead as the centre-piece. This is probably a successor to the use of a single cylinder for a necklace as practised in the Old Kingdom. A pendant, scarab button or an amulet was also used as the centre-piece of the long string of ring beads.<sup>38</sup> At Abydos, one long string of faience ring beads has in the middle four pendants separated by carnelian beads.<sup>39</sup> Broad *usekh* collar made of beads is also known. One from Sedment is in the U. C.<sup>40</sup> Such collars were found also at Saqqarah, but those of the so-called Heracleopolitan Middle Kingdom in Firth’s reports are probably of the XI Dynasty (脚注位置不明)<sup>41</sup>, and will be discussed in the Chap. 19. In a tomb at Qau, two anklets were found, one at each ankle. Each of them consists of 14 ovoid spacers strung end to end and flat round the ankles.<sup>42</sup> The threading of beads was usually on flax thread, and we also find coarse hair.<sup>43</sup>

As to the pictorial representation of beads, a new source of data is the painting of beads on coffins,<sup>44</sup> and the painted bead collar on the cartonnage which was placed over the face of the dead in this period.<sup>45</sup> Several such painted cartonnages were found at Saqqarah by Firth and are dated by him to the Heracleopolitan period, but the earlier ones are certainly of this Intermediate period.<sup>46</sup>

<sup>31</sup> Ibid., p. 20.

<sup>32</sup> Ibid., Corpus nos. 75p16, 69B12, 9H.

<sup>33</sup> Ibid., Corpus nos. 82H12; 75J8, J18; 75K18, K20; c6L16; 78D3; 86L2, K6.

<sup>34</sup> Cf. Brunton’s remark on the re-used early beads, in QauII, p. 22, Sect. 34.

<sup>35</sup> Brunton, QauII p. 21, Sect. 33.

<sup>36</sup> Petrie, Diospolis Parva, pp. 40–41.

<sup>37</sup> Brunton, QauI, p. 73, sects. 179–180.

<sup>38</sup> Brunton, Qau II, pp. 21–22, sects. 33–34.

<sup>39</sup> Frankfort, The Cemeteries of Abydos, in J. E. A. xvi (1930), p. 217, pl. xxxiv, 3.

<sup>40</sup> Bd. no. 446, from Sedment 1512, see Petrie and Brunton, Sedment I. pl. xxxvii; for another bead collar with semicircular end spacers from Sedment 2106, see the same work, p. 11, Sect. 22.

<sup>41</sup> Firth, Teti Pyramid Cemeteries pp. 40–56.

<sup>42</sup> Brunton Qau II, p. 20, Sect. 30.

<sup>43</sup> Ibid., p. 22, Sect. 34.

<sup>44</sup> Petrie and Brunton, Sedment I, pl. xviii.

<sup>45</sup> Ibid, pl. vi, from Tomb 421, another one from Tomb 2123 is described on p. 12.

<sup>46</sup> Firth, Teti Pyramid Cemeteries, p. 44.



After the rise of the Theban princes, Egyptian people enjoyed another period of prosperity. The Middle Kingdom was one of very great splendour for the Egyptian civilization. It was especially excellent in literature, art and crafts, including the bead manufacture. For the refinement of taste and the exquisiteness of work, it was never exceeded in Egyptian history. The treasures from Dahshur and from Lahun show adequately that it was a great period of jewelry.

The materials employed are mainly those already used in previous periods. The percentage of each material is as follows: Hard stones 0.8 %; glazed stones 1.7 %; metal, 0.3 %; plastic materials 86.9 %; soft stones, 0.1 %; and miscellaneous materials 2.2 %. This distribution of materials shows a tendency to recover its condition in the Old Kingdom, except in the case of metal beads. This exception is probably due to the following two causes: firstly, the metal beads in the Old Kingdom are usually the small ring beads, but in Middle Kingdom, the large and elaborated metal beads became in favour. Since our statistical table is based upon the individual number of the beads, the metal beads of the Middle Kingdom appear under a disadvantageous light quantitatively.

Secondly, the large and elaborated beads of gold and silver from excavations are usually kept by the Cairo Museum. The few in the U.C. had a part packed away during the European Crisis of 1928, before I had time to register them. Another difference between the Old and the Middle Kingdom is the increase in hard stone beads and the decrease in glazed steatite beads. This is probably due to the advance of the technique of stone working, which made possible the substitution of the cheaper but less beautiful steatite by the hard stones.

Beads of hard stones which became rarer after the Early Dynasties came to be abundant again in the Middle Kingdom. As suggested by Brunton, active trade with Nubia and the South was probably the determining factor.<sup>1</sup> The kinds

of hard stones used in the Middle Kingdom are more varied, and they were chosen for the richness and purity of colour. Carnelian is the commonest one, but only occupies 61.7 % of the beads of hard stones. Other common stones are garnets (17.9 %); amethyst (11.4 %); turquoise (4.6 %); lapis lazuli (2.3 %); and haematite (1.2 %). There are also a few examples of green felspar, green jasper (one or two of them probably fine durite), speckled diorite, and also one specimen each of onyx, chalcedony, and white quartz.

As remarked by Petrie, amethyst beads are one of the characteristics of the XIIth Dynasty. "A few are known in Predynastic times, and occasionally an amulet, a scarab, or a bead may be of the Old Kingdom, or the XVIIIth Dynasty, but no string of amethyst beads is known outside of the XIIth Dynasty until the very different style of the Roman times".<sup>2</sup> White felspar,<sup>3</sup> beryl, quartzite, speckled granite, red jasper<sup>4</sup> obsidian, matrix of emerald,<sup>5</sup> and mother of emerald,<sup>6</sup> have been also reported. But the last two terms seem to be coined by Egyptologists to indicate green felspar which has nothing to do with emerald. There are probably also some mistakes in the identification of materials in certain cases; for instance, the "beryl" in Reisner's report is probably a mistake of other green stones, such as green felspar; and the "quartzite" in some reports is an opaque quartz, and the "speckled granite" is probably speckled diorite or gabbro.

Beads of glazed stones are made mostly of steatite, but rock crystal and opaque quartz were also used. Metal beads are made of gold, silver and copper. Gold beads were made either of gold alone or of a plastic core covered with gold leaf. Some beads consist of gold leaf or foil over a body of

<sup>1</sup> Brunton, *QauII*, p. 16.

<sup>2</sup> Petrie, *Diospolis Parva*, p. 42, sect. 62.

<sup>3</sup> *Ibid.*, p. 44, sect. 64, from Tomb G6.

<sup>4</sup> Reisner, *Kerma IV*, pp. 106–107; Quartzite beads reported also in Garstang, *Burial customs*, p. 110, fig. 100.

<sup>5</sup> Carter and Carnarvon, *Five years' Expeditions*, pp. 7, 55, 59, 60.

<sup>6</sup> Garstang, *Burial Customs*, p. 110.

faience<sup>7</sup> or wood,<sup>8</sup> but they are regarded here as faience or wooden beads decorated with gold, not as metal beads. Beads of thin gold foil over wax core have been reported,<sup>9</sup> but the so-called “wax” is probably some other kind of plaster. Beads of plastic materials consist of faience (97.2 %), frit (2.0 %) and clay (0.8 %). Faience beads are mostly in the colour of blue-green (85.8 %) and black (13.4 %), but this period has brilliant turquoise blue tint, varying to a rich, deep blue. Some of green faience turned buff, or pinkish brown, due to decay and decomposition. Red faience has been reported,<sup>10</sup> but it is probably a reddish brown faience, which has white or buff core with a coloured glaze, and is quite different from the red faience of the New Empire which has a core of red paste covered with a translucent glaze. Among the frit beads, 95.4 % are blue and 4.6 % (all on Bd. no. 671) are pinkish brown and one specimen each of black frit and white frit. The identification of the last as frit is doubtful, and it may be of some kind of soft stones (but not limestone). As to the clay beads, about half of them (43.9 %) are made of ordinary grey clay without any further treatment, including a few of coarser kind (mud), but 35.0 % of them were painted black and polished and 16.4 % painted red (Ostwald 6ne), but unbaked and 4.7 % baked red, (Ostwald 61e), which is red pottery. The last two materials are very rare, and each of them occurred once only in the U.C. The commonest of miscellaneous materials is ostrich shell (some perhaps of mollusc shell), but ivory, bone, pearl shell, wood (plated with gold foil) and seed are also known. Soft stones are rare, mostly of calcite. Other soft stones are limestone (pink, yellow, white and greenish grey), steatite (black, brown and green) and serpentine.

Five glass beads supposed to be of this period are in the U.C., but four of them are labelled with place name only, without any tomb number, probably all surface finds. The other one labelled as from Abydos 53B is probably also an accidental intrusion. It is true that a necklace of blue glass beads has been reported by Winlock as found at Deir el Bahari in the tomb of Princess Mait of the XIth Dynasty,<sup>11</sup> but the identification of their material requires a further examination. A faience bead from Armant was considered as glass by the excavator until examined and corrected by an expert.<sup>12</sup> Sometimes it is difficult to distinguish faience from glass when the material is rather homogeneous due to

the mixture of a large quantity of glaze with the body material. At Abydos, Peet found pieces of small discoid bead of greenish glass from a Middle Kingdom tomb, but he regarded it as “may be later and belong to a secondary interment”.<sup>13</sup> Two decorated glass beads were also found in the same cemetery, but both came from disturbed tombs. As said by the excavator, “the evidence of two disturbed tombs is not sufficiently strong to weigh against the complete absence of such beads in undisturbed tombs of the Middle Kingdom”.<sup>14</sup> Beck quoted turquoise glass bead found by de Morgan at Dahshur, now in the Beck Collection, and a lion’s head of blue glass with the royal name of the king Khepre-nub-re, which is dated by Beck to the XIth Dynasty.<sup>15</sup> But this king who was once regarded as of the XIth Dynasty is now generally considered by Egyptologists as belonging to the XVIIth Dynasty. The Dahshur jewelry found by de Morgan, now in the Cario Museum, contains no specimen of glass, so the glass bead in the Beck Collection may come from Dahshur, but certainly not from the royal tombs, probably even not from a Middle Kingdom tomb. There are five “Middle Kingdom” beads of glass from Armant: one clear glass bead from a robbed tomb and four pink clear glass found together with typical Middle Kingdom beads in the neighbourhood of a tomb. As remarked by the finder, “their date is thus open to doubt on archaeological ground”.<sup>16</sup>

Typologically, the people of the Middle Kingdom had an artistic taste for the curved line. They preferred the spheroid form for beads just as they preferred the round-bottomed type of pots for pottery. Ball beads of stones, metals and faience are peculiar to the XIIth Dynasty when of large size.<sup>17</sup> Flattened barrel beads or rhombi beads of various materials (H32, H33, H36, L25, M13, PN34,) and the large and thin disc beads of metals (M4) and of pearl shell (M53), which were usually used as a centrepiece of a necklace, are also characteristic of this period.<sup>18</sup> The typology of beads is discussed in details according to their material group in the following paragraphs.

Common forms of the beads of hard stones are as follows: ring beads (H1, 2, 5, 6) 43.1 %; spheroid beads (H8–10) 43.0 %; barrel beads (H14–16, 19) 10.3 %;

<sup>7</sup> Mace and Winlock, *Tomb of Senebtisi*, p. 67.

<sup>8</sup> Mace and Winlock, *Op. cit.* p. 73, and Firth, *Teti Pyramid Cemeteries*, pp. 51, 54.

<sup>9</sup> Carter and Carnarvon, *Five Years’ Expeditions*, p. 60.

<sup>10</sup> Reisner, *Kerma IV*, p. 109.

<sup>11</sup> Winlock’s report in *B. M. M. A.*, vol. xvi (1921), p. 52, figs. 29–30; referred to in Brunton, *Qua II*, p. 21.

<sup>12</sup> Mond and Myers, *Armant I*, p. 94.

<sup>13</sup> Peet, *Cemeteries of Abydos III*, p. 26.

<sup>14</sup> *Ibid.*, vol. II, p. 48, vol. III, p. 24.

<sup>15</sup> Beck, *Glass Before 1500 B.C.* in *A. E.* 1934, June; pp. 14–16, nos. 17, 18, 22.

<sup>16</sup> Eond and Myers, *Armant I*, p. 72. I have examined these glass from Armant in the Ashmolean Museum, and am convinced that they are certainly modern “Venetian” glass.

<sup>17</sup> Petrie, *Diospolis Parva*, p. 42, sect. 62; and Peet, *Cemeteries of Abydos II*, p. 46.

<sup>18</sup> Peet, *Cemeteries of Abydos II*, p. 46, pl. ix, figs. 6, 8; and vol. III, p. 28.

cylinder beads (H21–22) 1.5 % and other forms 2.1 %. It shows that their general distribution was no longer so concentrated in the ring beads as during the First Intermediate period and that the sudden popularity of spheroid beads is striking. Other forms of ordinary beads are as follows: H4e, a biconical ring bead H20, drop-shaped beads H27, 32, 33, 36, 38f, flattened barrel, rhombic or circular beads; H56m a barrel bead with collars; H60a, an unfinished ring bead. The popularity of the beads with a flattened section is another characteristic of this period as already referred above. There are three kinds of spacers found in this period: long, rectangular bars (H63), cylinders with four horizontal grooves (H61) and drop beads with a Y-shaped perforation (H68). The last two types are limited to the Middle Kingdom. The forms of pendants are as follows: 4 ball pendants, some with a neck (H71), several drop pendants mostly with a pointed lower end (H73, 74), 3 shell-shaped pendants (H75), 2 olive-shaped pendants (H78) and a flattened drop pendant with two perforations (H76j). There are also several decorated beads in the U.C.: 2 barrel beads capped with gold (H93c), 43 rosette beads (H90b) and one etched carnelian bead (H99b). The last specimen is etched with an eye pattern. It is an interesting piece and will be discussed at the end of this chapter. The decoration of beads of hard stones with gold caps was not uncommon in this period. Some ball beads of obsidian (H93b) and cylinder beads of carnelian and green felspar (H93f) have also gold caps at both ends.<sup>19</sup> The following decorated stone beads have been also reported: H96c, 96d, rosette beads in cubic or conical form<sup>20</sup>; H96 g melon beads<sup>21</sup>; and H97, gadrooned beads of barrel or drop form. The treasure of Tod contains a lot of lapis lazuli beads of various forms.<sup>22</sup> They were imported ready-made from Mesopotamia. They have not been published in details. The following are some of special types which were exhibited in the Cairo Museum<sup>23</sup>: large barrel beads with a roughly rectangular section (H46b), flattened rhombic or barrel beads (H32t, 33i) cylinder beads with an elliptical, lenticular or rectangular section H29, 35, 45, large melon beads (H96g), flat pendants of an inverted drop form (H30d) and two kinds of spacing beads with a carved pattern of horizontally parallel lines (H9h, 98j).

The beads of hard stones of this period are well shaped and smoothed (H3000). The regularity and polish of them are never

surpassed in Egyptian history. Some of them still possess a ridge around the body of beads, indicating that they were smoothed biconically (H6000). The proportion of different perforation types is as follows: biconical (H100) 43.8 %; double parallel (H200) 43.1 %; conical (H300) 0.3 %; plain (H400) 12.5 %; and unrecorded 0.3 %. This shows that the conical perforation is rather exceptional for this period, and even these few exceptions are probably either intrusive beads of a later period or made of broken pieces of the biconical perforation. The biconical type that was predominant throughout the previous periods now occupied only 43.8 %. Meanwhile, the double parallel type now increased to 43.1 %. But if we classify these beads according to their form first, then the various types of perforation show a different distribution:

	Ring beads (%)	Ball beads (%)	Long beads (%)	Other forms (%)
Biconical (H100)	88.2	4.6	29.6	7.3
Parallel (H200)	0.8	80.0	61.1	62.2
Conical (H300)	0.2	0.3	0.4	1.2
Plain (4000)	10.8	15.1	8.9	13.4
Total	100.0	100.0	100.0	84.1 (15.9)

This shows that the double parallel type is predominant for all forms of beads except the ring beads, for which the biconical type was still prevailing. The opening of the perforation of both types is in general smaller than those of the previous period. When reporting on the stone beads of the Middle Kingdom found at Kerma in Nubia, Reisner regards the boring operation undertaken from one side as the normal method. He says that “apparently if the hole begun one side gave difficulties, owing to the drill working into slanting position or being diverted, another boring was begun on the opposite side to meet the first hole”.<sup>24</sup> But in the U.C. Collection, the perforation is almost exclusively of the type from both sides, that is, either biconical or double parallel. The plain perforation, H400, is perhaps only a variety of the double parallel type, with the ridge inside the hole eliminated by a further smoothing process. Perhaps the bead-makers at Kerma had a special preference for the single boring perforation, just as the glazing of hard stones was carried to an extraordinary extent at Kerma.

For the beads of glazed stones, although thousands of glazed crystal and opaque quartz beads have been found at Kerma, yet in Egypt proper, they have never been in great numbers in any period.<sup>25</sup> In the U.C., there are only six beads

<sup>19</sup> Carter and Carnarvon, *Five Years' Expedition*, pp. 5, 7, 55; pls I i, 2; xIv, 2.

<sup>20</sup> Reisner, *Kerma IV*, p. 127; and de Morgen, *Dahebour II*, pl. viii.

<sup>21</sup> Brunton, *Mostagedda*, pp. 113–114, from Tomb10114.

<sup>22</sup> De Morgan, *Dahebour II*, pls. vii–viii, now in the Cairo Museum nos. S74, S76.

<sup>23</sup> Cairo Museum, J66511–66513, 66534, 66552–66556; cf. la Roque Tôd, pp. 119–120.

<sup>24</sup> Reisner, *Kerma IV* p. 93.

<sup>25</sup> *Ibid.*, pp. 49, 50, 53.

of glazed crystal and three beads of glazed opaque quartz. Their forms are three ring beads (L2), one ball bead (L6), one flattened barrel bead (L21), one faceted ball bead (L32) and three drop pendants (L51, L53). As in the case of unglazed hard stones, their proportion is mostly of the double parallel type, except the ring beads which have the biconical perforation. Majority of the beads of glazed stones are of steatite, which is 840 in number in the U.C. The distribution of their form is as follows: ring beads (L5) 0.7 % Spheroid beads (7–8) 1.7 %; barrel beads (L11–14) 7.8 %; cylinders (L16–17) 86.8 %; and other forms 3.0 %. Although this is a period of ball beads, yet the glazed steatite was used almost exclusively for cylinder and barrel beads. This is probably due to the fact that the glazed steatite has the same colour as the blue-green faience, but offers much greater difficulty for being shaped into a ball bead, and therefore, its place was substituted by faience for the ball bead. The few exceptions registered above as spheroid beads are either thick ring beads (DL7) or biconical beads (L8), not true ball beads. Other forms are as follows: 13 flattened barrel beads, some with a collar at each end (L21, L25); two cylinders with a rectangular section L30; one cylinder with a rosette-shaped section L39; and one shell-shaped pendant L53j. For the decorated beads, there are six rosette beads, L66; one melon bead, L71; and one cylinder carved with horizontally parallel lines, L74. Melon beads of glazed quartz have been reported from Kerma.<sup>26</sup>

Beads of gold and silver were frequently found in the rich tombs of this period, but copper beads were comparatively rare. The common types of metal beads are as follows: ring beads (M2–3) 7.4 %; ball beads (M5–6) 68.5 %; barrel beads (M8–9) 4.3 %; cylinder beads (M12) 11.1 %; and other forms 8.7 %. It indicates that this is a period of ball beads. The “other forms” included the following types: 3 large thin wafer beads which are one of the characteristics of this period (M104), 9 faceted spheroid beads, but their date doubtful (M16), one cylinder made of coiled wire (M52b) and one gadrooned barrel bead (M61e). For the beads of precious metals, those in the U.C. give only a faint indication of their abundance in this period. We must look for them in other collections, especially the Cairo Museum. There are the following undecorated beads: M11d, drop beads; M13g, M29h, flattened barrel beads either ordinary single one or double one used as spacers; M31–32, spacing beads made of ring beads, spheroid beads and barrel beads; M36d, semicircular end spacers; and M43, shell-shaped pendants.<sup>27</sup> For the decorated beads of metals in the Cairo

Museum, there are the following types: M56 h, melon beads; M59, rosette beads; M61b, gadrooned drop beads; M71, beads with a granulated decoration; M88, spacing pendants inlaid with carnelian and green felspar; and M90b, leaf-shaped pendants inlaid with black and blue paste.<sup>28</sup>

Technically, the cylinder and the ring beads were made usually by rolling up a small sheet of metal until the ends butted together, M300, but sometimes with the ends fused together by heat, M400. Ball beads and barrel beads were often made by plating a metal foil over a plastic core, M600. The gilding on bronze and electrum by fusing gold foil on them was also practised in this period.<sup>29</sup> For the large ball bead, the jointed-halves method, (M500), was usually employed. Sometimes a tube is inserted into the body of ball beads to carry the thread (M6) and is soldered at each pole of the ball.<sup>30</sup> The wafer beads, M4, were made by cutting a thin sheet into a large disc and piercing the centre with a hole, M100. The decorated beads were made by coiling a metal wire, M900, or were made in the ordinary way with the decoration added afterwards, such as by means of repousse, burnishing, inlaying or granulating method. The details of all these methods have been discussed above in Chap. 9. It should be noted that many of these methods were introduced in this period for the first time.

The typological distribution of the beads of plastic materials is as follows: ring beads (PN1, 2, 6) 83.2 %; ball beads (PN8–11) 8.4 %; barrel beads (PN16–18, 20) 2.3 %; cylinders (PN22–23) 4.8 %; and other forms 1.3 %. Although the ring bead was still predominating, yet the ball bead was used in a great number for the first time and only second to the ring bead. If we deduct the faience beads from them, the popularity of ball beads is more striking:

	Ring beads (%)	Balls (%)	Barrel beads (%)	Cylinders (%)	Others (%)	Total (%)
Frit	30.0	64.2	1.9	2.0	1.9	100
Clay	1.8	37.6	58.2	0.9	1.5	100
Both	22.2	26.9	17.4	1.7	1.8	100

The chief difference between frit and clay is that the clay beads are much more fragile. Only the baked variety of clay (namely, red pottery) is strong enough to be in the form of ring beads. The frit beads prefer the ball from which was the general fashion of this period; but the clay beads prefer the barrel form. It seems that the fragile material requires more surfaces around the hole for threading against the total mass

<sup>26</sup> Ibid., p. 118, called as “corrugated ball-beads” by Reisner.

<sup>27</sup> Jewelry from Dahshur, now in the Cairo Museum, nos. “1–4, S33, S65, S72 and S75; Engelbach, Harageh, corpus nos. 70h, 70i; Peet, Cemeteries of Abydos III, p. 28, pl. viii, fig. 14; Firth Teti Pyramid Cemetery, p. 59, fig. 68; and Mace and Winlock, Tomb of Senebtisi, p. 60, pls. xxii–xxiii, p. 67, pl. xxivB.

<sup>28</sup> Jewelry from Dahshur, now in the Cairo Museum, nos. S73, S82, S79, J3985 and Cat. 52865.

<sup>29</sup> Reisner, Kerma IV, pp. 282–283.

<sup>30</sup> Petrie, Objects of Daily Use, p. 2.

of material in order to avoid breakage, and therefore, the barrel form is preferable to the ball form. Other forms in the U.C. are as follows: PN19g, two conical beads of painted black clay, probably broken pieces of some ordinary long barrel beads; PN21, 19 drop beads, mostly of frit, with 2 of clay; PN34c, a flattened barrel bead of clay; and PN37d, five necked flattened barrel beads of blue frit. For the decorated beads, there are one melon bead, PD21b, and one cylinder bead with four grooves, PD26d, both of blue frit, and one cylinder bead incised with a criss-cross pattern made of white paste, PD13b.

For the faience beads, ring beads are the commonest one, and a great number of them were required in making necklaces, bracelets, anklets and ornamentation of garments. Ball beads are also common, and the large ball bead is characteristic of this period. These ball beads were made usually by hand palms or fingers and then pierced from one end, PN400, and many of the resulted beads took the form of pear shape and had one end splitted due to being deformed by the piercing process. Sometimes they have gold and silver caps at ends, PD70b, or a metal tube through the centre of the body of beads, PN8h.<sup>31</sup> Next come cylinder beads, PN22–23; barrel beads, PN16–18; drop beads, PN21; and concave biconical beads, PN15. There are also a few examples of biconical ring beads, PN4; conic beads used in making the ceremonial whip, PN12–13, PN24p; rod-shaped beads, PN251; flattened barrel beads, PN29, 35f, 37d; olive-shaped beads, PN33; segmental beads, PN62a, 62b, 65b; and flattened ring beads with a groove, probably a degenerated form of some amulets, PN66. Some beads of special forms are probably accidental products and not intentionally so made; for example, several ring beads with a triangular section, PN49b, a semi-spheroid bead, PN31; and a flattened conical bead, PN46b. The spacer was common in this period. There are several spacing beads made of jointed ring beads or jointed cylinders, PN72, or of a solid piece in the form of a square or rectangular plaque, or of a fancy cylinder. PN79f, 79h, 78b; and there are also several semicircular end spacers, PN81. Spacing pendants are in the form of degenerated beetle amulets and were made always in solid bar pierced with two perforations (PN82), not fixed with two ring beads for suspension as in the case of the New Empire. The forms of faience pendants are as follows: ball pendants with a neck, PN86b, flattened drop pendants with a pointed end, PN87q, inverted drop pendants, either without or with a neck, PN93c, 93j, 93k, leaf-shaped pendants, PN93m and arrowhead amuletic pendants, PN97c. The four-armed beads, PN69, from Deir el Bersha, may be regarded as one kind of decorated beads, namely a variety

of the four-lobed bead, PD35. Some floral spacing beads, PN84d, from Lahun, have a Y-shaped perforation.<sup>32</sup>

For decorated faience beads, there are altogether 528 beads of this period in the U.C. Collection. The distribution of the main types is as follows: rosette beads 48.7 %, crumb beads 26.9 %, painted spiral beads 14.2 %, cylinders with a carved decoration 4.2 %, melon beads 3.4 % and other decorated beads 2.6 %. The painted spiral beads are in the form of barrel beads or drop beads, PD1–2, occasionally of cylindrical or spheroid beads, PD3–4. One long cylinder bead with a painted spiral pattern, PD4g, was probably used in making the ceremonial whip. Similar specimens have been found in the tombs of the Early Middle Kingdom at Harageh and at Qurneh.<sup>33</sup> Crumb beads are in the form of barrel beads PD48 and flattened barrel beads PD51, occasionally of drop beads PD49 or cylinders PD50. Rosette beads are either ring beads with the edge notched, PD18, or four-lobed or eight-lobed rosette, PD35. Carved cylinders are decorated with a spiral pattern, PD10, or with several rows of slanting parallel short lines, probably a degenerated spiral pattern, PD62, or with a chessboard pattern, PD39. The decorated beads of miscellaneous types are as follows: a star bead, PD19; a “lantern” bead (a term used by Beck), PD69; two cylinders with a rosette-shaped section, PD26b; a flattened cylinder with vertically parallel lines, PD58d—a flattened barrel bead with horizontally parallel lines, PD60b; sixteen beads of rectangular section carved with a criss-cross or chessboard pattern, PD65; two spacing pendants of a debased beetle form, PD83 and one rosette pendant, PD86. Some of these decorated beads may be classed as amulets or debased amulets. The following decorated beads of faience have been reported too: collared cylinders carved with a criss-cross pattern, PD13f; floral disc beads, PD36b<sup>34</sup>; melon beads with a collar at each end, PD22<sup>35</sup>; cylinders of a square section carved with a debased spiral pattern, PD62c<sup>36</sup>; ball beads capped with gold, PD70b<sup>37</sup>; cylinders capped with gold, PD70<sup>38</sup>; fancy spacing pendants inlaid with a small carnelian disc, PD74<sup>39</sup>; and green leaf-shaped spacing pendants painted with black patches, PD84.<sup>40</sup>

<sup>32</sup> Both of the beads from el Bersha are now in the Cairo Museum J35073G; for the drop-shaped spacer, see Brunton, Lahun II, pl. Ixii, royal xii, e.

<sup>33</sup> Engelbach, Harageh, pl. xv; and Petrie, Qurneh pp. 3–4, pl. viii, 28.

<sup>34</sup> Engelbach, Harageh, corpus nos. 41F, 54L.

<sup>35</sup> Petrie, Ehnasye, p. 4, pl. ixA, 3.

<sup>36</sup> Junker, Kubanieh-sued, p. 186, no. 10.

<sup>37</sup> Garstang, El Arabah, p. 5, pl. iii.

<sup>38</sup> Mond and Myers, Armant I, p. 21, pl. xlii, 76.

<sup>39</sup> Cairo Museum J47809, and also see Schaeffer, Priestgraeber, p. 61, fig. 89.

<sup>40</sup> Cairo Museum J35 073G (A).

<sup>31</sup> Petrie, Diospolis Parva, p. 42.

The typology of beads of miscellaneous materials depends upon the nature of material. There are a few ivory beads in the form of barrel beads, R32; cylinders, R33; spacing bars, R44; and a broken pendant, probably of the drop form, R45n. The ostrich shell was made always into ring beads, R51–52. The large thin wafer bead, R53, is made of pear shell and is one of the characteristics of this period. The gilt wood beads are plated with a gold foil and are in the form of ball beads, R79, long spacing bars, R83b and semicircular end spacers, R83d.<sup>41</sup> One conical bead, R82, is identified provisionally as of wood. A flattened barrel bead, R94, is made of a whole seed of some kind of plants.

Beads of soft stones were rare in this period, and some of them are probably reused beads of earlier periods. In the U.C., there are 11 ring beads of calcite (S6), 4 spheroid beads of steatite or limestone (S2r, S7–8), 10 barrel beads of calcite, steatite, limestone and serpentine (S14, S16), 5 cylinder beads of limestone and serpentine (S18), and 2 drop pendants (S53b). Beads of special forms are: a flattened barrel bead (S30), a flat discoid pendant with double perforation (S53e), and a debased beetle pendant (S56b), and a melon bead (S75), both of pink limestone.

As to the use of beads, they were used for headbands or circlets, anklets, bracelets, necklaces, girdles and also used as ornamentation attached to garments, as bead potnets, and as bead “handle cover”.<sup>42</sup> The last object is assumed by Reisner as some sort of handle, but seems to me more likely to be a broken piece of some sort of ceremonial false tail consisting of a wooden core covered with a beadwork, as such that one found in a Middle Kingdom tomb at Lisht.<sup>43</sup> Conical beads were used for ceremonial whip or flail.<sup>44</sup> The counter piece of the *usekh*-collar was sometimes also made of beads, e.g. in the treasure from Dahshur.<sup>45</sup> Clay beads were used for decorating doll’s hair. The doll’s hair was made of threads of flax fibre, and the pellets of clay or mud were rolled on the threads by fingers.<sup>46</sup> Pendants formed by a number of vari-coloured beads threaded on wire, with

caps of gold at each end are one of the characteristics of this period. They have a ring bead of gold attached to the upper cap of gold for suspending.<sup>47</sup> Large gold tubes were used for threading on the plaits of a wig.<sup>48</sup> Some brads were made expressly for burials not for actual use.<sup>49</sup>

The arrangement of beads depends upon their use. The necklace is either the complex *usekh*-collars, with semicircular end spacers,<sup>50</sup> or the simple one consisting of one or several strings jointed by some spacing beads. The simplest necklace is one or more strands of small ring beads of the same kind.<sup>51</sup> In the case of strings consisting wholly of ball beads, they are usually in graduated size and were arranged accordingly, with the large ones in the centre.<sup>52</sup> Faience large ball beads alternated with short slender cylinders are also an arrangement characteristic of this period.<sup>53</sup> Beads of different materials either of the same form or in different forms were arranged in alternate groups of a certain number of each kind, e.g. carnelian and gold ball beads were arranged in alternate groups of 5–10 beads; and barrel beads of faience were separated by groups of ring beads.<sup>54</sup> Some necklaces consisting of several strings of small beads were divided up into sections by spacing beads, sometimes with pendants attached to the lower border. Sometimes a single carnelian barrel bead bordered with one spheroid bead of faience on either side of it was worn as necklace.<sup>55</sup> The girdle round the waist is either the narrow one consisting of one or several strings joined by some spacing beads or the broad band consisting of many rows of vari-coloured ring beads arranged in certain pattern and attached with a series of independent strings of large beads. At Kerma, there was a girdle of long, slender barrel beads set side by side, an arrangement similar to the well-known ladder-form girdle of shell plates found in the Pan graves; and another girdle of at least three rows of small ring beads, from which hung a fringe made of strings each of which bore three long cylindrical beads and one ring bead.<sup>56</sup> Some girdle consists of two or four rows of tiny ring beads and divided up into sections

<sup>41</sup> Firth Teti Pyramid Cemetery, pp. 51, 54; pl. 27c, 4; and Mace and Winlock, Tomb of Senebtisi, p. 73, pl. xxvi.

<sup>42</sup> Reisner, Kerma IV, pp. 94–106; cf. Quibell, El Kab, p. 15; Mace and Winlock, Tomb of Senebtisi, pp. 60–75; De Morgan, Dahchour I, pp. 99–100, pl. xxiii; Dahchour II, pp. 48, 53, 58, 74, pl. viii; and Brunton, Lahun I, pp. 14–15, pl. xiii etc.

<sup>43</sup> Mace and Winlock, Tomb of Senebtisi, pp. 10, 69, pls. xxvii, xxxix.

<sup>44</sup> Complete whips have been found in several graves; see Mace and Winlock, Tomb of Senebtisi, pp. 15–16, 101, pls. xxx–xxxii; Morgan, Dahchour I, pp. 98, III, pl. xxxix; Dahchour II, p. 54; Gautier and Jequier, Fouilles de Licht p. 78; Engelbach, Riqqeh and Memphis VI, p. 19, pl. xxii, 8.

<sup>45</sup> Cairo Museum, S166, S167, and another from the Tomb of Prince Horus, J3985.

<sup>46</sup> Petrie, Objects of Daily Use, p. 59, pl. ii, 379–382; Garstang, Burial Customs, p. 152, fig. 150; Petrie, Kahun, Gurob and Hawara, p. 30, and also B. M. A. A. vol. xxvii, p. 56.

<sup>47</sup> Garstang, Burial Customs, p. 113, fig. 104.

<sup>48</sup> Cairo Museum, Exhibition No. 3995; and see also Brunton, Lahun I.

<sup>49</sup> Mace and Winlock, Tomb of Senebtisi, pp. 57–58.

<sup>50</sup> Ibid. pp. 66–88; Garstang, Burial Customs, p. 112, fig. 101; De Teti Pyramid Cemetery, pp. 51, 54, 55, pl. 34A, 34B, 27c, 32c; Naville, Deir el Bahari, p. 44, pl. x.

<sup>51</sup> Reisner, Kerma IV, p. 98.

<sup>52</sup> Garstang, El Arabah, p. 4, pl. I; and Brunton, Monstagedda, pp. 113–114, from Tomb 733.

<sup>53</sup> Brunton, Monstagedda, pp. 113–114, from Tomb 1719, and Brunton Qau III, p. 3.

<sup>54</sup> Reisner, Kerma IV, p. 98.

<sup>55</sup> Mace and Winlock, Tomb of Senebtisi, pp. 60–61, pls. xxii–xxiii, and also p. 63.

<sup>56</sup> Reisner, Kerma IV, p. 100, pl. 42, fig. 2.

by some spacing beads.<sup>57</sup> The broad girdle has a band consisting of many rows of vari-coloured ring beads, sometimes as much as forty rows, and the patterns were shown by the difference of their colour; for example, a series of diamonds of dark green outlined with black, and a zigzag pattern of light green, dark green and black. A series of independent strings of large beads was attached to the lower border of the band.<sup>58</sup> The arrangement of beads for bracelets and anklets was in one of the following ways: one or more strands of small ring beads, netted bands of small ring beads or strands of long cylindrical beads strung horizontally.<sup>59</sup> Some bracelets or anklets consist of eight strings of short cylinders, divided up into three or four sections of two beads each by means of spacing bars. The cylinders are of two colours, which were arranged alternately so that within each section there was a band of each colour.<sup>60</sup> For the ornamentation of garment, blue ring beads were sometimes sewn in double lines to form a series of concentric rhomboids with one diagonal vertical. The bead potnet is a closely woven bead net presenting a lozenge pattern in blue, white and black (or red) beads.<sup>61</sup> The ceremonial whip or flail found at Lisht consists of three strings of beads, each string having nice short conical beads at top, one long cylindrical bead in the middle and five more conical beads at bottom. The conical bead of carnelian is in each case separated by two of the conical beads of blue faience.<sup>62</sup> Among the beads of this period in the U.C., there are only two strings labelled as "in original order" (Bd. nos. 525, 601).

The string used for threading beads is thick twisted cord, sometimes the beads being separated and secured in place by wrapping another thread around the main thread or cord,<sup>63</sup> thick threads made of many strands either twisted or plain,<sup>64</sup> leather threads<sup>65</sup> or copper wire.<sup>66</sup> For the ornamentation of garments, the beads were either threaded on drawstrings of skirts or sewn on cloth.<sup>67</sup> But in one case, the warp of the cloth is of simple threads, while the woof consists of single thread and bunches of three to five threads alternating. In the heavy strand of the woof, small blue

faience ring beads are threaded so as to stand on the surface of the cloth.<sup>68</sup> As to the pictorial representation of beads, they are represented on the cartonnage masks (of the Early Middle Kingdom), the mummiform coffins (of the Late Middle Kingdom), the statues and statuettes, the wall painting in the tomb, and on the wall of rectangular sarcophagus or coffins. Only the last subject has been studied in details by G. Jequier.<sup>69</sup> Each of the rest requires a similar detailed study which I could not undertake at present, due to want of time.

