HISTORY OF OPHTHALMOLOGY 4

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History of Ophthalmology 4

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Theodor Leber's studies in Paris (1864–1867) as an assistant of Richard Liebreich

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Key words: History of ophthalmology, Theodor Leber, Richard Liebreich

In 1864 Theodor Leber, then 24 years old (Fig. 1) gave a report to the Heidelberg Ophthalmological Congress about the vascular system of the eye. He wrote into his diary: 'I demonstrated some preparations of injected vessels in order to explain my report . . . I got much applause' [1, 2].

Among the audience was Richard Liebreich, who at that time invited Leber to become assistant of his clinic in Paris. One year earlier Liebreich (Fig. 2) had published his famous *Atlas of Ophthalmoscopy*, which had been the brilliant conclusion of an eight year period of outstanding effort in von Graefe's clinic [3]. Liebreich possessed impressive artistic ability and while in Graefe's clinic he executed a number of fundus paintings. In 1855, in the first volume of *Graefe's Archives* his illustrations were incorporated in Graefe's publications and also were published as his own 'Ophthalmoscopic Sketches' [4, 5].

Liebreich moved to Paris in 1863 and his *Atlas* was published in both German and French. He wished – as he wrote in the preface – 'that this atlas should get a kind acceptance not only in his home, which he was leaving at this time but from his new French colleagues' [6].

When Leber accepted the invitation in autumn 1864, Liebreich was not the only German colleague he met in Paris. For 20 years a Société médicale Allemande existed and Liebreich had become president of this society. Due to his initiative in 1865 an annual report was published [7]. On the frontispiece (Fig. 3) we find Liebreich as president and Laqueur as secretary. In spite of his French-sounding name, Laqueur was also German. His original name was Herz and he came from Silesia. He had also worked in Graefe's clinic in Berlin. In autumn 1863 he followed Liebreich to Paris as his assistant.

Among the active members of the society (Fig. 4) were two other famous ophthalmologists: Louis Wecker from Frankfurt and Eduard Meyer from Thuringia. Both of them had been assistants of Graefe and had moved to Paris two years earlier than Liebreich. Upon his arrival in Paris, Leber became a member of the Société Médicale Allemande. Through the Société he met Dr. Rottenstein, an oral surgeon from Frankfurt. During the following years, he collaborated with Leber in the field of dentistry.

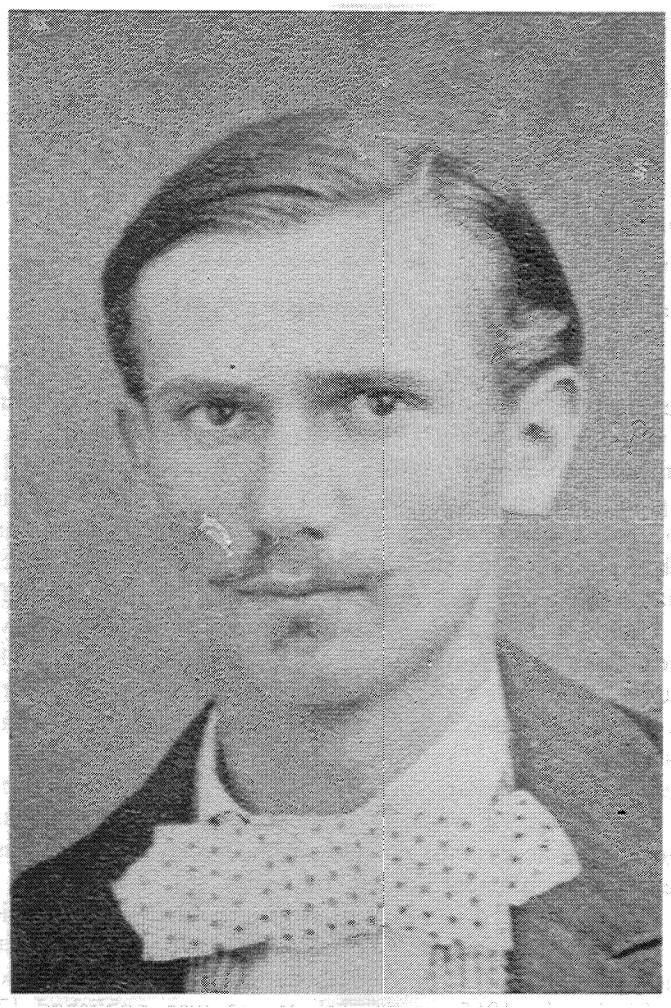


Fig. 1. Theodor Leber (1870–1917)

During his first months in Paris the library of the Société was of great help to Leber. This library included 1600 volumes, 2500 separata and many German periodicals. Following Liebreich's suggestion, Leber published a summary of his research work about the vascular system of the eye in the report of the Société. This French version was edited by Javal and Leber was very grateful for this valuable help.

Together with Javal Leber initiated studies regarding factors determining the amount and the course of astigmatism after cataract extraction. With his newly constructed ophthalmometer Javal worked in Liebreich's clinic and examined the postoperative patients. Unfortunately the prototype of the

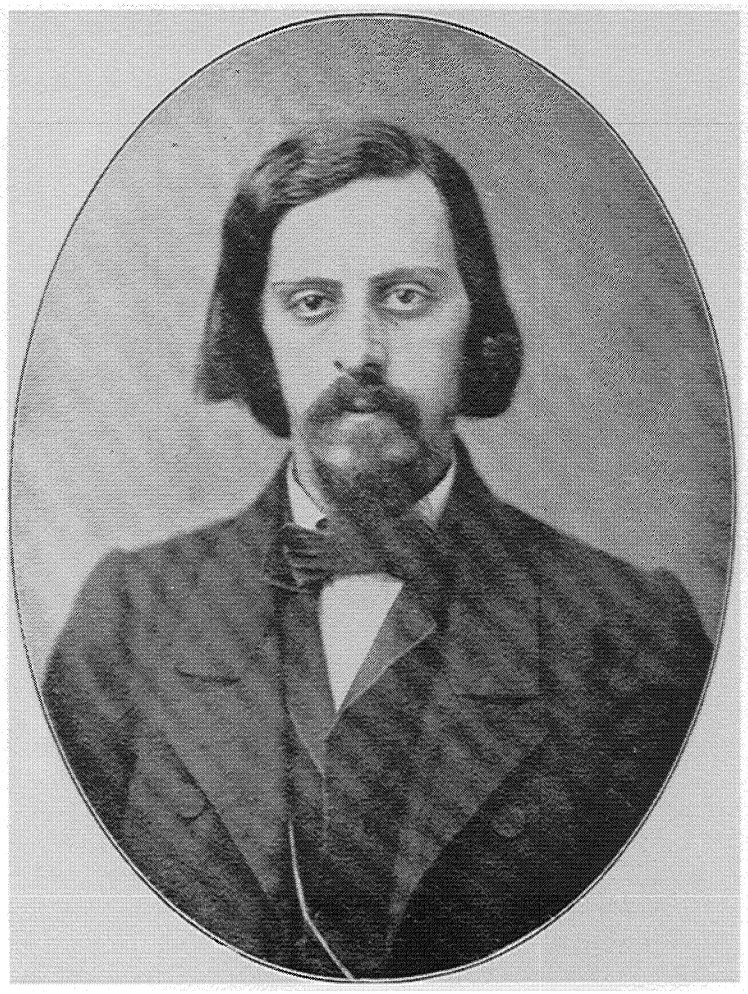
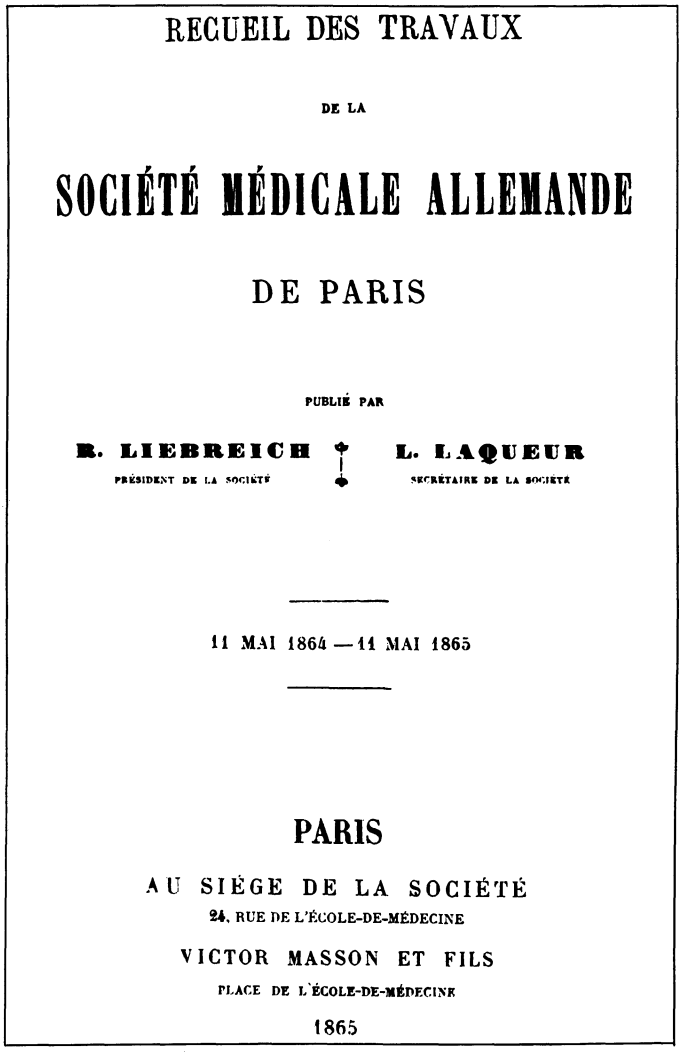


Fig. 2. Richard Liebreich

apparatus was not sufficiently reliable and the examinations were not finished during Leber's stay in Paris. Two years later the results were reported by Javal in Heidelberg.