An interesting case of the contact of cultures as shown by the beads is the etched carnelian bead of this period in the U.C., which has been briefly referred to above. In Beck's comprehensive article on the ancient etched carnelian beads, it is said that the only definite case of a specimen of this process for Egypt is a scarab of Amenhetep I.<sup>70</sup> Now I find three specimens of etched carnelian beads in the U.C., all three from Egypt. Two of them are dated to the Greco-Roman period and will be discussed in the Chapter XXIII. The Middle Kingdom piece is on the string Bd. no. 1055, from Abydos 197, found by Petrie in 1922, but has not been published in his report or other works. This tomb contained the "Antef Stelae" mentioned in the report<sup>71</sup> and can be dated to the XIth Dynasty with a fair certainty. This specimen has an eye decoration combined with a chevron design (H99b), a typical pattern of the beads of the "Early Phase (before 2000 B.C.)" in Beck's article. This kind of beads was fairly common in Mesopotamia from the Prehistoric times down to the Sargonic period<sup>72</sup> and has been found also in Mohenjo-daro, India.<sup>73</sup> Two beads from Ur, now in the British Museum (B. M. 120598, 123213), show a striking similarity in form and pattern to our specimen. There is no question that our specimen was imported from Mesopotamia. The synchronology between Egypt and Mesopotamia from this evidence can be collated by other evidences. There are two Egyptian alabaster vases inscribed in cuneiform with Sargonic (Akkadian) royal names, Rimus and Naram-sin, and the vases are of the X-XI Dynasty

<sup>57</sup> Mace and Winlock, *Tomb of Senebtisi*, pp. 68-69, pls. xxii-xxiii.

<sup>58</sup> *Ibid.*, p. 69, pls. xxvii and xxxic; and another one from Deir el Bersha, now in the Cairo Museum, J35073G(G).

<sup>59</sup> Reisner, *Kerma IV*, pp. 96-97, pl. 42, fig. 2.

<sup>60</sup> Mace and Winlock, *Tomb of Senebtisi*, pp. 72-73, and similar ones from Dahchour, see de Morgan, *Dahchour I*, p. 99; *Dahchour II*, p. 48.

<sup>61</sup> Reisner, *Kerma IV*, pp. 103-104, fig. 170; pp. 105, 106, fig. 171.

<sup>62</sup> Mace and Winlock, *Tomb of Senebtisi*; pp. 15-16, pls. xxx-xxxi.

<sup>63</sup> Reisner, *Kerma IV*, p. 127.

<sup>64</sup> Junker, *Kubanieh-sued*, p. 187.

<sup>65</sup> Firth, *Teti Pyramid Cemetery*; pp. 59-60; and B. M. M. A., vol. xvi, p. 52.

<sup>66</sup> Mace and Winlock, *Tomb of Senebtisi*, p. 75.

<sup>67</sup> Reisner, *Kerma IV*, pp. 100-104.

<sup>68</sup> *Ibid.*, p. 300.

<sup>69</sup> G. Jequier, *Les frises d'objets des sarcophages du Moyen Empire*, pp. 49-68, 73-75, 97-111, 187-1971.

<sup>70</sup> Beck, *Etched Carnelian Beads*, in *A.J.* vol. xiii(1933), p. 395. This specimen (Cairo Museum 14/5/26/4) is not a scarab, but a barrel-bead with a lenticular section, and the royal name etched on it is not so clearly written as implied in Beck's statement (which is based upon the poorly drawn picture given in Petrie's *Historical Scarabs*), and may belong to a Pharaoh of other dynasty.

<sup>71</sup> Petrie, *The tomb of Courtiers*, p. 10, sect. 20.

<sup>72</sup> Woolley, *Ur Excavations II*, p. 374; Mackay, "A" *Cemeteries at Kish*, pt. I, p. 56. pl. iv, fig. 30; and Mackay, *A Sumerian Palace etc.*, pl. xliii, fig. 9, pl. Ix, figs. 54-58.

<sup>73</sup> Marshall, *Mohenjo-daro*, vol. I, pp. 104-105; vol. II, pp. 515-516, pl. cxIvi, 43-45.

form.<sup>74</sup> A cylinder seal inscribed in hieroglyph and cuneiform in the collection of Carnarvon bears the royal name "Sehetepibre" (Amenemhet I), the first Pharaoh of the XII Dynasty, and its cuneiform inscription belongs to the IIIrd Dynasty of Ur as shown by its form of writing, according to Sayce.<sup>75</sup> The treasure from Tod in Upper Egypt is dated to Amenemhet II of the XIIth Dynasty by the cartouche on the box. The box contained many gold, silver and lapis lazuli objects, including cylinder seals and beads, which were

certainly imported from Mesopotamia. The beads of lapis lazuli of special forms, such as the facted barrel beads, H46b, the triangular spacers, H98 h, have been found at Ur.<sup>76</sup> Cylinder seal of lapis lazuli from this find has cuneiform inscriptions which are of the period of Hammurabi of the Ist Dynasty of Babylon.<sup>77</sup> So the synchronology between Egypt and Mesopotamia of this period is fairly certain, as proved by the beads and other archaeological objects, and our specimen gives an additional evidence.

<sup>74</sup> A. H. Sayce, *The Date of Middle Kingdom*, in *A.E.*, 1921, pp. 102–103; for the date of this form of vases, see also Petrie, *Stone Vases*, pls. xxviii, 584, 589; xxix, 617, 621.

<sup>75</sup> Pinches and Newberry, *A Cylinder-seal etc.*, in *J. E. A.* vol. vii, (1921), pp. 190–199, pl. xxxii, for Sayce' remark, see *J. E. A.* vol. viii, p. 285.

<sup>76</sup> Wolley, *Ur Excavations II*, p. 369, fig. 78; pls. 144–145.

<sup>77</sup> Ia Roque, *Tôd (1934 a 1936)*, pp. 119–121.



After the Middle Kingdom, Egypt was invaded by nomadic peoples. The Semitic invasion from the Asiatic side resulted in a line of Hyksos or “Shepherd Kings”. About the same time, a group of the Nubian people invaded Egypt from the south and established several settlements along the Nile valley. The latter people is distinguished from the Egyptians by the form of their tombs (the so-called “Pan” graves), as well as the funerary objects, including beads. The Hyksos people seemed to bring very few things with them from their native land except the horse and a certain type of the incised black pottery which is called as “Hyksos pottery” by Petrie, but may be imported from the east by the Egyptians themselves. In this chapter, the Egyptian and the Pan Graves will be dealt with separately, and the term “Second Intermediate Period” or “S.I.” will be used for the Egyptians when they lived in Egypt, and some types of beads are certainly Egyptian beads got by them from the Egyptians.

The materials used for beads are as follows:

	Hard stones (%)	Glazed	st. metals (%)	Plastic (%)	Misc (%)	Soft (%)	st. Glass (%)
S. I.	5.9	0.5 %	0.4	81.2	11.6	0.1	0.3
Pan.	2.8	(reported)	0.4	48.9	47.9	(reported)	None

It shows that the materials used were concentrated to faience (plastic materials) and ostrich shell (miscellaneous materials) in this period. The beads of ostrich shell became popular in this period and were extremely common in the Pan graves, almost equal to the faience beads in their number. The beads of glazed stones, and to a less degree the beads of hard stones, became rarer in this period, especially in the Pan graves. The occurrence of glass beads in the Middle Kingdom seems to be questionable, as already discussed in the last chapter. Glass beads were introduced probably in this period, either invented by the Egyptians themselves or imported from the east. But, none of them has been found in the Pan graves so far.

Among the hard stones used for beads in this period, the commonest one is carnelian (52.2 %). Next come garnet (33.3 %), amethyst (11.0 %), green feldspar (2.4 %), and green jasper (0.6 %). There are also two specimens of lapis lazuli,<sup>1</sup> and one specimen each of red jasper, olivine and quartz in the U.C. Heliotrope (a kind of coloured chalcedony), chalcedony, and iron stone have also been reported.<sup>2</sup> In the Pan graves, beads of hard stones are rather rare and consist almost exclusively of carnelian. Among the 207 specimens from the Pan graves, now in the U.C., the only exceptions are two beads of garnet, and one each of quartz and haematite.<sup>3</sup> But in the publication of excavations, amethyst,<sup>4</sup> green felspar,<sup>5</sup> and “red ochre”<sup>6</sup> have been also reported from the Pan graves. Glazed stone beads from the Egyptian graves of this period were uncommon, and those in the U.C., are exclusively of glazed steatite, although glazed quartz has been observed at Diospolis Parva.<sup>7</sup> From the Pan graves, there are several beads of glazed quartz (including glazed crystal),<sup>8</sup> but none of glazed steatite. Among the metal beads, the proportion between gold and silver beads is 100–114 in the Egyptian graves, but 100–41 in the Pan graves. Silver was probably imported from the east. There are also five beads of copper in the U.C., from the Egyptian graves. Most of the plastic materials are blue–green and black faience, which occupies 97.2 % (blue

<sup>1</sup> Also found at Abusir, see Moellers and Scharff, *Abusir el-Meleq*, pp. 94–95, from Tomb 525.

<sup>2</sup> *Ibid.* pp. 94–95.

<sup>3</sup> Haematite beads have been found also in other sites, see Mace, *El Armah and Abydos*, p. 101, and Brunton, *Mostagedda*, p. 125, sec. 170.

<sup>4</sup> Brunton, *Qau III*, p. 7; *Mostagedda*, p. 125, sec. 170.

<sup>5</sup> Wainwright, *Balabish*, p. 21, types 13, 23; and Brunton, *Mostagedda*, p. 125, sec. 170.

<sup>6</sup> Brunton, *Monstagedda*, p. 125, sec. 170.

<sup>7</sup> Petrie, *Diospolis Parva*, p. 53, sec. 83.

<sup>8</sup> Brunton, *Mostagedda*, p. 125, sec. 169; Wainwright, *Balabish*, pp. 21–22, type 5.

75.9 %, black 21.3 %) for the Egyptian graves, and 93.0 % (blue 81.0 % and black 12.0 %) for the Pan graves. After deducting the faience beads, the remaining 7 % of the plastic materials from the Pan graves consists of a kind of black paste (black frit), and all came from one Pan grave (Badari 5503). Blue frit and red faience have been also reported from the Pan graves, but both were very rare.<sup>9</sup> From the Egyptian graves, the kind of plastic materials is more varied. There are blue frit, unbaked clay, mostly in the natural grey colour, but some painted black and polished,<sup>10</sup> white faience, and also a few beads of red paste (red frit).<sup>11</sup> Among the miscellaneous materials, ostrich shell was extremely popular, especially in the Pan graves. Spacing bars of pearl shell are one of the characteristics of Pan graves, but have not been observed in the Egyptian graves. Bone and ivory beads have been found both in the Egyptian<sup>12</sup> and the Pan graves.<sup>13</sup> As to the beads of soft stones, among the over 14,000 beads of this period (excluding those from the Pan graves) in the U.C., there are only 14 beads made of soft stones, namely, eleven of serpentine, two of white limestone (including calcite), and one of a kind of yellow stone. From the Pan graves, only a single specimen has been reported as made of soapstone.<sup>14</sup> Beads made of opaque glass, either blue or green, have been found in the Egyptian graves of this period, but not in the Pan graves. Some of them are probably later intrusions, but it is possible that this material was introduced during this period. There is a lion's head of blue glass with the name of the king "Khepre-nub-re" of the XVIIth Dynasty.<sup>15</sup>

Typologically, the beads of glass are ring beads (GN6a), small spheroid beads (GN8a) and barrel beads (GN16). The ring beads are of a glassy material partly covered with white patina, and they may be a kind of glassy faience instead of true glass. Small spheroid glass beads and spheroid ring beads (GN1f) have been reported also from other sites of this period.<sup>16</sup>

As to the beads of hard stones, the distribution of common forms for the Egyptian graves is as follows: ring beads (H1, 2, 5, 6) 10.8 %, biconical ring beads (H4) 0.8 %;

spheroid beads (H8–10) 82.5 %; barrel beads (H14–16, 19) 4.5 %; cylinder beads (H21–22), 0.5; and other forms 0.9 %; and that for the Pan graves is as follows: ring beads 12.5 %; biconical ring beads 45.9 %; spheroid beads 40.6 %; barrel beads 0.5 %; cylinder beads none, and other forms 0.5 %. It indicates that the people of this period followed the tradition of the Middle Kingdom in their preference of the spheroid beads, although the large spheroid beads became uncommon now. Next came the ring beads and barrel beads, but cylinder beads were very rare. There are also one drop pendants, H20, three flattened barrel beads H36, three drop pendants with a pointed lower end H74, and one melon bead, H96g. All the biconical ring beads from the Pan graves, now in the U.C., were found in one grave (Hu X8), although they numbered as much as 95. There is also one circular bead with a lenticular section, H32c, in the U.C., as from the Pan graves. There are the following types forming the Pan graves at Mostagedda: H17d, conical beads; H95c, cylinders carved with a spiral pattern, and H96m bossed carved with a rosette pattern.<sup>17</sup> It is obvious that many of these beads of hard stones are reused beads survived from the Middle Kingdom, but at least some of them were certainly made in this period, as proved by their technique. The perforation of the stone beads of this period is distributed as follows:

	Biconical (H100) (%)	Parallel (H200) (%)	Conical (H300) (%)	Plain (H400) (%)
S. I.	9.8	34.6	55.1	0.5
Pan.	1.5	10.1	84.5	3.9

The conical perforation pierced from one end was generally practised for the first time in this period. A few cases of this kind of perforation reported or found in the earlier periods were either doubtful or broken pieces of beads of biconical perforation. It is interesting to note that the employment of the conical perforation as the normal mode for piercing the beads of hard stones is first observed among the Middle Kingdom people at Kerma in Nubia, and that the Pan grave people is generally regarded as coming from Nubia.

Another thing common to the Pan graves and the Kerma people is the use of the beads of glazed quartz and glazed crystal. They were extremely popular among the Kerma people, as already mentioned in the last chapter. Those that form the Pan graves have a form of ball beads made of glazed crystal, L6,<sup>18</sup> or of a drop pendant made of glazed

<sup>9</sup> Brunton, Mostagedda, p. 124, sec. 170.

<sup>10</sup> Unbaked clay beads also reported in Garstang, El, Arabah, p. 26, E3.

<sup>11</sup> Red paste beads also reported in Brunton, Qau III, p. 11.

<sup>12</sup> Brunton, Qau III, p. 11, pl. xxxii, 43; Petrie and Brunton, Sedment, p. 18. xlili, 9.

<sup>13</sup> Brunton, Qau III, p. 11. pl.xi, 18; Mostagedda, p. 125, pl Ixxvi, 13, 33, 34.

<sup>14</sup> Brunton, Mostagedda, p. 125, pl. Ixxvi,35.

<sup>15</sup> Beck. Glass before 1500 B.C., in A.E. 1934, une, pp. 14–15, no.17, where the king is wrongly dated to the XIth Dynasty.

<sup>16</sup> Petrie and Brunton, Sedment, p. 16, pl.xliii; Brunton, Qau III, p. 11, pls.xi, 94; xxxii, 63–64; Moellers and Scharff, Abusir el Meleq, pp. 94–95, pl.72 (Berlin18765).

<sup>17</sup> Brunton, Mostagedda, p. 125, pl. Ixxvi, 14, 36, 59–62; and a similar boss was found at Fifeh, see Petrie, Gizeh and Rifeh, pl.xiii, 105.

<sup>18</sup> Wainwright, Balabish, pp. 21–22, type 5.

quartz, L51d<sup>19</sup>. There are also some glazed quartz beads from Diospolis Parva, but their form has not been mentioned.<sup>20</sup> Glazed steatite beads have not been reported from any of the Pan graves. Those from the Egyptian graves are in the form of ball beads, L7–8, barrel beads, L12–13, and cylinder beads, L16–17. Cut of the 74 beads of glazed steatite in the U.C., 72 beads are derived from one string (no. 488) found at Qau (tomb 7382), and probably all of them are reused beads surviving from the Middle Kingdom.

Copper beads found in the Egyptian graves are in the form of small ring beads, M2–3 and have not been observed in the Pan graves. All the gold and silver beads from the Pan graves, and most of those from the Egyptian graves are in the form of small ring beads M2–3, made by rolling a small sheet of metal until the ends butted together, M300. From the Egyptian grave came also 21 barrel beads, M8d, two short plain cylinders, M12b, and one cylinder made of coiled wire, M52b, all of gold, and also three small barrel beads, M8–9, and one biconical ring bead, M10n, both of silver. From El Arabah came a shell pendant of electrum M43d, which is a Middle Kingdom type.<sup>21</sup> Gold or electrum spheroids, M5, and barrel beads, M8, made of thin sheet of metal on a core M600) have been reported from Mostagedda, as well as several silver barrel beads made in the same way as the gold one.<sup>22</sup> The forms of blue–green faience the commonest one of plastic materials are distributed as follows:

	Ring beads (PN1, 2, 6) (%)	Ball bead (PN 8–11) (%)	Barrel beads (PN 16–18) (%)	Cylinders (PN22–23) (%)	Other forms (PN21, etc.) (%)
S. I.	97.5	1.0	0.2	1.2	0.1
Pan	79.9	11.9	0.5	5.5	2.2

It seems that the beads from the Egyptian grave are more concentrated in the ring bead, whereas those from the Pan graves are more equally distributed. But if we tabulate out the percentage of the beads of black faience, the result is rather different, especially in the case of the Pan grave:

	Ring beads (%)	Ball beads (%)	Barrel beads	Cylinders (%)	Other forms
S. I.	91.1	7.8	One specimen	0.6	0.2
Pan	7.6	91.2	—	1.2	—

<sup>19</sup> Brunton, Mostagedda, p. 125, sec. 169 (ix).

<sup>20</sup> Petrie, Diospolis Parva, p. 53, sec. 83.

<sup>21</sup> Garstang, El Arabah, p. 26.

<sup>22</sup> Brunton, Mostagedda, p. 125, sec. 170.

Although the popularity of ball beads is a tradition surviving from the Middle Kingdom, yet the extremely popularity of small ball beads of black faience is one of the characteristics of the Pan grave. Brunton regards them as “probably of native make”.<sup>23</sup> A certain type of small ring beads of a bright blue colour, very irregularly made (PN6c, PN2cw,) was another distinctive characteristic of the Pan grave,<sup>24</sup> but occurred also in the Egyptian grave.<sup>25</sup> Special forms of blue–green faience beads are as follows: two flattened barrel beads, PN35b; seven small segmental ring beads PN62a, and one inverted drop-pendant PN95d, the above three types from the Egyptian grave; 62 pear-shaped beads (PN21f), one short cylinder with a rectangular section (PN52i), one segmental ring bead (PN62a), and two segmental spheroid beads (PN62h), from the Pan grave. The last type seems to be ordinary spheroid beads accidentally adhered during the manufacturing process, not the result of a special modelling process with a “butter-pat”-like tool, as in the case of some segmental beads of the New Kingdom. Special forms of black faience beads are as follows: PN12c, conical beads, PN37b, a flattened barrel bead, and PN63a, a small segmental ring bead, all from Egyptian graves. Besides the faience beads, the Pan grave produced one lot of beads of black paste (black frit) in the form of short cylinders, PN22b–c, and ring beads, PN6d. A few spheroid beads of red faience and one shapeless amulet (or bead) of blue frit have been also reported from the Pan grave.<sup>26</sup> From the Egyptian graves, there are also 82 beads of white faience, mostly of ring beads (PN2c, 2g, 6d), with one or two of pear-shaped beads (PN11c), or cylinders (PN22t); 163 beads of blue frit, also mostly of ring beads (PN2a, 2c, 6a), with two small spheroids (PN8a), 7 barrel beads (PN16g), and 2 flattened barrel beads (PN35b); 77 small barrel beads of grey clay (PN16c), still on the original string, probably used as the hair of some wooden dolls; 14 of polished black clay, in the form of spheroids (PN8b) and pear-shaped beads (PN21n); and 4 cylinders of red paste (red frit) (PN22b, 22m). The last material has been found also in the form of small spheroids, PN8b.<sup>27</sup> Flattened spheroid beads, PN34g, and flattened drop pendants, PN87g, have been found at Qau and Badari.<sup>28</sup>

Decorated beads of faience were rather rare in this period. In the U.C., there are 37 melon 9 beads of blue faience from the Pan grave, PD21d, 21e,<sup>29</sup> and one lot of 29 rosette

<sup>23</sup> *Ibid.*, pp. 125–126, sec. 168.

<sup>24</sup> *Ibid.*, p. 125, sec. 168.

<sup>25</sup> Brunton, Qau III, p. 11, sec. 24.

<sup>26</sup> Brunton, Mostagedda, p. 125, sec. 170.

<sup>27</sup> Brunton, Qau III, p. 11, pl. xxxii, 93.

<sup>28</sup> *Ibid.*, pl. xi, 30, 117.

<sup>29</sup> Melon beads have been found also at Qau, both in the Egyptian and the Pan graves, see Brunton, Qau III, pl. xi, 19; xxxii, 60–62.

beads of white faience, PD35c, from an Egyptian Tomb at Harageh, probably a disturbed tomb or surface find.<sup>30</sup> The following types of decorated beads of faience have been reported from the Pan graves of various sites: PD21e, melon beads of black faience,<sup>31</sup> PD1b2e painted spiral beads, in the form of barrel beads or drop beads,<sup>32</sup> PD4b, cylinders with painted spiral,<sup>33</sup> PD8f, barrel beads carved with a double spiral (or criss-cross pattern, PD48, crumb beads, PD58f, cylinders notched with parallel strips,<sup>34</sup> PD65d, cylinders with a netted pattern,<sup>35</sup> and PD65w, small plaques carved with a zigzag line.<sup>36</sup> From the Egyptian grave, cylinders carved with a spiral pattern, PD10e, or a criss-cross pattern, PD13b,<sup>37</sup> wallet-shaped spacers with a row of short strokes at the lower edge, PD76,<sup>38</sup> and crumb beads, PD48,<sup>39</sup> have been also reported. All of these decorated beads are probably reused beads of the Middle Kingdom.

Among the beads of miscellaneous materials, ring beads of ostrich shell, R51–52 were the commonest one. They were very common both in the Egyptian and the Pan graves, only second to faience beads. Another characteristic type of the Pan-grave beads is the spacing beads of pearl shell, R71, which are rectangular bar bored at each end to receive a double thread.<sup>40</sup> For ivory and bone beads, there are the following types: barrel beads of ivory, R32m,<sup>41</sup> cylindrical beads of bone R36h,<sup>42</sup> barrel beads with grooves at each end, sometimes decorated with a criss-cross pattern in the centre, R43b, R40m,<sup>43</sup> all from the Pan grave. From the Egyptian grave of this period came one collared barrel bead of ivory, R43b,<sup>44</sup> and one drop pendant, R45k.<sup>45</sup> Fish

vertebrae were used for white disc beads in some Pan graves.<sup>46</sup>

Beads of soft stones are extremely rare in this period. There are 9 ring beads, S6bc, 2 short cylinders (or thick ring beads), S16a, all of serpentine; one ring bead of a kind of yellow stone, S2d, one spheroid bead of calaite, S7c, and one spacing bead of white limestone, S41, all from Egyptian graves. The last one may be made of shell, which differs very little from white limestone when decayed. The only specimen reported from the Pan grave is one flattened barrel bead made of soapstone, S27j.<sup>47</sup>

In regard to the use of beads, they were used as necklaces, bracelets, anklets, girdles, finger rings, head circlets, and also as ornaments sewn on garments in the Egyptian graves of this period.<sup>48</sup> For the Pan grave beads, they were also sewn on leather,<sup>49</sup> besides their use as necklaces, bracelets anklets and girdles.<sup>50</sup> The spacing bars of pearl shell seem to have been used always as bracelets.<sup>51</sup>

For the arrangement of beads, the spacing bars of pearl shell were used by themselves. The number in a bracelet ranged from 12 to 38 slips which were threaded together through each end. Two threads were passed through each hole, crossing, and one passing along each side, so as to make a flexible band for a bracelet. The slips were graduated in length and were threaded always edge to edge.<sup>52</sup> In the Pan grave, a string consists sometimes of a number of beads of one type only, e.g. all of blue ring beads, black spheroids or large carnelian barrel beads,<sup>53</sup> or white shell ring beads<sup>54</sup>; and sometimes consists of two kinds of beads arranged alternately, such as alternate carnelian spheroid beads and ring beads of gold or white shell,<sup>55</sup> alternate blue and white ring beads.<sup>56</sup> At Diospolis Parva, the arrangement is 7 white and 7 black alternate, or 1 white alternating with 2 or 3 blue or black.<sup>57</sup> In an Egyptian grave at Mostagedda, a necklace was found to be composed of groups of three shell ring beads alternating with three blue faience more or

<sup>30</sup> Floral beads have been found also in the Pan graves, see Brunton, Mostagedda, p. 125, sec. 169 (viii), Corpus no. Pan grave beads 50.

<sup>31</sup> Brunton, Mostagedda, p. 125, sec. 169 (viii); Wainwright, Balabish p. 21, type 15.

<sup>32</sup> Brunton, Mostagedda, p. 125, sec. 169 (iii), pl.Ixxvi, 31, 32.

<sup>33</sup> Wainwright, Balabish, p. 21, type 17.

<sup>34</sup> Brunton, Mostagedda, p. 125, sec. 169 (i), (iv) pl.Ixxvi, 15, 33; p. 125, sec. 170.

<sup>35</sup> *Ibid.*, p. 125, sec. 169(ii), pl.Ixxvi, 16, 17; & Wainwright, Balabish pl.xiii, 6.

<sup>36</sup> Brunton, Mostagedda, pl.Ixxvi, 19.

<sup>37</sup> Mace, El Amrah and Abydos, p. 88, pl.xliv.

<sup>38</sup> Brunton, Qau III, pl.xi, 47.

<sup>39</sup> Petrie and Brunton, Sedment I, p. 20, sec. 35, Petrie, Diospolis Parva, p. 53, sec. 83.

<sup>40</sup> Brunton, Qau III, p. 7, pl.xi 41–42; Brunton, Mostagedda, p. 125, pl.Ixxvi, 54–57; Petrie, Gizeh and Rifeh pp. 20–21, Petrie Diospolis Parva pp. 46–47, pl. xI; Wainwright, Balabish, p. 20, pl.iii.3.

<sup>41</sup> Brunton, Qau III, pl.v, from Tomb 1301, now in the U.C.

<sup>42</sup> Brunton, Mostagedda, p. 125, pl.Ixxvi, 13.

<sup>43</sup> *Ibid.*, p. 125, sec. 169(iv), pl.Ixxvi, 33; Brunton, Qau III, pl.xi18.

<sup>44</sup> Brunton, Qau III, p. 11, pl.xxxii, 43.

<sup>45</sup> Petrie and Brunton, Sedment, p. 18, pl.xliii, 9.

<sup>46</sup> Brunton, Mostagedda, p. 125, sec. 170; Wainwright, Balabish, p. 21, type IB.

<sup>47</sup> Brunton, Mostagedda, p. 125, sec. 169(v), pl.Ixxvi, 35.

<sup>48</sup> Petrie and Brunton, Sedment I, p. 19, sec. 33.

<sup>49</sup> Wainwright, Balabish, p. 20; see also Petrie, Diospolis Parva p. 47.

<sup>50</sup> Brunton, Mostagedda, pp. 125–126, sec. 170.

<sup>51</sup> Wainwright, Balabish, p. 20, pl.iii, 3; and Petrie, Diospolis Parva, pp. 46–47, pl.xI.

<sup>52</sup> Wainwright, Balabish, p. 20, pl.iii, 3; Petrie, Diospolis Parva pp. 46–47, pl.xI.

<sup>53</sup> Wainwright, Balabish, p. 20, pl.viii, 9, 12.

<sup>54</sup> Petrie, Diospolis Parva, pp. 46–47.

<sup>55</sup> Wainwright, Balabish, p. 20, pl.viii, 8, 13.

<sup>56</sup> *Ibid.*, p. 20; Petrie, Gizeh and Rifeh, p. 21, sec. 62.

<sup>57</sup> Petrie, Diospolis Parva, pp. 46–47.

less regularly.<sup>58</sup> At Sedment, a girdle of minute blue beads, sometimes with a few white between groups of 15 or 20 blue<sup>59</sup>; and in another grave, two patches of a string of stone beads, gave the order, 1, 2, 2, 3, and 2, 2, 2, 2, carnelian and amethyst alternately, and also there were two strings of shell and blue faience ring beads, small and large groups of the two colours irregularly alternating<sup>60</sup>

The strings used for threading the beads in the Pan grave are either leather threads or some fibrous material.<sup>61</sup> In an Egyptian tomb at El Arabah, a plain cirlet of electrum was used for suspending a shell pendant of metal.<sup>62</sup> But the commonly used strings were probably always some fibrous material.

Since this is a period of artistic degradation, there is a marked tendency to use beads of Middle Kingdom types and materials, both in the Egyptian<sup>63</sup> and in the Pan graves.<sup>64</sup> There are also other traits common to the Pan grave and the Egyptian graves of this period; e.g. the abundance of white shell ring bead, the use of the irregularly made beads of blue faience, and the small spheroids of

black faience, and the general adoption of conical perforation for stone beads. The Pan-grave people show their resemblances with the Middle Kingdom people at Kerma in Nubia by the use of glazed crystal beads, the adoption of the conical perforation for stone beads, and the habit of stitching beads on the leather garments. But certainly, the closest affinities with the Pan-grave culture are found among the Nubian C-group. As enumerated by Wainwright, there are the following resemblances between the Pan graves and the Nubian C-group: 1, shell and black faience beads; 2, the alternate arrangement of these beads; 3, 4, 5, carnelian spheroid and barrel beads and glazed crystal beads; 6, cylindrical faience beads; 7, shell-strip bracelets.<sup>65</sup> Shell-strip bracelets are a characteristic common to the Pan graves and the Nubian C-group. Their differences are: the tiny blue faience ring beads and the habit of sewing beads into the seam of leather were absent in the Nubian C-group, whereas the beads, cloths and porphyry beads which were found in the Nubian c-group were absent from the Pan graves.<sup>66</sup>

<sup>58</sup> Brunton, Mostagedda, p. 134, sec. 186, from Tomb 418.

<sup>59</sup> Petrie & Brunton, Sedment, I, p. 19, sec. 33.

<sup>60</sup> *Ibid.*, pp. 16–17.

<sup>61</sup> Wainwright, Balabish, p. 20, pls. iv, 1; x, 1.

<sup>62</sup> Garstang, El Arabah, pp. 25–26.

<sup>63</sup> Petrie, Sedment, p. 20, sec. 35; Brunton, Qau III, p. 11, sec. 24.

<sup>64</sup> Wainwright, Balabish, p. 23; Petrie, Diospolis Parva, pp. 46–47, sec. 68; Brunton, Mostagedda, pp. 125–126, sec. 169.

<sup>65</sup> Wainwright, Balabish, pp. 50–51.

<sup>66</sup> *Ibid.*, pp. 49–50; cf. Reisner, *Archaeological Survey in Nubia*, vol. I, pp. 52, 338.

The Egyptians expelled their Hyksos kings, and became an independent people again, under their vigorous pharaohs, Egypt extended her rule into Asia and Nubia, and built up a new Empire. Until the Eastern campaigns of Thotmes III, many aspects of Egyptian arts and crafts, including beads and pottery, still followed more or less the tradition of the late Middle Kingdom, and the Second Intermediate period. Then, the contact with foreign civilizations at Asia introduced and stimulated many inventions and novelties. This is a new phase of Egyptian Civilization. The grandeur, the riches and the pomp of Egyptian art of this period are adequately shown in the bead manufacture as well as in other objects; but they are not so refined and exquisite as those of the Middle Kingdom.

The materials used for beads in this period are as follows: glass 12.3 %; hard stones 11.2 %; glazed stones 0.02 %; metals 0.7 %; plastic materials 68.7 %; miscellaneous materials 7.1 %; and soft stones 0.03 %. In comparison with the previous periods, the position of both the glazed stones and soft stones became more insignificant. Glass became common for the first time. Ostrich shell beads which form 97.3 % of miscellaneous materials were not uncommon in the Early XVIIIth Dynasty, but were rather rare in the New Empire proper, that is, after the Eastern campaigns of Thotmes III. The latest specimens of shell beads of well-dated finds from this period (New Empire) in the U.C. are five beads from Amarna and 3 beads from the burnt deposit of Tutankhamen at Gurob. After that the ostrich shell beads seemed to drop out entirely, until the XXIIInd Dynasty when they came into favour again.<sup>1</sup> There was an increase of metal beads, but the figure given for them in the above table is very low. This is because beads of precious metal are much sought for by the ancient and modern tomb robbers, and the few found by the excavators are mostly retained in the Cairo Museum. Comparatively, there are a slight increase in the beads of hard stones and a

slight decrease in faience beads, if we compare them with the Second Intermediate period. But the faience bead still occupied the first place. The colour of faience was no longer limited to blue green, black brown and white, but extended to have also the following colours: buff (Ostwald 4ec-ge) grey, (2-4ig, 13-14li 19-20n1), leaf-green (211e) red (5-6pe-ne), violet (111i, 13pi) and yellow(2-31a-1c). This was a phenomenon prevailing only after the conquest of Thotmes III. Although red faience has been referred to in previous chapters, the true red faience with a red body material did not appear until the New Empire. Lucas says that so far as he knows, there is none of the red faience before the XVIIIth Dynasty or after the XXth Dynasty.<sup>2</sup> There are in the U.C., also several beads of white faience, unbaked and unglazed, probably from Amarna (No. 914). Faience beads occupy 99 % of the beads of plastic materials. Other kinds of plastic materials are as follows: many beads of frit of the colour of blue or green, and one lot of 19 beads of brown vegetable paste (No. 910). Red pottery has also been reported,<sup>3</sup> but it may be red paste or faience. Glass seems to have been used for the first time in the Second Intermediate period, as discussed in last chapter, but it became common only after the beginning of the XVIIIth Dynasty. Next to the lion's head of blue glass with the royal name "Khepre-nub-re" of the XVIIth Dynasty, already mentioned in the last chapter, the earliest known glass which carries its own evidence of date is a barrel bead of blue glass with the royal name "Zeserka-re" (Amenhetep I) of the early XVIIIth Dynasty.<sup>4</sup> As the vari-coloured faience, glass of various colours other than blue did not become prevalent until a little later, namely about the Mid-XVIIIth Dynasty. The distribution of various colours is as follows: (the letters and numerals in the brackets indicating the

<sup>1</sup> cf. Wainwright, Balabish, pp. 5-6, 22.

<sup>2</sup> Lucas, *Glazed Ware in Egypt, India and Mesopotamia*, in J. E. A. vol. xxii, p. 146.

<sup>3</sup> Firth, *Teti Pyramid Cemeteries*, p. 73, NE18.

<sup>4</sup> Mace, *El Amrah and Abydos*, p. 75, pl. liii.

colour symbols according to the Ostwald Charts): blue (13–14pi, 17–18 1e) 32.6 %, yellow (2ia–1c) 21.3 %, black 15.1 %, green (20–211e) 15.0 %, red (5–6 1e–pe) 10.1 %, white 4.1 %, brown (5pn, 5 pg) 0.7 %, violet (10 1i) 0.4 %, grey (3ig) 0.4 %, colourless and transparent 0.3 %. Most of these glass beads are opaque, but some of the colour of the pale blue (16pe) or dark yellow (21e) are translucent, and the colourless ones are almost transparent. The occurrence of grey glass is questionable. The translucent grey beads from Amana, 4 in number, are certainly of Roman date, wrongly included in the XVIIIth Dynasty from that site. Other beads of this period are opaque and seem to be ordinary pale blue glass entirely covered up with a greyish white patina. Beads of hard stones are mostly of carnelian (88.1 %) and red jasper, or opaque variety of carnelian (8.1 %). Next come garnet (2.4 %), amethyst (0.5 %) rock crystal (0.4 %), lapis lazuli (0.2 %) and green felspar (0.1 %). There are also 5 specimens of speckled diorite, 2 of green jasper, 2 of turquoise, 1 each of chrysoprase, slate, brown and white quartz pebble and a kind of black stone. Both turquoise and chrysoprase have been reported from other sites.<sup>5</sup> Malachite<sup>6</sup> and white quartz<sup>7</sup> have been also reported. As to the glazed stone, although glazed steatite scarabs were very common in this period, yet beads of glazed steatite were extremely rare now. The few specimens found in this period are probably reused of old types, except the type L27 which is an uninscribed semi-barrel seal, a form occurring frequently in this period. The “poppy-petal” pendant of rock crystal on the string no. 695 in the U.C. is a characteristic form of this period, but it is not certain whether this bead is really glazed, or only stained with glaze by contact with decayed faience or rusted copper objects. Metal beads were made of gold (76.7 %), silver (10.7 %) and copper (9.5 %), and also a certain kind of grey metal (3.1 %). The last one consists of 12 spacing bars found at Gurob (string no. 551). The gilt plaster in Quibell’s report<sup>8</sup> is probably thin gold foil over a core of some paste (M600). The distribution of miscellaneous materials is as follows: ostrich shell 97.3 %, resin, either black or yellow 1.5 %, ivory or bone, 0.5 %; reed 0.6 % and wood 0.1 %. Large ring beads of shell, R53b, and some small ones with a fibrous structure, R52c, seem to be made of mollusc shell. Some of resin beads are probably amber. Tiny amber beads have been reported from Saft el-Henna,<sup>9</sup> and beads of

reddish coloured resin have been found at Balabish<sup>10</sup> and also in the Tomb of Tutankhamen.<sup>11</sup> Beads of soft stones are very rare in this period. In the U.C., there are 3 beads each of serpentine and steatite, 2 each of calcite, limestone and gypsum and also 3 white stone beads and 1 bead of green stone unidentified. Most of them are probably reused beads of previous periods.

Typologically, glass beads have the following distribution: ring beads with a rounded edge (GN2) 10.0 %, ring beads with a flat edge (GN6) 2.1 %, biconical ring beads, (GN4) 3.8 %, spheroid beads (GN1, 8, 9) 62.7 %, barrel beads (GN12, 19) 2.6 % and miscellaneous beads 2.0 %. Due to the nature of material and the method of manufacture, glass periods in this period usually took the shape of spheroid beads, barrel beads and ring beads with a round edge. Biconical ring beads (GN4) is a characteristic form of this period. Ridged barrel beads (GN18) consist of one lot of 35 beads, but they may be made of faience instead of glass. Ring beads with flat edges but rounded corners (GN7) were very rare in this period. Four of the six specimens of this type in the U.C. are certainly of the Roman date wrongly included in the XVIIIth Dynasty beads from Amana as already referred to above. Among miscellaneous forms, there are some conical beads (GN13), one biconical ball bead (GN10), 5 spheroid beads with an oval section (GN25, 27, 29), 10 spheroid beads or barrel beads with a flattened oval section (GN46–49), one half-barrel bead (GN41f), one collared barrel bead (PN73b), 7 segmental beads (GN74–75), one segmental bead with a flattened section (GN76) one four-armed bead (GN79) and some irregularly made beads (GN80). There are the following types of spacers and pendants: one spacer made of three spheroid beads joined together (GN83), a few drop pendants (GN84), some with a ring fixed for suspending (GN85) 27 flattened drop pendants (GN87–89), one tooth-shaped pendant (GN92), 33 “poppy-petal” pendants (GN93) and 9 oval pendants (GN95b). In the Tomb of Tutankhamen, large biconical ring beads with a very large perforation, called by Beck as “quoit beads” (GN204p), a series of conical beads of graduated sizes (GN13), and plumb pendants (GN90d) have also been found.<sup>12</sup> From other sites, flattened barrel beads (GN36c), double barrel spacers (GN18e), pointed pendants (GN90b) and crescent pendants (GN97b–d) have been reported too.<sup>13</sup> Technically, almost all of them were

<sup>5</sup> For turquoise, see Firth, *Teti Pyramid Cemeteries*, p. 69, NE65; for chrysoprase, see Moeller, *Goldschmidearbeiten*, p. 27; some turquoise beads from the Tomb of Tutankhamen, see Temporary no. 359 in the Cairo Museum.

<sup>6</sup> Moellers, *Goldschmidearbeiten*, p. 27.

<sup>7</sup> Firth, *Teti Pyramid Cemeteries*, p. 80, NE89.

<sup>8</sup> Quibell, *Tomb of Yuua and Tuiu*, p. 64.

<sup>9</sup> Petrie, *Hyksos and Israelite Cities*, p. 39.

<sup>10</sup> Wainwright, *Balabish*, p. 57.

<sup>11</sup> Temporary nos. 351, 362, 367, in the Cairo Museum.

<sup>12</sup> Cairo Museum, Temporary nos. 762, 763, (*Carter’s Report*, vol. 1, pl. xxxvD) 222 (vol. II, pls. Ixviii–Ixix), 404 (vol. III, pl. XXXA), and 366 (vol. III, pl. xviii); for the conical beads, see also Davies, *Tomb of Queen Tiyi*, pl. vi, 3.

<sup>13</sup> Brunton and Engelbach, *Gurob*, corpus no. 74j, 44z; Engelbach Harageh, corpus no. 55D, 44G; and Brunton, *Qau III*, pl. xxxii, 17.

made by the wire-winding process, with the trace of manufacture either still remaining or eliminated. A few blue ring beads found at Kahun (no. 1110) were made by the folding method A (GN300) with the joining mark still plainly shown. From the Amarna finds, Beck reports some folded glass beads and several cylindrical beads made by the Drawn-out Method B (G800) namely the cane was made by folding, not by blowing before being drawn out.<sup>14</sup> Some beads seem to have been finally shaped into the desired form by grinding.<sup>15</sup> Four beads of grey glass made by the Drawn-out Method B (G700) are certainly Roman in date (no. 1474), wrongly included in the XVIIIth Dynasty beads from Amarna, which is honey combed with Roman burials in a certain part of the site.<sup>16</sup>

Decorated glass beads were fairly common. The proportion between them and the plain glass beads in the U.C. is from 10.6 to 100. Their general distribution is as follows: raised spiral beads (GD2) 11.4 %; coloured spiral beads (GD65–66) 6.4 %; spots beads 26.6 %; (including GD12–13), with sparse spots 25.4 % and GD14–15, with crowded spots 1.2 % “spots and lines” beads (GD16–18) 8.3 %, beads with a corded pattern (GD68) 1.9 %; eye beads and pendants 38.2 % (including GD23–25, rounded eye beads 7.5 %; GD34–35 flattened eye beads 8.9 % and (GD36–37) eye pendants 21.8 %, beads with an onyx pattern (GD61–62) 4.4 %, beads with a single horizontal band (GD70) 1.2 %; beads of miscellaneous patterns 1.6 %. Beads of the type GD2a are ordinary ring beads, and their raised spiral pattern is due to the method of manufacture when carelessly finished, and probably never intended to be a decoration. Coloured spiral beads consist of two bands, one of a white colour, and another of a dark colour, either black, blue or green. Their form is either a barrel bead or a drop bead. Most of the spotted beads have white spots on a dark ground (black, blue, violet or green), but a few of them have black spots on a light ground (white, yellow, green or pale blue). They are either in the form of ball beads (GD12–14), barrel-beads (GD13, 15c) or oval pendant (GD15p). The spots and lines pattern are found on the ball beads (GD16), or barrel beads (GD17), one with lines and spiral circles instead of spots (GD18). The eye pattern consists of a white ring around a dark central spot. The method of applying the eye decoration on beads was by impressing either a white ring (GD23) or a stratified eye (GD25, 34–35), upon the matrix of beads which are in the form of a spheroid, or barrel bead, either with an ordinary round section, (GD23, 25), or with a flattened section (GD34–35). Eye pendants have either one or two stratified eyes (GD36b–d), or one spiral circle

(GD36g), or a circle of tiny spots around a central eye (GD37). These eye pendants are mostly with a flattened section and have a hole across the body besides the hole in the suspending ring. The cord pattern was made by twisting one white and one black threads of glass together into a cord and was then impressed upon the matrix of beads, usually a spheroid or barrel bead (GD68). The type GD68y, a large bead with a corded pattern is a broken bead from Amarna, but its date doubtful, probably of Roman instead of XVIIIth Dynasty. The types GD28 and GD70f also have a cord element in their pattern. Onyx glass beads are either a spheroid or a barrel bead, of a black colour, (occasionally brown) with a white band around the centre in imitation of an onyx stone. Beads of the type GD70 have a single horizontal line either of plain black or of corded line of black and white, and their forms are a flattened barrel bead. Miscellaneous decorated beads in the U.C. are as follows: a collared cylinder bead with a moulded spiral pattern (GD9), two ring beads with an indented edge (GD6b), a black barrel bead with four raised yellow horns (GD20), a pear-shaped beads decorated with cords and stratified eyes (GD28), a blue drop bead made by the wire-winding process and capped with a yellow glass at one end (GD664g), a melon bead with a zigzag pattern (GD79f) and a flattened barrel bead with a whirling pattern (GD84). From the excavations at various sites, the following types have also been reported: GD66, a blue melon bead with a narrow neck at both ends,<sup>17</sup> GD6i, ordinary melon beads,<sup>18</sup> GD79b–c, barrel beads with a zigzag pattern,<sup>19</sup> GD15f, hour-glass beads with spots, GD35g, flattened ball beads with stratified eyes, GD62j, barrel beads with red, green and white strips GD95, yellow drop pendants with blue strips, and GD96b–d, circle pendants with a decorative pattern on one face.<sup>20</sup> The material of the last type may be of faience instead of glass, it should be noted that almost all of the body of these decorated beads enumerated above were made by the wire-winding process (G600).

Beads of hard stones are distributed as follows: ring beads (H2, 5, 6) 3.3 %, biconical ring beads (H4) 20.7 %, spheroid beads (H1, 8–10) 62.5 %, barrel beads (H14–16, 19) 3.8 %, cylinder beads (H21) 3.0 %, “poppy-petal” pendants became very common in this period. Among the old forms, the spheroid beads are commonest, a tradition surviving from the Middle Kingdom, but they are usually smaller in size. Among the miscellaneous beads in the U.C. there are three ring beads of the type H3, one drop pendant (H20g), three flattened beads of barrel-shaped, circular of

<sup>14</sup> Beck, *Classification*, pp. 60–61, Figs. 51–52.

<sup>15</sup> Cf. Beck's remark in his “*Classification and Nomenclature*” p. 61.

<sup>16</sup> Peet and Wolley, *City of Akenaton L*, pp. 66–67, 71.

<sup>17</sup> Petrie, *Meydum and Memphis III*, pl. xxvii, 94.

<sup>18</sup> Brunton, *Qau III*, pl. xxxii, 61.

<sup>19</sup> Naville, *Mound of the Jew*, p. 43, pl. xv T III, 5; and another one from Amarna, see Cairo Museum no. 55525.

<sup>20</sup> Brunton and Engelbach, *Gurob*, corpus nos. 70R, 58A, 58G; 44X and 44Y; Brunton, *Qau III*, pl. xxxii, 94.



rhomboid form (H26–27, 32), 9 half-barrel beads (H39), 4 melon beads (H96), 2 segmental beads (H57b), one leaf-shaped spacer (H69) and 9 square-spacing beads with an open-work centre (H98). For miscellaneous pendants, there are 30 flattened oval pendants (H87d), a rounded oval pendant (H87h) 7 drop pendants (H71–73), 4 flattened drop pendants (H75), 5 “petal-shaped” pendants (H87b) and 2 irregular pendants (H88a) plumb-shaped pendants (H79f) have been found in the Tomb of Tutankhamen.<sup>21</sup> Some disc beads of lapis lazuli from Bubastis were sawn with notches at the edge so as to give a zigzag outline, (H96k).<sup>22</sup> A large faceted carnelian bead has been reported from Saqqarah,<sup>23</sup> but its exact shape has not been recorded. Rectangular-spacing beads (H63c) have been also reported.<sup>24</sup> Technically, stone beads of this period in general are less well finished than those of the Middle Kingdom. As to the perforation, the conical type which became common for the first time in the Second Intermediate period, now became an almost universally used type as shown in the following percentage table: biconical perforation (H100), 0.5 %; double parallel (H200), 2.2 %; conical (H300), 95.6 %; plain (H400), 1.3 %; and unknown, 0.4 %. It is clearly shown that not only the primitive biconical type was rare now, but both the parallel and the plain types which were prevalent in the Middle Kingdom also became rather rare. The few beads with a perforation type other than the conical one are probably most of them surviving old beads reused in this period rather than a surviving old beads reused in this period rather than a surviving technique still practised in this period. The unknown types are either unfinished and unpierced beads or some spacing beads with the type of individual perforation unrecorded. There is one lapis lazuli bead with a grooved perforation (H800) from Amarna, but I suspect that it may be an intrusive Roman bead.

Beads of glazed steatite were very rare in this period. In the U.C., there are 5 barrel beads (L13–14), 2 melon beads (L71) and one unincised half-barrel seal (L27). Except the last one, they are probably old beads reused. There is also one “poppy-petal” pendant of rock crystal (L55) with a trace of blue glaze. It was temporarily typed as of glazed stone may be unglazed ordinary pendant stained with a glaze-like stuff by a contact with some decayed faience or copper objects. Wallet-shaped spacer (L41) has been found in this period.<sup>25</sup>

As to metal beads, the beads of grey metal are in the form of a spacing bar (M33d). For copper beads, there are

many ring beads, most with a flat edge made by the rolled sheet method, but a few with a round edge (M2c, 7a), some slender short cylinders (M12b–c), and a broken pendant with only a suspending ring remaining (M48), the last being of a brownish black and its identification of material doubtful. Silver beads in the U.C. consist of one lot of 42 ring beads (M7p). Silver conical beads (M7p), barrel beads (M8b) and flattened barrel beads (M13g) have been reported from Thebes.<sup>26</sup> Gold is the commonest metal used for beads. The distribution of the forms of gold beads is as follows: ring beads (M2–3) 58.3 %; barrel beads (M8–9) 30.0 %; spheroid beads, (M5, 21) 6.4 %; pendants (M43–48) 3.0 %; and miscellaneous materials 2.3 %. Ring beads are mostly with a flat edge (M3b), but a few with a rounded edge (M2a), made by rolling a small sheet of metal until the ends butted together (M300), except three specimens which have their ends overlapped (M200). Barrel beads were sometimes made by plating gold foil over a core of some paste (M600). Ball beads (M5b) were made by joining two semi-spherical halves (M500). Some spheroid beads have a collar at each end (M21b), whilst some being double beads (M21m). Miscellaneous beads in the U.C. consist of one spacer and six decorated beads. The spacer was made of two cylinders joined together side by side (M28). Among decorated beads there are a “lantern”-bead of openwork (M51), three ring beads with a notched edge (M56b), a gadrooned ring bead (M56f) and a ring bead made of a circle of gold globules (M68b). But the U.C. Collection is rather poor in gold beads. We must look up other collections and publications in order to get a more complete picture of their variation. From the Tomb of Tutankhamen, there are the following types of gold beads: conical beads for the ceremonial whip, M7p; biconical barrel beads, M10a; quoit beads (or biconical ring beads with a large perforation), M10p; long drop beads, M11h; short cylinder beads, M12b; flattened circular or rhomboid beads M13b, 13e, M7; spacing beads made of three ring beads, M27c; or of seven broad ribbed ring beads, M30; plumb-shaped pendants M45f, gadrooned ring beads, M56f; beads made of a circle of gold globules, M68b; and granulated beads with a decorative pattern made of tiny globules fixed on the surface of the body of beads M71i.<sup>27</sup> There are

<sup>21</sup> Carter, *Tomb of Tutankhamen III*, pl. xviii, temporary no. 366 in the Cairo Museum.

<sup>22</sup> Petrie, *Objects of Daily Use*, p. 7, pl. v.

<sup>23</sup> Firth, *Teti Pyramid Cemeteries*, p. 80, NE89.

<sup>24</sup> Engelbach, *Harageh*, corpus no. 58w.

<sup>25</sup> Brunton, *Qau and Badari III*, pl. xxxii, 15.

<sup>26</sup> For the conical beads see Temporary no. 336 in the Cairo Museum from the tomb of Tutankhamen; for the other two forms see B. M. M. A., xii, p. 18, Fig. 12.

<sup>27</sup> All in the Cairo Museum; Type M7p, see Temporary no. 336; M10a see T.nos. 261–262 (Carter’s report, vol. III, pl. xxxviA7, B6); M10p, see T. no. 219 (vol. II, pl. xxv); M11 h, see T.no. 222 vol. II, pls. Ixviii–Ixix); M12b, see T.no. 904; M13, M7, see T, nos. 912–913, vol. I, pl. xxxvic; M27c, see T.no. 260 (vol. II, pl. xxxvi, B.1); M30 see T.no. 346 (vol. III, pl. xx, B); M45f, see T.no. 366 (vol. III, xviii); M56f see T.no. 263, vol. III, pl. xxxvi, A, 2; M86b, see T.no. 85; M71i, see T.nos. 232, 362, 367 (vol. III, pl. xviii, right top).

also the following types from other sites: biconical ring beads, M10n; slender cylindrical beads, M12d; beads made of a double circle or joined globules, M68f; pendants made of a tube with a ring attached to one end for suspending, M50e; and some leaf-shaped pendants, M90c; all the above form Tell Basta<sup>28</sup>; spacing beads made of three rows of ring beads joined by slender tubes M31, cross-shaped spacers with two perforations perpendicular to each other, M25; pendants in the shape of floral petals, M48f, 48h; and flattened drop pendants decorated with tiny globules, M94; all the above from the treasure of Queen Ashhetep<sup>29</sup>; spacers made of two ball beads, M26d or of two barrel beads (M29b),<sup>30</sup> leaf-shaped or floral-petal pendants of hollow gold, flat behind and with a small ring at each end,<sup>31</sup> barrel beads with a series of stamped ribbed lines around the body M62b<sup>32</sup>; open-work beads and pendants, M64b, 64c, 64p,<sup>33</sup> a disc bead with a zigzag band soldered around the body M66d,<sup>34</sup> and wallet-shaped or “shell”-spacing beads M86.<sup>35</sup>

Now, we come to beads of plastic materials. Beads of brown vegetable paste are in the shape of ball beads PN8f. The beads of blue frit in the U.C. are distributed as follows: ring beads (PN2, 6) 12.7 %; biconical ring beads (PN4) 23.4 %; spherical beads (PN8) 34.6 %; barrel beads (PN16–17) 2.4 %; drop beads (PN21) 0.9 %; cylinder beads (PN22) 0.3 %; segmental beads (PN63) 25.7 %. As in the case of the Middle Kingdom, spheroid beads were the commonest form. Biconical ring beads were a characteristic type of this period. Segmental beads are unbroken ring bead and became prevalent in this period because of the introduction of a new technique as will be discussed below about the segmental bead of faience. The distribution of faience beads of various types is as follows: ring beads (PN2–3, 6–7) 77.7 %, biconical ring beads (PN4) 1.2 %; spheroid beads (PN1, 8–9) 5.6 %; barrel beads (PN16–18) 1.0 %; cylinder beads (PN22–23) 3.4 %; drop beads (PN21) 0.4 %; segmental beads (PN62–63) 8.1 %; spacer (PN72–83) 1.8 %; pendants (PN86–98) 0.5 %; miscellaneous beads 0.3 %. Ring beads, especially the small ones (PN2a–c, PN6a–b) were extremely common. It seems immaterial

whether they are with a rounded edge (PN2) or a flat edge PN6. The roundness of the edge of these small beads depends upon the viscosity and the thickness of glaze, and it is often impossible to tell whether the edge of a particular bead is flat or slightly rounded. The segmental bead became prevalent for the first time in this period. They were strung together with ordinary ring beads and seemed to be left such to save the trouble of breaking them into separate ring beads. The perforation of ring beads and segmental beads is small at first, but became large in the late part of this period. The segmental bead of faience found in British Bronze Age graves are now generally regarded as being imported from Egypt.<sup>36</sup> Biconical ring beads are a characteristic of this period spheroid beads, cylinder beads, barrel beads and drop beads are not uncommon, although not so numerous as ring beads and segmental beads. Spacing beads are mostly in the shape of joined ring beads or cylinders (PN72), or in a leaf-shaped or floral form with one ring fixed at each end (PN83). Other spacers are less common. In the U.C., there are also the following types of spacers: spacing beads made of flattened cylinder beads (PN73), of joined segmental cylinder (PN75), of joined hollow cylinders or solid half-cylinders with one ring at each and perpendicular to the length of the cylinder (PN76), of joined drop beads (PN74b, 74d), of solid bars in the shape of a beetle or leaf, pierced with two perforations, one at each end (PN82), and of long solid bars with a multiple perforation (PN79). The percentage of each type of these spacers enumerated above is as follows:

PN72	PN73	PN74	PN75	PN76	PN79	PN82	PN83
65.1 %	0.6 %	0.3 %	3.2 %	5.5 %	1.3 %	0.5 %	23.3 %

Tyoe PN83 is very similar to type PN82 in shape, except that the former was made by the moulding method with two ring beads fixed at both ends for stringing, whereas the latter was made by the modelling method with perforations pierced into the body. The latter is a Middle Kingdom type, and there are only three specimens of them in the U.C., all coming from the early XVIIIth Dynasty debris in the XIth Dynasty temple at Deir el Bahari and the temple of Serabit at Sinai, both possibly relics from the Middle Kingdom. The former type (PN83) became prevalent for the first time in New Empire and superseded the latter for general use. There are also spacers made of joined small spheroid beads (PN74g) and wallet-shaped spacers (PN78f) reported from other sites.<sup>37</sup> Pendants are mostly of the type of floral pendants made by the modelling method B (PN98) and half-drop pendants (PN86j, 89). Other pendant is as follows:

<sup>28</sup> Cairo Museum J38713, J38675; see Edgar, *The Treasure of Tell Basta*, pls. Iii.1v.

<sup>29</sup> Cairo Museum, Cat. nos. 52670, 52672, 52673; see Vernier, *Bijoux et orfèvreries*.

<sup>30</sup> Cairo Museum, J26298.

<sup>31</sup> Cairo Museum, Cat. nos. 52674; see Davies, *Tomb of Queen Tiye*, pl. xxi.

<sup>32</sup> Cairo Museum, J41587.

<sup>33</sup> Cairo Museum, Cat. 52679, see Vernier, *Bijoux et orfèvreries*, pp. 225–226, pl. Iv.

<sup>34</sup> Petrie, *Objects of Daily Use*, p. 7, pl. v.

<sup>35</sup> Petrie, *Qurneh*, p. 9, pl. xxix.

<sup>36</sup> Beck and Stone, *Faience beads of British Bronze Age*, p. 252.

<sup>37</sup> Engelbach, *Harageh*, corpus no. 55j; Brunton, *Qau III*, pl. xxxii, 14.

cylindrical pendants (PN91), leaf-shaped pendants (PN92, PN93m) and pyramidal pendants (PN94a). For miscellaneous beads of faience, there are the following types in the U.C.: 22 pear-shaped beads (PN11), 31 conical beads (PN29–30), 4 half-barrel beads (PN39b), 8 half pear-shaped beads (PN40–43), a half-cylinder bead (PN41), 5 flattened cylindrical beads (PN31, 45f, 47b), 2 faceted barrel or spheroid beads (PN56–58), 2 segmental beads made of joined biconical ring beads (PN64), 9 button beads and 4 boat-shaped beads, both with 2 perforations perpendicular to each other (PN69). The following types of miscellaneous beads of faience have been also reported; PN4p, quoit beads or biconical ring beads with a large perforation<sup>38</sup> PN55b, faceted spheroid beads of blue frit, PN83k, leaf-shaped spacers and PN98e, 98i, floral pendants.<sup>39</sup>

Decorated beads of faience in the U.C. are as follows: floral beads (PD36) 34.1 %; melon beads (PD21) 33.5 %; milled or notched ring beads (PD15–18) 20.2 %; painted spiral beads (PD2, 4) 3.3 %; crumb beads (PD48) 2.2 %; and miscellaneous decorated beads 6.7 %; painted spiral beads are in the shape of either a barrel bead or a drop bead. Crumb beads are in the form of barrel beads of various sizes. Both these spiral beads and crumb beads were prevalent in the Middle Kingdom, but occurred only occasionally in the early XVIIIth Dynasty. Most of them in the above table came from the Early XVIIIth Dynasty debris in the XIth Dynasty temple at Deir el Bahari and the temple of Serabit at Sinai, except 3 beads from Amarna and one bead from Saft el-Henna. After this they seemed to die out entirely. As remarked by Reisner, “many dated objects and fragments of the Middle Kingdom were also found at each temple, and the inclusion of all the fragments of faience in the XVIIIth Dynasty group seems hardly to be justifiable.”<sup>40</sup> Probably part of them were deposited there in the Middle Kingdom. The floral beads are one of the characteristics of this period. They were made by the moulded method A (PN500). Miscellaneous decorated beads are as follows: 15 beads in the shape like a winged arrow head, painted with black and blue glaze and regarded by Petrie as “Seems as if made to imitate plaiting with coloured straws”<sup>41</sup> PD78m; 14 carved or modelled cylinders (8 with a single spiral pattern, PD10, one with a double spiral pattern, PD13e; one with a broken or debased spiral pattern PD62c; one with a netted pattern, PD39d; 2 with a double line around the body at each end, made of blue frit, PD55f; and one with an appearance of three spheroid beads separated by a double ring beads,

PD55b), 6 floral cone beads, PD33; 5 square-spacing beads with an opening in the centre, PD71; 4 open-work beads similar to the gold bead M64 mentioned above, PD67; 9 moulded floral pendants with a ring for suspending, PD93b; and one each of the following six types; PD6, a large hollow ball with a segmental decoration in blue and black; PD35c, a ring bead consisting of four globules joined together; PD43a, a blue spheroid bead painted with two spots; PD46d, a black biconical ring bead decorated with green crumbs; PD81b, a ribbed spacer; and PD83b, a beetle-shaped spacer. The following types have been also reported: a modelled spiral barrel bead of dark violet glaze (PD8b) was found at the temple of Serabit at Sinai and is supposed by Petrie as of the early Dynastic and having survived perhaps from Snefru’s offering,<sup>42</sup> but I think that there is no necessity to push it so early, since we know that spiral raised beads were not unknown in the Middle Kingdom.<sup>43</sup> Feather diaper beads (PD73), a term used by Beck,<sup>44</sup> have been found in the Tomb of Tutankhamen to form a part of corselet.<sup>45</sup> From Amarna, there is a spacer made of a bar with one face flat and plain and the other face ribbed, PD81b, which is regarded by the finder as “of a type which is frequently found in the tomb of the period in Greece”.<sup>46</sup> Painted cornflower pendants, PD93d, have been found at Amarna.<sup>47</sup> Several plaques notched at the edge and carved with two horizontal lines, PD27d, or carved with a criss-cross pattern, PD65f, or painted with joined triangles, PD78b, have been also found.<sup>48</sup> Technically, the moulding method, (PN500–600) was introduced for the first time in this period, as already referred to above. Actual moulds used for the manufacture of beads have been found in several site of this period,<sup>49</sup> but so far never been found in earlier period. The modelling method C, that is, modelling with a “butter pat” like tool seemed to be introduced also in this period for the making of spheroid beads, segmental beads and occasionally cylinder beads. The modelling and piercing method (P400), which was very common in the Middle Kingdom for the manufacture of spheroid beads, now became only very rarely employed. In general, the perforation was small

<sup>38</sup> From the Tomb of Tutankhamen, see Carter’s report, vol. II, pl. xxv; Temporary nos. 760, 761, and 765 in the Cairo Museum.

<sup>39</sup> Brunton, Qau III, pl. xxxii; Petrie, Tell el Amarna, pl. xx, nos. 518–520; pl. xixi, 450–451, 453.

<sup>40</sup> Reisner, Kerma IV, p. 134.

<sup>41</sup> Petrie, Researches in Sinai, p. 152, Fig. 159.

<sup>42</sup> *Ibid.*, p. 150, Fig. 155, no. 9.

<sup>43</sup> Engelbach, Harageh, corpus no. 47N.

<sup>44</sup> Beck, Classification, p. 50, Group XLVIII, A46.

<sup>45</sup> Temporary no. 515 in the Cairo Museum, see Carter’s report, vol. I, pl. xxxviii.

<sup>46</sup> Pendlebury and Frankfort, City of Akhenaton, II, p. 100, pl. xlii, 1.

<sup>47</sup> Petrie, Tell el Amarna, pl. xix, 471.

<sup>48</sup> Brunton and Engelbach, Gurob, corpus no. 41H; Brunton, Qau III, pl. xxxii, 27, 97.

<sup>49</sup> Petrie, Kahun Gurob, and Hawara, p. 37; Petrie, Tell el Amarna, pp. 28–29; Hamsa, Excavation at Qantir, in A.S. xxx (1930), p. 52 and from the Palace of Amenhetep III at Thebes, see B. M. M. A. vol. vii, p. 185.

(PN100) in the early part, but became fairly large (PN200) in the late part of this period.

As evidence of foreign intercourse, the faience bead of segmental type have been for a long time regarded as imported from Egypt into the Bronze Age Britain. Both Mackay and Mrs. Cunnington<sup>50</sup> suggest that the segmental beads may have originated in the accidental sticking together of separate small beads, but Beck and Stone think that there is no reason to believe that such beads originated through and were made by the fusion of separate small beads, but do not give their own suggestion for the origin of such beads.<sup>51</sup> I would venture to suggest that the segmental beads of faience of this period may have originated from the particular kind of technique of being shaped by means of a “butter pat” like tool. This technique was probably invented originally for producing small spheroid beads or ring beads at great speed. This suggestion gets support from the fact that the earliest known Egyptian segmental bead is made of ivory of bone,<sup>52</sup> a material which has to be grooved into segments before being cut into separate beads. On the other hand, the segmental faience beads became prevalent only after the introduction of the modelling method C for the production of the individual bead as well as the multiple (or segmental) bead. Beck’s remark that the segmental beads first occurred in the VIth Dynasty, coloured blue, green and red, and that such beads occurred throughout the First Intermediate period<sup>53</sup> is due to some mistake. The small segmental beads of the Old Kingdom illustrated in his article, described as of blue, green and red, are almost certainly of the New Empire. The remark on the First Intermediate period is not borne out by the reports of excavations of sites of that period, such as Brunton’s Qau and Badari, nor by our study of beads in various collections. Of course, when segmental beads became a favourite, other methods may have been employed for their production. Petrie states “that they were sometimes intentionally for threading to save the trouble of dealing with so many, being merely ribbed tubes; otherwise they are short bead left joined in manufacture, and not yet broken apart”.<sup>54</sup> By a spectrographic analysis, Beck and Stone come to the conclusion that “there is so great a resemblance between a Wiltshire segmental bead and one from Tell el Amarna that there can be little doubt that both were made in Egypt and are roughly of the same date”. They also notice that “one of the most striking difference between the Egyptian and

Wiltshire beads is the size of the perforation. All the English beads of the large size have very large perforation, whilst almost all the Egyptian beads have small perforation”.<sup>55</sup> Probably the Egyptian specimens they used for comparison are too early in date. Beads from the early XIXth Dynasty onwards have a perforation large than those from Amarna, as already noted.

Among beads of miscellaneous materials, black resin beads are in the shape of small ring beads (R4e, 4f) and the brown resin ones are spheroid (R6), biconical barrel-shaped (R8g) and flattened barrel-shaped (R12i). Resin beads from the Tomb of Tutankhamen are large ring beads with a rounded edge, (R2e), biconical ring beads, R5 and barrel beads R8c.<sup>56</sup> Bone and ivory beads are in the shape of cylindrical beads R33 and spacing bar R44. A great quantity of small white ring beads were found at Thebes and recorded as “bone beads” by the finders,<sup>57</sup> but from their appearance as pictured in the publication, they seem to be shell beads. Ring beads of ostrich shell R51–52 were not uncommon at the beginning of the XVIIIth Dynasty, but became very rare, if not unknown, in the later part of this period. A few shell beads are fairly large in diameter (R53b), but not so large as the wafer beads (R53d) of the Middle Kingdom. The type (R68a) is some unfinished shell beads. There are also some long disc beads of pearl shell pierced with two perforations, each near the opposite end of its diameter, R72g.<sup>58</sup> Wood beads in this period were usually covered with a thin gold foil. A few uncovered wood beads are probably not in their original state, but have their gold foil stripped off in either ancient or recent times. In the U.C., only long drop beads of wood, R80, are represented. But from other finds, it has been reported that gilt wood beads in the shape of ball beads, R79, long drop beads R80,<sup>59</sup> and conical beads R82d<sup>60</sup> have been found used for forming a ceremonial whip. Reed beads are a curious type, made of a small piece of reed bent into the desired shape, R93. They were found in the early XVIIIth Dynasty debris in the XIth Dynasty Temple at Deir el Bahari.<sup>61</sup>

Out of the 16 beads of soft stones in the U.C., 11 beads are in the shape of ring beads with a round edge (S2) or

<sup>50</sup> Mackay’s remark in Marshall, Mohenjo-daro, p. 514; Mrs. Cunnington’s opinion in her work, *An Introduction to Archaeology of Wiltshire*, p. 106.

<sup>51</sup> Beck and Stone, *Faience Beads of British Bronze Age*, p. 211.

<sup>52</sup> Brunton, *Badarian Civilization*, p. 27, Sect. 56, type 76a3.

<sup>53</sup> Beck and Stone, *Faience Beads of British Bronze Age*, p. 223.

<sup>54</sup> Petrie, *Kahun, Gurob, and Hawara*, p. 37.

<sup>55</sup> Beck and Stone, *op. cit.* p. 252, 224.

<sup>56</sup> Temporary nos, 362, 764, and 351; see Carter’s reports, vol. I, pl. xxxiv, and vol. III, pl. xix, C.

<sup>57</sup> Carter, *Five years’ explorations at Thebes*, pp. 78–81, especially nos. 31, 53, and 59 in that report.

<sup>58</sup> Naville and Hall, *The XIth Temple at Deir el Bahari*, III, p. 25, pl. xxv, 3.

<sup>59</sup> Temporary no. 404 in the Cairo Museum, see Carter’s report, vol. VI, pl. XXIA.

<sup>60</sup> Davies, *Tomb of Queen Tiye*, pl. VI, 3.

<sup>61</sup> Naville and Hall, *The XIth Dynasty Temple at Deir el Bahari* III, p. 17, 26, pl. xxvii, 6.

barrel beads (S14). But there is neither a single ring bead with a flat edge (S6), nor a single cylindrical bead which may be considered as a barrel bead with a straight edge (S18). This seems to give a support to our hypothesis that the soft stone beads of this period are probably reused old beads. Due to the softness of material, the straight edge of the bead was easily worn round by use. Other forms of soft stone beads in the U.C. are as follows: S21d, a ring bead with a roughly elliptical section, probably due to wearing; S23g, 27b, flattened barrel beads; S29f, a half-barrel bead with a V-shaped perforation; S63, a flattened drop pendant with a flat back. The identification of the last piece as a soft stone (serpentine) is doubtful, and it may turn out to be made of some paste or decayed faience. If so, it should be retyped as of the type, PN98i in the group of plastic materials. Biconical or conical ring beads, S3b and S4e, and a poppy-seed pendant, S65b, have also been reported.<sup>62</sup>

As to the use of beads of this period, it can be best illustrated by the finds from the Tomb of Tutankhamen, because that is the richest well-preserved tomb as well as the best-preserved rich tomb. Beads found in this tomb were used for simple necklaces, broad usekh collars, decoration on the strings for suspending a pectoral or other breast ornaments, ceremonial whips or “flails”, imitation animal tail, corselets, a kind of stole with fringes, ornaments on the robes, beadwork device of the skull cap, beadwork for covering sandals and for covering the surface of a hassock.<sup>63</sup> Some of these uses are observed also in other finds, for example simple necklaces from many sites,<sup>64</sup> a broad collar from Amarna, bracelets and anklets from the Tomb of Meryt-Amun, ceremonial whip (or scourge) and beads worked into cloth, both found at Deir el Bahari.<sup>65</sup> Besides those enumerated above, there are also other uses of beads, for example bead-embroidered veil or shroud from Saft el-

Hanna,<sup>66</sup> bead network pouch, fly whisk, anklets and girdle from Qurneh,<sup>67</sup> girdle and chaplets from Thebes,<sup>68</sup> strings attached to a bronze forehead ornament, and bunch of short strings with a manet ornament, both from Amarna.<sup>69</sup> Besides using the beads threaded as ordinary necklaces for votive offerings, the Egyptian also stuck broken cylindrical beads into circular cakes of mud for the same purpose.<sup>70</sup> These mud cakes are supposed by the discoverer as representing loaves of bread. If so, the real cakes of that time may have been sometimes decorated with beads too. As a foundation Deposit, beads were either threaded as those for the ordinary purpose,<sup>71</sup> or left loose, and taken out by handful from a container (probably a basket) and put there at the ceremony of the foundation.<sup>72</sup> Some of the faience beads from the foundation deposit have their perforation still filled up with the glaze got during the manufacturing process and were never threaded.

The arrangement of beads can be observed only on the strings which were preserved in their original order when discovered. Among the 401 strings of this period in the U.C., only 32 of them are either on their original strings, or rethreaded in their original order. The best illustration of the arrangement of beads in this period is also the finds from the Tomb of Tutankhamen, which have been only partly published so far. Reports of excavations of other sites also give us some information on this subject. Simple necklaces may consist entirely of one kind of beads of the same form, material and colour, for example all of blue faience disc beads,<sup>73</sup> or of the same form but of different colour, for example small round carnelian and garnet beads alternately arranged, or two blue and white beads alternated with two yellow,<sup>74</sup> or of different forms of beads and pendants, for example two carnelian poppy-petal pendants alternately with two faience pendants, each pendant separated from the next by four of the tiny faience beads of various colours<sup>75</sup> or drop beads alternated with ball beads.<sup>76</sup> A slightly more complex necklace consists of two or three strands connected

<sup>62</sup> Brunton and Engelbach, Gurob, corpus nos. 58Y, 58X, and 45L.

<sup>63</sup> All in the Cairo Museum; simple necklaces, see Temporary nos. 88, 266, 362, 760–765, 1286 (Carter’s reports, vol. I, pls. xxxiv–xxxv, vol. II, pl. IxxviiB); usekh-collar, see T.nos. 944–951, (vol. I, pl. xxxix, 6); decoration on pectoral-strings, see T.nos. 227, 231–232, 344–345, 350–351, 943 (vol. I, pl. x1; vol. II, pl. Ixxxiv; vol. III, pl. xix) bracelets, see T.no. 237, 260–264, 357, 359 (vol. II, pl. Ixxxv; vol. III, pl. xx; ear-ornaments, see T.nos. 366–367 (vol. III, pl. xviii); ceremonial whips, see T.nos. 336, 404–405 (vol. III, pl. xxiA); false tail, see T.no. 1211; corselets, see no. 515 (vol. I, pl. xxxviii); stole see T.no. 346, vol. III, pl. xxB; robe-ornaments, see T.nos. 1071–1083, vol. Ipl. xxxiv); skull cap (vol. III, pl. xxxii); sandals, see T.nos. 747, 904, 912–913 (vol. I, pls. xxxv–xxxvi) hassock, see T.no. 575 (vol. III, pl. Ixix).

<sup>64</sup> Bd. nos. 1108–1111 (from Kahun) 1508–1512 (from Badari) etc. in the U.C.

<sup>65</sup> Pendlebury and Frankfort, City of Akhenaton, II, p. 18, pl. xxxvi2; Winlock, The Tomb of Queen Meryt-Amun, p. 15, pl. xvii, B–C; Naville and Hall, The XIth Dynasty Temple at Deir el Bahari, III, pp. 25–26, pls. xxv, L, xxvii, 6.

<sup>66</sup> Petrie, Hyksos and Israelite Cities, p. 38.

<sup>67</sup> Petrie, Qurneh, pp. 8–9, pls. xxv, xxix.

<sup>68</sup> Winlock, Tomb of Queen Meryt-Amun, pp. 14–16, pl. xviiA, text Fig. 2.

<sup>69</sup> Peet and Woolley, City of Akhenaton, vol. I, p. 31, vol. II, p. 22, pl. xxxvi, 3.

<sup>70</sup> Naville and Hall, the XIth Dynasty Temple at Deir el Bahari, III, p. 17.

<sup>71</sup> E.g. Petrie, Koptos (1896), p. 14.

<sup>72</sup> Petrie, Six Temples at Thebes, p. 14, Sect. 31.

<sup>73</sup> E.g. Firth, Teti Pyramid Cemeteries, p. 83, NE91; Carter Five Years’ Explorations at Thebes, p. 80, Tomb 53.

<sup>74</sup> Petrie, Hyksos and Israelite Cities, p. 41, tomb 378; p. 44, tomb 379.

<sup>75</sup> Ibid., p. 38, tomb 246.