Certainly Leber's knowledge of the French language was excellent, since by the autumn of 1864 he was able to give a course in anatomy and histology of the eye in French. He continued these courses with good success until 1866.

In Liebreich's clinic Leber and Laqueur were the only assistants and the two were much involved with the outpatient department and in the operation theatre. Leber enjoyed the experience and stated: 'The immense


RECUEIL DES TRAVAUX

DE LA

SOCIÉTÉ MÉDICALE ALLEMANDE

DE PARIS

PUBLIÉ PAR

R. LIEBREICH
PRÉSIDENT DE LA SOCIÉTÉ

L. LAQUEUR
SECRÉTAIRE DE LA SOCIÉTÉ

11 MAI 1864 — 11 MAI 1865

PARIS

AU SIÉGE DE LA SOCIÉTÉ
24, RUE DE L'ÉCOLE-DE-MÉDECINE

VICTOR MASSON ET FILS
PLACE DE L'ÉCOLE-DE-MÉDECINE

1865

Fig. 3. Frontispiece of the first issue of the annual reports of the Société Médicale Allemande.

volume of work does not matter; it is excellent to get practice carrying out routine work'.

Unfortunately a close investigative collaboration between Leber and Liebreich did not develop as they had divergent interests. Liebreich published on surgical problems and prepared a second edition of his *Atlas*. His major concentration was the collection of new fundus-pictures he personally painted.

Leber, however, was interested in experimental work. On the occasion of the Heidelberg Congress in 1865 he prepared a report about the structure of

Liste des membres actifs le 11 mai 1865.

MM. R. Liebreich, président.
Jules Worms, vice-président.
L. Laqueur, secrétaire.
Rottenstein, bibliothécaire.
B. Lewenberg, trésorier.
Bovet, Neufchâtel.
E. Coblentz, Deutz.
L. Gros, Paris.
Gutzeit, Königsberg.
Krishaber, Paris.
Th. Leber, Carlsruhe.
Lehmann, Copenhague.
Martin, Paris.
Ed. Meyer, Paris.
Ordenstein, Paris.
Raszwetoff, Moscou.
E. Schultze, Munich.
Stokes, Dublin.
Tuchmann, Bavière.
L. Wecker, Paris.
Wolff, Berlin.

Fig. 4. Members of the Société Médicale Allemande.

the cornea. He injected turpentine into the corneal canaliculi of animals in order to demonstrate the conjunctival lymph-vessels.

This experimental work as well as clinical observations were the subjects of many reports he gave in the scientific meetings of the clinic which usually took place in Liebreich's home on the Champs Elysées. As a rule they lasted until midnight in a cheerful and friendly atmosphere.

By chance not only Liebreich's name but also the names of all his principal coworkers started with an 'L'. Therefore a telegraph was sent on Liebreich's birthday in the following alliteration: '*Langes, leichtes, leidloses,*

lustiges, liebereiches, leuchtendes Leben lache liederreichem Liebreich! Laqueur, Leber, Loewenberg'. Naturally the English translation cannot imitate this alliteration: 'A long, light, harmless, funny, rich of love-filled, bright life with laughter [may occur] for Liebreich, rich of songs! Laqueur, Leber, Loewenberg'.

This alliteration hints also at other talents of Liebreich. He was not only highly gifted in painting but also in music. Leber's letters describe many invitations and parties of musical performances. Liebreich himself was a fine bass vocalist and Leber admired his beautiful voice and his musical talent.

Stimulated by Liebreich, Leber was introduced into the society of Paris. It was the first time that he established contacts with the intellectual world of an international metropolis. The Hungarian pianist Savrady invited him to the concerts in her home. He was a permanent guest of the international jour fixe of Dr. Ludwig Bamberger [8], who was compelled to flee from Germany because of his membership in the republican movement of 1848. Especially near the end of his stay in Paris, Leber received so many social invitations that he was hardly able to accept them all.

Without any doubt the highlight of these social events was the visit of Napoleon to the clinic. The mother of Empress Eugénie, the countess Montijo, suffered from glaucoma, and was operated upon by Liebreich. Leber described in detail the iridectomy performed on the right eye, 4 July 1856, following a method previously published by Liebreich. The function of this eye had been decreased by constriction of the visual field. One week later the healthier left eye was operated on. The operations on both eyes were successful and constituted a great success for Liebreich. Leber was very impressed by the beauty of the Empress Eugénie and by the affability of Napoleon. The latter ignored with friendly nonchalance the fact that Liebreich was introduced to him still wearing shirt sleeves and without a coat. Leber also admired the very modest behavior of the countess during the clinical treatment.

Soon after this exciting event Leber came to Heidelberg. At the Ophthalmological Congress he met Hermann Knapp, his first ophthalmological teacher. During the last weeks he had spent in Knapp's clinic he had prepared together with Knapp a report about binocular ophthalmoscopy with Giraud-Teulon's ophthalmoscope [9]. The advantages of this new technique were accurately described in this report, which was translated into French by Louis Wecker and published in 1864 in the *Annales Oculistiques* [10, 11].

Knapp and Leber were probably surprised to learn that Liebreich had not tried to establish scientific contacts with Giraud-Teulon in Paris and that he did not use the binocular ophthalmoscope. There was no mention of it in Liebreich's publications.

The relations between Liebreich and his French colleagues in Paris were not without animosities. Certainly Liebreich's popularity in the Society and his connections to the family of the Emperor caused envy. This became

evident, when the Empress asked one of the ministers to appoint Liebreich as a professor at the University. Leber was deeply disappointed to find that the faculty at the University refused. Their opposition was based on the fact that Liebreich never had become a doctor of the Paris faculty and never had participated in any 'concours'. The French press unfortunately published articles and cartoons which defamed Liebreich. Although the faculty was asked to give a full explanation of its decision, Liebreich ended the matter by withdrawing from consideration.

The embarassing affair was seen by Leber to be related to the declining political position of Napoleon during 1865. In response to the opposition in the parliament, Napoleon was compelled to withdraw French troops from the Mexican expedition. This, however, spelled disaster for the Emperor Maximilian, who had been installed by Napoleon [12].

In January 1866 a colleague of Leber went from Vienna to Paris. He was assigned as a medical officer of the volunteer Austrian troops of Maximilian. Leber foresaw the catastrophe in Mexico and was concerned about the fate of this colleague. In his own words: 'I am in extreme fear for him, but naturally it was, here, in Paris, too late to change anything'.

One short period of renewed enthusiasm for Napoleon occurred in July 1866, when Venice was to be turned over by Austria to Napoleon in order to gain his support during the Prussian-Austrian war. Leber wrote: 'Napoleon is at the climax of his glory and power. Not in vain the city was illuminated and decorated with flags'.

The enthusiasm, however, was short-lived. Venice was instead given to Italy and peace between Prussia and Austria was declared so quickly that Napoleon's role as an arbitrator was no longer needed. Therefore the compensations he required were refused by Bismarck. Thus the former enthusiasm changed into the cry: Revenge for Sadowa.

The battle for Sadowa, or Koniggrätz, as it is called in German also had an important effect on Leber. He was invited to visit the Prussian war-hospitals around Koniggrätz in the company of an American medical officer whom he had met in Paris. The American colleague was ordered to give a report to his government.

Leber took two months of leave from Liebreich. During the ensuing time in Bohemia he had many valuable and instructive experiences in military medicine. Afterwards he returned to Liebreich's clinic and remained in Paris during the winter, since his new position as an assistant to Graefe in Berlin was not available until Easter 1867.

During these last months in Paris he completed histological, bacteriological, and biochemical studies in conjuction with Dr. Rottenstein. They published together a monograph on the development of caries of the teeth. This monograph appeared not only in Germany but was reprinted in France, England and the USA.

Following his return from Paris, Leber continued to have friendly contacts with Liebreich. The developments in ophthalmology, however, were not the

main subjects of their correspondence, since Liebreich had gradually retired from ophthalmology.

In 1917, exactly 50 years after his farewell to Paris, Leber wrote the obituary for Liebreich [13]. In an impressive way he described his great talents and contributions, but also the difficulties he had to face and which finally caused his resignation. This was the last note Leber published 14 days before his own death.

Acknowledgement

Th. Leber's diaries and letters of these years in Paris are preserved in the archives of the Leber-family in Heidelberg. I am very thankful that I could use all these valuable sources for this publication.

References

1. Jaeger W. The foundation of experimental ophthalmology by Theodor Leber. Doc Ophthalmol 1988; 68: 71–77 [History of Ophthalmology, Vol. 1].
2. Jaeger W. Theodor Lebers Arbeiten über das Blutgefäßsystem des Auges am Josephinum in Wien (1863/64). Spektrum Augenheilkd 1990; 4(6): 217–220.
3. Liebreich R. Atlas der Ophthalmoskopie, 1863; 2. edn. 1870.
4. Liebreich R. Ophthalmoskopische Notizen. v. Graefes Arch 1855; 1(2): 33–356.
5. Kaiser W. Friedrich Richard Liebreich (1830–1917). Ein hallescher Doktorand als Pionier der modernen französischen Ophthalmologie. Wiss. Z. Univ. Halle 1973; 22(4): 89–94.
6. Hirschberg J. Geschichte der Augenheilkunde IX und X. In: Handbuch der gesamten Augenheilkunde v. Graefe-Saemisch, 2 edn, Vol. 15. Berlin, 1918.
7. Liebreich R, Laquer L. Recueil des Travaux de la Société Médicale Allemande de Paris. Paris: Victor Masson et Fils, 1865.
8. Arnsberg P. Die jüdischen Gemeinden in Hessen: Anfang, Untergang, Neubeginn. 1971; 2: 28–29 (Short Biography of Dr. Ludwig Bamberger).
9. Giraud-Teulon AM. Ophtalmoscope binoculaire ou s'exerçant par le concours des deux yeux associés. Ann d'Oculistique 1861; 45: 233–250.
10. Knapp JH. Über die Vorzüge des Binokularen Augenspiegels. Report of 23.1.1863 in collaboration with Theodor Leber. Verhandlungen des Naturhist.-med. Vereins zu Heidelberg 1865; 3: 26–33.
11. Knapp JH. Exposé des avantages de l'ophtalmoscope binoculaire. Ann d'Oculistique 1864; 51: 33–42.
12. Valsecchi F. Das Zeitalter Napoleons III. und Bismarks 1854–1878. In: Historia Mundi 10: 53–92. Bern, 1961.
13. Leber Th. Richard Liebreich. Nachruf Klin Mbl Augenheilkd 1917; 58: 566–576.