<sup>76</sup> Quibell, Tomb of Yuua and Tuiui, pl. xii.

by spacers, for example three strands of tiny faience beads separated by spacing bars into zones, and beads of the lowest strand mixed with Bes pendants,<sup>77</sup> or double strands of tiny beads separated by leaf-shaped or amuletic spacer.<sup>78</sup> The pendants on a necklace may be a complex one, consisting of two suspending strands, each made of three ring beads with a bell-shaped bead at end.<sup>79</sup> Ring beads of large diameter were sometimes so strung as to represent their face, not their edge.<sup>80</sup> The floral broad collar from Amarna consists of two polychrome end-pieces in the shape of lotus flower, between which were strung six rows of various floral beads, with the addition of a large number of small red and yellow ring beads used for spacing.<sup>81</sup> One of the eight floral collars found in the Tomb of Tutankhamen shows six rows of petals and flowers of various kinds.<sup>82</sup> The broad bracelets consist of several rows of beads of various kinds separated by spacers<sup>83</sup> and sometimes fastened by metal clasps.<sup>84</sup> Girdles of the Early XVIIIth Dynasty have the “wallet” or “shell” spacers of stone or metal (H98m, M96) strung at intervals on two or three strings of ring beads,<sup>85</sup> or on two strings of six slender barrel beads each, and in one case a space of seven.<sup>86</sup> Two pouches with handles, found at Qurneh, were made of small blue beads arranged into a network.<sup>87</sup> A lozenge-shaped pattern (netting) of red and

yellow beads was found at Amarna.<sup>88</sup> Another piece of patterned bead-work in tiny beads of brilliant colours was found at Deir el Bahari.<sup>89</sup> Very elaborated pattern made by a skilful arrangement of tiny beads of many colours were found in the Tomb of Tutankhamen for the decoration of sandals, skull cap and hassock. In the same tomb, beads were also sewn on robes for decoration.<sup>90</sup> A beadwork found at Qurneh is made of 16 strings of long blue beads, 8 inches long, united in a twisted thread handle and is regarded by the finder a “apparently a fly whisk”.<sup>91</sup> Sometimes strings of bronze manet plaque and beads were threaded in a number of short strands which are taken together in a bunch.<sup>92</sup>

Strings used for stringing beads are usually of linen threads,<sup>93</sup> but sometimes on plaited leather,<sup>94</sup> and in one case, the beads are united by a stout wire through them.<sup>95</sup>

As to the pictorial representation of beads in this period, there are plenty of material for a detailed study. They are painted as offerings to the gods on the wall of temples,<sup>96</sup> on the wall of tombs where both the scene of bead manufacture and the finished pieces worn by the owner of the tomb are shown,<sup>97</sup> on wooden figurines,<sup>98</sup> on statues and on mummiform coffins. As already noted above, a detailed study of the pictorial representation is beyond the scope of this essay.

<sup>77</sup> Pendlebury, City of Akhenaton, II, p. 41, pl. xxviii, 7.

<sup>78</sup> Petrie, *Researches in Sinai*, p. 152, Fig. 159, 3–4.

<sup>79</sup> Mace, *El Amrah and Abydos*, p. 89, pl. xIvi.

<sup>80</sup> Naville and Hall, *The XIth Temple at Deir el Bahari*, III, p. 17.

<sup>81</sup> Pendlebury, *City of Akhenaton*, II, p. 18, pl. xxxvi, 2.

<sup>82</sup> Temporary no. 947 in the Cairo Museum, see Carter’s report, vol. I, p. 173, pl. xxxix.

<sup>83</sup> Carter, *Tomb of Tutankhamen*, vol. II, pl. Ixxxvi.

<sup>84</sup> *Ibid.*, vol. III, pl. xx; see also Winlock, *Tomb of Meryt-Amun*, p. 15, pl. XVII, B–C.

<sup>85</sup> Winlock, *op. cit.* p. 15, pl. XVII, A; and Moellers, *Goldschmidt-tearberten*, p. 28, no. 33, pl. 8.

<sup>86</sup> Petrie, *Qurneh*, p. 9, pl. xxix.

<sup>87</sup> *Ibid.*, p. 8, pl. xxv.

<sup>88</sup> Pendlebury and Frankfort, *City of Akhenaton*, II, p. 32, U352.

<sup>89</sup> Naville and Hall, *The XIth Temple at Deir el Bahari*, III, p. 25, pl. xxv, 2.

<sup>90</sup> Carter, *Tomb of Tutankhamen*, vol. I, pl. xxxvic; vol. III, pl. xxxii; vol. III, pl. Ixix, B, and vol. I, pl. xxxiv, A and B.

<sup>91</sup> Petrie, *Qurneh*, p. 8, pl. xxv.

<sup>92</sup> Pendlebury, *City of Akhenaton*, II, p. 22, pl. xxxvi, 3.

<sup>93</sup> Naville and Hall, *The XIth Temple at Deir el Bahari*, III, p. 28; Winlock, *Tomb of Meryt-Amun*, p. 15.

<sup>94</sup> Naville and Hall, *op. cit.* vol. III, p. 17.

<sup>95</sup> Petrie, *Objects of Daily Use*, p. 17, no. 56.

<sup>96</sup> E.g. on the wall of the temple of Seti at Abydos, see Petrie’s archaeological note in A.St. G. Caulfield, *Temple of Kings at Abydos*, p. 17.

<sup>97</sup> See various publications of the wall-painting of Theban tombs, such as those by the Egyptian Exploration Society, and those by the Metropolitan Museum of Arts, New York.

<sup>98</sup> E.g., A wooden figure in the British Museum (B. M. 32749) wears a hip-band of several strands of beads, with oval or semi-circular spacers, see Hall’s article in *J. E. A.*, vol. XV(1929) p. 237, pl. x1, I.

After the new empire, Egyptian power declined. For several times, Egypt lost her independence and then recovered it again under a native rule, until she was finally conquered by the Greek. Egyptian civilization also lost its vigour. The product of arts and crafts became degenerated and poor. At the same time, there was a more intensive intercourse between various regions around the Mediterranean Sea, as evidenced by beads and other objects. So far, the archaeological study of this period is rather neglected by Egyptologists, because the finds from this period are not so ancient nor so pretty and interesting as those from the earlier periods. As will be shown below at the end of this chapter, a whole archaeological group of the Persian period has been wrongly dated to the XXIII Dynasty. A careful re-examination of the archaeological materials of this period, and also of the Ptolemaic period, is badly needed. In the following discussion, what have been given by Petrie as of “XXIIIrd Dynasty” is changed into the “XXVII–XXX Dynasty or the Persian period”. The reasons for this change will be given at the end of this chapter.

The materials used for beads of this period are as follows: glass 1.4 %, hard stones 2.0 %, glazed stones (0.01 %) metals 1.9 %, plastic materials 93.0 %, miscellaneous materials 1.4 % and soft stones 0.3 %. Beads made of faience became extremely common, because the mummy-nets of faience beads came to be prevalent in this period. A single mummy-net together with the designs done in coloured beads sometimes consists of thousands of beads. Glass, hard stones and shell beads decreased proportionally. Beads of glazed steatite remained extremely rare. Metal beads were common. About 89.3 % of metal beads from the Persian period, probably because the silver mines in Greece and in Asia Minor became available now. Beads of soft stones recovered its ground to a certain extent since it became out of favour in the Old Kingdom. About 84.3 % of them came from the XXIIInd Dynasty.

Among glass beads, the green colour was most popular, and the colours used in the New Empire were continued to be employed, which include black, blue, brown, red violet,

white and yellow. But the presence of grey glass in the New Empire is questionable as already pointed out in the last chapter. Beads of hard stones are mostly of carnelian (43.6 %) and lapis lazuli (41.0 %). Next came wood opal or brown and white quartz pebble, (3.9 %), a certain kind of green stone (2.5 %), yellow quartz pebble, (1.9 %), red jasper, (1.5 %), green felspar, (1.2 %) and amethyst, (1.0 %). Other stones are 4 each of agate, rock crystal, speckled diorite; 2 each of chalcedony, onyx; and one each of green jasper, garnet and haematite; and a certain kind of white stone. Beads of white quartz, beryl, syenite, brown silicate and black silicate have been reported.<sup>1</sup> Most of carnelian beads (91 %) and all of beads of red jasper, garnet and amethyst came from the early or middle part of the Late Period, following the tradition of the New Empire. Wood opal and yellow quartz pebble were used mostly in the XXVth Dynasty. All beads of lapis lazuli of this period are dated to the late part of this period, namely the Persian period, when these materials were brought into Egypt by the Persians in large quantities, probably mined in Afghanistan. Green feldspar, haematite, onyx, speckled diorite and a certain kind of green stone were used also only in the Persian period, and most of them were still employed in the Ptolemaic period for the manufacture of stone amulets. For metal beads, silver ones form 89.3 %, the rest being antimony (7.6 %), gold (1.9 %) and copper (1.2 %). These antimony beads are interesting. They were certainly imported from some foreign country as beads, not as metal, because their forms are foreign to Egyptian. All of them were found at Lahun, dated to the XXIIInd Dynasty. Stranger beads of iron pyrites have been reported.<sup>2</sup> Among the beads of plastic materials, 95.4 % of them are made of faience, 4.2 % of blue frit, 0.4 % of gilt yellow paste and a

<sup>1</sup> Petrie, Nebesheh and Defenneh (in Tanis II), P. 22, from Tomb 23; beryl beads are reported also from the royal tomb at Nuri in nubia, see Reisner' reported also from the royal tomb at Nuri in Nubia, see reisner's report in B. M. F. A. vol. xv, P. 32.

<sup>2</sup> Petrie, II lahun, Kahun and Gurob, p. 25.

single specimen made of brown paste or mud (Bd.no. 1132 in the U.C.). All of beads of gilt yellow paste in the U.C. came from a tomb at Lahun (Bd.no. 570). Faience beads are mostly of blue and green, including pale green, (62.7 %), but faience beads of white (11.3 %), black (11.1 %), red and pink (9.2 %) and yellow (5.5 %) are also common. Grey faience was rather rare (0.2 %), and a dirty brown bead also occurred, probably a decayed green faience (Bd.no. 1430 in the U.C.). The colour of faience beads of this period is dull and dirty, much inferior to those of the New Empire. Among miscellaneous materials, ostrich shell beads were comparatively commonest one (79.6 %), almost all of them coming from the XXII–XXVI Dynasties. Pink coral beads form 14.5 %, all dated to the Persian period. The rest 5.9 % are 17 beads of resin or amber, 2 wafer beads made of conus shell, 2 beads of black resin and 2 beads of ivory or bone. Beads of a soft resin have been reported from Thebes.<sup>3</sup> Among beads of soft stones, there are 71 beads of calcite, all dated to the XXIIInd Dynasty except one of the XXVth Dynasty; 18 beads of alabaster (13 from the XXII Dynasty, 5 from the XXIIInd), 7 of limestone (3 from the XXIIInd Dynasty, 4 from the XXV–XXVI Dynasties), 4 of steatite (one each from the XXIIInd and the XXVth Dynasty, and two from the Persian period) and two green stone beads of uncertain date. It seems that the popularity of beads of soft stones in the XXIIInd Dynasty was rather short-lived and did not last into the Persian period.

Typologically, decorated glass beads were rather common in this period. The proportion between the decorated and the plain glass beads in the U.C. is 31–100. Plain glass beads of this period were made by the wire-winding method (G600). The distribution of various forms is as follows: spheroid beads (GN1, 8, 9) 32.2 %, ring beads (GN2, 6) 20.2 %, ring beads with rounded corners (GN7) 19.0 %, biconical ring beads (GN3, 4, 12) 5.6 %, biconical large beads (GN10–11) 11.2 %, barrel beads (GN15–16) 4.1 %, cylinders (GN20–21) 3.4 % and miscellaneous beads 5.3 %. Beads with rounded corners, either of discoid or cylindrical shape (GN7, 20d, 21b) were very rare before the Roman times. All the specimens of this kind in the U.C. came from Memphis, except one ring-based and one cylinder from Saft el-Henna and Riqqeh, and all of them may be intrusive late beads. Large biconical beads (GN10–11) is a characteristic of the XXII–XXIII Dynasties. Among the 36 specimens of them in the U.C., only 2 came from the XXVth Dynasty and another 2 are vaguely dated to the XXII–XXV period. The biconical ring beads (GN3, 4, 12) are a revival of the New Empire type, all from the XXV–XXVIth Dynasties. The varieties GN3 and GN12 seem to be badly made specimens of the ordinary biconical ring

beads (GN4). Miscellaneous glass beads (GN27e, 49d) two unscripted buttons either oval or rectangular (GN44–45), three polygonal cylinders (GN60–63), two polygonal spherical beads (GN61), three segmental beads (GN74), one irregular bead (GN80) and four faceted cubic beads (GN77c). A specimen of light green glass bead similar to the last type came from Tanis and is described as “with facets cast, the mould being from a cut gem” and dated to the XXXth Dynasty.<sup>4</sup>

There are 99 decorated beads of this period in the U.C. Their distribution is as follows, grouped mainly according to the pattern of decoration: spots beads (GN12–14), 20 ring-eye beads (GD23), 15 stratified eye (GD26), 49 crowded stratified eye beads (GD27), 1 bead of stratified eyes dots (GD30), 1 flattened eye bead (GD35), 2 compound eye beads (GD38), 3 eye beads made by uncertain methods GD39 and 6 miscellaneous decorated beads. It shows clearly that eye beads were common in this period. Among miscellaneous beads, there are one each of melon beads (Gd6d), spherical onyx beads (GD61c), flattened barrel beads with a single horizontal line (GD70c), or with a zigzag pattern (GD79d), all the above form the early part of this period, probably survival from the New Empire; and one each of collared barrel bead with a feathered pattern (GD82), and ball beads with splashed pattern (GD86c), both probably from the Persian period. Both pieces of spotted beads (GD12b, 14b) are dated to the XXIIInd Dynasty. Eye beads made by means of applying rings to the core occurred occasionally in the New Empire, but not so common as in the early and middle part of this period, especially in the XXVth Dynasty. Among the 20 specimens in the U.C., 10 of them are dated to the XXVth Dynasty, 8 to the XXIIInd Dynasty and two to the XII–XXXth Dynasties. The ordinary type of stratified eye beads seems to occur throughout the whole Late Period, but the crowded stratified eye beads with seven eyes of blue spots encircled by white and brown rings (GD27) are all dated to the Persian period, perhaps with a few exceptions occurring in the XXVIth Dynasty. They have been wrongly dated to the XXIIIrd Dynasty, but this is evidently a mistake, as will be discussed at the end of this chapter. Compound eye beads have each large eye consisting of several small stratified eyes and belong to the Persian period too. Both the large bead with stratified eye and dots (GD30) and the flattened eye bead with a comma-shaped dot (GD35d) are labelled as “XXIII Dynasty” by Petrie, but are probably also of the Persian period.<sup>5</sup> Similar beads of stratified eyes and dots were found in Etruscan and Greek tombs and dated by Dillon to the sixth century

<sup>4</sup> Petrie, Tanis I, p. 30, Sect. 37.

<sup>5</sup> For the compound eye beads, see also Petrie and others, Heliopolis, p. 35, pl. xxx, 3; for the beads with a dots-and-eyes pattern, see also Petrie, Hyksos and Israelite cities, pl. XIXA.

<sup>3</sup> Quibell, Ramesseum, p. 10.



B.C.<sup>6</sup> The method of the manufacture of eye beads of the group GD39c–g has not been recorded on my register-card, but they seem to be made by the stratified method, dated probably to the Persian period. Both the types GD 19 m, spherical beads with many small knobs,<sup>7</sup> and GD37, spherical beads with horned eye,<sup>8</sup> have been recorded from this period. But the latter type (GD37) is dated probably to the Ptolemaic period.<sup>9</sup> So far, decorated glass beads made by the cut-off rod method have not been found in the Late Period. A single specimen of millefiori beads which is almost certainly made by the cut-off rod method has been published by Seligman and Beck and described as found by Bynton when excavating a large cemetery containing burials of the period XXII–XXV Dynasty.<sup>10</sup> But certainly it is a Roman bead. Mr. Brunton has kindly given me the following information concerning this bead: “He (Seligman) has evidently made a mistake, I have looked up my records, and can find no trace of the bead in question. If I gave him the bead, it may be a loose bead with no history. If it came from the XXII to XXV cemetery area (which I am almost certain it could not have done), it definitely did not come from a tomb, because if so, I should never have given it away”.<sup>11</sup>

The distribution of the types of beads of hard stones is as follows: spheroid beads of hard stones is as follows: spheroid beads (H1, 3i, 8, 9) 34.9 %; ring beads (H2, 3g, 6, 7) 5.1 %; biconical ring beads (H4, 10) 1.5 %; barrel beads (H14–16, 18–19) 4.2 %; cylinder beads (H21–22) 39.7 %; special beads 7.0 %; pebble pendants (H76e, 88) 1.9 %; and other pendants 1.9 %. Both the cylindrical and the spheroid beads were fairly common, but the ring beads and the barrel beads were comparatively rare now. All the biconical ring beads in the U.C. from the early part of this period (XXII–XXV Dynasty), a survival from the New Empire. Special beads in the U.C. are as follows: 7 polygonal spherical or barrel-shaped beads, H50, all from the XXII–XXIII period; 2 flattened barrel beads, H33, all from the XXVth Dynasty; 9 button beads with a circular, oval or rectangular face, H40–41, all from the XXVth Dynasty; one rectangular spacer, H.62b, from the XXII–XXIII period; 3 square spacers, H62d, from the Persian period; one cubic bead, H45, and one irregular bead, H60a, both made of lapis lazuli, from the Persian period; and one lot of 14 grooved latened barrel beads, H97a, from the tomb of Vizier Nekht of the

XXVIth Dynasty found at Abusir. There are also several onyx beads either in the form of barrel beads with a light band around the middle of the body,<sup>12</sup> or in the form of a discoid button with a dark spot in the centre of one face.<sup>13</sup> Three faceted beads either cubic (H58) or discoid (H52) in the U.C. (nos. 1269, 1274) are labelled as from Memphis and dated to this period; but according to their type, they seem to belong to the Roman period. As a matter of fact, these two strings of beads from Memphis consist of beads of various periods, ranging from the XXIIth Dynasty to the Roman period. As to the pendants, many pendants made of pierced pebbles without any further treatment (H88), including a few in roughly drop-shaped (H76), are all dated either definitely or probably to the XXVth Dynasty. These pebbles are mostly white quartz patched with brown colour (wood opal), a stone frequently used for beads by the Predynastic people, but these late beads can be easily distinguished from the Predynastic one by their technique of perforation. Other pendants are as follows: 5 poppy-petal pendants, H86, from the XXII–XXV period, a surviving type from the New Empire; 2 each of drop pendants (H73–74), and plumb pendants (H79), all dated to the XXII–XXV period too. There are also a spheroid pendant, H71, labelled as “XXIII Dynasty”, but more probably of the Persian period, and a thick disc pendant of uncertain date from Memphis.

Technically, stone beads of this period are inferior to those of the New Empire. The surface of some beads are only roughly finished (H1000), and some beads are naturally smoothed pebbles (M7000). The distribution of various kinds of perforation for the beads of hard stones is as follows: biconical (H100) 0.2 %; double parallel (H200) 9.8 %; conical (H300) 40.0 %; plain (H400) 2.0 %; sawn and filled (H600) 12.5 % and grooved (H800) 35.5 %; the biconical perforation which was the predominant type before the Middle Kingdom now almost entirely disappeared. The single specimen in the above table came from Memphis and is probably a reused old bead. The double parallel and the plain perforation, which were very common in the Middle Kingdom became also rather uncommon now, and most (about 93 %) of them belong to the early part of this period (the XXI–XXV Dynasties). The conical perforation which became prevalent in the New Empire still retained its predominant position, but steadily declined in its popularity. Its distribution according to periods is 75 % for the XXII–XXIII period, 18.6 % for the XXVth Dynasty, and only 6.4 % for the Persian period. On the other hand, the grooved perforation became prevalent for the first time in the late part of this period. It first appeared in the XXVth

<sup>6</sup> Dillon, *Glass*, p. 187, pl. xv, 1.

<sup>7</sup> Petrie, *Hyksos and Israelite Cities*, pl. xixc.

<sup>8</sup> Petrie and others, *Heliopolis*, p. 35, pl. xxx, 3; Brunton, *Qau III*, pl. xliii, 16.

<sup>9</sup> Eisen, *Eye-beads*, p. 17; and Beck's Report in Brunton, *Qau II*, p. 25.

<sup>10</sup> Beck and Seligman, *Far Eastern Glass*, p. 15, pl. iii, 6.

<sup>11</sup> Private Correspondence, 13 Feb., 1942.

<sup>12</sup> *Museum Journal of University of Pennsylvania*, vol. viii, Fig. 89, pp. 228–229.

<sup>13</sup> Petrie, *Memphis 1*, p. 12, pl. xxvi, 12; and Petrie *Hyksos and Israelite Cities*, p. 19, pl. xxA.

Dynasty, but 95 % of them are dated to the Persian period. All the specimens with their perforation made by the sawn and filled method were made of lapis lazuli, and all dated to the Persian period.<sup>14</sup> Beads of hard stones of the Persian period have 93 % either with a grooved perforation (67.9 %) or a sawn and filled perforation (25.1 %), and 5 % with a conical perforation. The remaining 2 % consist of several beads with either a double parallel or a plain perforation, and a single specimen with a biconical perforation, the last being probably a reused old bead, as suggested above.

There are four glazed steatite beads of this period in the U.C. all from the early part of this period (XXII–XXVth Dynasties). Three of them are spherical beads (L6, L8 m, and L11c), and one of the polygonal barrel shapes (L34). The last one is a form very popular in the XXII–XXIII period and agrees with its date. But the other three beads may be old beads reused.

As to the typology of metal beads, gold beads in the U.C. are as follows: 6 ring beads (M3e) dated to the XXIIInd Dynasty, 2 barrel beads (M8 h) and 3 hexagonal barrel beads (M17b) dated vaguely to the XXII–XXIII period and agrees with its date. But the other three beads may be old beads in the U.C. are as follows: 6 ring beads (M3e) dated to the XXIIInd Dynasty, 2 barrel beads (M8 h) and 3 hexagonal barrel beads (M17b) dated vaguely to the XXII–XXX Dynasties. Gold beads in the shape of ball beads (M5, 7) and cylinder beads (M12H) are also known, the former made by rolling a thin sheet of gold into a cube soldering down the joint and burnishing in the end over a globular core of soft paste.<sup>15</sup> Copper beads in the U.C. are as follows: 5 ring beads (M2–3), one ball beads (M5d), and 2 granulated ring beads (M68h) and the last type dated to about 350 B.C. For antimony beads, there are 20 plain spheroid beads (M5b), 5 spheroid beads with three short raised ridges on both sides (M58) and 19 button beads with a raised dot in the centre of one face (M78). All of these antimony beads were found at Lahun dated to the XXIIInd Dynasty.<sup>16</sup> They were made by the casting method (M700), as shown by the seam around the body of the beads. The material, form (except the plain ball beads), and technique are all foreign to Egypt of this period, and they are certainly imported beads from some foreign country. Most of the silver beads of this period in the U. C. are definitely dated to the late part of the Persian period by the associated coins, and probably, all of them came from this late when the Greek silver mines became available. Their distribution

according to the types is as follows: ring beads (M2) 0.4 %, barrel beads (M9m) 0.2 %, cylinder beads (M2) 29.5 %, hexagonal spherical beads (M16) 54.1 %, axe-shaped pendants (M46, 49) 4.5 %, open-work beads (M64c) 1.4 %, granulated beads (M68–70, 72) 8.1 %, beads with a criss-cross pattern (M74) 1.0 % and incised plaques (M82) 0.8 %. Ring beads were made of a large and thick disc. Cylinder beads were made by rolling up a small sheet of metal until the ends butted together (M300). Both the hexagonal beads and the axe-shaped pendants were made of a solid piece of metal. Open-work beads are spherical beads formed of two polar circles of silver wire, the two groups joining round the equator. This kind of beads open-work made of metal or faience are known in the New Empire. Silver granules were joined together to make ring beads (M68) or cylinder beads (M69). On some beads, a decorative pattern was formed by a skilful arrangement of the granules of various sizes (M70), or by fixing the granules of the same size in the desired pattern on a core of the same metal (M72). The last one is in the shape of flattened bead and is a Persian type.<sup>17</sup> Granulated ring beads were sometimes used for capping the ends of a chalcedony barrel bead.<sup>18</sup> Cylinder beads incised with a criss-cross pattern in imitation of the granules (M74) are probably a degrade type of the granulated bead. Some small rectangular plaques used as beads are incised with a St. Andrew's cross and one dot each in the four void spaces between the arms of the cross.

Among beads of plastic material, the bead of brown paste or mud is in the form of a small spherical bead (PN1b) and the beads of gilt yellow paste are either ring beads (PN6) or slender cylinders (PN22h), both used for making a mummy-net. With a few exceptions, the blue frit beads are also mostly in the form of ring beads (PN6), cylinder beads (PN22–23), and spacing ring beads (PN72b, 77a) used also for mummy-nets. There are few beads of blue frit in the following forms: several segmenta beads (PN63a), one or two examples of ball beads (PN8b), barrel beads with a square section (PN51), pentagonal spherical beads (PN55c), and hexagonal barrel beads (PN59). Faience was still the most popular material used for beads in this period. The distribution of various types of faience beads is as follows: ring beads (PN2–3, 6–7) 70.6 %, spheroid beads (PN1, 8–9) 2.1 %, barrel beads (PN16–18) 0.6 %, cylinder beads (PN22–23) 21.2 %, segmental beads (PN62–63) 3.9 %, spacers (PN72–83) 0.7 % and miscellaneous beads 0.9 %. This shows that due to the prevalence of the mummy-net which requires a great quantity of cylinder beads, there was a conspicuous increase of cylinder beads at expense of other

<sup>14</sup> Petrie, *Nebesheh and Defenneh*, (in *Tanis II*), p. 24, Sect. 23.

<sup>15</sup> Petrie, *Objects of Daily Use*, p. 2, no. 1; and Mace, *El Amrah and Abydos*, p. 91, pl. lli.

<sup>16</sup> Petrie, *II Lahun*, p. 25, pl. xxix, no. 56; *Proc of Soc. of Bibl. Arch.* vol. xiv, (1891–1892), p. 227.

<sup>17</sup> Petrie, *Objects of Daily Use*, p. 2, Sect. 5, no. 3.

<sup>18</sup> *Mus. J. of University of Pennsylvania*, xviii, pp. 228–230, Fig. 89.

forms. Even the ring bead shows a slight decrease in comparison with the cylinder beads, although it was still extremely numerous for the use of patterned beadwork. Besides the common spacing ring beads of the type PN72b, there is a special kind of spacers (PN77) made by providing two holes for a single piece of beads, not by the jointing of two ring beads. This special spacer is a characteristic of this period and perhaps of the Ptolemaic period too. Among miscellaneous beads of faience in the U.C., there are 31 short cone beads (PN12–13), which were used for the ceremonial whip; 66 floral cone beads (PN70) which were strung as pendants; and 30 long cone beads (PN24), some of them probably a degraded type of the floral cone beads. The floral cone beads are a characteristic of the XXII–XXIII Dynasties, although a more naturalistic type of them has occurred in the New Empire. Other miscellaneous beads are as follows: 27 biconical beads (PN4–5) dated to the XXII–XXVth Dynasties, some of them probably a survival of the New Empire beads; 21 pear-shaped or drop-shaped beads (PN11, 21); 6 concave biconical beads (PN15c); 3 concave short cylinders (PN14c); and 16 cylinder beads with an oval section (PN31); both of the above two types probably being misshaped ordinary cylinders; 5 flattened cylinders with a lenticular section (PN36); and one with a rectangular section (PN44); 8 egg-shaped beads (PN25), probably misshapen ball beads; 3 flattened beads with the profile in barrel-shaped, pear-shaped, or circular form (PN29–30, 34); one oval bead with both sides flat (PN45h); 4 pentagonal spherical or barrel-shaped beads (PN55–56) and 17 hexagonal spherical or barrel-shaped beads (PN58–59), both dated to the XXII–XXIIIth Dynasties, and being characteristic types of this period; 9 cylinder beads with a neck at each end (PN61) found together at Bernesht, dated to the XXVIth Dynasty, or later, and one flattened segmental bead consisting of two spheroid beads (PN65d). The true pendants are rather rare in this period, if we exclude those specimens which are really beads but stung as pendants. We find the following examples of true pendants in the U.C. all dated to the early part of this period (XXII–XXVth Dynasties): one drop pendant (PN87b), 2 floral cone pendants (PN94c), one poppy-petal pendant (PN98d), and 3 pendants in the shape of a pilgrim bottle (PN98g).

As to decollated faience beads, both the painted spiral cylinders (PD4e) and crumb beads (PD48h) were found in the Tomb E256 at El. Arabah, dated to the XXVth Dynasty. They are old types which ceased to be used after the early XVIIIth Dynasty. Either there is some mistake on the dating of that tomb, or these specimens are reused ancient beads. The distribution of other types is as follows: ring beads with notched edges (PD15–18) 66.2 %, melon beads (PD21) 9.8 %, floral conical or discoid beads (PD33, 36) 7.7 %, beads with a criss-cross pattern (PD39–40, 91) 10.4 %, beads with painted dots (PD41, 43) 4.7 %, beads with dots

and circles (PD42, 53d) 0.6 % and miscellaneous beads (PD30f, 60d,) 0.6 %. All the notched ring beads and most of the melon beads are dated to the XXII–XXV period. One melon bead made of blue frit is from Naucratis, dated to the XXVI–XXXth Dynasties, and 5 melon beads of the faience may be dated to the Persian period. Floral conical and discoid beads are all dated to the XXIIth Dynasty. All of them except the type PD33d have occurred in the New Empire. Among the beads with a criss-cross pattern, the barrel-shaped ones (PD40) are earlier than either the cylindrical beads (PD39) or the drop pendants (PD91). The former are dated to the XXIInd Dynasty, whereas the latter two are dated to the Persian period. Several spheroid or barrel-shaped beads painted with dots (PD43) and one large ball bead carved with circles and dots (PD53d) are dated to the XXIInd Dynasty, while the button beads either painted with a dot in the centre of one face (PD41) or carved with five circles and dots on one face (PD42) are dated to the Persian period. There are in the U.C., also one gadrooned barrel bead painted with three bands around the body (PD30f), coming from Abydos, dated probably to the XXII–XXV period, and one flattened barrel bead with a horizontal groove on each side (PD60d), coming from Memphis. A basket pendant PD98 has been reported from Lahun.<sup>19</sup>

Among beads of miscellaneous materials, shell beads are most numerous. Due to the nature of material and the method of smoothing the edge, almost all of beads of ostrich shell are in the shape of ring beads with a flat edge, R52, only a few exceptional specimens with a flat edge, R51. They are all dated to the XXII–XXV period. On the other hand, all the coral beads are dated to the Persian period. Their forms are as follows: one thick ring bead (R51h), 45 ball beads (R55), including 13 beads with flat ends (R56), two cylindrical beads, either with a round section (R56), or with a rectangular section (R60), and 14 flattened barrel beads with a rectangular section (R64i). A necklace of coral beads, well formed and drilled with a small hole was found at Naucratis.<sup>20</sup> There are in the U.C., also 4 large wafer beads, R53, made of the top part of a large conus shell, dated to the XXVth Dynasty. Bone and ivory beads are rare. There are the following types in the U.C.: R32i, a small barrel beads, made of ivory, and R36b, a cylinder bead still retaining the original triangular section of bone, both dated to the XXII–XXV period. As to the amber bead, there are 11 flattened barrel beads with an oval section (R12c–e), another one with a rectangular section (R16 m), one each of the half barrel bead (R13) and of the half cylindrical bead (R14), and two irregular beads (R20). All of these amber beads are dated to the XXII–XXV period

<sup>19</sup> Brunton, LahunII, pl. I xii, corpus no. 46T.

<sup>20</sup> Petrie, Naucratis, p. 40, Sect. 45, dated to about 5th century B.C.

except the irregular beads which can be dated only vaguely to the XXII–XXX period, perhaps even later. Irregular amber beads were very common in the Roman times. There are in the Roman times. There are two decorated beads made of black resin, found in Memphis. They are in the form of a thick and large ring bead, incised with one row of short parallel lines near each end, R23b.

Beads of soft stones became popular against in the XXII–XXIII Dynasties. About 87.3 % of the beads of soft stones of the Late Period in the U.C. came from these two Dynasties. Among them, there are 31 hexagonal barrel beads, S38, 24 spheroid beads either hexagonal, S37, or pentagonal, S36. All of them are made of calcite, except a single exception made of buff steatite. These calcite polygonal beads are characteristic of this XXII–XXIII period. There are also 14 ball beads, mostly of calcite (37c), 2 cubic beads, also of calcite (S33), 17 barrel beads, mostly of Egyptian alabaster (S14–15), and one axe pendant of white limestone (S62b), all dated to the XXII–XXIII period: 2 limestone ring beads definitely dated to XXVIth Dynasty by the associated name Scarab (S2k), 3 barrel beads with either a rounded (S13), or an oval section (S23e), one cubic bead (S33), 4 drop pendants of Egyptian alabaster (S52, S55), and one hexagonal barrel bead, probably a survival from the XXII–XXIII period (S38). There are only two beads of soft stones which can be attributed to the Persian period: one cylindrical bead (S18j) and one drop pendant (S52b), both made of steatite.

The common use of beads as necklaces, waistbands or girdles,<sup>21</sup> bracelets,<sup>22</sup> anklets<sup>23</sup> and bead-fringes<sup>24</sup> was continued in this period. The mummy-net made of beadwork, which occurred occasionally as early as the Old Kingdom, now became extremely prevalent and is one of the characteristics for the dynasties immediately following the New Empire.<sup>25</sup> Eye beads were used on bronze earrings and are dated by the finder to the XXIIIrd Dynasty,<sup>26</sup> but more probably of the Persian period.

The arrangement of beads partly depends upon their use. At Qau and Badari, only a small number of necklaces are composed of a single type of beads, but most of them consist of odds and ends in great variety.<sup>27</sup> A necklace from the royal tomb of Sheshenq at Tanis consisted of alternating

lapis lazuli and gold, with two hexagonal beads of calcite and one cylinder bead of lapis lazuli.<sup>28</sup> Another necklace from er-Ratabeh is made of a long string of graded large biconical glass beads.<sup>29</sup> The bead of fringe from Abydos consists of a broad belt made of ring beads, and a network of cylindrical beads and ring beads hanging from the belt.<sup>30</sup>

The mummy-net consists of a diagonal network of short cylinders, usually with the ordinary or spacing ring beads serving to join the meshes. On to these networks were stitched the beadwork in the designs of winged scarabs, four genii and other mythological devices (such as ungainly face) worked in ring beads of various colours, the ring beads being used in pairs.<sup>31</sup> The beadwork pattern is sometimes in a rosette design.<sup>32</sup> A diagonal network from Abydos has 20 squares wide at the top and 10 below, the colour being alternately five squares of green and one of blue in stripes across the body. Another example has the vertical stripes across the body. Another example has the vertical stripes of black and green body. Another example has the vertical stripes of black and green alternately with yellow ball beads at the junction.<sup>33</sup> The net-work of beads on a wooden coffin found in the royal tomb of Sheshenq at Tanis are arranged in two horizontal rows of blue faience cylinders alternating with one row of gold.<sup>34</sup>

As already referred to above, there is one whole archaeological group which is dated by Petrie and his followers as of the XXIIIrd Dynasty (eighth century, B.C.), but really should be dated to the Persian period (fifth century, B.C.), one of the characteristics of this group is the stratified eye beads of glass with the eyes in two rows. It includes two varieties: GD27d, glass beads have the stratified eyes consisting of blue spots encircled in white and brown rings, usually have three eyes at one pole and four minor ones at the opposite end, and the eyes at the opposite end and the eyes cover the whole surface with little or none of the matrix shown; and GD27b, glass beads have a body or matrix in yellow, blue or green colour inlaid with two rows of stratified eyes. This type, especially the variety GD27d was at first considered as “probably of the XXVI–XXXth dynasties” by Petrie,<sup>35</sup> but later on Petrie regards it as of

<sup>21</sup> E.g. Brunton, *Some Notes on the Burial of Shashanq*, in A.S. vol. xxxix, p. 544.

<sup>22</sup> Petrie, *Nebesheh and Defenneh*, (in *Tanis II*) p. 22, from tomb 23, and Schaefer, *Priestgraeber*, p. 114.

<sup>23</sup> E.g. Bd.no. 1025 in the U.C.

<sup>24</sup> Petrie, *Abydos I*, p. 40, pl. Ixxix, 8.

<sup>25</sup> Garstang, *Burial Customs*, p. 203.

<sup>26</sup> Petrie, *Meydum and Memphis III*, p. 27, pl. xxviii, 137.

<sup>27</sup> Brunton, *Qau III*, p. 23.

<sup>28</sup> Brunton, *Some Notes on the Burial of Shashanq*, in A.S. xxxix, p. 1/2 544.

<sup>29</sup> Petrie, *Hyksos*, p. 32, pl. xxxiii, 62.

<sup>30</sup> Petrie, *Abydos I*, p. 40, pl. Ixxix, 8.

<sup>31</sup> Garatang, *Burial Customs*, p. 205, Fig. 217; Petrie and Others, *Heliopolis*, pp. 33–34, 36, pl. xxxii, 4; Illahun, pp. 25–26; Quibell, *Ramseeum*, p. 12; Peet, *Cemeteries of Abydos II*, p. 90.

<sup>32</sup> Garstang, *El Arabah*, p. 15; Garstang, *Burial Custom*, p. 203.

<sup>33</sup> Petrie, *Abydos I*, pp. 35–36.

<sup>34</sup> Brunton, *Some Notes on the Burial of Shashanq*, p. 544.

<sup>35</sup> Petrie, *Kahun*, p. 37.