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A German oculist in Russia

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Key words: History of ophthalmology, Joseph Hillmer

In the summer of 1751 the Viennese oculist Joseph Hillmer travelled from Berlin to Russia. He entered the empire of the Tsarina Elisabeth from East-Prussia, where he was called by some patients who were suffering from eye-diseases.[1] Hillmer was born about 1720. His father let him become a surgeon and taught him to couch the cataract as he did himself.[2] In spite of many known facts about Hillmer's life between 1746 and 1775, we do not know when he died. From 1750 until about 1768 he resided in Berlin and owned a large house near the Berlin castle 'An der Jäger-Brücke' (Fig. 1).[3]

In 1748 Frederick II of Prussia had appointed Joseph Hillmer an ordinary professor at the Berlin Collegium Medico-Chirurgicum. From 1740 to 1770 Simon Pallas (1694–1770) lectured on eye-diseases in his capacity as professor for surgery at that first Berlin medical school, which was founded in 1724. Hillmer's obligation was to lecture on ophthalmiatrics in particular – 120 years before Albrecht von Graefe (1826–1870). But first the king permitted the oculist to continue his practise as he travelled extensively throughout Europe, because Hillmer wished to get more experience for his professorship.[4]

In the beginning of August 1751, Hillmer stayed for a few days in Riga in Livonia, which had (with Estonia) become a part of the Russian empire by the Treaty of Nystad in 1721. He cured surgically at least 14 patients, 11 of them by couching on 14 eyes. Eight blind people, having been treated by Hillmer's round cataract needle, remained as blind as before or their eyes got worse. Two of the patients who could see better by that therapy had been couched on both eyes, but we do not know whether improvement was in both eyes or monocular only. One of them, an 80 year old man, was sent home by the oculist without any bandage immediately after having been couched. The Municipal Physician of Riga, Benjamin Theophil Graf (1700–1767), took over to cure this old man postoperatively, at last with good result. Only a few days after his operations Hillmer had left this town, not regarding post-operative complications or healing of his clients' eyes.

Before leaving Riga he had committed a depository of his drugs to a merchant. Such commitments were as typical for oculists as for tradesmen. While staying at a place the oculist himself sold his remedies, a part of them under the term of *arcana*, meaning: with secret pharmaceutical composi-

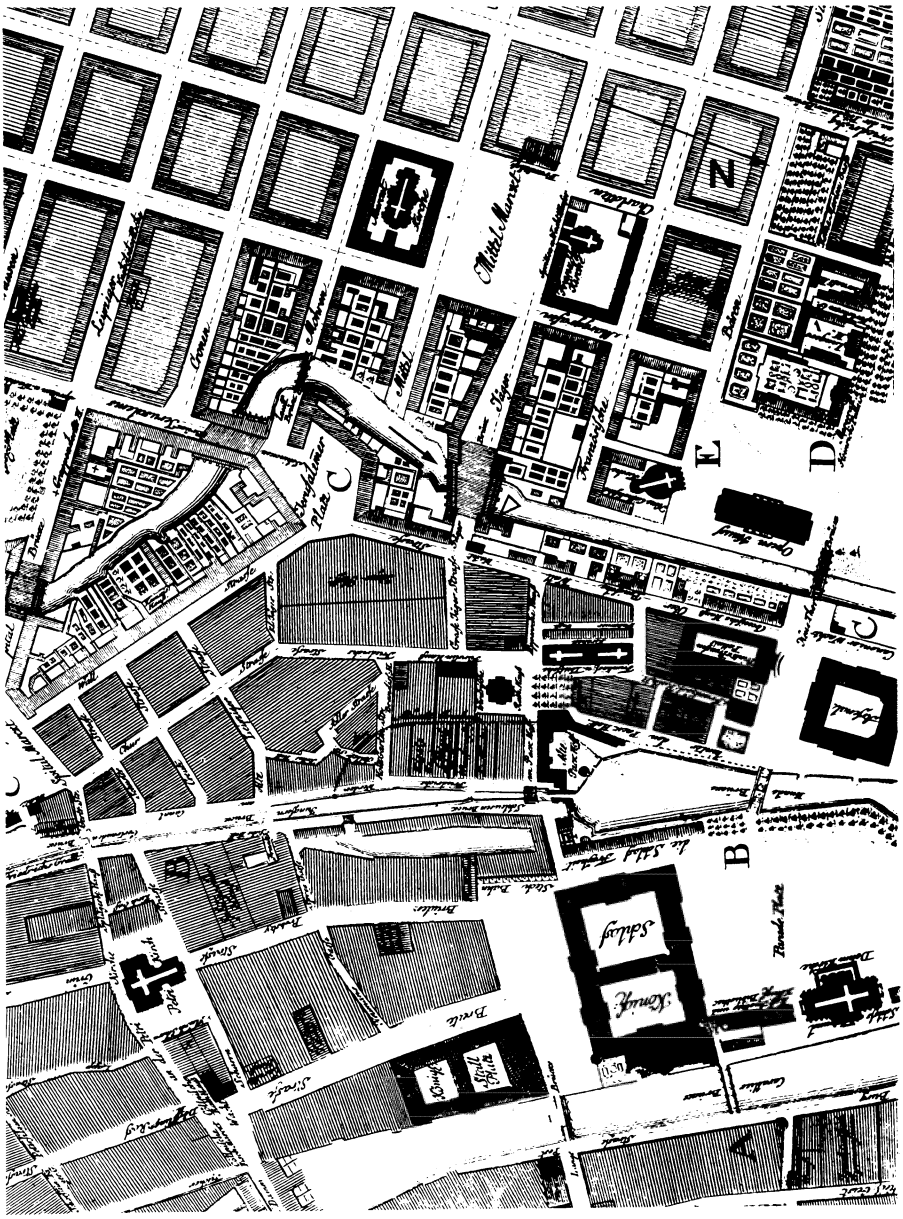


Fig. 1. A part of Schmettau's Berlin map (1748) showing the *Jäger-Brücke*; Hillmer's house is indicated by a triangle in the center of the map. (Landesarchiv Berlin)

tions, which should be useful especially against eye-sicknesses. Nevertheless, most buyers were cheated by high-priced common substances. On the 30th of November 1751 the Municipal Physician Graf wrote to Herman Kaau Boerhaave (1705–1753) in St. Petersburg, indicating that he was unable to hinder Riga tradesmen from selling such deposited drugs, if the duty was paid.[5] Kaau Boerhaave, a nephew of Herman Boerhaave (1668–1738), had become in 1748 the First Personal Physician of the Tsarina Elisabeth and director of the Petersburg Medical Chancellery (*Medicinskya kantselyariya*), the Russian medical supervising board at the time. By the same letter Graf also asked Kaau Boerhaave what he should do if the notorious charlatan John Taylor (1708–1772) arrived (this oculist actually visited Russia in 1752/53) or another vagabond of that sort.

On the 13th of August 1751 Hillmer had arrived at Pernau in Estonia. The mayor Furst and the senior finance officer welcomed the oculist. The next morning Furst ordered the Pernau Municipal Physician Johann David Wissel (1719–1775) to be informed, that 'a very famous and great physician, the Court Counsellor and Doctor Hillmer has invited the municipal authorities to his operations'.[6] They all wanted to accept the invitation and Wissel should join them. The Municipal Physician wondered who had permitted Hillmer to practise. He only watched the oculist couching the cataract on the 61 year old nobleman Krüdener's eyes, with bad results on the right one. But Krüdener had been operated on in the same way one year before by the oculist Goulliette from Königsberg.

In 1745 Goulliette had couched the cataract on both eyes of Peter Anton Knutsen von Gyllenstubbe (1671–1757), the head of the administration district (*Landrat*) of Arensburg at the island Oesel in the Riga bay. Goulliette's surgery had given better sight to the patient, but he could not read without glasses, which the oculist had promised to send by post. But he never did so, although he and his companion Tenel, a razor-smith from Mitau in Courland, had earned from Gyllenstubbe 600 roubles, which would be 24 000 DM today (at the time one rouble was equivalent to 1,69 g of gold).

In 1751 Gyllenstubbe consulted Hillmer in Pernau, where the oculist let one of his servants distribute handbills (we know only one piece from Frankfurt in 1746; Fig. 2) and blow a French horn to announce his arrival. Hillmer treated Gyllenstubbe a second time by couching as Gouliette had done before. All facts indicate that this repeated therapy was done without proper indication. The result was worse than that of the first treatment.[7] Hillmer took some more money: 1000 roubles (40 000 DM) while his wife tried additionally to get a couple of horses.[8] However, Hillmer had also delivered glasses to Gyllenstubbe, who became able to read and who characterized the oculist 'as a good cataract and money-bag-cutter'.[9] Only Joseph Hillmer boasted about a payment of 10 000 roubles![10]

Within four days the oculist had operated on eleven patients in Pernau. In

Hierdurch wird zu wiſſen gethan, daß heut aus Nürnberg hier iſt ankommen der Weltberühmte Herr Operateur Hillmer, Chirurgus Oculiſta D. Medicinæ, welcher in Ungarn, Oeſtereich, Böhmen und andern Orten, wie aus ſeinen vielen Atteſtatis zu erſehen, in verſchiedenen menſchlichen Gebrechen bey hohen und niedrigen Wunder-Curen gethan, auch wird man ſchon zum theil aus einigen Zeitungen vernommen haben, daß ſolcher erſt kürtzlich in Nürnberg und umliegenden Gegend bey etlicher Wochen Aufenthalt etlich und 40. ſtockblinde Perſonen mit Gottes Gnad hat ſehend gemacht, vieler anderer groſſen Curen, die man nicht zu Papier kan bringen, zu geſchweigen; es werden nicht allein ſolche von denen dermahlen hier gegenwärtigen Herren Nürnbergern, ſondern auch Anſpachern, Windsheimern, Offenheimern und Würtzburgern in ſo wenig Tägen Aufenthalt bey der Durchreiſe geſehen und gehöret zu haben, können angerühmet werden. Er ſtatuiret ſich hier ebenfals ein groſſes Lob zu machen. Man glaube aber nicht daß er ein Marcktſchreyer oder ſo gewöhnlicher unerfahrner Land-Betrieger ſeye; dann er ſteiget Zeit ſeines Lebens auf keine Bühne oder Theatrum und ſchickt niemand von ſeinen Leuten aus, vielweniger darff ſich ein Paquet-Krämer rühmen mit ihm eine Connoiſſance oder Bekandtſchafft zu haben, und reiſet auch keinen Meſſen und Jahrmärckten nach, ſondern, weilen er an verſchiedene Höfe und Städte beruffen iſt, und dermahlen ſeine Durchreiſe leydet, ſich etliche Monath hier aufzuhalten, ſo wird er nicht ermangeln allen Armen um Gottes willen, und denen Reichen um ein billiges zu dienen, wo aber gar keine menſchliche Hülffe mehr zu hoffen, ſolches gleich aufrichtig zu ſagen, und darff ihm ein Blinder nichts zahlen er habe dann zuvor ſein völliges Ge-

Geſicht: Sie belieben ſich nur bey Zeiten ihm anzuvertrauen, damit er Gelegenheit hat in der That mehr als zu glauben iſt, mit wahren Proben ſich ferner zu recommendiren. Es beſtehe in was es nur immer wil, wird er nichts annehmen, wo er nicht gewiß weiß zu helffen. Wer ſeinen Zuſtand ſelbſt nicht weiß, oder erkennen kan, der beliebe nur den Urin zu ſchicken, er wird in allen ſtücken jederman zeigen, daß er ein ſo groſſer als aufrichtiger und gewiſſenhaffter Medicus ſey.

P. S.

Der 24ſten Septembr. frühe um 10 Uhr iſt honetten Perſonen erlaubt zuzuſchauen, wie er ſtockblinde ſehend machet, mehrentheils mit ſeinem geheimen Augen-Geiſt in einer Minuten; ſolcher dienet ſehr wohl allen blöden Geſichtern; Dergleichen geheime Mediciniſche Kleinodien er mehr beſitzet in hinfallender Sucht, Schwindſucht, Venus-Kranckheiten, Fieber, Haupt, Magen, und Weiber-Zuſtand, auch taube und lahme damit zu curiren.

NB. Die armen mögen ſich nur gleich bey Zeiten melden um die Proben umſonſt an ihnen zu zeigen.

Logirt in der Fahrgaſſe im ſchwartzen Adler.

Franckfurt den 18. Septembr. 1746.

Fig. 2. Hillmer's handbill from Frankfurt. (Stadtbibliothek Frankfurt am Main)

seven cases he couched the cataracts on nine eyes, seven of which lacked positive results. He had treated a woman of 67 years by couching the cataract on the *wrong* eye, which had a sufficient sight before that cure. Afterwards she was blind in both eyes. Here we may get the idea that Hillmer was left-handed (Fig. 3). The Municipal Physician Wissel let this woman's son, Andrei Garriën, in his capacity as Municipal Notary certify the case for the Medical Chancellery in Petersburg.[11] We learn by the certificate that Garriën's poor mother had to pay 12 roubles for Hillmer's endeavour.

In one case the oculist had cut off a pterygium incompletely. He tried also in vain to help a young girl by treating her pockmarked face surgically. When he undertook to cut off a ganglion from the right hand of the Pernau garrison's Sergeant Or, he could not remove it completely. The Municipal Physician wondered why none of the garrison's surgeons had been informed and why the officers had sent this patient directly to the oculist. For some

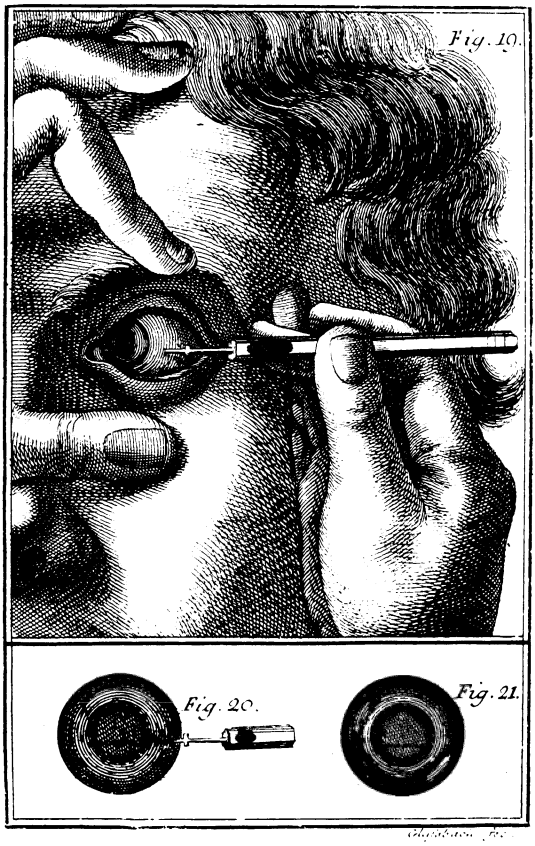


Fig. 3. Cataract couching by *Güntz*. (A. von Haller, *Disputationes Chirurgicae Selectae*)

officers' infertile wives Hillmer had prescribed herbal baths, made from rue, marjoram, mint, valerian, thyme, lavender and juniper.

Before the oculist left Pernau on August 17th, he had committed again a drug-depository to the postmaster Friesel. Moreover, after the oculist's departure Heno's pharmacy in Pernau sold Hillmer's *Eyespirit*. More than two months later Wissel reported to the Medical Chancellery in Petersburg, that on December 1st, the Colonel Ulbrich had died, because every day since Hillmer's visit he had taken 80 drops of his *Universal Elixir*, which was composed mainly of aloe and myrrh.[12] Measured in high doses, aloe has the effect of a drasticum.

On the 27th of August Hillmer reached Narva at the old Estonian–Russian border, having visited Reval for a few days. The Municipal Physician of that town, Johannes Burchart (1718–1756), reported to the Medical Chancellery on 11 patients having been operated on by couching the cataracts on 14 eyes, without any good result for nine of them.[13] While trying to remove a 'thick pellicle' from one eye's cornea, the oculist had cut through the latter and caused a staphyloma. As usual he sold his remedies and distributed handbills. Reval's Municipal Physician had sent some of these handbills to St. Petersburg to inform Herman Kaau Boerhaave. He also announced to the director of the Medical Chancellery, that 'another charlatan, actually Taylor', would be on the way.

When Joseph Hillmer arrived at Narva, the Municipal Physician of that Estonian place, Johann Gottfried Keiling (1687–1766), assisted by local authorities, tried to inform him about the Royal Swedish medical decree concerning oculists, and its Russian equivalent from 1750.[14] Nevertheless, Hillmer passed over the Municipal Physician's supervising function and started his operating and drug-sale. He had used his professorship as an argument, threatening to denounce Keiling to high-ranking persons in Petersburg, 'because he has written thither to His Excellency the Privy Councillor von Boerhaave'.[15]

During his five days in Narva Hillmer treated at least nine patients, six of them by couching their cataracts. There was a good result in one eye only. The Baroness von Rosen had paid 1000 roubles for unsuccessful couching. Because Hillmer had guaranteed the baroness that he would return the money, if he did not succeed in couching her cataract, she requested the tsarina by a petition to make him fulfill his promise.[16]

The oculist operated on a staphyloma of a young girl's eye, which had been induced by smallpox, and earned 50 Roubles. Because he had cut open the eyeball, his surgical intervention produced a phthisis bulbi. He plucked eyelashes, when a woman suffered from 'phalangosis' (trichiasis). On the 31st of August he left Narva; the above mentioned person blowing the French horn was driving in front of him. Hillmer had committed a big drug-depository to Narva's postmaster Schmid.

When the oculist reached the Russian capital, he changed his tactics. In

Petersburg resided the first physician of the empire directing the Medical Chancellery, the supreme authority for all Russian medical affairs. The documentation of facts on Hillmer's Baltic and Russian undertaking, edited by Kaau Boerhaave,[17] shows clearly how difficult it was at the time to enforce medical supervising regulations throughout the country, because of poor traffic connections. Moreover, Hillmer wanted to stay in Petersburg longer than only a few days, as he usually did at smaller places (to avoid the trouble with postoperative complications, induced by his surgical treatments). The large capital made him wait for more clients and money.

So he visited Herman Kaau Boerhaave on September 4th and asked him to permit his eye-surgery and drug-sale. The director of the Medical Chancellery could not allow the latter, because in St. Petersburg drugs could be sold only by crown pharmacies (*kazennye apteki*[18]). If Hillmer would have a special pharmaceutical composition or arcanum, at his request the Chancellery would analyze the speciality. If it was approved to be sold by the crown pharmacies, the oculist would get a reward. The pharmacological analysis proved Hillmer's remedies as commonly known, with the exception that the oculist had left out some expensive components of the prescriptions, to make more profit by his self-made drugs, which were also priced much higher than those of remedies sold by pharmacies.