“the XXII Dynasties”,<sup>36</sup> or “XXIII”,<sup>37</sup> or even definitely as “XXIII Dynasties”,<sup>38</sup> or “eighth century, B.C.”.<sup>39</sup> Allen, Beck and Wainwright follow Petrie’s dating and assign it to the XX–XXIII, the XXIII Dynasty, or the XXIII–XXV Dynasties, respectively.<sup>40</sup> But the appearance of this kind of beads is not limited to Egypt. In Italy, both varieties were often found in the tombs of the fifth century B.C., but none of the variety GD27d, and very few, if any, of the variety GD27d was found before that date, according to the research of Eisen. So Eisen rightly suggests that Petrie dated his beads too early and the Italian beads are dated too late. Otherwise, we could not account for their absence in Italian tombs of the XXII–XXVth centuries, B.C.<sup>41</sup> It seems to me that Petrie’s dating is certainly too early.<sup>42</sup> None of this kind of beads was found large cemetery at Matmar, which contains 700 or more tombs un plundered, and is definitely dated to the XXII–XXV period.<sup>43</sup> Besides this negative evidence, there are positive proofs to indicate that this kind of beads should be dated to the fifth century tombs B.C. in Italy referred to by Eisen, the cemeteries of the Persian period both in north Syria<sup>44</sup> and in Palestine<sup>45</sup> produced this kind of beads. Beads similar to the type GD27b have been found in Europe in the tombs of the fifth–fourth century B.C.<sup>46</sup> They were found also at Malta, dated by Murray from Egyptian analogy to the XXV–XXVI Dynasties,<sup>47</sup> perhaps a little too early. Moreover, this kind of eye beads is not an isolated find, but always forms an archaeological group with other objects in the cemetery. The so-called

XXIII Dynasty cemetery at Yehudiyeh produced also the following characteristic objects besides the stratified eye beads in question: pendants of human and ram’s heads made of colour glass; small bronze bell; small amulets of gods such as Bes and Ptah) and dad-pillar, uzat-eyes either painted or carved<sup>48</sup> and also bronze fibulae.<sup>49</sup> All of them occurred in the north Syrian cemetery of the Persian period,<sup>50</sup> and most of them (except the animated glass pendants and bronze bell) in the Palestinian cemetery of the Persian period<sup>51</sup>. Most of them were found also in the layer CD (Level 197–192) at Gerar.<sup>52</sup>

The layer CD (Level 197–192) at Gerar is dated by Petrie to the eighth century B.C., and the problem of its date will be briefly discussed here, because Petrie’s dating for it is again too early and it should be dated to the fifth century B.C. (the Persian period). Besides the objects which were found also in the cemeteries of the Persian period both in Palestine and north Syria, this layer also produced some pottery which are like a silver bowl in the British Museum and known in bronze vessels of the Persian period in Egypt.<sup>53</sup> Therefore, the whole group from this layer CD seems to be of the Persian period. The next layer below is the layer EF (Level 192–189) which is dated by Petrie to the XXIIInd Dynasty and is called “the floor of shashanq” (about 930 B.C.) Again this dating is too early. This layer is evidently of the XXVIth Dynasty, that is the period of the Scythian invasion of Syria (624–596 B.C.) as proved by the presence of the triangular bronze arrowheads.<sup>54</sup> This weapon has been found in the cemeteries of the Persian period in north Syria and Palestine referred to above.<sup>55</sup> It is never found in Egypt till after the Scythian invasion of Syria.<sup>56</sup> It is extremely improbable that this weapon should have been plentiful in south Palestine three hundred years earlier than in Egypt. In the same layer (Level 192–189) or the layer just below (Level 189–183), there were found a series of bowls which is the same as those of the seventh

<sup>36</sup> Petrie, *Illahun*, p. 26, pl. xxix, 52–53; also in British Museum, *How to observe in Archaeology* (2nd ed. 1929), p. 90.

<sup>37</sup> Petrie, *Hyksos*, pp. 17–18, pl. xix.

<sup>38</sup> Petrie, *Meydum and Memphis III*, p. 37, pl. xxviii, 135, 137.

<sup>39</sup> Petrie, *Gerar*, p. 24, pl. xxii, 194, 196.

<sup>40</sup> Allen, *A Handbook of the Egyptian Collection*, p. 117; Beck’s *Classification*, p. 64, Fig. 62; Petrie and Wainwright, *Heliopolis*, p. 35, pl. xxx, 3.

<sup>41</sup> Eisen, *Characteristics of Eye Beads*, pp. 14–16.

<sup>42</sup> Eisen’s statement (op. cit. p. 15) that Petrie puts the stratified eye-bead under the heading of the XIX Dynasty (Petrie *Meydum and Memphis III*, pl. xxviii, 135) is certainly a mistake on Eisen’s part. Although the heading of that plate is written as “pottery XIX Dynasty to Ptolemaic”, the bead in question is clearly stated as dated to the XXIII Dynasty on p. 37.

<sup>43</sup> Kindly communicated by Mr. Brunton.

<sup>44</sup> Woolley, *A North Syrian Cemetery of the Persian Period*, pp. 115–129, pl. xxix, Figs. 13, 16; the cemetery dated by the Greek vases and coins to 600–300 B.C., centring upon the fifth century B.C. see p. 127.

<sup>45</sup> Johns, *Excavations at Atlit*, p. 52, pl. xxv, 642, and pl. xxvi, 662 the cemetery dated to the latter half of the Persian period and the early part of Hellenistic, according to the evidence of coins, see p. 44.

<sup>46</sup> Dechelette, *Manuel d’Archeologie*, III, pp. 358–359, Fig. 364; IV, pp. 820–824, Figs. 573–574.

<sup>47</sup> M.A. Murray, *Egyptian Objects found in Malta*, in A. E. 1928, p. 51, Fig. 5.

<sup>48</sup> Petrie, *Hyksos*, pp. 17–18, pl. xviii–xix.

<sup>49</sup> *Ibid.*, pl. xxA.

<sup>50</sup> Woolley, op. cit. p. 126, pl. xxix, 1 and 2 (animated glass pendants) pl. xxii, 194, 196 (stratified eye beads) pl. xxix, 179 amulets); pl. xxix, 13, 16 (uzat-eyes); and pl. xxiii, (fibulae).

<sup>51</sup> Johns, op. cit. p. 82, no. 664, pl. xxvi, (uzat-eye) pp. 48–49 (small amulets of gods); and Fig. 13 (fibulae).

<sup>52</sup> Petrie, *Gerar*, p. 24, pl. ixvi, 1–3 (animated glass pendants); pl. xxii, 194, 196, (stratified eye beads). This report is not available to me at this moment, but as far as I can remember, bronze fibulae, uzat-eyes, and small amulets of gods seem to have occurred in this layer too.

<sup>53</sup> *Ibid.*, p. 24, pl. Ixv, 1–3.

<sup>54</sup> *Ibid.*, p. 34, pl. xxix, 13–22.

<sup>55</sup> Woolley, op. cit. p. 121; pl. xxii, 28; and Johns, op. cit. p. 56, Fig. 14.

<sup>56</sup> Petrie, *Tools and Weapons*, p. 34, pl. xli, 76.

century B.C. at Naucratis,<sup>57</sup> and a lot of Scythian objects, such as the pottery model of the square wagons, and of humped oxen, and the broad bladed form of iron daggers,<sup>58</sup> besides the triangular bronze arrowheads. Petrie's dating of this layer EF is mainly upon the amulet of the aegis of Bast which he regards as a characteristic of the XXII<sup>nd</sup> Dynasty.<sup>59</sup> But this kind of amulets occurred throughout the XXII–XXVI period,<sup>60</sup> and in consideration of the presence of Scythian objects, we should date it to the lower margin of the time range, namely about the XXVI<sup>th</sup> Dynasty. In the layer F (Level 189–183) which contained the Naucratis pottery of the seventh century B.C. referred to above, there was found also a jar handle with Hebrew stamp,<sup>61</sup> which occurred for the first time in the Jewish period, 600–300 B.C.,<sup>62</sup> and also several iron furnaces<sup>63</sup> besides many iron tools and weapons. The earliest iron furnace found in Egypt is discovered at Naucratis, dated to the sixth century B.C.<sup>64</sup> But according to Petrie's scheme, both the jar handle with Hebrew stamp and the iron furnaces have to be dated to 1100 B.C. or earlier, and he actually did date them so. It seems to me almost certain that they should be dated to the XXVI<sup>th</sup> Dynasty, namely about the seventh century B.C., or a little earlier but not much. Independently, Lucas comes to the same conclusion that Petrie's higher dating for Gerar finds is too early in consideration of the plenty of iron in this layer.<sup>65</sup> This higher dating is so contradictory to the known archaeological, and documentary evidences that Petrie has to postulate a "Shashanq Migration" theory to account for these Scythian objects which occurred in his "XXII<sup>nd</sup> Dynasty" layer. Shashanq the founder of that Dynasty is a "man of Susa". It is he and his followers, not the Scythians who brought these objects of the central Asiatic types to Gerar in Palestine during their migration into Egypt.<sup>66</sup> This is a revival of his old heresy of the Assyrian origin of the XXII<sup>nd</sup> Dynasty,<sup>67</sup> which has been refuted by Breasted, because Shashanq is certainly of Lybian origin, as proved by the Stelae of Harpeson.<sup>68</sup> The logical solution of this

problem is to bring down the supposed "XXII Dynasty" layer to the XXVI<sup>th</sup> Dynasty, and the supposed "XXIII Dynasty" layer or the eighth century B.C. layer to the Persian period.

After this Palestinian excursion, we may return to the Egyptian side, and see what will be the result after this alteration of date. The important cemeteries of the Late Period found at Yehudiyeh are dated by Petrie to the XXIII–XXV Dynasties. His chief argument seems to be that they are certainly later than the XXII<sup>nd</sup> Dynasty, and the whole of the small amulets and eye beads disappeared earlier than the XXVI<sup>th</sup> the Dynasty.<sup>69</sup> The first part of his argument is quite correct. But the *uzat*-eyes and other small amulets were certainly used in the Persian period the fall of the

XXVI<sup>th</sup> Dynasty and some of them found in Palestine and north Syria are well dated by the associated coins, as already referred to above. From Yehudiyeh come one of the smooth well-made *uzat*-eye with black brows, which is associated with a scarab of Psamtic and is therefore of the XXVI<sup>th</sup> Dynasty or later (Bd no. 1240 in the U.C.), but it would be dated to the earliest phase of the "XXII Dynasty" group according the Petrie's scheme. Also in the U.C. (1400), a compound eye bead and a bronze bell, which will be dated by Petrie to the XXIII<sup>rd</sup> Dynasty are associated with a copper coin, which, although too corroded to be definitely identified, is certainly of the Persian or Ptolemaic period. They are labelled with a tomb-number "236" only, but judging by the label they came from either Saft el Hanna or Yehudiyeh. I suspect that the "XXIII Dynasty" group is so placed by Petrie due to the reason that there are only two possible dates for them, namely either the XXIII–XXV period or the Persian period, and Petrie prefers the first alternative. But the XXV Dynasty beads have a different style, as proved by those associated with the scarabs of royal names of the dynasty as well as by Reisner's excavations of the royal tombs in Nubia. So this group is limited to the XXIII–XXV period if we follow Petrie's scheme. But according to the historical evidences, the XXIII<sup>rd</sup> Dynasty lasted less than a century, perhaps only about 50 years or less, and the XXIV Dynasty only six years. It is too short a span of time for the rise, development and disappearance of a style as outlined by Petrie.<sup>70</sup> Another cause of Petrie's higher dating is his assumption that the small amulets of semi-precious stones, such as those found in the tomb of Uza-hor (or Hor-uta) at Hawara are dated to the XXVI<sup>th</sup> Dynasty. But they really belong to the XXX<sup>th</sup> Dynasty or the early Ptolemaic period.<sup>71</sup> Petrie gave the date of the

<sup>57</sup> Petrie, Gerar, p. 21, corpus nos. 7c, 7m.

<sup>58</sup> Petrie, Gerar, and also quoted in Petrie's article in A. E. 1928, pp. 101, 104.

<sup>59</sup> Petrie, Gerar, p. 4, pl. xxi.

<sup>60</sup> Petrie, Amulets, p. 42, Fig. 195.

<sup>61</sup> Petrie, Gerar, p. 19, pl. xliii.

<sup>62</sup> British Museum, How to Observe in Archaeology, (2nd p. 87. ed. 1929).

<sup>63</sup> Petrie, Gerar, p. 14.

<sup>64</sup> Petrie, Naucratis, p. 39.

<sup>65</sup> Lucas, Ancient Egyptian Materials & Industries, p. 406, footnote.

<sup>66</sup> Petrie, The Shashanq Migration, in A.E., 1928, pp. 101–104.

<sup>67</sup> Petrie's article in proc. of the Soc. Of Bibl. Arch. vol. xxvi, p. 284.

<sup>68</sup> Breasted, Ancient Records of Egypt, vol. IV, pp. 393–399, and the note on page 399.

<sup>69</sup> Petrie, Hyksos, pp. 17–18.

<sup>70</sup> Ibid.

<sup>71</sup> E.g. the well-dated specimens published in Mond and Myers, The Bucheum.

tomb of Uza-hor correctly as of the XXXth Dynasty in his early report,<sup>72</sup> but unfortunately, he alternated it to the XXVIth Dynasty in his later report and other works.<sup>73</sup>

After having pushed back the materials of the XXX Dynasty to the XXVI Dynasty, he has to squeeze those of the Persian period into the obscure and short-lived XXIII Dynasty. It seems to me that there is no doubt that the supposedly “XXIII Dynasty” cemeteries at Yehudiyeh belong to the Persian period.

The same case happened at Meydum and Kafr Ammar. From one burial at Meydum, some stratified eye beads were found together with uzat-eye amulets, and one of the stratified eye beads on a bronze ear ring. They are accordingly dated by Petrie to the XXIIIrd Dynasty.<sup>74</sup> But a similar stratified eye bead also on an ear ring was found at Palestine, but here, they are definitely dated to the fifth-fourth century B.C. by the associated coin.<sup>75</sup> Undoubtedly, those found at Meydum should be so dated too. A cemetery at Kafr is dated by the finder to the XXIII–XXV Dynasties because of the presence of eye amulets and beadwork mummy-nets.<sup>76</sup> But the occurrence of this type of *uzat*-eye amulets in the well-dated cemeteries of the Persian period in Palestine and north Syria has been referred to above, and it is almost certain that they occurred in Egypt at that period too. The beadwork mummy-nets were found abundantly as early as the XXIInd Dynasty, and they lasted into the Ptolemaic period as shown by the finds at Denderah<sup>77</sup> and at Armant.<sup>78</sup> We may assume with reasonable certainty that they should occur in the Persian period too. A tomb group from the grave 69 at Kafr has a compound bead, a horned eye bead and some small eye beads with blue spots outlined in circles of white and brown.<sup>79</sup> They are dated by Wainwright to the XXIII Dynasty according to Petrie’s scheme. The structure of the eye beads is not recorded in the report; therefore, it is not certain whether they were made by the stratified method or the cut-off rod method. As referred to above, a stratified compound eye bead in the U.C. is associated with a bronze bell and a coin of the Persian or Ptolemaic period, and the bead itself can be dated to the fifth century B.C.<sup>80</sup> But the compound eye beads

made by the cut-off rod method are dated to the end of the Ptolemaic or the early Roman period.<sup>81</sup> The eye beads of blue spots outlined in circles of brown and white have two distinct types: a stratified type belongs to the fifth century B.C., as discussed above, and a cut-off rod method belongs to the Roman period.<sup>82</sup> From the picture given in the report, these small eye beads seem to be of the latter type. The upper limit of the time range of this cemetery at Kafr Ammar may reach the Persian period, but most of the tombs seem to be of the Ptolemaic and early Roman period, as shown by beads and other evidences. For example, there are two types of tombs in this cemetery: one is shaft-grave about 10 ft. deep with wooden box-coffins which have a pent proof and four corner-posts, and another type is the deep and large shaft-grave of a great depth, and the mummies in it had no coffins, but together with their bandages were all one black pitchlike mass of resin.<sup>83</sup> The tomb type, coffin type and the method of mummification are evidently of the Ptolemaic period,<sup>84</sup> perhaps a little earlier or later, but not of the XXIII Dynasty. The pottery type such as the handled pitchers of a greenish-grey ware<sup>85</sup> is also of the Persian or Ptolemaic period. Therefore, the supposedly “XXIII Dynasty” cemetery at Kafr Ammar should be dated to the Persian or Ptolemaic period.

Due to the neglect of the research on the materials of the Late Period, especially the Persian phase, a confusion of the antiquities of the XXVI Dynasty with those of the XXX Dynasty often happened. For instance, the garment of gold and faience beads from the tomb of Zannehibou (or Thanehebu) at Saqqarah is dated by Vernier as of the XXVI Dynasty,<sup>86</sup> but it is labelled as of the XXXth Dynasty in the Cairo Museum according to a more correct dating.<sup>87</sup> The famous painted tomb of Petrosiris at Tuna Gebel (Hermopolis) is dated to the period of the Persian conquest by some authors, but to the Macedonian Conquest by others.<sup>88</sup> Our case is just another example of the higher dating due to the confusion of the antiquities of the XXVI Dynasty with those of the XXX Dynasty. This higher dating of the archaeological materials of the Persian

<sup>72</sup> Petrie, Hawar, p. 9.

<sup>73</sup> Petrie, Kahun, pp. 19–20; and *Seventy Years in Archaeology* (1931) p. 96.

<sup>74</sup> Petrie, Meydum and Memphis III, p. 37, pl. xxviii, 135–137.

<sup>75</sup> John, op. cit. p. 104, pl. xxxvi, 991.

<sup>76</sup> Petrie and others, Heliopolis, p. 34.

<sup>77</sup> Petrie, Denderah, p. 32; also Mus, J. of University of Pennsylvania, vol. viii (1917), p. 234, Fig. 94.

<sup>78</sup> Mond and Myers, *The Bucheum*, p. 128, on the back of a bull.

<sup>79</sup> Petrie and others, Heliopolis, p. 35, pl. xxx, 3; xxxii, 3.

<sup>80</sup> Eisen, *Characteristics of Eye Beads*, p. 17, text figure 14, pl. 1, 55, 56.

<sup>81</sup> *Ibid.*, p. 21, Figs. 55, 62.

<sup>82</sup> E.g. Brunton, *Qau III*, p. 27, pls. XIV–XIVI, 176; some in the Cairo Museum (J70261) came from the royal tombs of Ballana and Qustul, and dated to the Byzantine period.

<sup>83</sup> Petrie and others, Heliopolis, p. 33, Sect. 57.

<sup>84</sup> Petrie, Hawara, p. 14; I.E.S. Edwards, *A Handbook to the Egyptian Mummies and Coffins*, p. 46.

<sup>85</sup> Petrie and others, Heliopolis, pl. xxxiv. 60–69.

<sup>86</sup> Vernier, *Bijoux et orfèvreries*, pp. 478–480, pl. ciii (Cat.no. 53668).

<sup>87</sup> Article in *A.S.*, vol. III, p. 5.

<sup>88</sup> Ch. Picard, *Les Influences étrangères au Tombeau de Petrosiris: Grece ou Perse* in *Bull. Inst. Fr.* vol. xxx (1930), pp. 201–227, and the works cited there.

period seems to be responsible for the scarcity of the remains from the two hundred years of the Persian period found in the reports of excavations, especially when in comparison with the short-lived XXIII Dynasty of the eighth century B.C.

After this long discussion, I think that we are justified in redating Petrie's "XXIII Dynasty" group in his collection,

and his reports to the Persian period, and this I have done in the discussion of the materials and typology of beads in the early part of this chapter. Of course, any antiquities which can be dated by definite evidences such as scarabs with royal names, as belong to the XXIII Dynasty still have their dating valid. But Petrie's "XXIII Dynasty" group is a totally different thing from them.



After the Macedonian conquest, Egypt was under the Greek domination for three centuries (332–30 B.C.). Ptolemaic Egypt is really a part of the Hellenistic world. Its culture shows a mixture of the remnants of the old Egyptian tradition and the recently introduced Greek elements. There was a gradual replacement of the former by the latter. When the Roman became a great power, Egypt was reduced to a Roman province, and the country remained in Roman occupation until the Arabian conquest. This Roman occupation (30 B.C.–A.D. 640) gradually destroyed the last remnants of the old Egyptian tradition. In its later phase, namely the Byzantine or Coptic Period (395–640 A.D.), the culture had changed so much that it would not be recognized as Egyptian by the Dynastic people. The history of beads and other antiquities shows the same traits as the history of culture as a whole.

As referred to in the last chapter, some early Ptolemaic beads were included in those dated by the finder to the XXVI–XXX Dynasties or even as early as the XXIII Dynasty. On the other hand, some glass beads of the late Ptolemaic period are probably wrongly classed as Roman beads. As a result, there are very few beads which are definitely dated to the Ptolemaic period. Among the 1,760 strings of beads registered by me in the U.C., there are only nine strings which can be more or less definitely dated to this period.

The material of Ptolemaic beads is as follows: gilt glass was used for the first time,<sup>1</sup> but glass of other colours was continued to be used. Among hard stones, garnet became a favourite, but carnelian, amethyst and rock crystal were also used. Beads of agate,<sup>2</sup> onyx, turquoise, lapis lazuli<sup>3</sup> and “black flint”<sup>4</sup> were also recorded. The last one is probably

an obsidian. For metal beads, silver is as common as, if not commoner, than gold. Faience beads of various colours were known, but their colour is not so good as those from the New Empire. A bead of unglazed steatite and several serpentine beads are in the U.C., as representatives of soft stones. Beads made of mollusc shell also occurred. Bone beads<sup>5</sup> and coral beads<sup>6</sup> have been recorded, but none of the glazed stones are known to me from this period.

Typologically, the forms of glass beads are spheroid (GN8), barrel shaped (GN15c) or cylindrical (GN20). The gilt spheroid beads (GN708c) are made by the drawn-out method A (G700), a Roman technique, but the date of this string (Bd. No. 577 in the U.C.) is well dated by the associated coins of Ptolemy Philadelphus.<sup>7</sup> Although the gilt glass beads in question are not particularly mentioned in the report, yet the gilt glass bead is commonly regarded as an invention of the late Ptolemaic Period.<sup>8</sup> Some glass beads are made of black and white glass in imitation of the bead of onyx stones, either in the form of a ball, (GD6li),<sup>9</sup> or a barrel bead, GD62b.<sup>10</sup> Three eye beads of green glass with eyes of yellow with a green centre and red border surrounded with black and white spots have been found at Mostagedda and dated to the Ptolemaic period by the finder.<sup>11</sup> But beads of this type, GD30, have been found in the Persian period, as already referred to in the last chapter.

Garnet beads were made usually of naturally smoothed pebbles of small size without any treatment other than perforation (H700). They retain their original forms, such as spheroid (H1, 8) or irregular (H60a). Some of them had their surface smoothed, but the smoothing process followed

<sup>1</sup> William, gold and silver Jewellery, p. 44; also Eisen’s article in *Art Bulletin*, Quarterly of the College of Art Association, II, pp. 87–119.

<sup>2</sup> Brunton, Mostagedda, p. 137.

<sup>3</sup> Petrie, Tanis I, p. 35.

<sup>4</sup> *Ibid.*, p. 34.

<sup>5</sup> Gardner, Naukratis II, p. 29.

<sup>6</sup> Petrie, Tanis I, p. 33.

<sup>7</sup> Petrie, *Objects of Daily Use*, p. 3. Pl 1–5.

<sup>8</sup> Eison, Lotus beads and Melon beads, p. 20.

<sup>9</sup> Petrie, Hyksos, p. 26, Sect. 34, pl. xxvii.

<sup>10</sup> Brunton, Mostagedda, p. 137, Sect. 194, Brunton, Qau III, p. 23, pl. xlviii, 12–13.

<sup>11</sup> Brunton, Mostagedda, p. 137, Sect. 194.

in main the original outline of the pebble so that they are roughly in the form of a biconical right bead (H4d), biconical ring bead with a square section (H44), or a pear-shaped bead with a lenticular section (H34b). There is also a truncated pyramidal pendant of garnet (H83e). Three beads of pale amethyst or rock crystal are of the type H23, which, as described by Petrie, “looks as if they were biterminal crystal ground cylindrical and polished.”<sup>12</sup> Carnelian beads in the form of small barrel (H15d) and cylinder (H21p) are also known. All of these beads of hard stones have a small double parallel perforation (H200) except the small barrel bead of carnelian which have a biconical hole (H100). Spheroid beads of carnelian, H18, biconical spheroid beads of amethyst, H10, barrel beads of agate, H15,<sup>13</sup> hexagonal beads of carnelian, H50,<sup>14</sup> and beads of onyx, H91,<sup>15</sup> have been also reported.

Silver beads have been found abundantly in the Persian period due to the contact with Greece, and most of the types of silver beads of the early Ptolemaic period followed closely the tradition of the Persian period. There are hexagonal spheroid beads (M16d), openwork spheroid beads (M64c), cylinder beads with a criss-cross pattern in imitation of the granulated cylinder beads (M74), and small rectangular plaque incised with a net pattern (M82d). The real granulated cylinder beads M69 also have been reported.<sup>16</sup> All these types of silver beads have their forerunner in the Persian period. There are also plain hexagonal cylinder beads, M17d,<sup>17</sup> and melon beads of silver, M56,<sup>18</sup> reported from excavations. As to gold beads, there are barrel beads either with an ordinary round section (M8d) or with a polygonal section (M19), both of which were made by the plating-on-core method (M600). Ribbed ring beads (M56f), collared barrel beads punched with spots (M76b) and hollow balls with filigree pattern soldered on to the surface (M66e–f) were also found. The last type, that is, gold ball beads with a filigree decoration is one of the characteristics of the Ptolemaic period, introduced from Greece where the technique of filigree gradually replaced that of granulation in the fifth to fourth centuries B.C. Openwork ball beads of gold, M64c,<sup>19</sup> and ball pendants decorated with gold globules, M95,<sup>20</sup> have been also reported from excavations. Lotus beads and Melon beads of gold and gilt terra-cotta

paste have been found in tombs of the Ptolemaic period in Egypt.<sup>21</sup> The latter being probably another name for the gold foil over a paste core.

Faience beads are mostly in the shape of ring beads with either a round edge (PN2) or a flat edge (PN6) and cylinder beads (PN22), both of which were used for making mummy-nets. These beadwork mummy-nets were a tradition surviving from the Late Period and for the most part were found only in the early Ptolemaic period.<sup>22</sup> Both the hexagonal beads (PN58e) and the collared cylinder beads (PN61) have their precursors in the Late Period, and the former is probably a reused or surviving bead of the Late Period. Spheroid beads (PN9b), barrel beads (PN17f), cylinder beads covered with a criss-cross pattern (PD39f), rectangular plaque incised with a St Andrew’s cross pattern (65x) and a grooved rectangular spacer (PD81d) are in the U.C. Segmental beads (PN62) and ribbed barrel beads (PD29) have been also reported.<sup>23</sup>

There are a large ring bead with a rectangular section (S32e) and a barrel bead of serpentine (S14k) in the U.C. collection. Some bone beads and coral beads have been reported, as already referred to above, but their forms have not been recorded. Probably their forms are similar to those of the Persian period. The beads of mollusc shell are in the form of thick cylinders. (R58m, 58p).

As to the use of beads, the commonest ones are the necklaces<sup>24</sup> and the beadwork mummy-nets.<sup>25</sup> The use of beads as necklaces is a common practice among most people throughout all ages, but the use of beadwork mummy-nets is a tradition surviving from the Late Period. These mummy-nets were made of ring beads and cylinder beads of faience, while patterned beadwork of winged scarabs, etc., were stitched on them. Beads were also threaded on bronze wire and used as earrings<sup>26</sup> or suspended on a gold earring as pendants.<sup>27</sup>

As mentioned in the early part of this essay (Chaps. 2 and 4), the registration of the Roman beads in the U.C. was done very inadequately, due to the pressure of time and the outbreak of the war. Many strings of this period have not been registered at all, and even those registered were recorded in a very summary way. However, something is

<sup>12</sup> Petrie, *Objects of Daily Use*, p. 3, no. 6.

<sup>13</sup> Brunton, *Mostagedda*, p. 137.

<sup>14</sup> Caton-thompson, *The Desert Fayum*, p. 148.

<sup>15</sup> Brunton, *Qau III*, p. 23.

<sup>16</sup> Petrie, *Tanis I*, p. 35, pl. xii, 27–28.

<sup>17</sup> *Ibid.*, p. 33, pl. xii, 26.

<sup>18</sup> Brunton, *Mostagedda*, p. 137.

<sup>19</sup> Petrie, *Objects of Daily Use*, p. 12, no. 194, pl. ix.

<sup>20</sup> Petrie, *Hyksos*, p. 42, pl. xxxviii, 57.

<sup>21</sup> Eisen, *Lotus beads and Melon beads*, p. 26.

<sup>22</sup> Mond and Myers, *The Bucheum*, p. 128.

<sup>23</sup> Petrie, *Memphis I*, pl. xlvi.

<sup>24</sup> E.g. Petrie, *Objects of Daily Use*, pp. 2–3, nos. 4–5; Petrie, *Tanis I*, p. 33; Brunton, *Mostagedda*, p. 137.

<sup>25</sup> E.g. Peet, *Cemeteries of Abydos II*, p. 96; Petrie, *Denderah*, p. 32; Mond and Myers, *The Bucheum*, p. 128, pl. xcv, 10; and *Mus. J. of Univ. of Penn.*, vol. viii, p. 234, Fig. 94.

<sup>26</sup> Petrie, *Hyksos*, p. 26, Sect. 34, pl. xxvii.

<sup>27</sup> *Ibid.*, p. 42, pl. xxxviii, 57.

better than nothing. Therefore, a brief and tentative account is given below for the Roman period.

The materials used for beads in the Greco–Roman period as a whole are as follows: G (glass) 61.9 %; H (hard stones) 4.9 %; L (glazed stones) 0.0 %; M (metals) 1.7 %; P (plastic materials) 17.2 %; R (miscellaneous materials) 14.2 %; S. (soft stones) 0.1 %. The most significant change is the replacement of faience by glass as the most frequently used material. Miscellaneous materials, including amber, black resin, ostrich shell, wood and so forth, show a great increase. There were also a slight increase in beads of hard stones and a slight decrease in both the metal beads and the beads of soft stones. If we separate the Ptolemaic group from the Roman–Byzantine group, we shall see that this change took place mainly in the Roman period and that the Ptolemaic period is transitional:

	G (%)	H (%)	L (%)	M (%)	P (%)	R (%)	S (%)
Ptolemaic	0.7	5.1	–	8.1	84.8	1.1	0.2
Roman– Coptic	73.3	4.9	(0.01)	0.4	4.5	16.8	0.1

Glass took the place of faience as the most favoured material used for beads. From the Roman period onwards, faience lost its hold upon the Egyptian people. The scarcity of Ptolemaic glass beads seems partly due to the fact that the late Ptolemaic glass beads are usually classed as Roman beads by the finders. The scarcity of metal beads in the Roman period is due to the invention of the gilt and silvered glass beads which substituted largely the real gold and silver beads.

As to the details of the materials of Roman beads, the plain glass beads of this period are of the colours of the following kinds (arranged in the order of their frequency): green (23.8 %), blue (22.5 %), black (13.3 %), lemon yellow (9.7 %), silver or pearly (6.5 %), opaque white (5.7 %), opaque red (5.1 %), gilt (4.5 %), brown (4.0 %), violet or purple (2.8 %) and colourless transparent (2.1 %). Four of the colourless glass beads are painted inside with red or yellow pigment. The silvered or pearly glass is a new one, but it may have been invented in the Ptolemaic period, just as in the case of gilt glass. Among the beads of hard stones, carnelian is the commonest one and occupies 71.5 %. Next come amethyst (10.1 %), rock-crystal (4.5 %) beryl (4.5 %), onyx (3.2 %) and green feldspar (1.9 %). There are also one or two specimens each of chalcedony, garnet, lapis lazuli, malachite, buff or white quartz, volcanic ash (or durite) and pink or black porphyry. The so-called bluish quartz<sup>28</sup> may be chalcedony. In the reports of excavations,

turquoise, grey granite<sup>29</sup> and grey opaque quartz<sup>30</sup> have also been recorded. There is a single specimen of glazed steatite in the U.C. (Bd. No. 1662), but its identification is doubtful. As to metal beads, gold, silver, copper, lead and iron have all been found used for beads. Gold and silver beads became rare now, because their place was substituted by the gilt and silvered kinds of glass beads. Some gold beads made by plating gold foil over a plastic core are also known.<sup>31</sup> Heads of plastic materials include black-baked clay, grey clay, brown vegetable paste and faience. The last material became rare now, and most of these faience beads (84 %) in the U.C. come from the Roman tombs at Gheyta; here, they were probably dug up from ancient cemeteries and reused by the Roman people, as suggested by the finder.<sup>32</sup> A peculiar type of decorated beads (PD38) is some made of paste inlaid with black glass or amber.<sup>33</sup> Among miscellaneous materials, ostrich shell (39.5 %) amber (25.8 %) and black resin (21.3 %) are rather common. Next come wood (6.7 %) and ivory (4.3 %). The sudden increase in amber beads is probably due to the introduction of Baltic amber in addition to the Mediterranean amber already used in the earlier period.<sup>34</sup> The remaining 2.4 % consists of mollusc shell (including dentalium shell), pink noble coral and bone. Fish vertebrae were also used as beads.<sup>35</sup> Beads of soft stones are rare. There are only two beads of calcite, two of soft haematite and one of serpentine in the U.C. Collection. Beads of limestone have been recorded.<sup>36</sup>

Typologically, the distribution of the types of plain glass beads in the U.C., as far as have been registered, is as follows: ring, oblate and spheroid beads (GN1–2, 7–9) 57.0 %; cylinder beads (GN20–21) 12.0 %; biconical beads (GN4, 10) 0.6 %, drop-shaped beads (GN12–19) 1.0 %, barrel beads (GN15–16) 1.4 %; flattened beads (GN25–50) 6.2 %, faceted beads (GN53–71, 77–78) 7.7 %, segmental beads (GN73–76), miscellaneous beads 0.2 %, pendants (GN84–92) 1.5 % and untyped 5.5 %. Due to the employment of a new technique, i.e. the drawn-out method A (GN700), the great part of the spheroid, oblate and ring beads of glass have both the end and the edge fairly flat, but curved at the corner where the end and the edge meet (GN7), or have the edge more or less rounded (GN2, 9), but the ordinary spheroid and oblate types (GN1, 8) and even

<sup>28</sup> Petrie and others, Heliopolis, p. 45, Sect. 83.

<sup>29</sup> Petrie, Hyksos, p. 60, pl. xlvi, 176; p. 62, tomb 68.

<sup>30</sup> Brunton, Mostagedda, p. 141, Tomb 1894.

<sup>31</sup> Petrie, Hyksos, pl. xlvi, 144.

<sup>32</sup> *Ibid.*, p. 60, Sect. 85.

<sup>33</sup> Brunton, Qau III, pp. 27–28.

<sup>34</sup> Cf. Eisen, Lotus beads and Melon beads, p. 25.

<sup>35</sup> Brunton, Mostagedda, p. 142, Tomb 11713.

<sup>36</sup> Petrie, Hyksos, p. 63, Tomb 210.

the ring beads with a flat edge and sharp corners (GN6) are also known. The same case occurred to cylinder beads (GN20–21), most of them with a curved corner (e.g. GN21b). This drawn-out method A seems to have used a blown glass tube of considerable length, around which the bead-makers probably made grooves to mark the length of each segment after having drawn it out thin, and cut off each segment afterwards for individual bead. When they were not separated by the cutting after having been grooved, the result was the segmental beads (GN73–76), which consist of many ordinary beads, with the edge mostly rounded (GN74), but some of them flat (GN75), a few segmental beads in the shape of collared cylinder (GN73e–f) or collared barrel beads (GN73h–j), and three specimens of flattened segmental beads (GN76). When the long drawn-out tube was cut directly into segments for individual beads without being previously grooved, the resulted ring beads or cylinders have a flat edge with sharp corners. The method of eliminating the sharp corners for the modern Venetian glass beads is by reheating them in revolving crucibles, but this method seems not to have been used by the Romans. Miscellaneous beads include three specimens of irregular beads (GN80), and one or two each of the following types: GN14, concave cylinders; GN18, concave biconical barrel beads and GN57–58, pear-shaped or cylindrical beads with a rhombic section. The last type may be included in either the group of flattened beads or faceted beads. Flattened beads of glass were rather common in this period, probably due to the technical reason too. The newly introduced technique of the folding method (G300–400) required the application of pressure when the small sheet of soft glass was being folded, and the application of pressure easily caused the beads to be flattened. This technical defect may have suggested some new forms to the bead-makers, and these new forms were deliberately produced by them later on. The cross section of these flattened beads is elliptical (GN25–29), lenticular (GN35–37), semi-circular (GN40–42), plano-convex (GN43) or approximately rectangular (GN47–50). The shapes of their profile are circular (GN25, 40, 43, 47), barrel shaped (GN26, 35–36, 41, 48), drop shaped (GN29, 37, 42, 49) and cylindrical (GN50). The majority of them have the drop-shaped profile (about 52 %), due to the method of manufacture being the folding method B (GN400). In the list given above, the beads with a square cross section are grouped under the item “faceted beads”, according to Beck’s nomenclature.<sup>37</sup> The profile of these square-sectioned beads is barrel shaped (GN53), pear shaped (GN54) and cylindrical (GN55). The curved faceted beads are pentagonal spheroid beads (GN59), hexagonal spheroid beads (GN62), hexagonal barrel beads (GN63),

heptagonal ring beads (GN66) and heptagonal barrel beads (GN68). Octagonal barrel beads (GN70) have also been reported.<sup>38</sup> Two kinds of flat, faceted beads were rather common in this period, namely the hexagonal cylinders (GN64) and the truncated cubic beads (GN77). The former is usually grass green in colour, an imitation of beryl both in colour and form. The latter is also an imitation of cut gem. There is also one each of the following faceted beads: a heptagonal cylinder (GN67), an octagonal cylinder (GN71) and a twisted truncated cubic bead (GN78). Among the pendants, the flattened drop pendant with a lenticular section is the commonest type; its perforation being made by the folding method. There are also some ordinary drop pendants (GN84), drop pendants with a plano-convex section (GN87), flattened elliptical pendants (GN89) and tooth-shaped pendants (GN91–92). Flattened vase-shaped pendant (GN59d) has been reported from Qau.