With regard to his practising, Hillmer was informed by Kaau Boerhaave, that he had to undergo an examination, as did any foreign physician or surgeon who wanted to practise in Russia. The regulation was based on a decree of Peter I in 1721.[19] It was similar to that of Prussia in 1718.[20] When Hillmer replied that he wanted only to cure eye-sicknesses, Boerhaave ordered him to perform sample operations in the presence of experienced physicians and surgeons, amongst them Petersburg's Muncipal Physician, James Grieve (1703–1763). The test was carried out by couching some cataracts on September 12th. (We find all the dates refering to Hillmer's visit to Petersburg in the diary of the Medical Chancellery.[21]) The oculist had to look after his patients (on his own account) in accordance with the rules of the surgical profession. Comparing these conditions with the reality of the oculist's visits to the other places mentioned here, we may understand the difference between orthodox medicine and surgery and such parasurgical persons as the oculist. He was not allowed to practise until the results of his operations were evaluated.

Only two days later the Medical Chancellery was informed that Hillmer had operated illegally without advising the medical authority. At the time the director of the Chancellery, in his capacity as Personal Physician of the tsarina, was staying at Catherine's Palace in Tsarskoe Selo. When he had received the information, he wrote a letter to Grieve on September 15th, renewing his orders on Hillmer. The very next day the occulist illegally couched the cataracts on both eyes of a high-ranking priest, the Protopope Slonskii. On the 17th of September he was summoned to appear in the

Chancellery and asked about his illegal behaviour. Hillmer promised to be obedient in the future.

Moreover, by (the tsarina's request and) order of that medical supervising board he couched the cataract on both eyes of the Court Lady Katerina Polikarpova in Tsarskoe Selo on September 19th, and without announcement to the Chancellery on another woman there. In addition he had examined a 'virtuoso' at the tsarina's court, most likely the violinist Pietro Mira (Petrillo),[22] whom Hillmer felt unable to cure. The operation of the Lady Polikarpova was performed in the presence of Her Majesty and had earned the oculist 500 roubles and the favour of kissing the empress' hand.[23] The tsarina's initiative concerning Katerina Polikarpove seems to have run counter to Kaau Boerhaave's intention. But meanwhile, Joseph Hillmer got the protection of Tsarevich Peter Feodorovich, subsequently Tsar Peter III, who ardently admired King Frederick II of Prussia.

On September 22th, when Kaau Boerhaave had returned to Petersburg, he learned that Hillmer had operated and sold his remedies all the time. Two days later, the Imperial Academy of Sciences sent the Director of the Medical Chancellery the oculist's request for translating handbills on his drug-sale into Russian, which made the Chancellery answer that those handbills would not be allowed to be printed. Meanwhile, Kaau Boerhaave had gotten some information about bad results of Hillmer's curing at the Baltic places. He summoned the oculist to appear before him and insisted firmly on his compliance.

On September 26th, Hillmer was ordered to present to the Chancellery, every patient on whom he had operated in Petersburg, so that physicians and surgeons, having watched his test operations before, could give their expert opinions on the results. The oculist presented only five patients, whose treated eyes were all suffering from acute inflammations. Because Hillmer pretended to have operated altogether on 13 or 14 patients, Kaau Boerhaave made the Petersburg police find out how many had been operated on by him. Before 9 a.m. on September 28th, the police had sent to the Medical Chancellery a list containing 45 of Hillmer's clients. At least 25 of them had been treated surgically. The same day at 10 a.m. the Chancellery was much surprised at news of operations, just performed by the oculist. The director ordered a German instruction for him (he himself was speaking Dutch, French and Latin, but Hillmer did not understand the latter!), which repeated all the regulations, already known and accepted by the oculist.

On October 2nd, Hillmer visited Kaau Boerhaave, begging his pardon and promising to obey the rules of the Chancellery in the future and to operate only in the presence of its delegates. On October 6th, he was allowed to couch some cataracts in the director's presence. Having seen him operating, Boerhaave explained to Hillmer the mistakes of his surgery, which had made him understand the sad reports on bad results of the

oculist's treatments that he had gotten by letters from Livonia and Estonia. Because patients with eye-sicknesses, if they became Hillmer's clients, only became worse, the director of the Chancellery forbade strictly the oculist to perform any eye-surgery from henceforth.

At the time he ordered some physicians and surgeons to examine as many of Hillmer's patients as they could find. The examinations were carried out from October 8th to 19th by the Municipal Physician James Grieve, Consulting Physician Johann Jakob Lerche (1708–1780), Directing Surgeon Georg Samuel Pohlmann and Surgeon at the Chancellery Karl Thiemann († 1771). In the meantime Hillmer had asked in vain the director and the Consulting Physician to allow him to do new operations. He also accused one of his servants of having stolen and secretly sold a lot of his drugs. When this servant was summoned to appear in the Medical Chancellery on the 20th of October, he showed Hillmer to have been lying, because the latter had dismissed him 12 days earlier.

The oculist, having heard of the servant's contact with the Medical Chancellery by a trick, lured the man into his residence, the house of the tailor Kriger at Bol'shaya Morskaya street,[24] and shut him in. Denouncing his former underling to be a thief by the known falsehood, he handed him over to the Petersburg police, who kept him in detention. When Boerhaave understood that Hillmer attempted in this way to camouflage his continual illegal drug-sale, he anonymously purchased some of those drugs, which the oculist handed over personally. By a *Promemorium* the director demanded the servant to be handed over from the police to the Chancellery to get some more news.

Several times from October 26th to 31st Hillmer asked officials of the Chancellery, especially the Municipal Physician, to communicate his intention of visiting Moscow to the director, who was absent from Petersburg at the time. The same day some people submitted petitions to the Medical Chancellery, making complaints about the bad results of Hillmer's eye-surgery and about their lost money. One of these petitioners had only paid the first half of the money for the oculist's treatment. When he came to get better postoperative assistance, Hillmer ordered his patient to be kept in Kriger's house, until he paid the second half. But the oculist's servants released the client – without any remedy or medical advice.

On November 1st, Hillmer asked the director of the Chancellery to permit his journey to Moscow to operate and to sell his remedies there. Kaau Boerhaave rejected the idea, wondering at the oculist's impertinence. Nevertheless, Hillmer repeated his request the next day assuring the director that if the Chancellery would not agree, he would ask higher ranking persons (the tsarevich?), and he would be sure to get the permission thereby at last!

'On November 3rd, the Medical Chancellery, outraged by the impudence of such an undignified man, resolved to call together every doctor of

medicine and the most respectable surgeons practising in Saint Petersburg for 'judging in all conscience Hillmer's operations and the effect of his medicines . . .'[25]

On the 4th of November all these physicians and surgeons came together. Having searched through all relevant reports and documents they assessed Hillmer's operations on eyes, which had been performed in their presence also. The oculist, having heard of the meeting, advertised in the *Saint Petersburg News* (*Sanktpeterburgskie vyedomosti*) the following day, announced that he was willing to leave the empire 'by sea'.[26] After three days the advertisement was repeated (by law foreigners had to advertise their departure from Russia three times, to make, for example, locals capable of claiming back lent money[27]). On November 10th, the Chancellery got the information that the oculist would now accept patients for surgical treatment, who had been refused by him before because he had found them to be incurable. Planning his departure, he had given up any restriction by his own indications for operating on the eyes, only to get some more money!

The following day Kaau Boerhaave, together with the secretaries Goldobin and Varing of the Medical Chancellery and its translator Libken, drove to Hillmer's residence to make the oculist listen to reason or to keep him in detention, renewing once again the ban on continuing his surgery in St. Petersburg and on the way back through the Estonian and Livonian places. The oculist tried to justify himself, until he was proved wrong by all the written reports, which the Chancellery had received from distant places and from the capital itself.

Hillmer refused to renounce his surgical treatments claiming correct operating procedures and the therapeutical effects of his remedies. The Medical Chancellery was only persecuting him because of hatred. Therefore, he would not grieve over its banning, but trust only in those who would protect him against its hatred. During Kaau Boerhaave's visit to Hillmer three poor people had arrived, with money in their hands, to receive operations, though all their eye-sicknesses were incurable. In the meantime Hillmer's wife had sold her husband's arcana all day. To prevent such misery in the future, the director ordered Joseph Hillmer together with his wife to be kept in their residence in detention, watched by a guard. For the act Kaau Boerhaave had been authorized by the court long ago, which he could have also done on the strength of his own authority.