As to the method of manufacture, only on third of them have it recorded. The distribution of various kinds of manufacturing methods is as follows: the drawn-out method A (G700) 78 %, the folding method B (G400) 16.5 %; the blowing method (G900) 3.5 % and the folding method A (G300) 0.2 %. There seems to be a certain relationship between the form and the technique. The drawn-out method A is connected with the ring beads, mostly with a rounded corner (GN6–7), spheroid beads (GN8–9) oblate beads (GN1–2), cylinder beads with rounded corners (GN21) and the round-edged segmental beads (GN74); the folding method A with the flattened or squared cylinder beads (GN50–55); the folding method B with flattened beads (GN49), flattened pendants (GN88) biconical beads (GN4, 10), pear-shaped beads (GN12, 19) and barrel beads (GN15), as well as ring beads (GN7) and spheroid beads, either single (GN8) or multiple (GN74), round-ended cylinders, either with an ordinary round section (GN20) or an elliptical section (GN26), and also a couple each of barrel beads (GN15) and drop beads (GN19). There is also one lot of 44 beads (Bead no. 1704) made by the wire-winding method (G600), but they are recorded as surface finds<sup>39</sup> and are almost certainly Arabic beads, judging by their colour (a translucent red) and technique. In the Roman period, the wire-winding method which had prevailed in the Dynastic period was almost entirely replaced by the lately invented methods, especially the drawn-out method A, for the manufacture of beads. Decorated glass beads were rather common in the Roman–Coptic period. The proportion between the decorated and the plain glass beads is 27.5 % to 100. Many of these decorated glasses are characteristics of this period. The

<sup>38</sup> Brunton, Qau III, pls. xlv, xlvi, 93 and 186.

<sup>39</sup> E.g. James Curle, *A Roman Frontier Post and Its people*, II, p. 337, Fig. 14.

<sup>37</sup> Beck, *Classification*, pl. 1.

distribution of the main groups is as follows: beads with a moulded pattern (GD1–8) 3.9 %, crumb beads (GD11) 4.0 %, eyed and mosaic beads (GD12–57) 12.8 %, imitation onyx beads (GD61–62) 9.2 %, green beads with one end yellow (GD64) 7.0 %, banded yellow beads (GD72–73) 40.7 %, other banded beads (GD63, 74–75) 1.9 %, beads with applied zigzag pattern (GD77) 6.1 %, waved, feathered and swirled beads (GD78–87) 5.9 % and other types 0.7 %. The raised spiral beads (GD2a) seem to be just ordinary ring beads carelessly made by the wire-winding method. There are only two lots of them in the U.C. (Bead nos. 1697 and 1704) both surface finds, the string no. 1704, contains also the spheroid beads made by the wire-winding method (GN608a), already referred to in the last paragraph. They were either reused Dynastic beads or intrusive beads of the Arabic period when the wire-winding method was re-introduced and employed extensively. A few barrel beads with the spiral pattern either raised or fluted (GD2d, 3) were also found. Melon beads (GD6) were very common in this period and were widespread within the sphere of the Roman domination. Some of them were found as far as the Roman frontier fort at Newstead in Scotland (39) ribbed barrel beads (GD7) may be regarded as a variety of the ordinary melon beads. The netted pattern cylinder beads (GD8) are made of gilt glass. Crumb beads of glass usually have a black core inlaid with crumbs of various colours. Their shapes are plain ball beads (GD11b), lobed ball beads (GD11c) and vase-shaped pendants (GD11g). This group of crumb beads is a characteristic type of the Roman period. Almost all the eyed and mosaic beads have the decoration made by the cut-off rod method. The only exceptions are four beads spotted either sparsely or crowdedly (GD12–14) and three stratified eye beads (GD26–27). The latter were found only once in the U.C. Collection (Bd. No. 954), which are dated as “Roman” in the report,<sup>40</sup> but labelled as “XXII–XXVI” in the museum. They are almost certainly of the Persian period, but may have been reused in the Roman period. Either the beads were decorated by applying some eyes made by the cut-off cane or a mosaic of several canes. Among the former group, the core is usually spherical (GD41), but sometimes cylindrical (GD44), truncated cubic (GD45) or discoid (GD50). The applied eye patterns are either flush (GD41, 44–45, 50) or projecting from the surface of the beads (GD47). In the case of disc pendant, the eye patterns are sometimes combined with a Christian cross. The structure of the eyes on the bead of type GD39 is not recorded, but those from this period (GD39b, 39h) are certainly of cut-off rod method. Among the latter group, the beads consisting of a single cut-off cane have usually a floral pattern, and their shapes are spherical (GD52), barrel shaped or cylindrical (GD54), or of a form of

pendant (GD49). Mosaic or millefiori beads are made up of several cut-off canes. This process was invented at the end of the Ptolemaic period and was soon employed widely.<sup>41</sup> The individual cane is either eye-patterned (GD42, 46) or floral (GD55–57). The form of the resultant beads is spherical (GD42, 46, 55–56), flattened barrel shaped (GD55d) or cylindrical (GD57). The small crowded eye beads from Qau<sup>42</sup> seem to be of the same type (GD46) as some found in the Nubian royal tombs of the Byzantine period<sup>43</sup> and in the Meroitic cemetery at Ermenne.<sup>44</sup> They are made of several cut-off canes of eye pattern, not of the stratified eyes. Spherical beads of a chessboard pattern made by cut-off patterned canes were found both in the Nubian royal tombs of the Byzantine period<sup>45</sup> and in the Roman–Nubian cemetery at Karanog.<sup>46</sup> The imitation onyx beads and the green beads with one end yellow are another two characteristic types of this period. Imitation onyx beads are either black or brown in colour, with one white band around the body. Their form is spherical (GD61), barrel shaped (GD62b–g) or cylindrical (GD62m). The green beads with one end yellow were made by the folding method B (G400) and usually show a pear-shaped form with the yellow patch at the big end (GD64b–d). They probably represent some kind of fruits or seeds. Some beads similar to this type but of blue and yellow colour (GD64g) have been found in the late XVIII Dynasty, but they can be easily distinguished from the Roman type by an examination of the method of manufacture. The XVIII Dynasty beads of this kind were always made by the wire-winding technique (G600). The spiral beads of the type (GD66) found at Qau seem to be made by the folding method judging by the pictures published in the report.<sup>47</sup> Another important type of this period is the opaque yellow beads banded lengthwise with clear green or clear white (GD72), some with one end capped with a patch of yellow glass (GD73) reminding one of the type GD64 discussed above. These banded beads were made also by the folding method B (G400), and the resultant beads are usually pear shaped. They are dated to the second century A.D.<sup>48</sup> Under the item of “other banded beads”, there are some ball beads banded either vertically (GD63) or horizontally (GD74), the former showing traces of being made by the folding method A (G300), and also a few examples of cylindrical beads inlaid

<sup>40</sup> From Saft el-Henna 277, see Petrie, Hyksos, p. 39, Sect. 55.

<sup>41</sup> Eisen, Characteristics of eye-beads, p. 4, and p. 20.

<sup>42</sup> Brunton, Qau III, p. 27, corpus no. 176.

<sup>43</sup> Cairo Museum, J 70261, published in Emery's Royal Tombs of Fallana and Qustul, pl. 45A, nos. 17–46, Cat. no. 140.

<sup>44</sup> Junker, Ermenne (1925 Vienna), p. 119, pl. xii, 142.

<sup>45</sup> Emery op. cit. pl. 46D, Cat. No. 157, Cat. Cairo Museum, J70274.

<sup>46</sup> Woolley and Randall MacIver, Karano, p. 75, pl. 40, nos. 7811, 7913.

<sup>47</sup> Brunton, Qau III, pls. xlv–xlvi, 37–38, 69–70, 120.

<sup>48</sup> Allen, A Handbook of the Egyptian Collection, p. 119.

with horizontal lines of various colours (GD75). The beads decorated with an applied zigzag pattern are again characteristic of this period. They are usually made of black glass, with the pattern in blue, yellow or red colour. The pattern consists of either one of several rows of zigzag lines, sometimes in combination with parallel lines, spots or eyes of cut-off canes. The shape of these zigzag patterned beads is mostly spherical or barrel shaped (GD77), occasionally cylindrical (GD94). The applied decoration is slightly increased from the surface of beads. The waved or feathered beads (GD78–85) have their pattern flush with the body of beads. They were made either by pressing the applied decoration into the core of beads or by mixing two kinds of coloured glass for the core at the beginning. The pattern is chevron for the type GD78 (each segment of the wave straight), feathered or ogee for the types GD82–85 (each segment S shaped) and scallop for the types GD79–81 (curved indentation made by dragging with a comb towards one end of beads only). Their form is barrel shaped (GD78b–d, 79b, 82), cylindrical (GD81), spherical (GD85b), ribbed spherical (GD79d–f), ribbed barrel shaped (GD83), flattened barrel shaped (GD84), hexagonal cylindrical (GD85d) and square cylindrical (GD78f). The swirled beads (GD86–87) were made by stirring numerous lines or patches of differently coloured glass, so as to produce a swirled pattern. Their shape is spherical (GD86c), cylindrical (GD87d–f), hexagonal cylindrical (GD87h) and oval button shaped (GD87j). The material of the specimen of the patched bead, GD87b, may be not of glass (painted clay). If so, it should be classed as PD80. Among the beads of miscellaneous decoration, there are one barrel bead of half-yellow and half-green, GD76, which may be regarded as a variety of the banded bead; one button bead with a spiral pattern around the hole (GD88); one drop pendant with a netted pattern (GD97), one large yellow barrel bead with a corded band around the centre (GD68k), and three pendants made by attaching one or several thick rings to a spirally decorated barrel or cylinder bead (GD92). Some decorated glass beads regarded sometimes as of the Roman dated may be early or even modern Venetian. For instance, the cane chevron bead or aggrey bead (GD91) which is widespread throughout the whole world, including Egypt, is almost certainly of Venetian origin,<sup>49</sup> although they have been regarded sometimes as of the Roman date and possibly of Egyptian origin.<sup>50</sup>

The distribution of the beads of hard stones is as follows: spherical (Hi, 8) 55.4 %; ring beads (H2, 4, 5) 4.2 %, barrel beads (H14–15, 19), 6.4 %, flattened beads (H27–35)

9.0 %, faceted beads (H43–54, 58) 12.5 %, onyx beads (H91) 2.9 %, miscellaneous beads 3.2 %, drop pendants (H74–76) 4.8 %, and types unrecorded 1.6 %. Majority of them are spherical beads. The ring beads are either round edged (H2) or ridge edged (H5), or spheroidal with a ridged edge (H4). Barrel beads are either round edged (H14), flat edged (H15) or biconical with flat ends (H19). Flattened barrel beads with an elliptical section (H27), pear-shaped beads with an elliptical or a lenticular section (H28, 34), beads of a lenticular section with a circular, barrel shaped, cylindrical profile (H32–33, 35). The pear-shaped beads with a lenticular section (H34) are a characteristic of this period and are made usually of amethyst and rock crystal. Faceted beads have the facets either curved or flat. Among the former group, there are rectangular, rhombic, square and heptagonal barrel beads (H46, 53), pentagonal and hexagonal spheroid beads (H47, 50), and heptagonal ring beads (H52). Among the latter group, i.e., the flat-faceted beads, there are truncated cubic beads (H58), polyhedral beads (H55) and parallel faceted beads, the last including short and long cylinders with a section triangular (H43), pentagonal (H48), hexagonal (H49, 51) or octagonal (H54). All the truncated cubic beads (H58) are made of carnelian, and all the parallel faceted cylinders (with one exception made of lapis lazuli) are made of beryl which is hexagonal in its natural crystalline form. Both of them as well as the onyx beads mentioned below are characteristic of this period. The onyx beads are either cylindrical or barrel shaped, once with a lenticular section (H91). The white band of onyx is always at the middle of beads. There is also one button bead of onyx with the black spot at the centre of the circular face (H90), found at Gheyta.<sup>51</sup> The miscellaneous types include two cylinder beads (H60) and two etched carnelian beads (H99f–g). The last type is interesting. These two specimens on the strings nos. 1526 and 579 came from the tombs 705 and 796s at Saft el-Henna. They are circular button beads with an oval or plano-convex section, decorated with an etched white pattern of a ring with a row of radiated small crosses, or of a large cross with four dots. They belong to the “Middle Period” (300 B.C.–A.D. 200) of Beck’s scheme<sup>52</sup> and can be distinguished from those of the “Early Period” (before 2,000 B.C.), not only by the decorative pattern, as pointed out by Beck, but also by the form of beads as well as their technique. The surface of the later beads is not so well finished as the early one, and the perforation is also smaller. We have one specimen of the “Early period” type from Abydos, as already discussed in the Chapter on the Middle Kingdom beads. The drop

<sup>49</sup> Kisa, *Das Glas*, pp. 134–135; Dillon, *Glass*, pp. 188–189, pl. xv, 2.

<sup>50</sup> Brent, *On Glass Beads with a Chevron Pattern*, p. 307; and Beck, *Classification*, p. 65, Fig. 66.

<sup>51</sup> Petrie, *Hyksos*, p. 60, pl. xlvi, 165.

<sup>52</sup> Beck, *Etched Carnelian Beads*, p. 396.

pendants are either ordinary drop pendants with a pointed end, made of amethyst (H74d), or the pear-shaped pendants with a lenticular section, made of crystal (76c). After this brief description of various types, it should be noticed that in certain cases, there is some connection between the form and the material, such as the flattened pear shaped of pendants with amethyst and crystal, the hexagonal cylinders with beryl and the truncated cubic beads with carnelian.

The technique of working hard stones was rather poor in quality, except for cutting facets. The surface of beads, although well polished, is usually uneven, perhaps due to the reason that they were not polished one by one as in the Dynastic period, but by a mass production method such as practiced by the modern bead-makers at Cambay in India, who polish their carnelian beads by dragging the leather bag containing beads and emery dust.<sup>53</sup> Due to the same reason, the beads inclined to be shapeless, as already remarked by Brunton.<sup>54</sup> The shaping process was reduced to a minimum, especially for the beads of beryl, amethyst and rock crystal. The perforation is mostly of the small double barrel type, H200 (64.9 %), and next after it the grooved perforation, H800 (26.2 %). But many of the double barrel type, H200, as well as the plain perforation, H400, may be made by the grooved technique, H800. The trace of groove may be eliminated by the final polish and can easily escape our detection. Both the single conic perforation, H300 (5.8 %), and a plain perforation, H400 (2.2 %), are known. There are also two examples of chamfered perforation, H500, and one example of the biconical perforation, H100. The last one is a large ring bead with a ridged edge and is almost certainly a reused ancient bead.

There is only a single specimen of glazed steatite bead which is hexagonal cylinder in form, L35. It came from Lahun. But identification of material is doubtful. Most of the jewellery of precious metals in U.C. was packed away during the European crisis before I started to register the Roman beads. The few metal beads recorded by me are mostly of silver. The form of these silver beads is either collared barrel beads, M21, or ball pendants, M40. There are also four copper beads in the shape of a cylinder, M12c, a button pendant, M41, a pendant of a drop-shaped plaque, M43, and a ribbed biconical ring bead, M92. There is also a large cylindrical pendant of iron (M50b), but whether it was used as beads or not is uncertain. Several silver cylinders of a particular type have been reported from Gheyta.<sup>55</sup> They are about one and a half inches long, and two small "eyes" at the top suspending them, M96. From kafr Ammar, a necklace of

gold was found, which consists of several spherical beads, M5b, one collared cylinder, M12, and one decorated bead of gold.<sup>56</sup> Some decorated beads of the type M83 from Gheyta<sup>57</sup> are made of gold foil over plaster (M600), a technique first appearing in the Predynastic period. Among the beads of plastic materials, the brown vegetable paste beads are spherical (PN8h), the clay beads are either large ring beads of black-baked clay (PN2y) or biconical barrel beads of grey clay (PN20k). Ordinary barrel beads of clay (PN16u) are also known.<sup>58</sup> Faience beads now became rare. Among the 215 undecorated faience beads in the U.C., one lot of 171 ring beads (PN6d) from Gheyta 471 are certainly reused old beads, as suggested by the finder.<sup>59</sup> The remaining 44 beads of faience are distributed as follows: 22 ring beads (PN2-3, 6), 6 biconical ring beads (PN4), 8 spherical beads (PN8-9) and 8 segmental beads with a flat edge (PN63). Segmental beads with a rounded edge (PN62) have also been found.<sup>60</sup> There are also 14 decorated faience beads. Almost all of them are melon beads (PD21), with only one exception of a cylinder incised with a netted pattern (PD39b). The melon beads were very common in the Roman period and widespread throughout the Roman Empire. As pointed out by Eisen, they can be readily distinguished from the early melon beads on account of their large perforation.<sup>61</sup> In the U.C., there are also two beads of white plaster or paste inlaid with a black glass plaque on either side (PD38) found at Qau. From the same site, similar beads inlaid with an amber plaque have also been found at Qau.<sup>62</sup> Ball beads of blue faience impressed with an eye pattern (or dot-and-ring pattern) of the type PD53 have been found both at Qau<sup>63</sup> and at Mostagedda<sup>64</sup> and also in the Nubian royal tombs of the Byzantine Period.<sup>65</sup>

Among the beads of miscellaneous materials, amber beads which became very common now are mostly in the shapeless form characteristic of this period. They seem to have been valued for the supposed merit inherent in the material, not for the prettiness of form. They are more or less pear shaped, with a cross section roughly lenticular, plano-convex, or triangular, R20, or simply irregular lumps,

<sup>53</sup> Arkell, *Cambay and Beads Trade*, p. 297.

<sup>54</sup> Brunton, *Qau III*, p. 27.

<sup>55</sup> Petrie, *Hyksos*, p. 62, *Tomb 71*, pl. xl, 71.

<sup>56</sup> Petrie and others, *Heliopolis*, p. 38, *Tomb 99*, pl. xxxix, 22; and also Petrie, *Objects of Daily use*, p. 3, no. 11, pl. II.

<sup>57</sup> Petrie, *Hyksos*, pl. xlvi, 144.

<sup>58</sup> Petrie, *Ibid.*, pl. xlvii.

<sup>59</sup> *Ibid.*, p. 60, *Sect. 85*.

<sup>60</sup> *Ibid.*, pl. xlvii, 171.

<sup>61</sup> Eisen, *Lotus beads and Melon beads*, p. 21.

<sup>62</sup> Brunton, *Qau III*, pp. 27-28.

<sup>63</sup> *Ibid.*, p. 27, pls. xlv-xlvi, 177 (Ptolemaic or a little later).

<sup>64</sup> Brunton, *Mostagedda*, p. 140, *Tomb 1102*.

<sup>65</sup> Emery, *The Royal Tombs of Ballana and Qustul*, pls. 48A (Cat. No. 163) pl. 46D (Cat. No. 157) corpus no. 32 on pls. 43-44.

R21–22. There are also amber beads of the following types: R4, ring beads; R6, spherical beads; R11, spherical beads with a flattened section; R16, flattened barrel beads; and R18, rectangular short cylinders. Some of them are better shaped and finished than the others. There are also some decorated amber beads if the carelessly scratched parallel lines can be called decoration. The shape of these decorated beads is either rectangular cylinder or flattened pear-shaped lumps; the parallel lines are either vertical or horizontal (R24). A barrel bead of amber decorated with an inlaid double zigzag pattern of blue paste (R23f) has been found at Qau.<sup>66</sup> Beads of black resin were also common in this period. Almost all of them are in the shape of ring beads with a flat edge (R4) or short cylinder (R10), except three specimens of conical ring beads (R3) and one each of spherical beads (R6) and ring bead with a round edge (R2). Bone beads are either cylindrical (R33) or barrel shaped (R32). Plain ivory beads are spherical (R316), while the decorated ivory beads are mostly barrel shaped, incised with parallel lines around the body of beads, probably done by the lathe (R43), but also each of the barrel beads incised with a dot-and-ring pattern (R42), and arrow-shaped pendants incised with horizontally parallel lines or with short parallel strokes and two dots (R48). Lotus beads and Melon beads made of ivory and bone have been also recorded.<sup>67</sup> All of the ostrich shell beads are ring beads with the edge either rounded or flat (R51–52). The pink shell beads which may be provisionally identified as coral are spherical, R56c, or roughly barrel shaped, R66, or entirely irregular, R49.<sup>68</sup> Beads of mollusc shell were shaped into cylinder beads (R59), some made of dentalium shell still retaining their natural surface of fluted parallel lines (R74c). Both the ordinary mollusc shell and the pearl shell were made into the flattened barrel beads (R64). Wood beads are mostly in the form of thick ring beads with a round edge (R78), but some of them were shaped into a ribbed barrel bead (R84) or a ring bead cut with a zigzag edge (R86). Disc beads of wood (R76–77) have been also reported.<sup>69</sup>

Beads of soft stones were rare in this period. There are two cylinder beads of soft haematite, with either an ordinary round section (S18) or a lenticular section (S28); two beads of calcite, either hexagonal ball beads (S37e) or flattened drop pendants (S70), and one serpentine bead in the form of a rectangular cylinder (S33).

As to the use of beads, they were mostly used for necklaces,<sup>70</sup> bracelets,<sup>71</sup> earrings<sup>72</sup> and occasionally for anklets.<sup>73</sup> A bead band of leather sewn with several small beads of silver and blue, yellow and red glass is dated to the Coptic period.<sup>74</sup> The arrangement of beads in this period was frequently carelessly done. Strings are often composed of a number of odds and ends,<sup>75</sup> but they were sometimes arranged in a certain order. In a tomb at Saft el-Henna, gilt beads were arranged alternating with the resinous beads; in another tomb, the order on a necklace seemed to have been green, carnelian and yellow in rotation. In the latter tomb, there is also a short string of beads used as pendants to an earring. They were arranged as follows: at bottom a small amethyst lozenge-shaped drop, above it four beads, paste, blue, green and black, strung on thin bronze wire.<sup>76</sup> The string used for threading the beads was probably mostly of some kinds of fibre which had decayed without leaving any trace. At Mostagedda, a bead necklace was threaded on yellow wool.<sup>77</sup> The earrings on which beads were threaded are made of either gold<sup>78</sup> or bronze.<sup>79</sup> A stone bead was found on a silver wire which was worn as a pendant.<sup>80</sup> An iron anklet with blue bead with incised eyes on it has been found at Mostagedda.<sup>81</sup>

For the pictorial representation of beads, there are many gilt cartonnage bust from mummies of the first century A.D. Some of them have modelled earrings inlaid with onyx and imitation pearl and also modelled necklaces of onyx barrel beads alternating with green and black ball beads.<sup>82</sup> In the Fayum Province of Egypt, Petrie found many Roman portraits of the second century A.D., which were represented as wearing jewellery. There are three kinds of earrings; the ball or disc earrings (M40–41, M95) were usually associated with gold-chain necklaces which frequently have a crescent pendant at the centre (GN97); secondly, the loop

<sup>66</sup> Brunton, Qau III, corpus no. 67.

<sup>67</sup> Eisen, Lotus beads and Melon beads, p. 26.

<sup>68</sup> Brunton, Qau III, pls. xlv–xlvi, 103–105.

<sup>69</sup> *Ibid.*, pls. xlv–xlvi, 163–164.

<sup>70</sup> E.g. Brunton, Mostagedda, pp. 139–142; Petrie and others, Heliopolis, p. 38, pl. xxxix, 22.

<sup>71</sup> Brunton, Mostagedda, p. 139, Tomb 420; Petrie, Hyksos, p. 61.

<sup>72</sup> Brunton, Mostagedda, p. 140, Tombs 574 and 1104; Petrie and others, Heliopolis, p. 45, pl. lii, 4; Petrie, Hyksos, p. 40, Tomb 439.

<sup>73</sup> Brunton, Mostagedda, p. 140, Tomb 1105.

<sup>74</sup> *Ibid.*, p. 140, Tomb 811.

<sup>75</sup> Brunton, Qau III, p. 27.

<sup>76</sup> Petrie, Hyksos, pp. 39–40, Tombs 291 and 439.

<sup>77</sup> Brunton, Mostagedda, p. 142, tomb 10109.

<sup>78</sup> Petrie and others, Heliopolis, p. 45, pl. lii, 4.

<sup>79</sup> Petrie, Hyksos, p. 40, Tomb 439.

<sup>80</sup> Petrie and others, Heliopolis, p. 28, pl. xxxix, 23; Petrie, *Objects of Daily Use*, p. 3, no. 10, pl. II.

<sup>81</sup> Brunton, Mostagedda, p. 140, Tomb 1103.

<sup>82</sup> Petrie, Kahun, p. 20, Sect. 31; also Cairo Museum, J33129–33131, J33135, from the first century A.D. cemetery at Meir.



earrings with pearls and beryl or gold beads on it were associated with necklace of stones beads, especially the cylindrical or spherical beryl beads (H8, H51); thirdly, the pendant or bar earrings were associated with the more

complex and gaudy form of stone or gold necklace. These pictorial representations of earrings and necklaces enable us to ascertain the arrangement of the beads as well as their date.<sup>83</sup>

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<sup>83</sup> Patrie, *Mawara*, p. 19, Sect. 28, pl. xi; and Petrie, *Roman Portraits*, p. 12, Sect. 24.

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## List of Abbreviations of Periodicals Cited

- A.E. Ancient Egypt, ed. by Petrie
- A.J.A. American Journal of Archaeology. Concord, N. H
- Ant. Antiquity, ed. by Crawford. Southampton
- A.J. Antiquaries' Journal
- Arch. Archaeologia. Issued by the Society of Antiquaries, London
- A.S. Annales du Service des Antiquites. Cairo
- B.M.N.A. Bulletin of the Metropolitan Museum of Art, New York
- B.M.F.A. Bulletin of the Museum of Fine Art, Boston
- J.E.A. Journal of Egyptian Archaeology
- J.R.A.I. Journal of the Royal Anthropological Institute, London
- L.A.A.A. Annals of Archeology and Anthropology. Issued by the Liverpool Institute of Archaeology, Liverpool
- Q.D.A.P. The Quarterly of the Department of Antiquities in Palestine, Jerusalem

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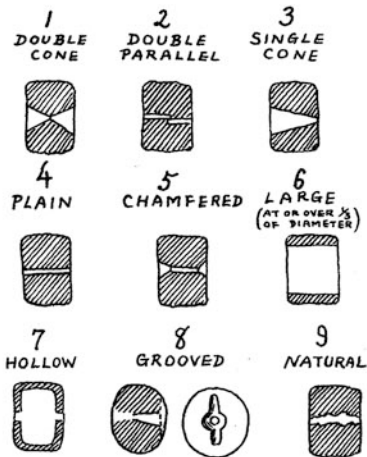
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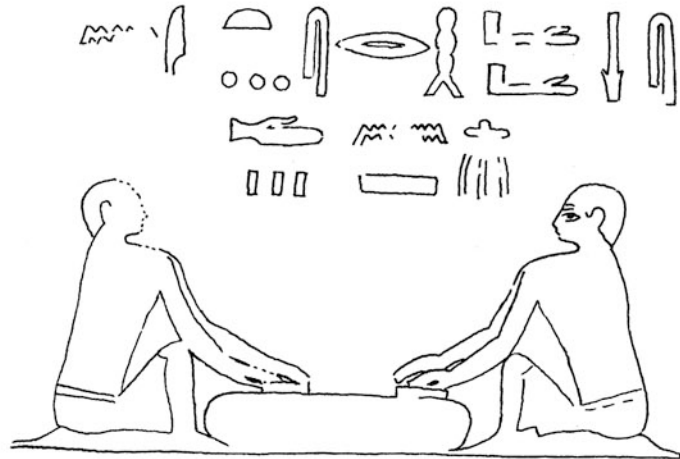
## Bead Corpus

- I. a. Perforation Corpus
  - b. Pictorial Representation of Beadpolishing, in the Tomb of Aba at Deir el Gebrawi (after Davies)
  - c. Somé Pictorial Representation of the Drilling Process.
    - (1) Tomb of Sakkara (after Steindorff)
    - (2) Tomb of Aba, Deir el Gebrawi (after Davies)
    - (3) Theban Tomb No. 181 (after Davies)
    - (4) Theban Tomb No. 39 (after Davies)
  - II. Corpus of Glass Beads
    - Undecorated Glass Beads GN.1–71
  - III. Corpus of Glass Beads
    - Undecorated Glass Beads GN.73–97
    - Decorated Glass Beads GD.1–50
  - IV. Corpus of Glass Beads
    - Decorated Glass Beads GD.51–96
  - V. Corpus of Beads of Hard Stones
    - (a)
    - (b)
  - Corpus of Beads and Pendants H.1–22
  - VI. Corpus of Beads of Hard Stones H.23–73
  - VII. Corpus of Beads of Hard Stones H.73–99
  - VIII. Corpus of Beads of Hard Stones L.2–85
  - IX. Corpus of Metal Beads M.1–94
  - X. Corpus of Beads of Pasty Materials PN.1–23
  - XI. Corpus of Beads of Pasty Materials PN.23–71
  - XII. Corpus of Beads of Pasty Materials PN.72–99
  - XIII. Corpus of Beads of Pasty Materials PD.1–38
  - XIV. Corpus of Beads of Pasty Materials PD.39–98
  - XV. Corpus of Beads of Miscellaneous Materials (Remainders) R.1–50
  - XVI. Corpus of Beads of Miscellaneous Materials (Remainders) R.51–93
  - XVII. Corpus of Beads of = Soft Stones S.15–85
- The Orders of the Key- forms of Undecorated Beads A.1–120
- I.
  - II.
  - III.
  - IV.
- The Orders of the Key- forms of Undecorated Spacers and Pendants A.120–240
- V.
  - VI.
  - VII.
- Common Regular Beads of Broad “Basic Dimensions”. B.1a–29

A. PERFORATION CORPUS.



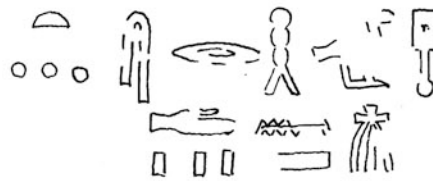
B. Pictorial Representation of Bead-polishing, in the Tomb of Aba at Deir el Gebrawi. (After Davies)



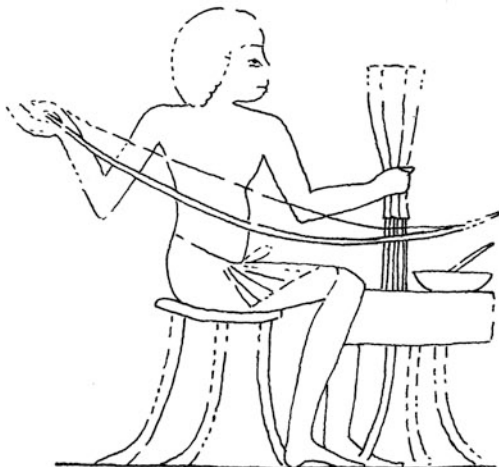
C. Some Pictorial Representations of the Drilling Process.



(1) Tomb of Ti, Sakkara. (After Steindorff)



(2) Tomb of Aba, Deir el Gebrawi. (After Davies)



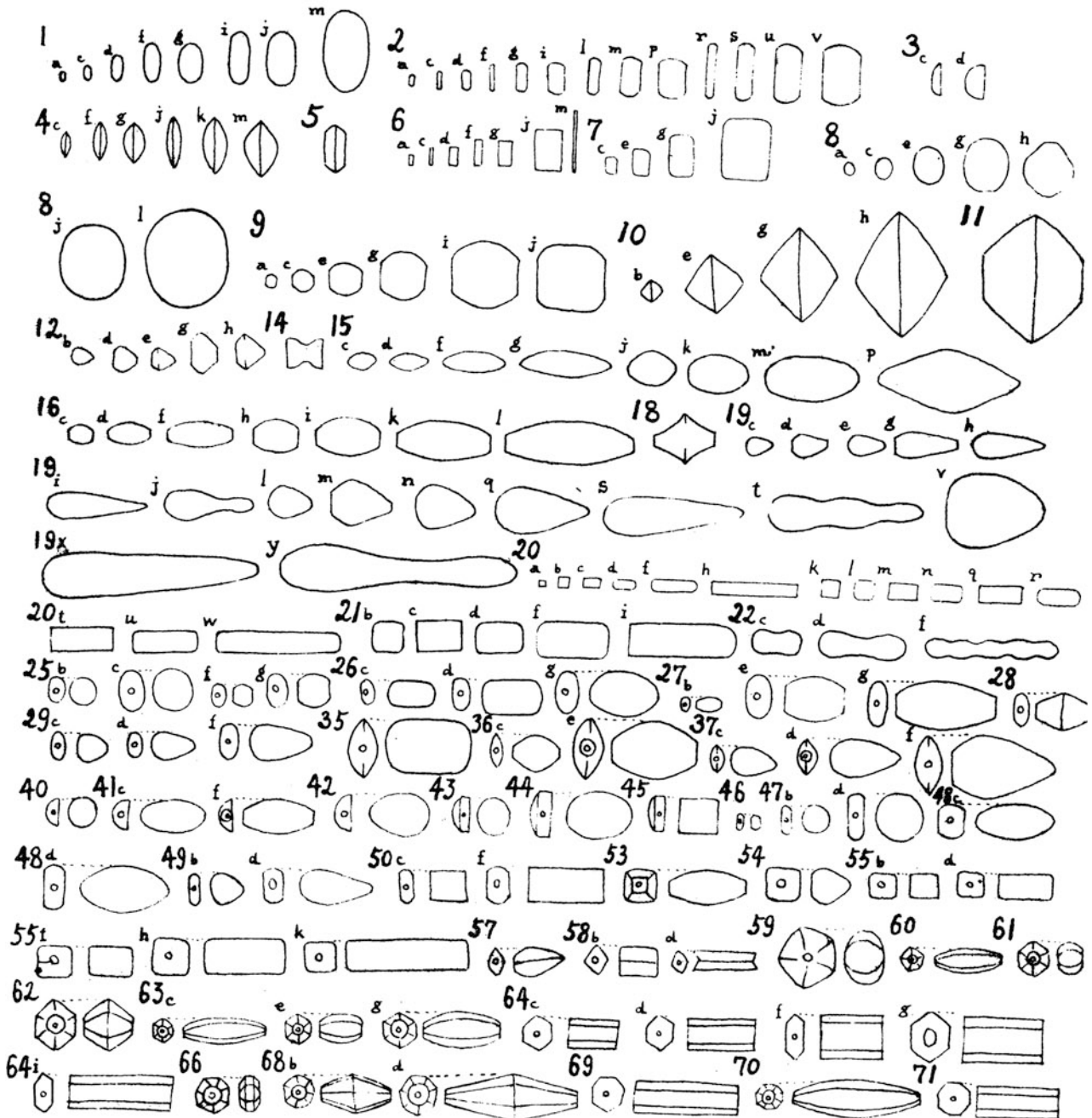
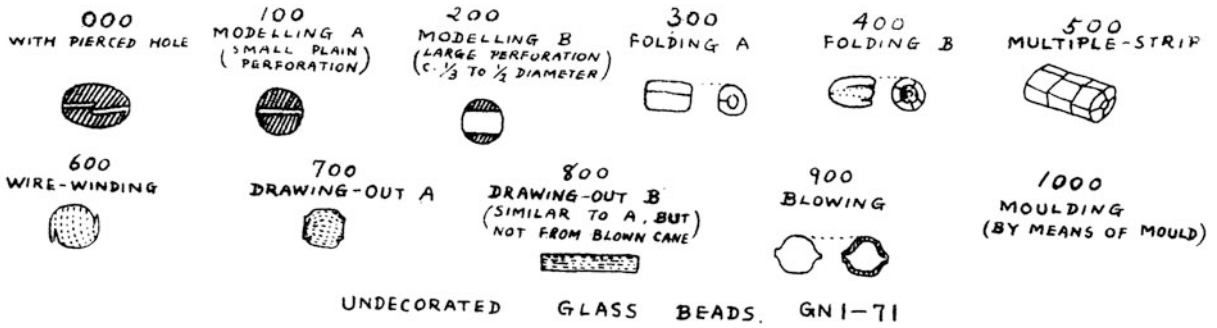
(3) Theban Tomb No. 181. (After Davies)



(4) Theban Tomb No. 39. (After Davies)

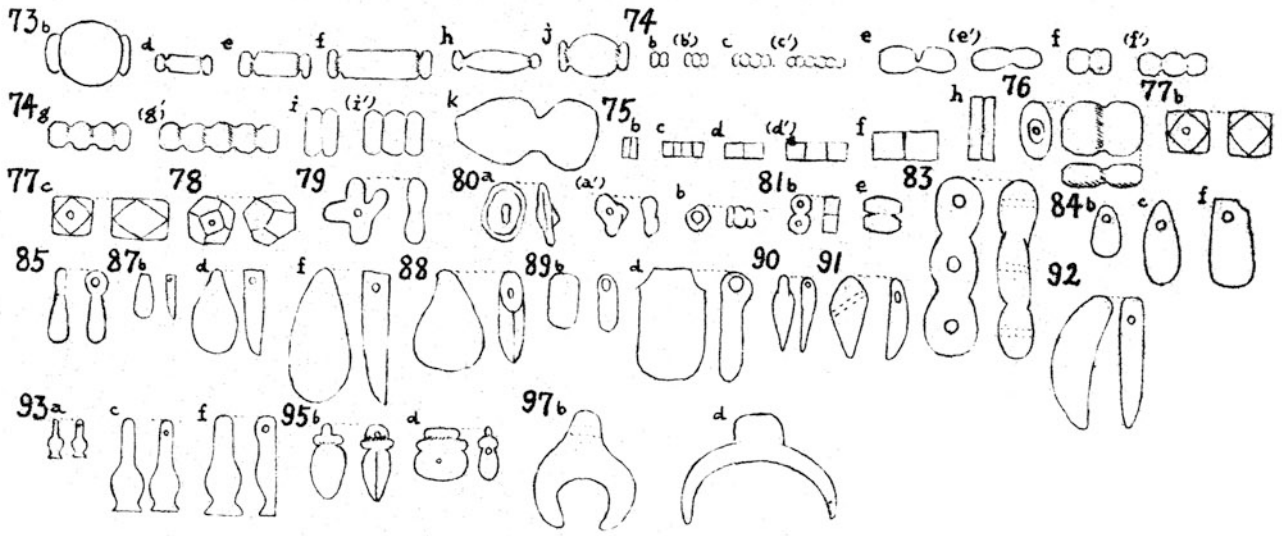
CORPUS OF GLASS BEADS  
TECHNICAL CLASSIFICATION ACCORDING TO THEIR MANUFACTURE

31

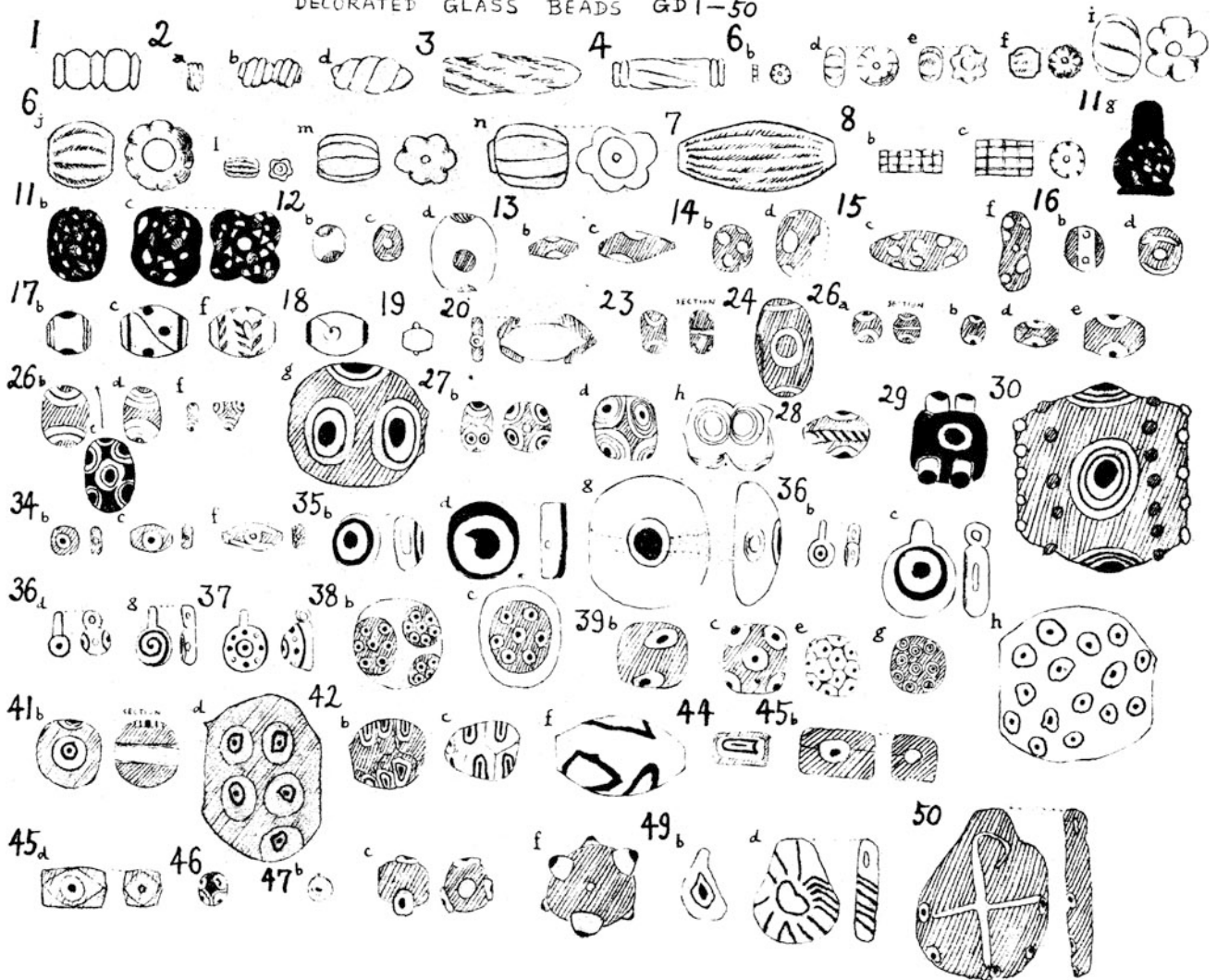


CORPUS OF GLASS BEADS

UNDECORATED GLASS BEADS GN73-97



DECORATED GLASS BEADS GD1-50

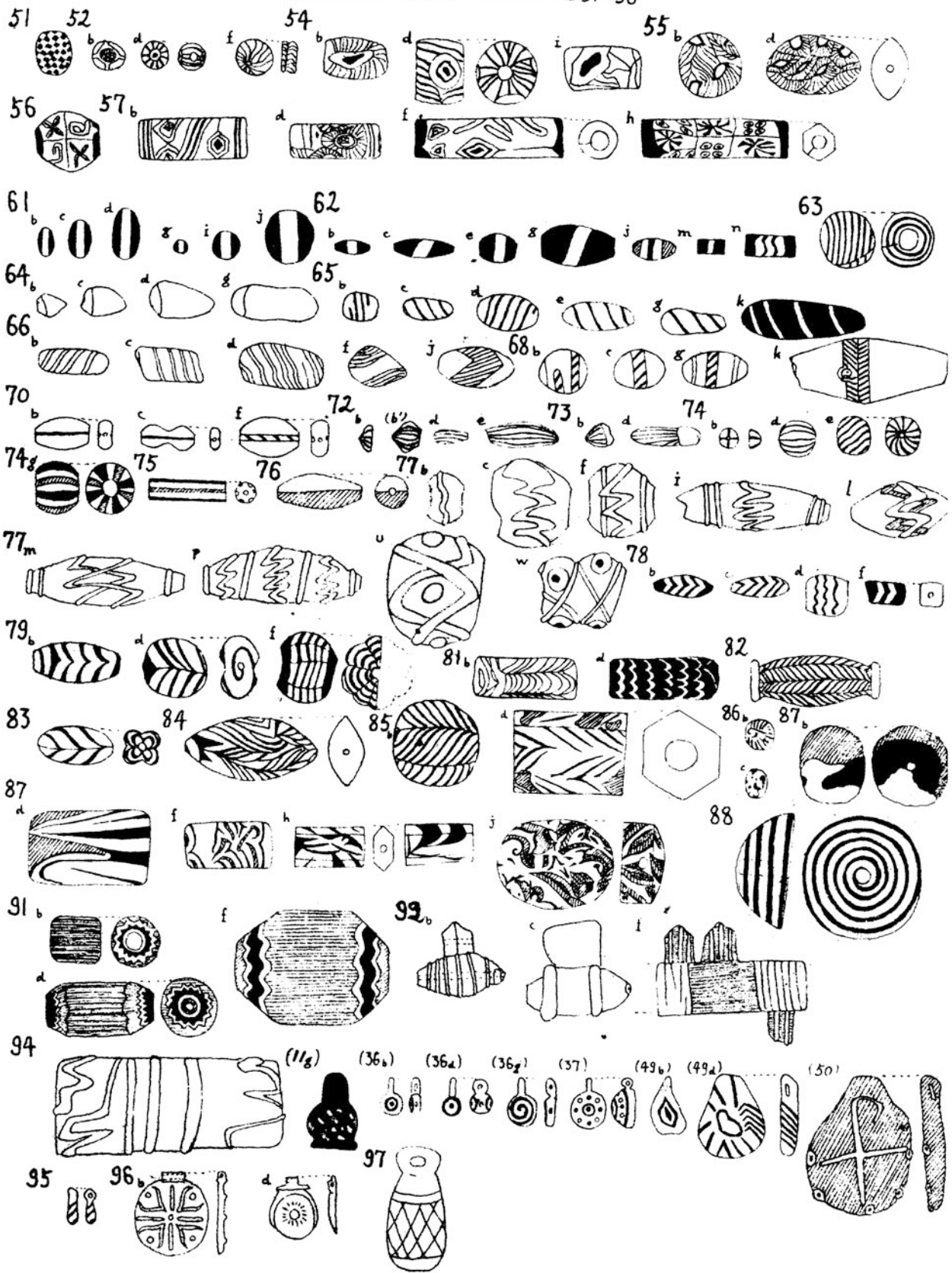




CORPUS OF GLASS BEADS

IV

DECORATED GLASS BEADS GD51-96

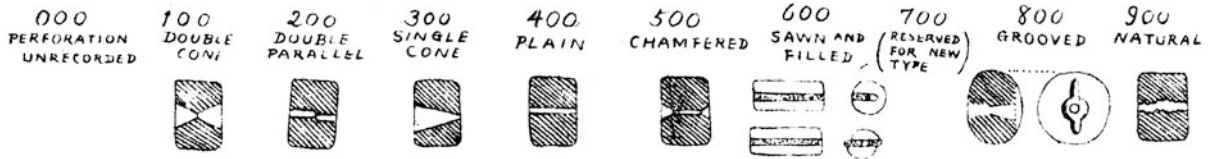


CORPUS OF BEADS OF HARD STONES



TECHNICAL CLASSIFICATION

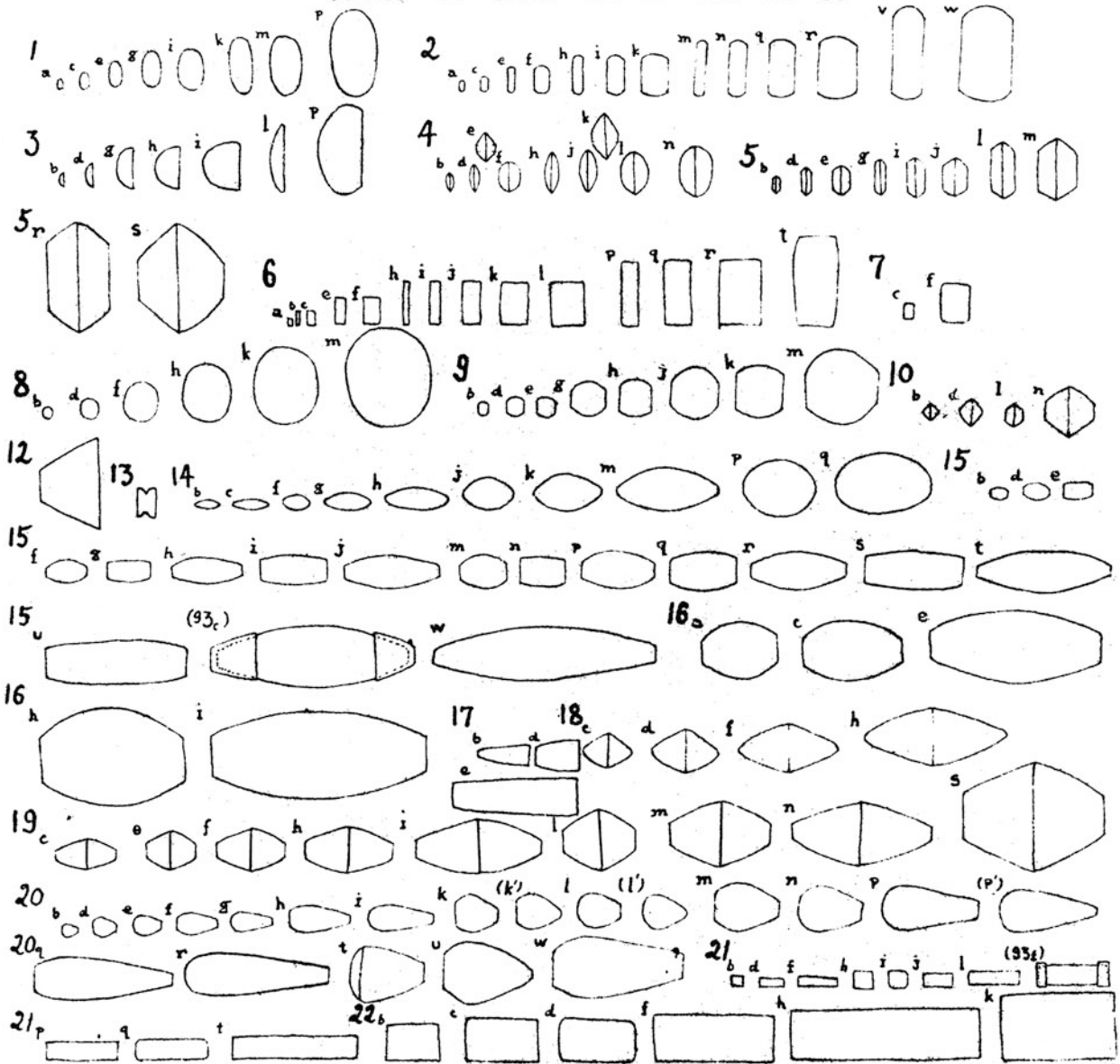
(A) ACCORDING TO THEIR PERFORATION



(B) ACCORDING TO THE FINISH OF THEIR SURFACE  
(THOSE WITHOUT ANY THOUSAND-NUMBER ARE EITHER OF THE CLASS 2000, OR HAVING THEIR FINISH NOT RECORDED.)

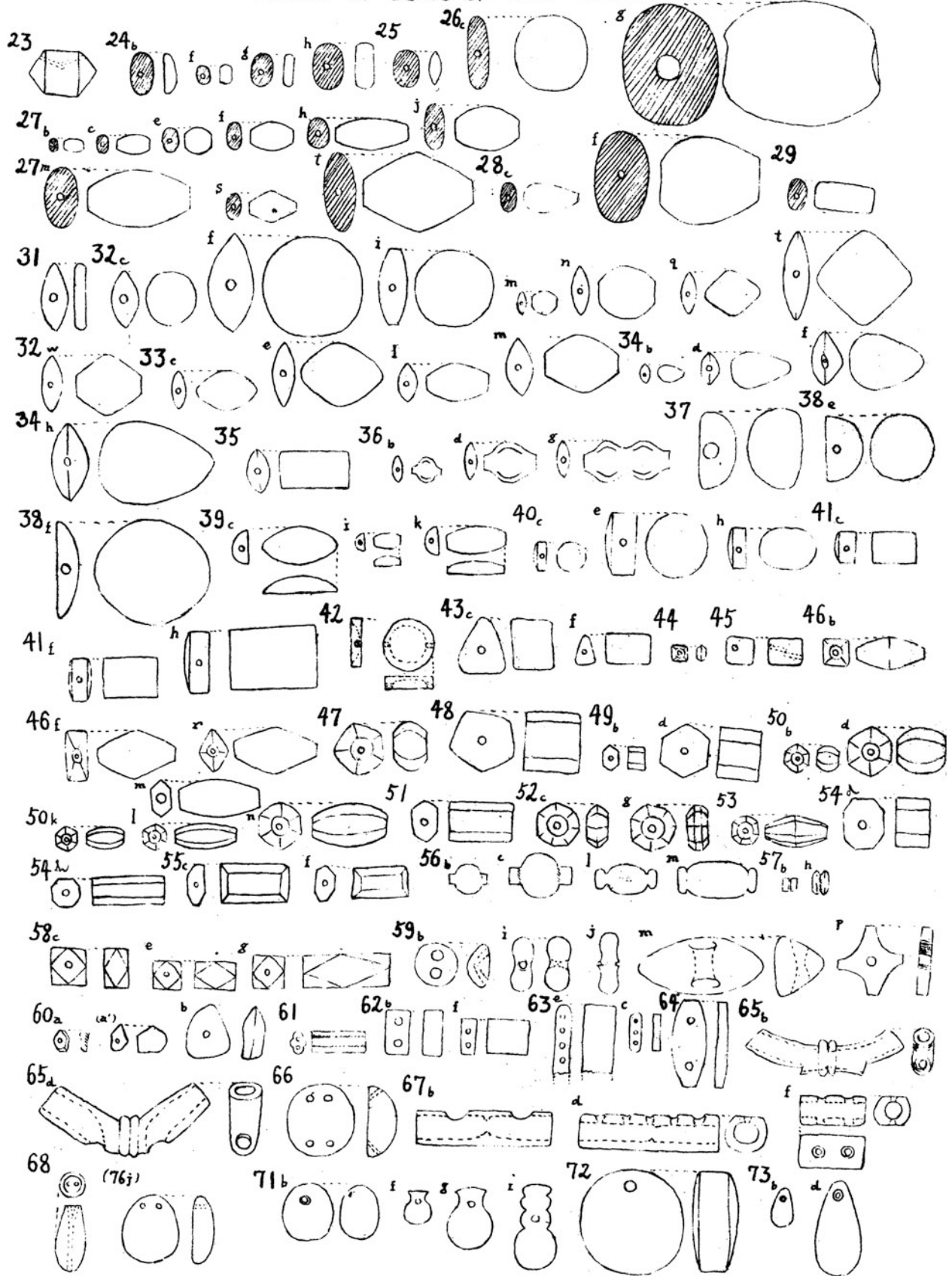


CORPUS OF BEADS AND PENDANTS H 1-22

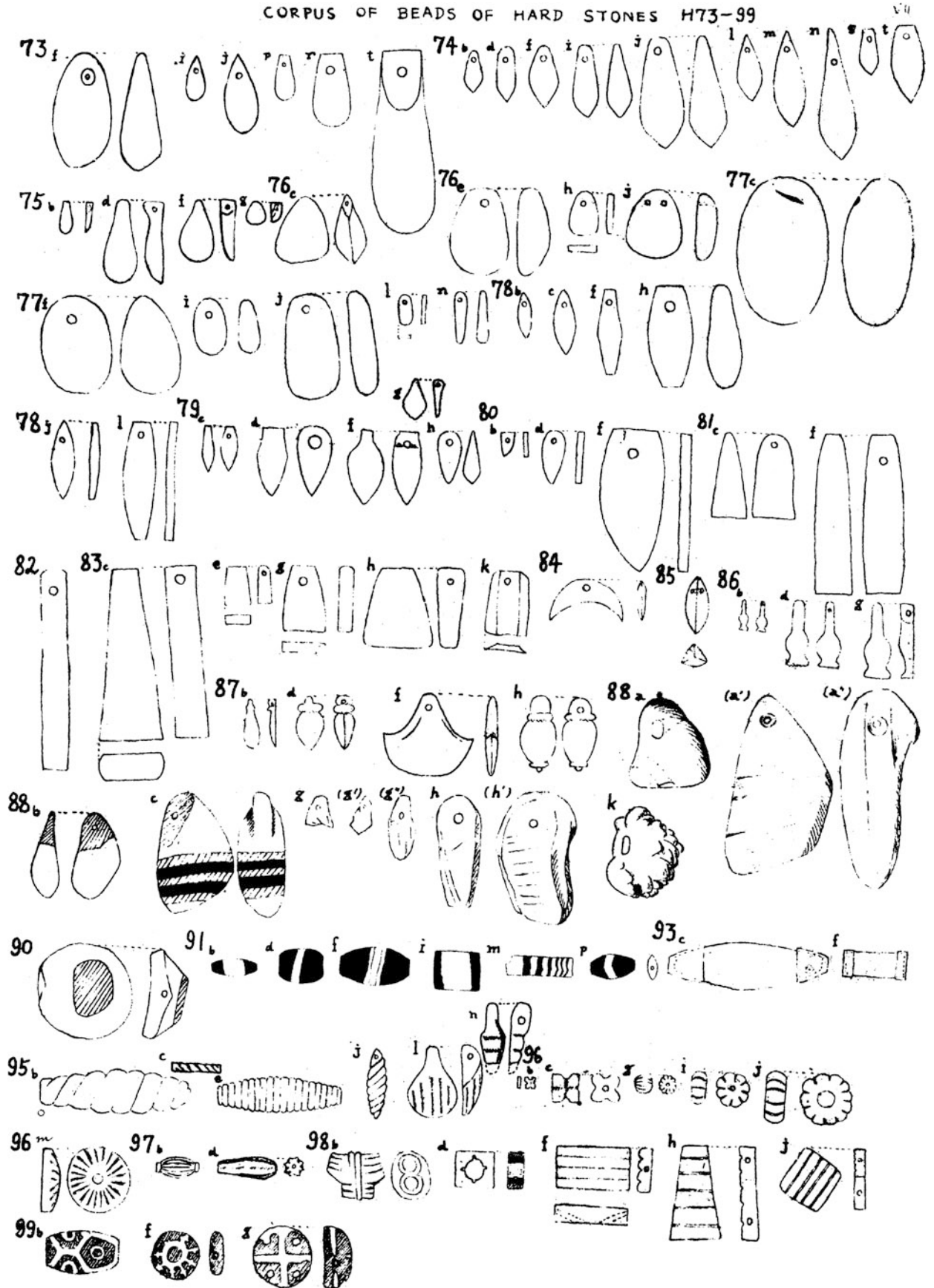


CORPUS OF BEADS OF HARD STONES H 23-73

VI

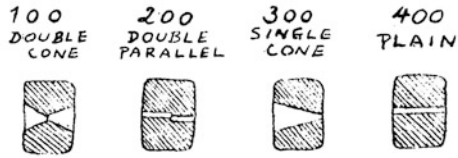


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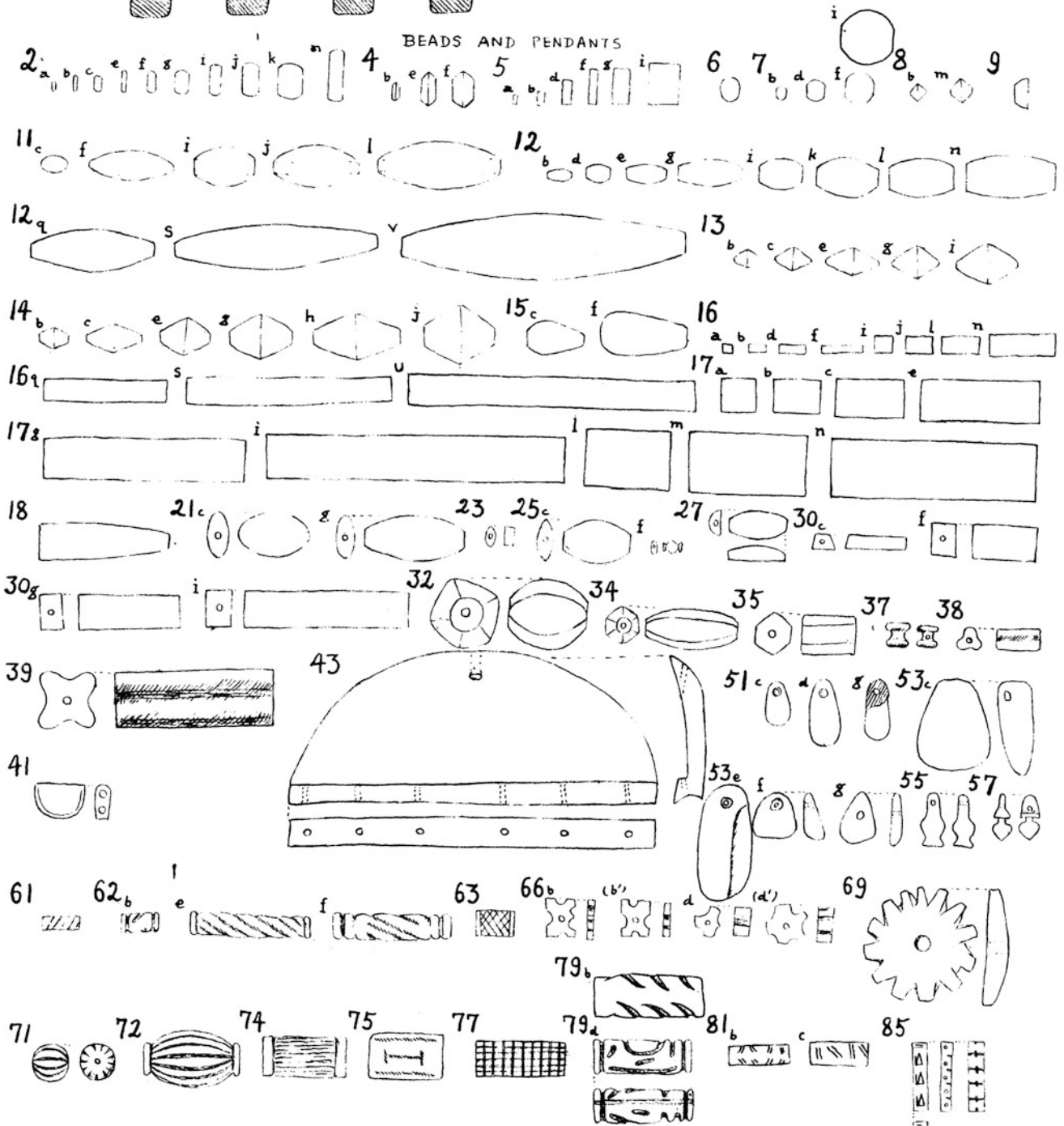


CORPUS OF BEADS OF GLAZED STONES, L2-85

CORPUS NUMBER TO INDICATE THE PERFORATION TYPE



BEADS AND PENDANTS

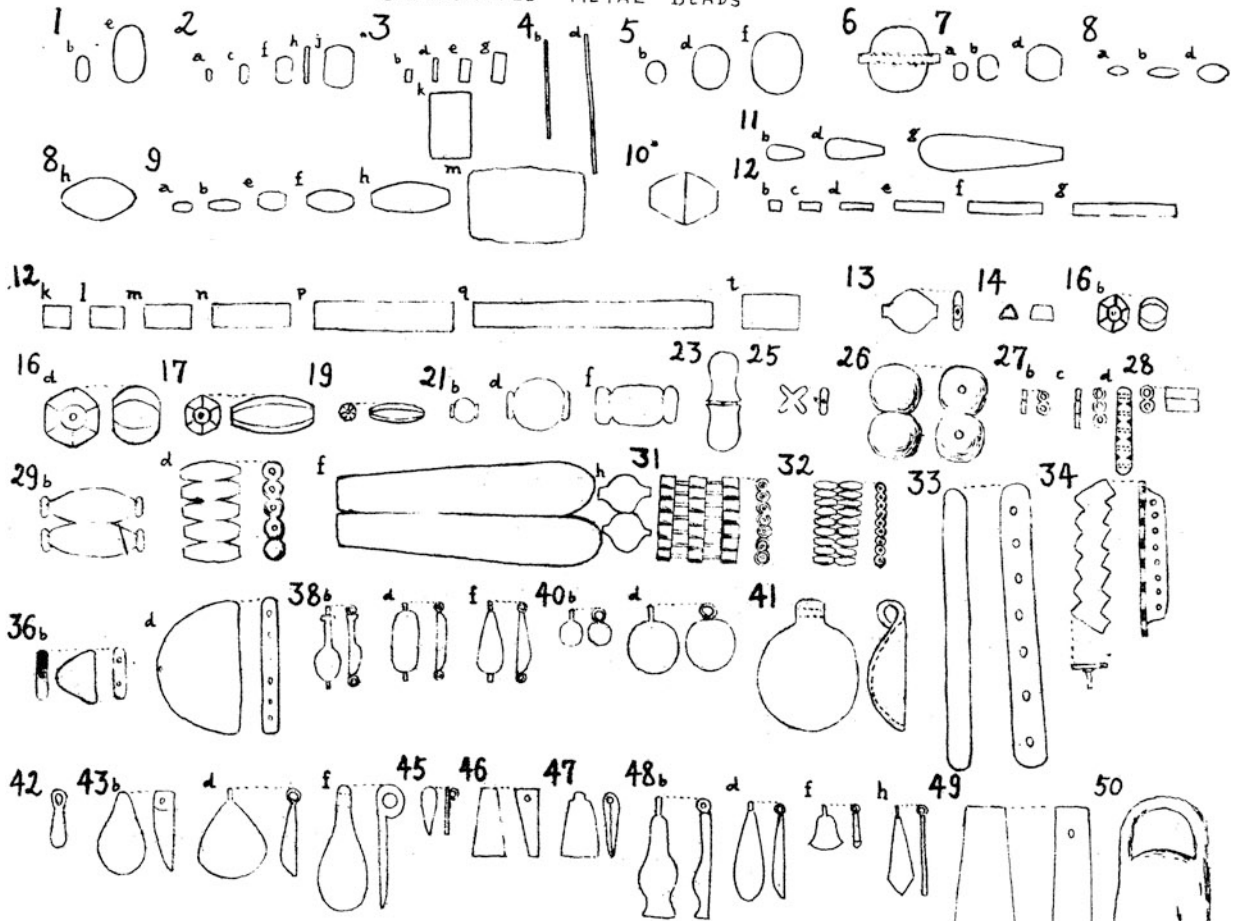


CORPUS OF METAL BEADS. M1-94

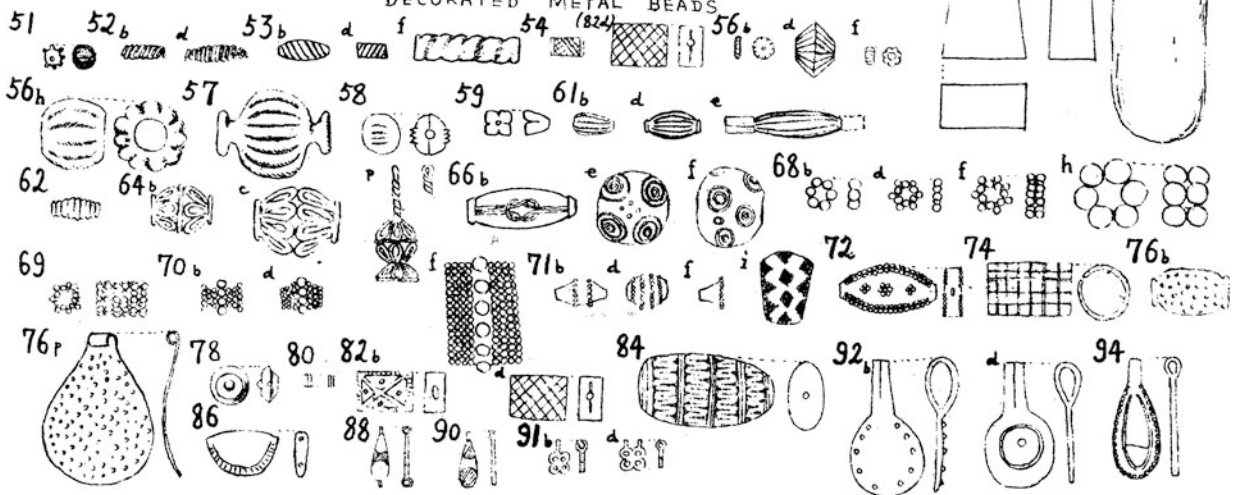
TECHNICAL CLASSIFICATION



UNDECORATED METAL BEADS



DECORATED METAL BEADS



CORPUS OF BEADS OF PASTY MATERIALS PNI-23

X

TECHNICAL CLASSIFICATION

100  
ORDINARY MODELLING A  
(SMALL HOLE)



200  
MODELLING B  
(LARGE HOLE  
C. 1/3 TO 1/2 DIAMETER)



300  
SPECIAL MODELLING C.  
(WITH A "BUTTER-PAT"  
LIKE TOOL)



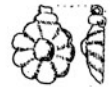
400  
MODELLING AND  
PIERCING



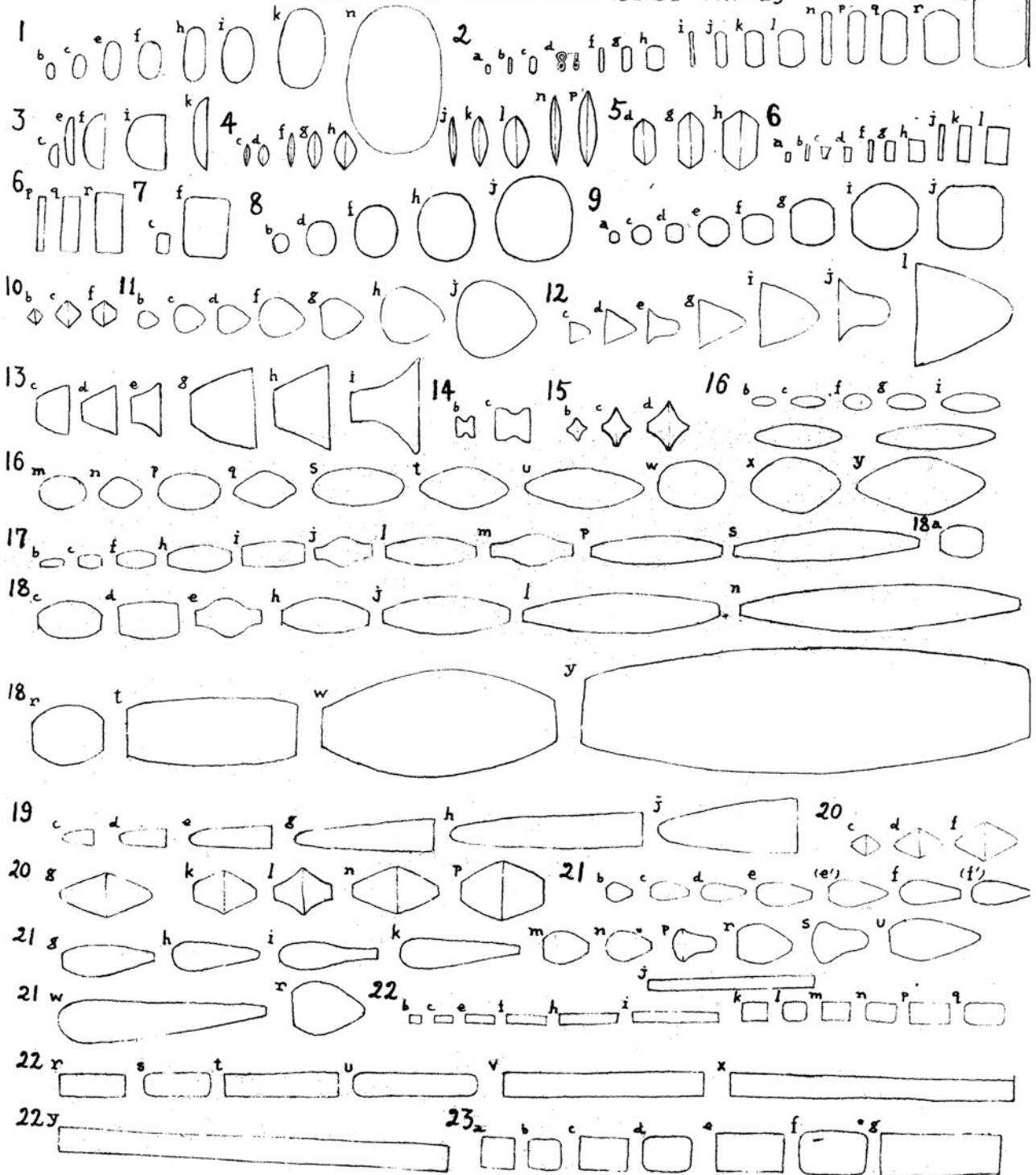
500  
MOULDING A  
(TOGETHER WITH  
THE PERFORATION)