The very next day the oculist sent a letter to his protector, the tsarevich, complaining to him 'about the hostility of the Chancellery, and in spite of that being completely untrue, this, his patron used it for reviling the Chancellery'.[28] The same night Hillmer sent Kaau Boerhaave a letter, trying to frighten him with much threatening, mainly by simple-minded arguments as to 'why my speechless horses . . . must go hungry . . .'[29] (because he was kept in detention). That very night his guard found out 'that he together with his wife tested pistols, as usual, by filling gunpowder into the doghead,

[testing] whether the flint will give fire by firing it to the touch pan . . .' and 'that he had begun to load those pistols with ball and powder, which they had given a message about to the director the same hour'.[30]

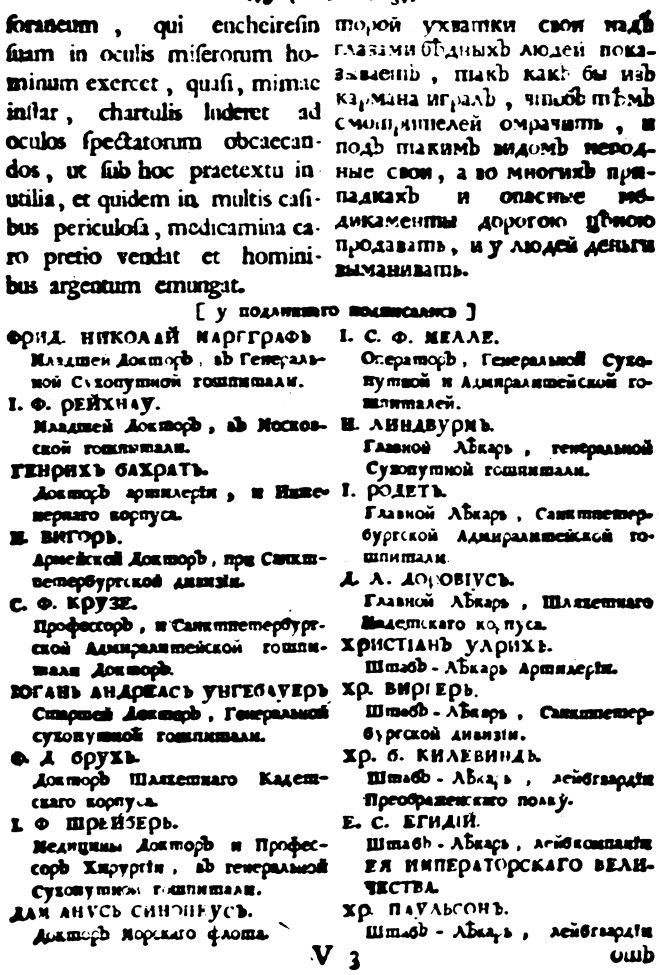
In the early morning on November 13th, Kaau Boerhaave caused the Consulting Physician Lerche, together with Goldobin and Varing and the translator Libken, to cautiously disarm the oculist, who owned six pistols, charged with 20 bullets, and a hunting knife. On November 15th, the guard found out, that one of Hillmer's servants was secretly trying to bring ropes into his master's flat apparently for preparing his flight. The ropes were confiscated and the guard increased by one man.

From November 16th to December 1st, the Chancellery collected all news on Hillmer's practising in Russia, from the Baltic places and from St. Petersburg herself. They were completed by examining the oculist's servants, who had also tipped off the Chancellery concerning where his drug-depositories could be found. On December 2nd, all letters and reports on his practising in Russia had been read out to Joseph Hillmer in the presence of those medical experts, who had given evidence against him, allowing the oculist to justify himself, which he was unable to do, chattering only insubstantial excuses.

On the 4th of December the assessment of the Medical Chancellery (dated November 4th) was read to him, signed by 33 physicians and surgeons, military and civilian (Fig. 4),[31] while a lot of them were present. The supreme expert opinion of the Petersburg medical staff judged Hillmer to be an empiricist with miserable medical knowledges. For that reason Kaau Boerhaave did not attach any value to his title of an ordinary professor at the Berlin Collegium Medico-Chirurgicum. Apart from the other records on Hillmer's practise the Chancellery had collected 125 case reports or expert opinions on his clients, among them 80 on cataracts having been couched. They made clear that in 82 per cent of all cases the oculist had treated the cataracts without any result, or that the eyes of his patients had gotten worse by his treatment. With respect to his malpractice and ruthlessness towards his clients' welfare, Hillmer was deemed a real *charlatan*!

Because he had contravened the medical rules of the Russian empire, he had to be subjected by law to severe punishment, both financial and corporal. However, at Kaau Boerhaave's official request Her Imperial Majesty had exempted the oculist from such punishment. He was sentenced, after having paid the expenses of his detention, to pay back earned money to these people, who had requested for that reason the tsarina by petitions (possibly 1000 roubles to the Baroness von Rosen?). In addition, he was to be brought out of the empire under military convoy, and never to return again.

On the 8th of December in 1751, Joseph Hillmer, together with his wife and servants, was escorted by four soldiers, commanded by a sergeant, to



(157)

foraneum, qui encheirefin suam in oculis miserorum hominum exercet, quasi, mimae instar, chartulis luderet ad oculos spectatorum obcaecandos, ut sub hoc praetextu inutilia, et quidem in multis casibus periculosa, medicamina caro pretio vendat et hominibus argentum emungat.

тою ухватки свои надъ глазами бѣдныхъ людей показываетъ, такъ какъ бы изъ кармана игралъ, чтобъ тѣмъ смотрителей омрачить, и подъ такимъ видомъ негодные свои, а во многихъ припадкахъ и опасные медикаменты дорогою ценою продавать, и у людей деньги выманивать.

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Fig. 4. Petersburg medical staff's expert opinion on Hillmer. (Lenin Library, Moscow)

the Polish (!) border, which he had crossed that same day at night. About the middle of March in 1752 he returned to Berlin.[32] He tried to counter the defamatory news about his Russian endeavour by a personal report, published by *Berlinische Nachrichten von Staats – und gelehrten Sachen*.[33] Comparing that report with the *Cancellariae Medicae Acta*, edited immediately after Hillmer's expulsion from Russia,[34] we may understand very well the charlatan's betraying tactic.

Hillmer never lectured on ophthalmiatrics at the Berlin Collegium Medico-Chirurgicum. In 1753 the Prussian king seemed to have tried to

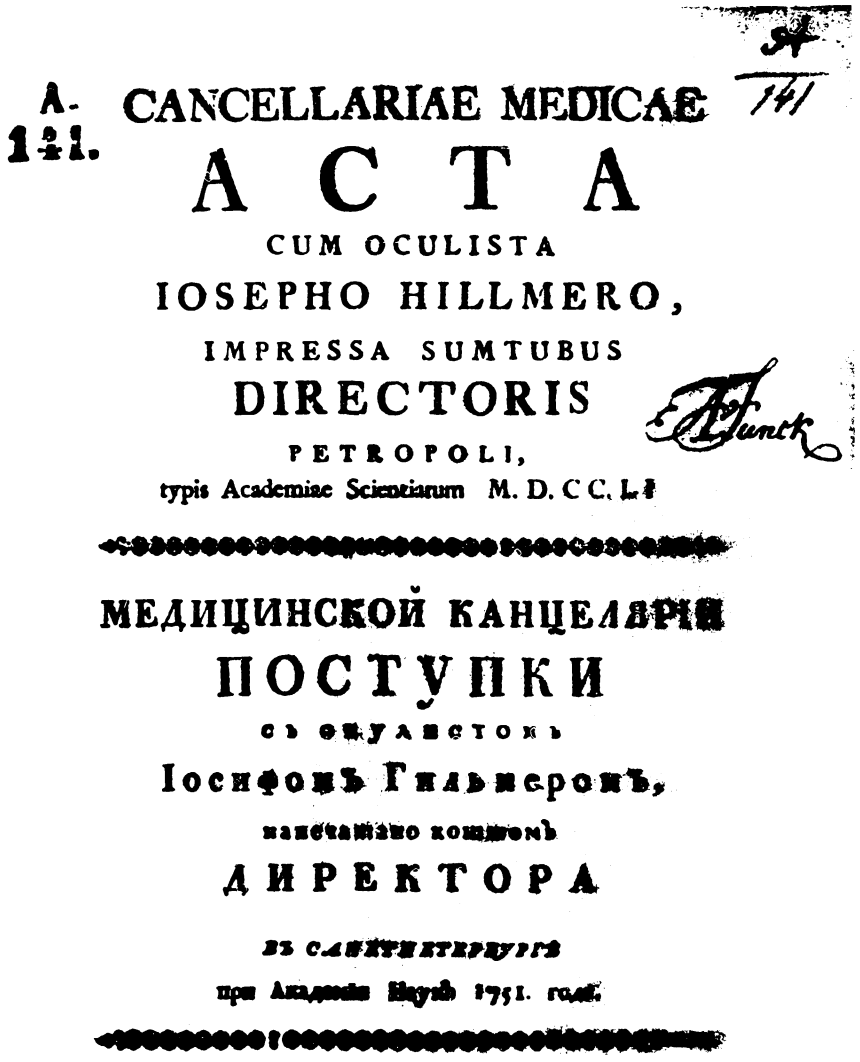

Fig. 5. Title page of *Cancellariae Medicae Acta*. (Lenin Library, Moscow)

compensate his mistake of having appointed that oculist a professor, by sending a young military surgeon, the Huguenot Jacques Taverne of Montpellier, to Paris for further ophthalmiatric training.[35,36] The Frenchman became Jacques Daviel's (1696–1762) disciple. In 1755 Taverne *extracted* the first cataract in Berlin.[37]

In Petersburg the First Personal Physician of Tsarina Elisabeth, Kaau

Boerhaave, was involved by the tsarevich, protecting the Prussian charlatan, in political tensions between the Grand Prince and Her Majesty's Chancellor, Aleksei Petrovich Bestuzhev-Ryumin (1693–1766), who was supporting the Austrian Empress Maria Theresia against the Prussian King Frederick II. To protect himself against false accusations by the tsarevich concerning the oculist's affair, Kaau Boerhaave ordered the documentary material on Hillmer, after having been translated into Russian, to be printed as a book

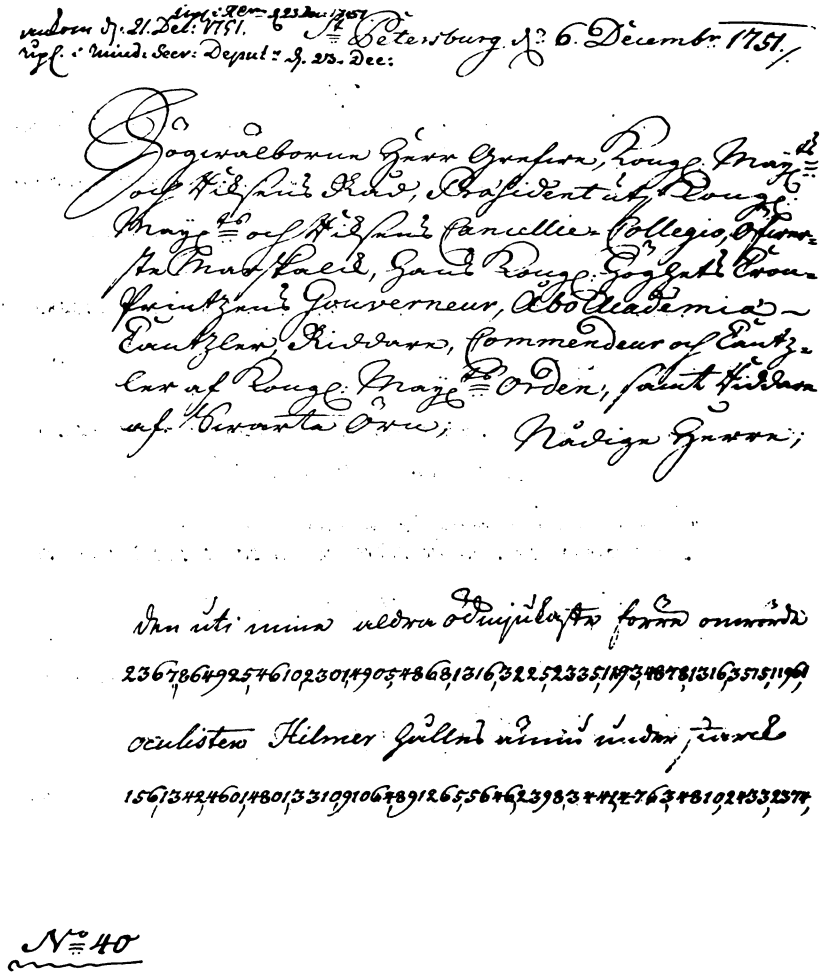

Fig. 6. Lagerflycht's letter from December 6th in 1751, containing a coded report on Hillmer. (Riksarkivet Stockholm)

on his own account. The translation had most likely been done by Martin Shein (1712–1762), at the time Senior Surgeon at the Petersburg naval hospital (*Admiraliteiskaya goshpital'*). (Shein has created the first *Russian* medical textbook[38] by translating and editing in Russian Lorenz Heister's famous *Compendium Anatomicum*[39] in 1757[40]).

In this way Herman Kaau Boerhaave's bilingual *Cancellariae Medicae Acta/Meditsinskoi Kantselyarii Postupki* (the whole book was printed in Russian, parts also in Latin; vide Fig. 4)[41] have become the *first* printed source of *Russian* medical (*ophthalmological*) terminology (Fig. 5).[42] There are many hints, for example by coded Swedish diplomatic records on Hillmer (Fig. 6),[43] indicating that the oculist's affair in Petersburg had been complicated by secret diplomatic tasks, which Joseph Hillmer could have been obliged to perform for the Prussian king, while the preliminaries of the Third Silesian War (1756–1763) were going on.[44,45]

Notes

1. *Berlinische Nachrichten von Staats – und gelehrten Sachen*, 1752, No 49, April 22nd.
2. Klingen, B.H. [Moehsen, J.C.W.], *Sendschreiben an einen alten erfahrnen Chirurgum in Strasburg*, worin von dem berühmten Augen-Artzt, Herrn Hillmer, aus Wien, der sich jetzt zu Berlin aufhält, eine unpartheyische Nachricht gegeben wird. Leipzig, 1748, p. 5.
3. *Berlinische Nachrichten* (see Note 1), 1751, No 48, April 22nd.
4. Copia der Bestallung. Zentrales Staatsarchiv [GDR], Dienststelle Merseburg, Rep. 108 D Sekt. III Rep. III Nr. 5a, fol. 31, 31v.
5. Graf, B.T.: *Letter to Herman Kaau Boerhaave*, dated 30th November 1751. In: H. Kaau Boerhaave, *Cancellariae Medicae Acta* (see Note 41), p. 82.
6. Wissel, J.D.: *Report to the Medical Chancellery*, dated 28th October 1751. In: Ibidem, p. 89 f.
7. von Gyllenstubbe, P.A.K.: *Letter to the Municipal Physician in Pernau, J.D. Wissel*, dated 28th February 1752. In: Ibidem, p. 176.
8. Bukov, *Letter to the Petersburg Postdirector von Asch*, dated 13th December 1751. In: Ibidem, p. 142.
9. von Gyllenstubbe, P.A.K.: *Letter to Subchamberlain Peterson in Petersburg*, dated 8th November 1751. In: Ibidem, p. 142.
10. Bukov, *Letter to Postmaster Hofmann in Reval*, dated 8th November 1751. In: Ibidem, p. 141.
11. Garriën, A.: *Notarial certificate*, dated 28th October 1751. In: Ibidem, p. 90 f.
12. Wissel, J.D.: *Report to the Medical Chancellery*, dated 2nd December 1751. In: Ibidem, p. 91 f.
13. Burchart, J.: *Letter to Herman Kaau Boerhaave*, dated 25th September 1751. In: Ibidem, p. 80 f.
14. *Polnoe Sobranie Zakonov Rossiskoi Imperri* [The Complete Collection of Laws of the Russian Empire]. [1st collection], Vol. XIII, No 9717.
15. Keiling, J.G.: *Report to the Medical Chancellery*, dated 19th September 1751. In: H. Kaau Boerhaave, *Cancellariae Medicae Acta* (see Note 41), p. 75.

16. von Rosen, J.: *Petition to the Empress Elisabeta Petrovna*, dated November 1751. In: Ibidem, p. 138 f.
17. On pages 1 to 63 the *Cancellariae Medicae Acta* contain Kaau Boerhaave's own report on Hillmer's visit to Petersburg, with distinct medical arguments, many of them he had heard lectured by his famous uncle in Leiden.
18. Kaau Boerhaave, H.: *Letter to the Consulting Physician of the Medical Chancellery, Grieve*, dated 15th September 1751. In: H. Kaau Boerhaave, *Cancellariae Medicae Acta* (see Note 41), p. 67.
19. *Polnoe Sobranie Zakonov* (see Note 14), Vol. VI, No 3811.
20. Mamlock, G.L.: *Zur Geschichte des Charitêkrankenhauses in Berlin*. Charité-Annalen, Berlin, 1905; 29, Teil II, p. 68 f.
21. Kaau Boerhaave, H.: *Cancellariae Medicae Acta* (see Note 41), pp. 159–173.
22. Casanova, G.: *Geschichte meines Lebens*. Berlin: Propyläen, 1964, new edition 1985; Vol. 1, p. 228.
23. *Berlinische Nachrichten* (see Note 1), 1752, No 49, April 22nd.
24. Stolpyanskii, P.N.: *Vrachi starago Petrograda (1703–1825)*. III. Vrachi okulistiky [Physicians of the ancient Petrograd (1703–1825). III. Oculists]. Petrograd, Vrach. gazeta, 1915; Vol. 1, p. 320.
25. Kaau Boerhaave, H.: *Cancellariae Medicae Acta* (see Note 41), p. 168; all quotations translated from Russian by the author. You may find a complete translation of *Cancellariae Medicae Acta* into German with (in addition) original pagination in: A. Henning, *Die Affäre Hillmer* (see Note 44), pp. 199–332.
26. See Note 24.
27. Ibidem.
28. Kaau Boerhaave, H.: *Cancellariae Medicae Acta* (see Note 41), p. 170.
29. Hillmer, J.: *Letter to Herman Kaau Boerhaave*, dated 12th November 1751. In: Ibidem, p. 173.
30. Ibidem, p. 170.
31. Ibidem, p. 157 f.
32. *Berlinische Nachrichten* (see Note 1), 1752, No 34, March 18th.
33. Ibidem, 1752, No 49, April 22nd and No 50, April 25th.
34. Kaau Boerhaave's book has been edited most likely in March 1752 (see Note 7).
35. The named year 1753 we learn by Taverne's request to be permitted to marry, dated 30th March 1756. Zentrales Staatsarchiv [GDR], Dienststelle Merseburg, Acta des Kabinetts Friedrich's II. Rep. 96 Nr. 434 G. 1, fol. 3.
36. Registres des Mariages de l'Eglise françoise de Berlin, Vol. III (1748–1806), p. 82: le 29e Avril 1756 . . . le mariage de Jacques Taverne Chirurgien Pensioné [sic] du Roy, et Occuliste, natif de Montpelier . . .
37. *Berlinische Nachrichten* (see Note 1), 1755, No 56, May 10th.
38. Palkin, B.N.: *Martyn Shein – russkii uchenyi lekar'* [Martin Shein – a Russian erudite physician]. Chirurgiya, Moskva, 1948; 6, p. 6.
39. Heister, L.: *Compendium Anatomicum*. 2nd edition. Altorfi et Norimbergae, 1719.
40. Gejster (Heister), L.: *Sokrashchennaya Anatomia* [Compendium anatomicum]. Transl. by Martin Shein. Sanktpeterburg: Imperial Academy of Sciences, 1757.
41. Kaau Boerhaave, H.: *Cancellariae Medicae Acta cum oculista Iosepho Hillmero, impressa sumtubus [sic] Directoris*. Petropoli: Academia Scientiarum, 1751/*Meditsinskoi Kantselyarii Postupki s okulistom Iosifom Gil'merom, napechatano koshtom Direktora*. Sanktpeterburg: Akademia Nauk, 1751.
42. Henning, A.: The Formation of Russian Ophthalmological Terminology. *Clio Medica*, Vol. 20. Amsterdam: Rodopi, 1985–1986; 1(4), pp. 105–123.
43. Lagerflycht, C.: *Letters from Petersburg to the President of the Chancellery in Stockholm*,

dated 15th and 22th November, and 6th and 13th December 1751. Riksarkivet Stockholm, Moscovitica, Vol. No 265, No 37, 38, 40, 41.