600  
MOULDING B  
(WITH ATTACHED RING  
FOR STRINGING)



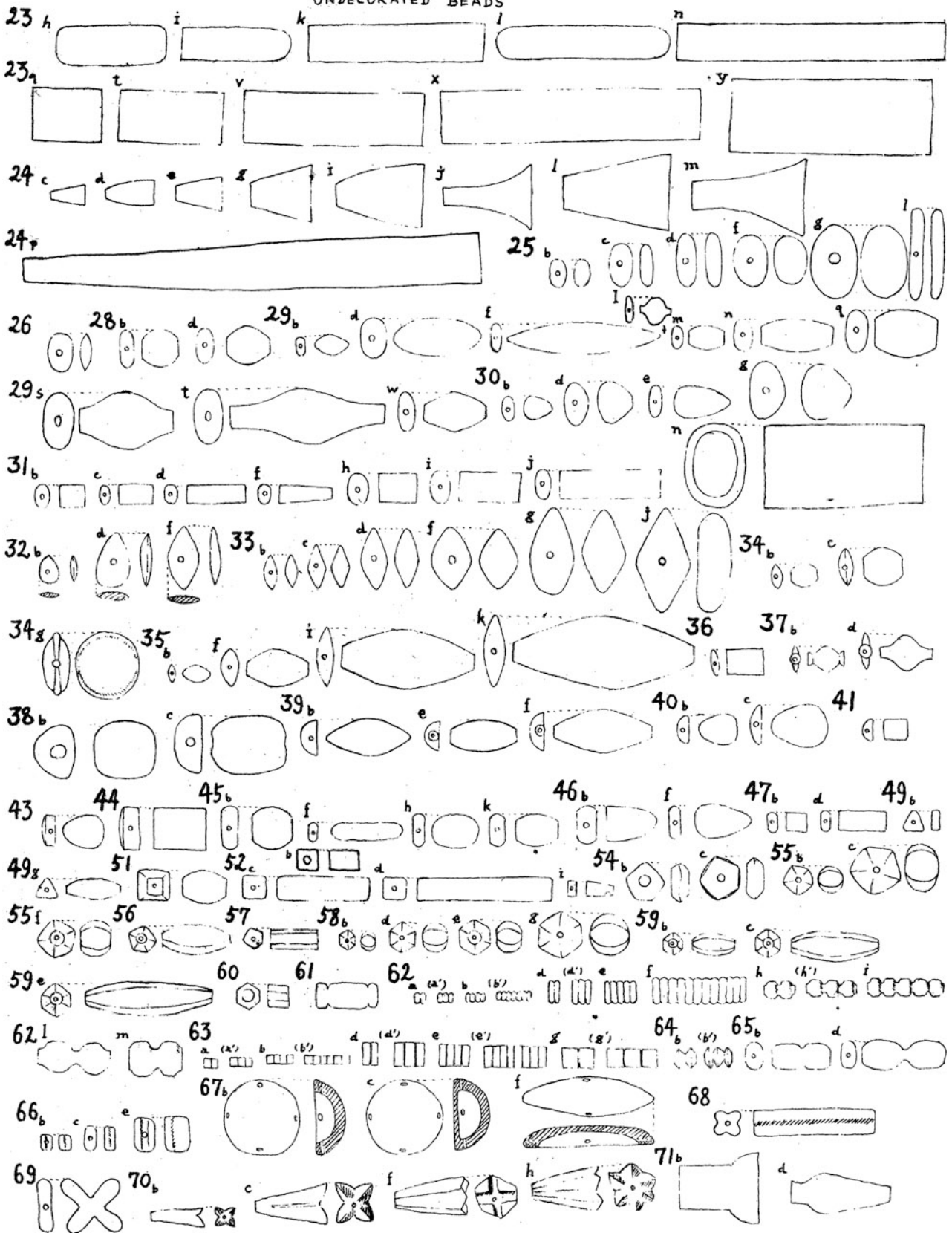
CORPUS OF UNDECORATED BEADS PNI-23



CORPUS OF BEADS OF PASTY MATERIALS. PN23-71

XI

UNDECORATED BEADS

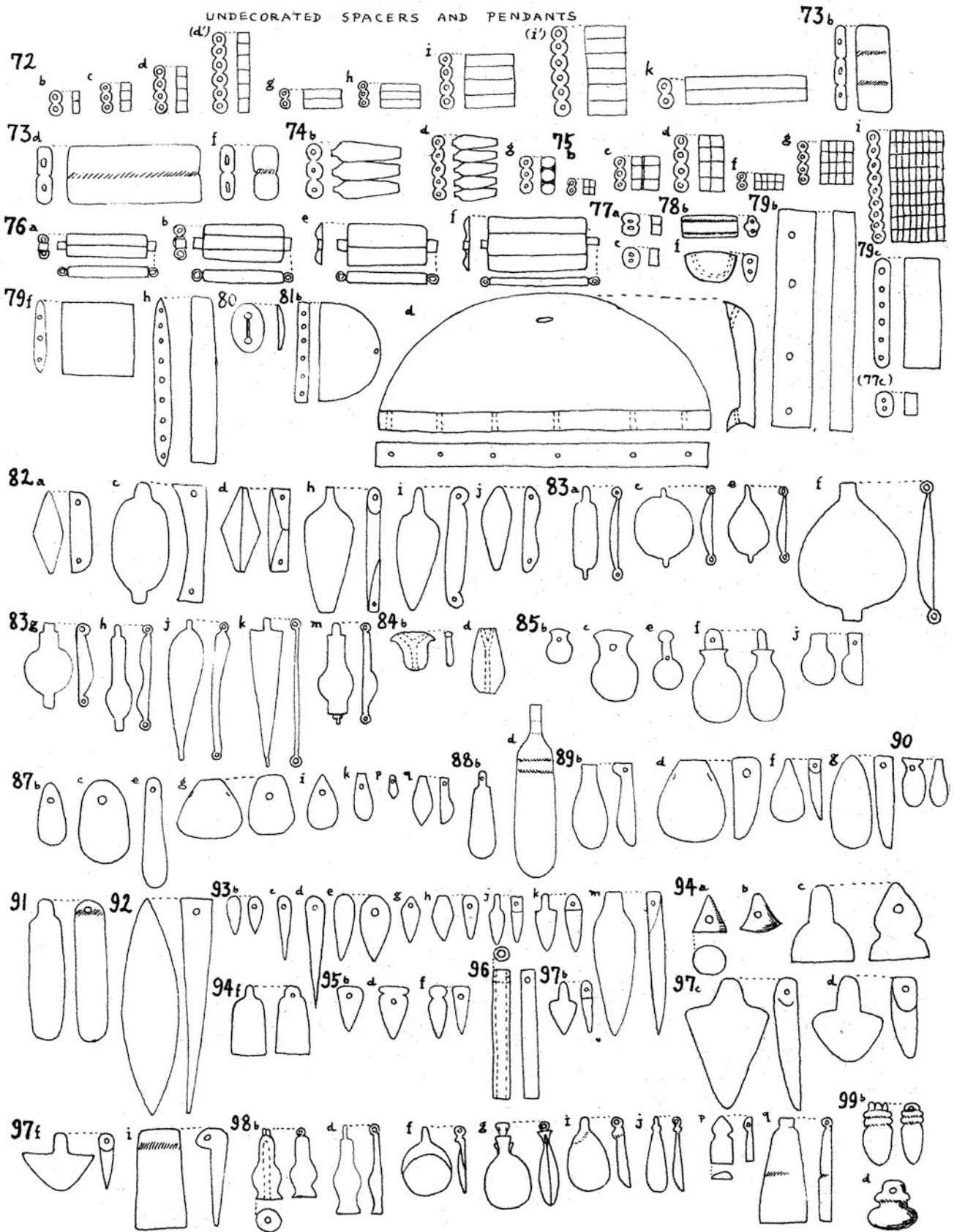




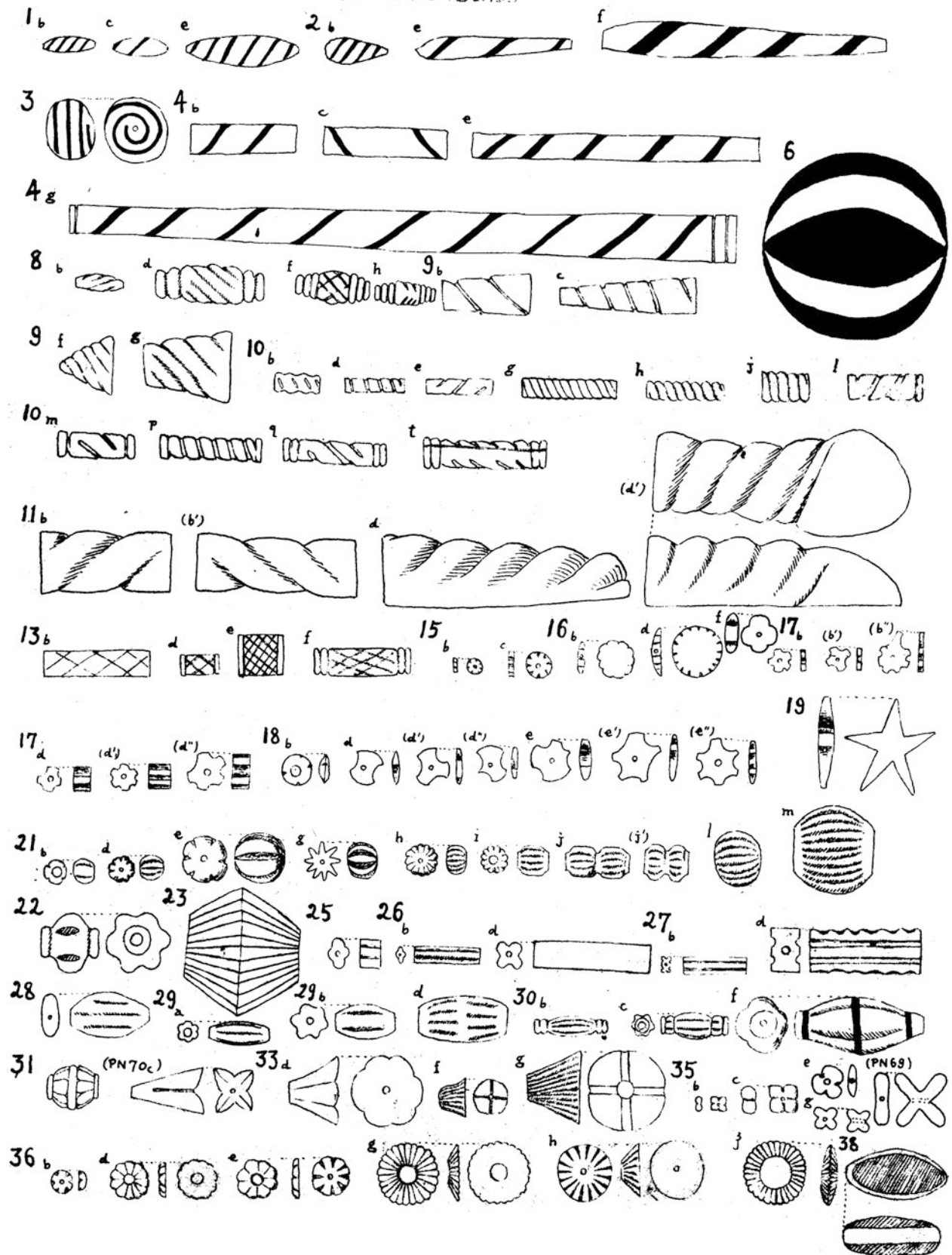
CORPUS OF BEADS OF PASTY MATERIALS, PN 72-99

XII

UNDECORATED SPACERS AND PENDANTS

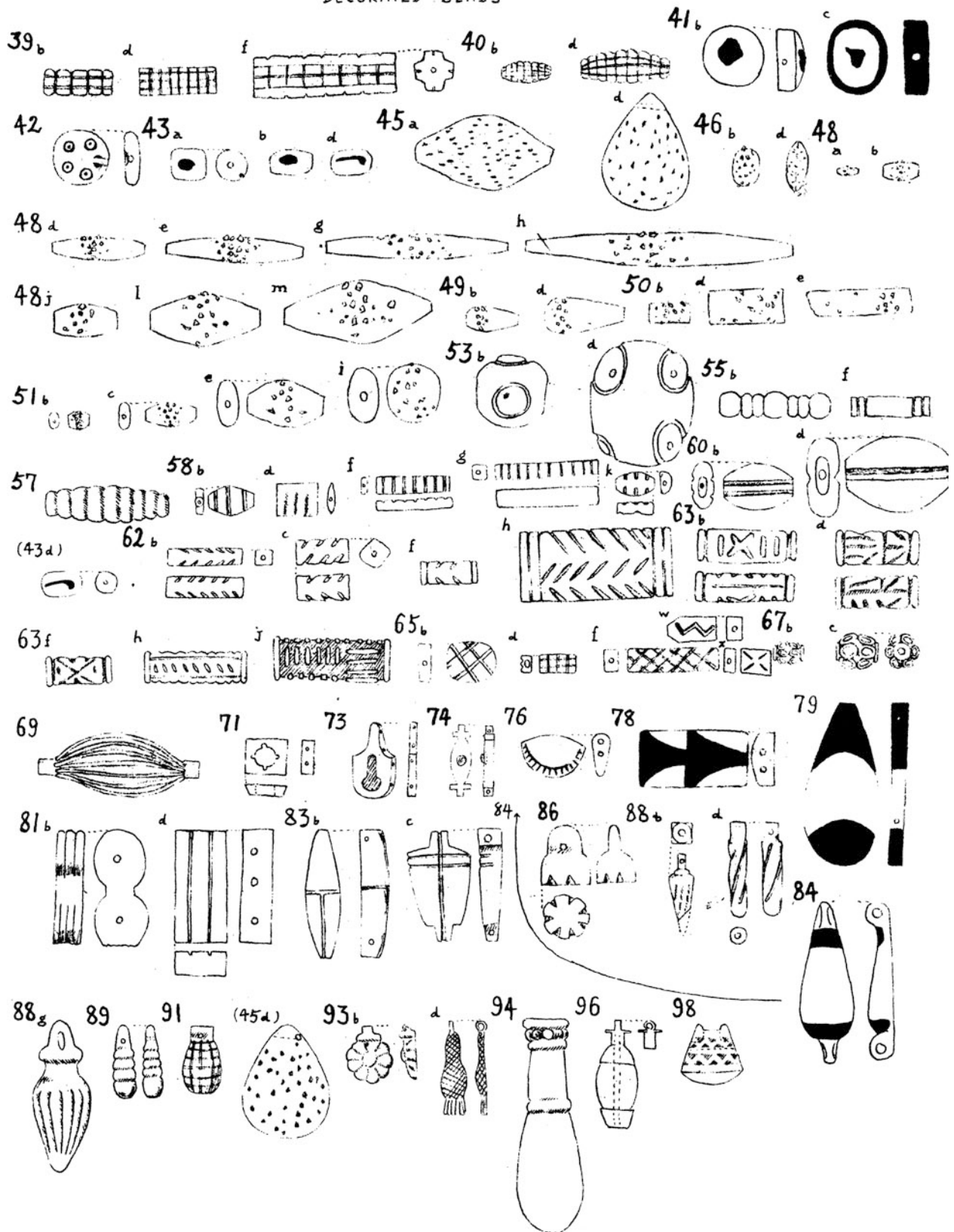


CORPUS OF BEADS OF PASTY MATERIALS. PD I-38  
DECORATED BEADS



CORPUS OF BEADS OF PASTY MATERIALS PD39-98

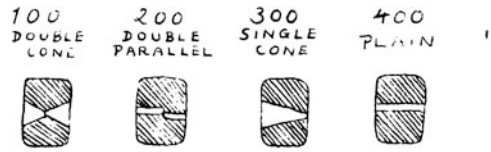
DECORATED BEADS



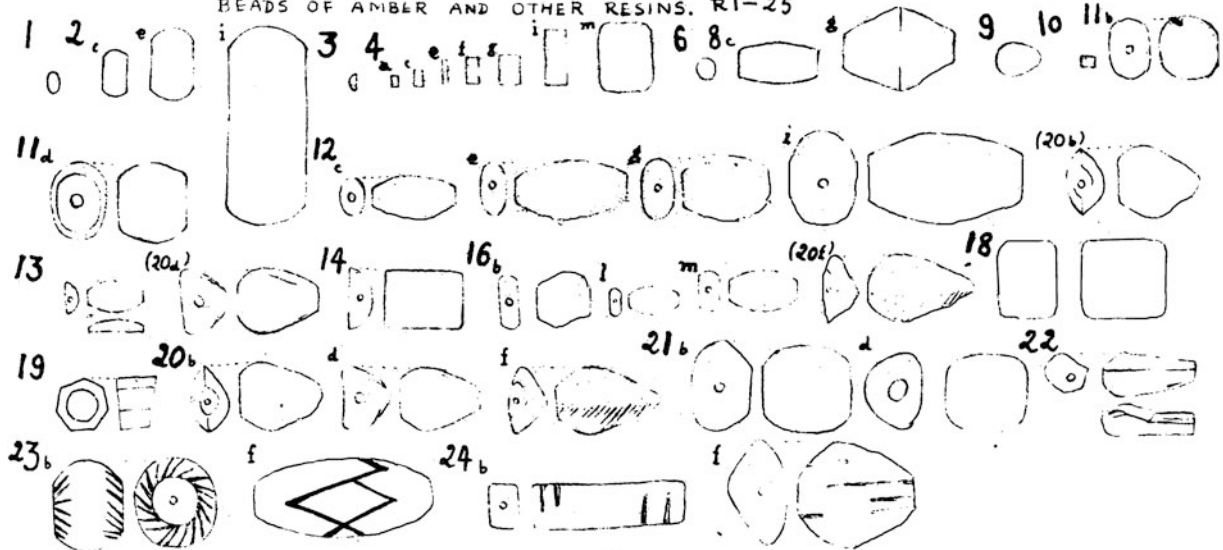
CORPUS OF BEADS OF MISCELLANEOUS MATERIALS (REMAINDERS) R1-50

XV

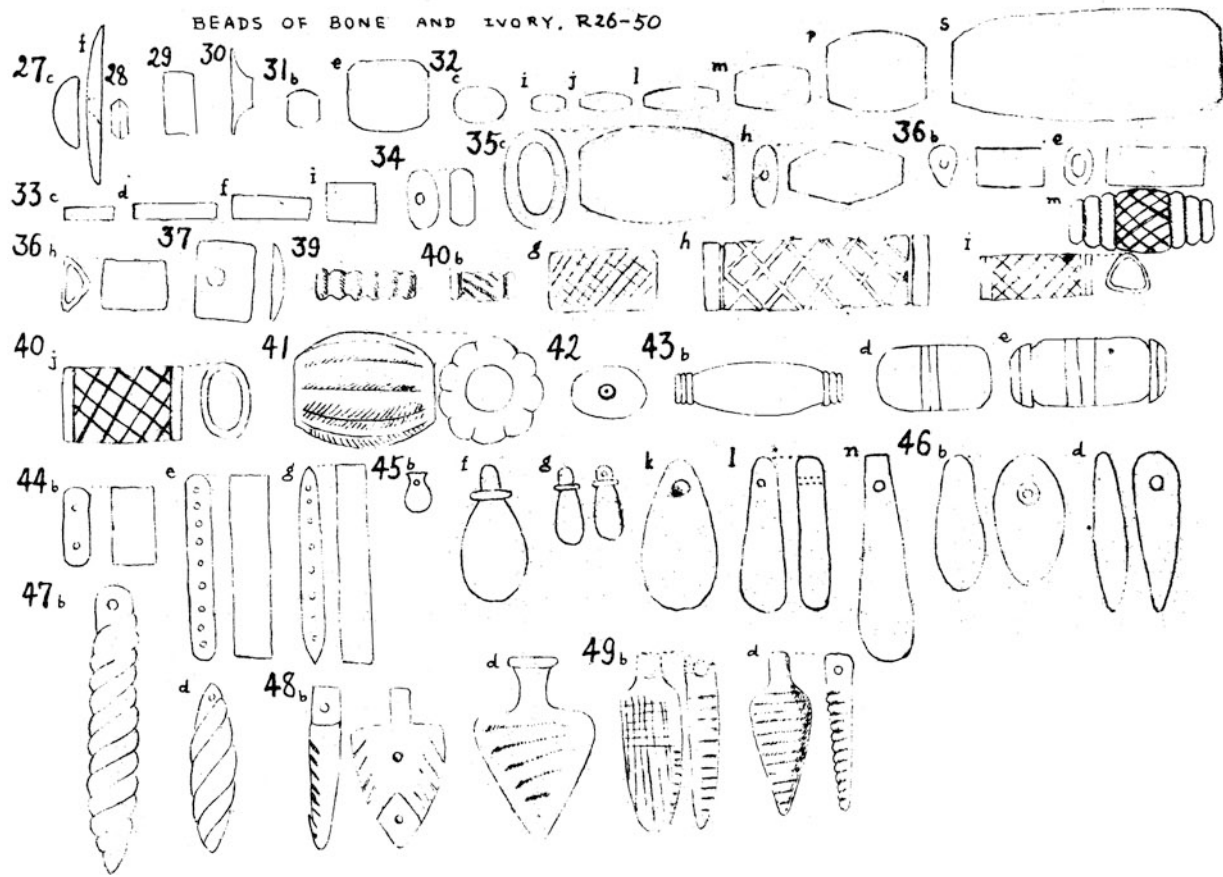
CORPUS NUMBER TO INDICATE THE PERFORATION TYPE



BEADS OF AMBER AND OTHER RESINS. R1-25



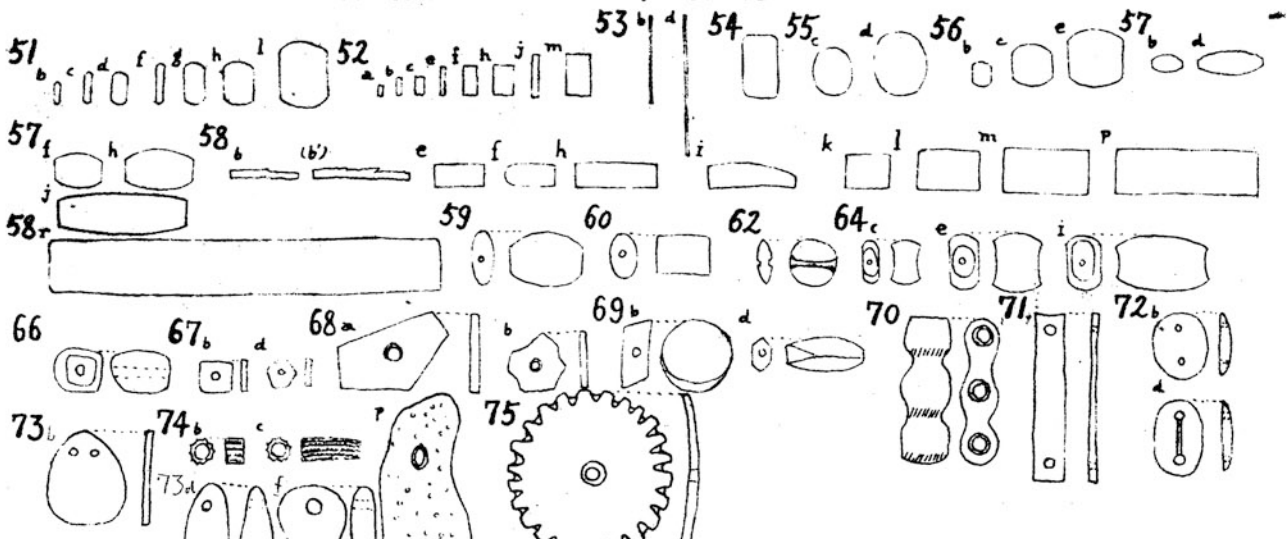
BEADS OF BONE AND IVORY. R26-50



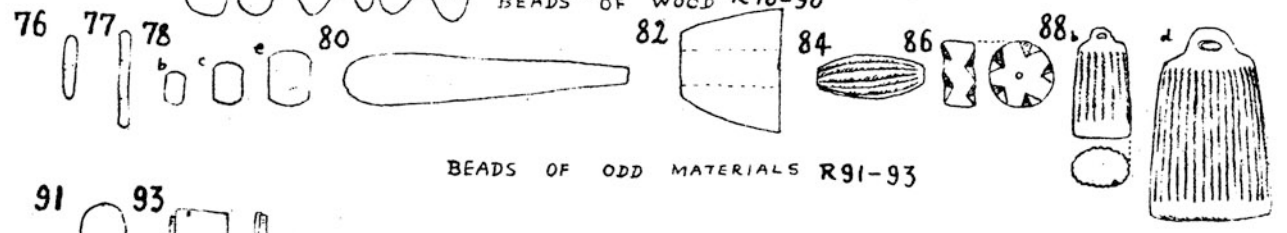
CORPUS OF BEADS OF MISCELLANEOUS MATERIALS (REMAINDERS) R51-93

XVI

BEADS OF CORAL AND SHELL, R51-75

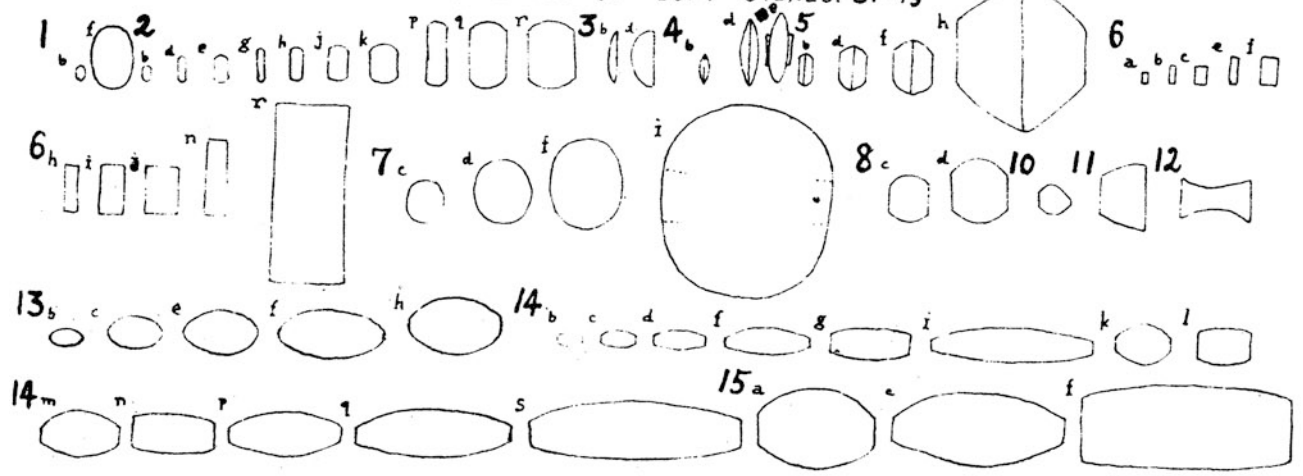


BEADS OF WOOD R76-90

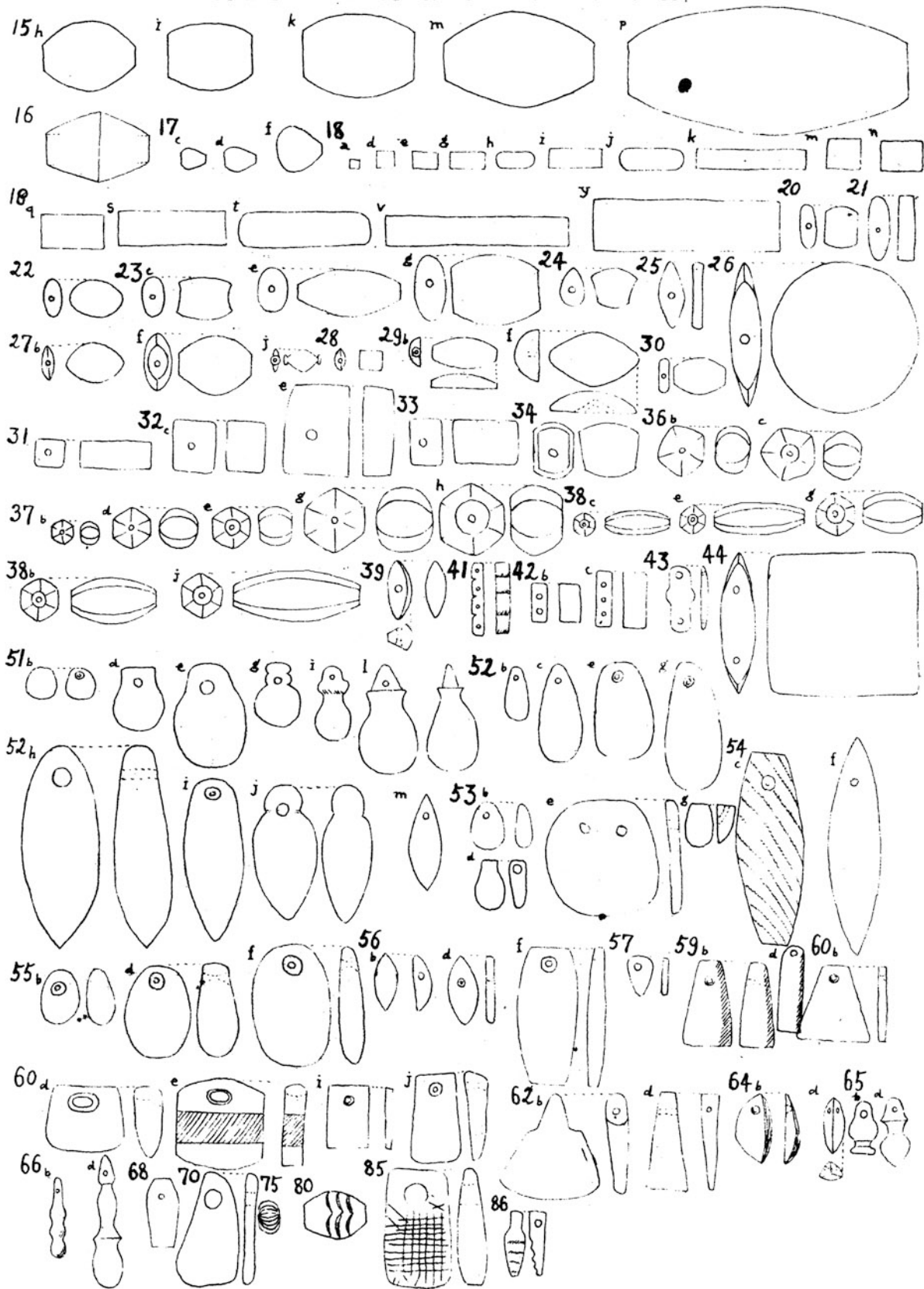


BEADS OF ODD MATERIALS R91-93

CORPUS OF BEADS OF SOFT STONES, S1-15



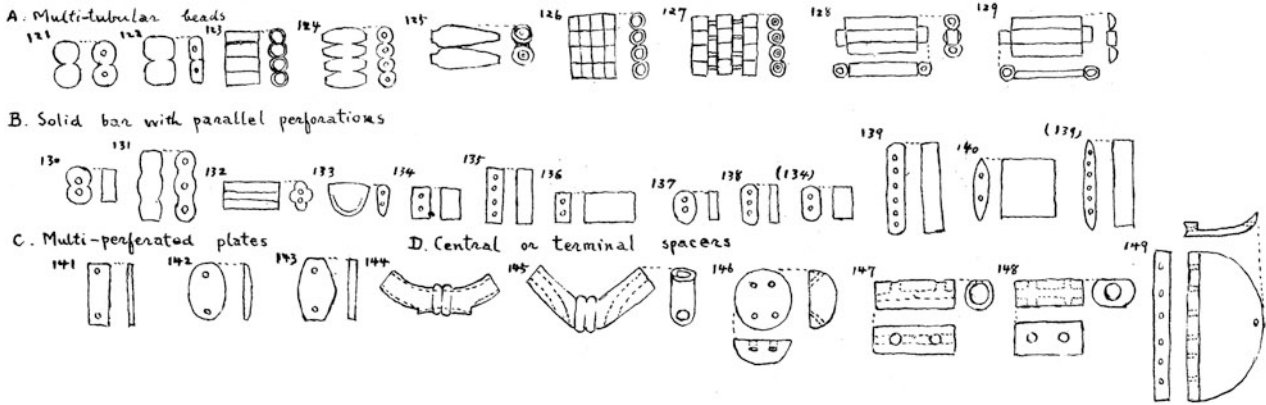
CORPUS OF BEADS OF SOFT STONES. 515-85.



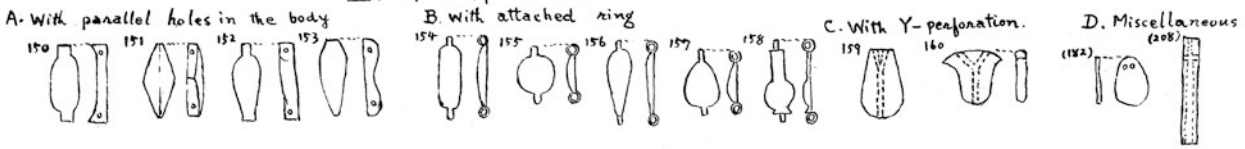


THE ORDER OF THE KEY-FORMS OF UNDECORATED SPACERS AND PENDANTS A120-A240

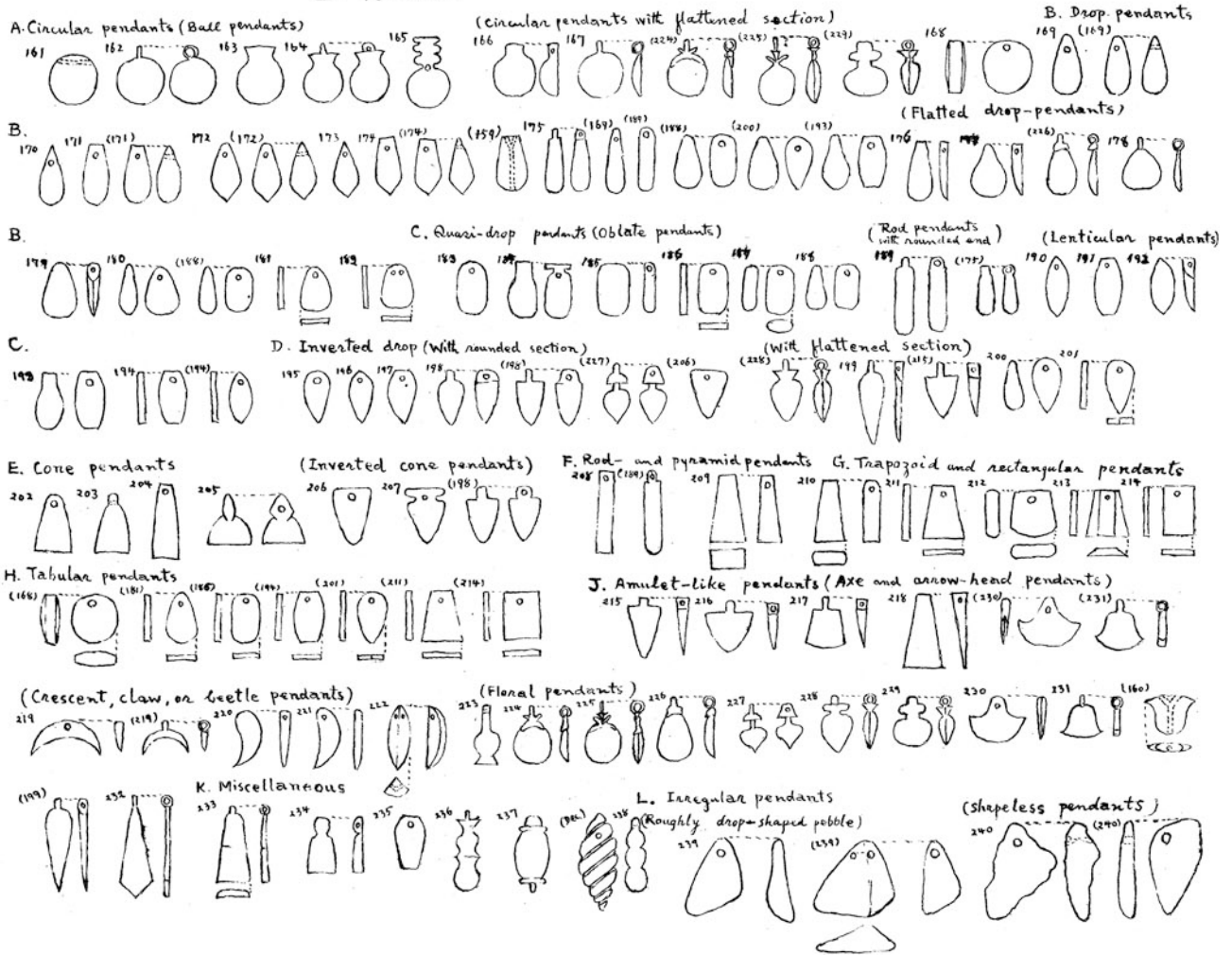
V. Spacing beads



VI. Spacer-pendants

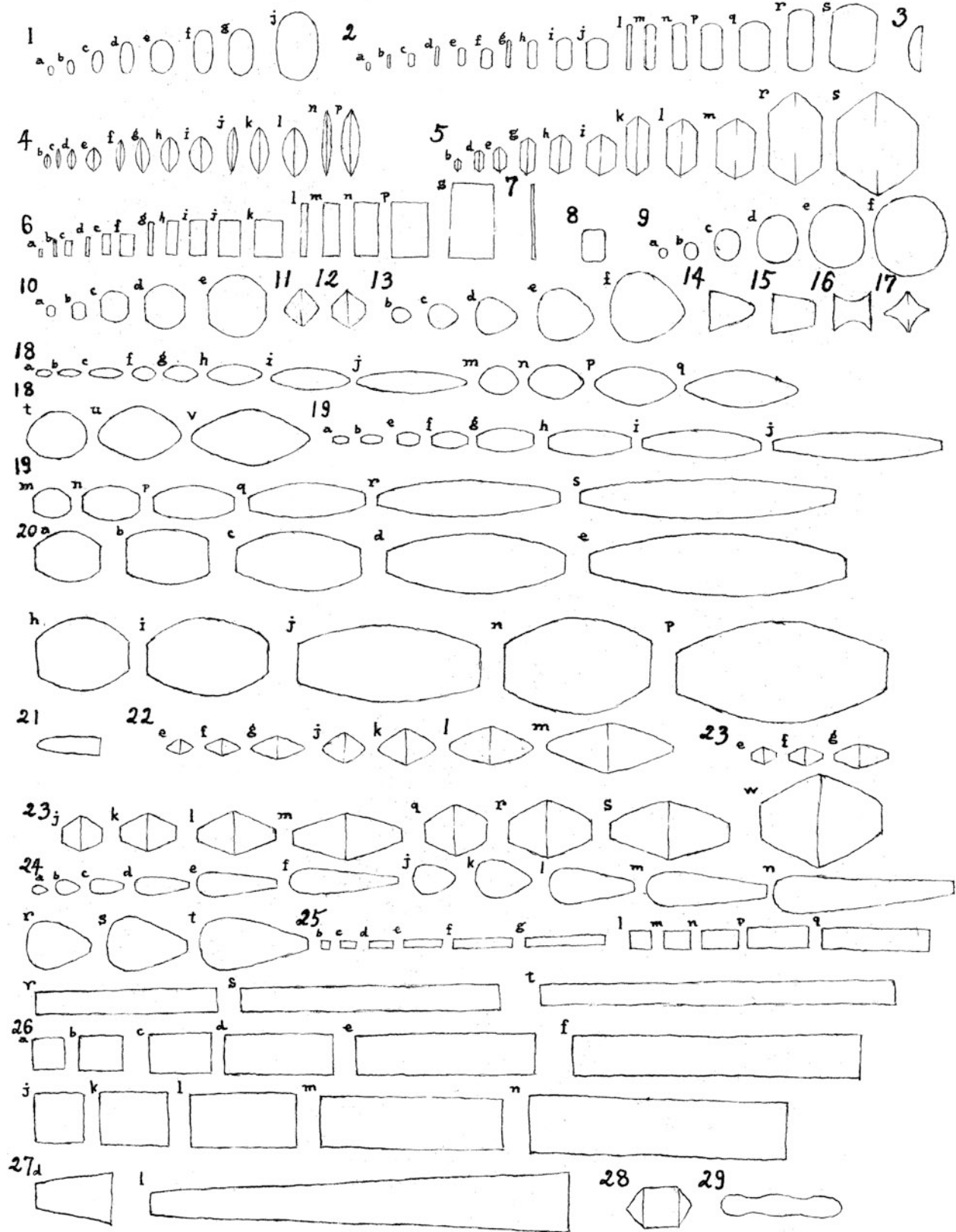


VII. Pendants





COMMON REGULAR BEADS IN BROAD "BASIC DIMENSIONS". B1a-B29.  
(REGARDLESS OF THE VARIATION OF SHAPE OR THE DIFFERENCE OF MATERIAL)



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## Afterword

In 1997, when Mr. Ren Shinan was the director, Institute of Archaeology of CASS entrusted Dr. Wang Tao, who was a reader in Chinese Archaeology and Cultural Heritage, Institute of Archaeology, University College London, to get the photocopy of PhD dissertation of Xianai (typed draft, in English) from library of UCL. At that time, we planned to translate this dissertation into Chinese and publish it together with the English version. Later, due to the personnel changed of London Press, and the difficulty in translation, the publication plan was delayed. In 1995, in order to edit *Collected Works of Xianai*, Wang Shimin, researcher of Institute of Archaeology of CASS, invited Yan Haiying of History Department of Peking University to translate Chapter 1 of Part 1 of the dissertation—Archaeology Value of Ancient Egyptian Beads—and added it into the *Collected Works*. In

consideration of the difficulty in translating the whole dissertation into Chinese, and the English version is sufficient enough for the readers of specialists in Egyptology, we decided to find a way to publish the English version alone and gave up the plan of publishing the Chinese version. In recent years, with the support of present director of Institute of Archaeology of CASS, Dr. Wang Wei, researcher Wang Shimin organized the further editing of Xianai's works and invited Prof. Yan Haiying to do the complete editing and review of Xianai's dissertation, three of her PhD students contributed in the work of retyping the whole dissertation into computer: Wang Huan, Daixin and Huang Qingjiao. Miss Gongwen from Institute of Archaeology of CASS and youngest son of Xianai—Xia Zhengyan—also contributed in the related work.