44. Henning, A.: *Die Affäre Hillmer*. Ein Okulist aus Berlin in Petersburg 1751. Europäische Hochschulschriften, VII, B, Vol. 5. Frankfurt am Main, Bern, New York, Paris: Peter Land, 1987; pp. 172–194.
45. Henning, A.: *Joseph Hillmer*. Okulist, Professor, Scharlatan im friderizianischen Berlin. Ophthalmothek, Dr. Mann Pharma, Vol. 9. Berlin, 1989, pp. 50–67.

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Some famous persons with visual problems as shown on postage stamps*

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Abstract. A number of persons important in all fields of human endeavor became blind or were born blind. The reason for the loss of vision varies a great deal, but many of them continued a productive life and contributed to the welfare and advancement of mankind. It is also surprising how many famous people lost one eye or lost nearly all vision in one eye. These were not only soldiers and warriors exposed to accidental traumas, but also writers, scientists and even physicians.

I. Accidental trauma

These injuries were the most frequent cause of blindness in the past. Only during the last decades has it been possible to repair severely injured eyes and only during the last century will most men live long enough to experience a mature cataract or a severe glaucoma which would cause substantial loss of vision.

A. *War injuries*
A good number of military men lost one or both eyes in action.

1. Jan Žižka (1360–1424). This great revolutionary and general was born in Trocnov in Southern Bohemia, a member of the lower aristocracy. When playing as a young boy with his comrades, his left eye was injured and became blind. From then on all pictures and statues show him with the left eye bandaged (Fig. 1). Žižka was one of the followers of Jan Hus (1369–1415), the religious reformer who was burned at the stake by the Council of Constance in spite of the emperor's promise for a safe conduct. When the news of Hus' death was relayed to Bohemia, a national revolt erupted which lasted for more than 20 years and for more than 15 years Bohemia was without a king. Žižka organized an army and trained the soldiers leading them to incredible victories. He twice defeated the emperor. He was a fanatical follower of the Bohemian puritan religion expressed in the Four Articles of Prague. He turned out to be as intolerant

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as the church, devastating and pillaging monasteries and convents. In 1420 at the siege of Rabi Castle Žižka was hit by an arrow and severely wounded. He barely survived, but lost all vision in his only right eye. He was inactive for two months, but soon returned to his troops and continued to fight leading his armies. From then on he was referred to as 'frater Žižka quamvis utroque oculo caecus . . .' Even as a blind general he exerted supreme leadership, prestige and authority to such an extent that some later historians doubted whether he was actually blind, though all the evidence would speak for it. Žižka reinvented the war chariot and rode on it as a blind leader swinging an iron bludgeon with which he would club to death many of his adversaries. Like so many of his contemporaries he died from the bubonic plague. In his last will he asked that the skin should be removed from his body and should be placed on a big drum so it could lead his countrymen in future battles.

2. Oswald von Wolkenstein (1377–1445). Wolkenstein came from a prominent noble family of southern Tyrol and was a famous troubadour in the late Middle Ages. He was the typical mixture of poet, composer and singer. He wrote not only a number of religious hymns, but many poems and songs concerned with daily life, politics and adventures. Wolkenstein was deeply involved in the fight between the Tyrolean nobility and the Habsburg Duke, Friedrich III. The nobility wanted to maintain its rights against the Duke and finally turned to the German king and later emperor, Sigismund of Luxembourg, younger son of Charles IV, the founder of the University of Prague. Wolkenstein traveled a great deal and led an adventurous life. He spoke ten languages and was once shipwrecked in the Black Sea. He lost one eye during a minor skirmish. He played an important political role at the church council in Constance where Jan Hus was burned at the stake. The illustrated portrait of Oswald (Fig. 2) is taken from the Innsbruck manuscript B. It gives a realistic picture of the troubadour. The right eye is missing and the right upper lid is ptotic. Oswald has a fleshy nose and big lips. A scar can be seen on the lower lip near the left angle of the mouth. The painter is unknown though recently a theory has been put forward that the picture is by Pisanello, who also painted a portrait of King Sigismund in whose following Oswald was at that time.

(a)

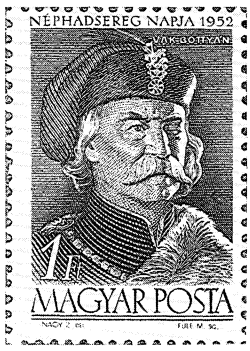
3. Louiz de Camoez (1524–1580). Little is known about this poet's early life. He was born in or near Lisbon of a noble Galician family who had fled to Portugal in 1369. On his father's side he was related to the famous explorer, Vasco da Gama. He spent his childhood in Coimbra where he attended the university 1539–42. He then returned to the royal court in Lisbon, but was exiled to North Africa when he injured a courtier in a street fight. In Morocco he fought the Moors. There, in a fight near Ceuta (Fig. 3b), he lost his right eye and from then on was well known as the one-eyed poet. In the picture we see him covering his eyes with his right hand. In most of his pictures we see a definite ptosis of his right upper lid (Fig. 3a).

(b)

His life was full of adventures. He returned to the court of John III, but soon traveled to Goa, Portuguese India, stayed there for several years and then was shipwrecked in Cambodia, spent some time in Macao (1556) and two years in Mozambique. He finally returned to Lisbon to the court of King Sebastian and died penniless just before Portugal once again lost its independence for several decades to Spain. He is famous not only for his numerous poems, but especially for the epic work *Os Lusiadas* which firmly established Portuguese as an independent language and poetically describes the history of Portugal. It was published in 1572.

4. King Christian IV of Denmark (1577–1648). Due to the early death of his father, King Frederik, Christian became king at the age of 11, though a regency controlled the country during his minority. He proved to be an unusually active, imaginative and enterprising sovereign. He initiated numerous reforms both in Denmark and in Norway which was at that time part of the Danish Kingdom. He erected magnificent buildings and held a splendid court in Copenhagen. He built up the army and especially the Danish navy. He soon became involved in a war with Sweden and was able to hold down King Gustafus Adolphus at the end of the so-called 'Kalmar' War. Christian later extended his influence over the free cities of Bremen and Hamburg and became involved in the Thirty Years War. The Imperial generals Wallenstein and Tilly invaded his country, but with the help of Sweden he was able to expel them again. In his interior policy the king helped to establish a strong economy. When the city of Oslo in Norway burned down, he had it rebuilt and established it as the new capital with the name of Christiana. The plague once swept over the country, but he escaped. He also extended the influence of Denmark overseas and established posts in many foreign countries, e.g. Ceylon. His last war was again against Sweden and in 1645 the Swedish general Torestensson turned north from Bohemia and invaded Holstein, Schleswig and Jutland. Christian was completely surprised by this attack and received the news in his Fredericksborg castle in Copenhagen. This was around Christmas, but he immediately started preparing for the war. In June of 1646, when he was 67 years old, he boarded the flagship Trinity and fought a big battle with the Swedish navy. His ship was hit by a large cannonball which immediately killed one of his companions and tore the arm off of another one. The king himself was badly wounded, collapsed into a pool of blood and became unconscious (Fig. 4). Many of the accompanying sailors believed that he was dead and the royal standard was lowered. However, the king regained consciousness and the official barber was called to dress and cleanse him. He had no less than 23 wounds from iron and wood splinters and the barber explained that 'the king leaked like an old sieve'. Christian slowly recovered, but the right eye had been so badly damaged that it became blind though the globe itself remained in the socket. When the king first saw himself with all these wounds and bandages he told his companion 'compared to me, the Jew Job,

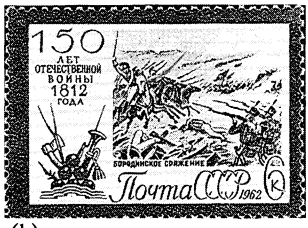
was a lucky fellow'. The barber continued to cleanse him, advised bloodletting and bathing of his feet in boiling water with strong herbs. The further course of war was unfortunate for Denmark and the glorious time of a large Danish kingdom was over. The Peace of Brömsebro established the hegemony of Sweden in the Northern Sea. Nevertheless, the courage of the king could not be denied and he remains a hero for all Danish nationals. The handkerchief with which he bandaged his wounded eye can still be seen in the Rosenborgh Castle in Copenhagen.



5. Janos Bottyan (1645–1709). Bottyan was born in Hungary near the Turkish border. He advanced from private to colonel in the Austrian Imperial Army serving under the most famous and successful commanders of his time. He participated in raising the siege of Vienna (1683) and served with Prince Eugene of Savoy against the Turks. When Rakoczi revolted against Austria, Bottyan fought first with the Imperial forces. He had a personal encounter with Ocskay (1703), a colonel in the Hungarian army and an adventurer of sinister fame. Bottyan was wounded and lost his left eye. From then on he was also called *Vak*, i.e. 'the blind one' (Fig. 5). In 1703 he joined the Kurucz Army of the revolting Hungarians. Kurucz (or plural Kuruczok) is a term used to designate militant defenders of Hungarian independence (derived from *cruciati*, crusaders). Bottyan was promoted to general and helped to liberate the Trans-Danubian counties (1705). His bravery is vividly described by the Hungarian poet and historian Kalman Thaly (1839–1909), who wrote a cycle of epics on Rakoczi.

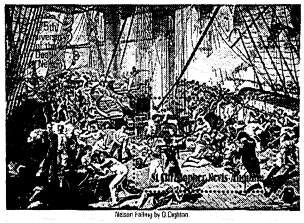
6. Blas de Lezo (1687–1741). Don Blas de Lezo was an officer in the Spanish Navy who rose in rank and acquired fame because of his unusual courage and his talent for strategy. As a navy officer he became a true *viejo lobo marino* and during the war of succession he participated in 22 combats. In 1704 the young Lezo lost his left leg during the battle of Velez-Malaga between the French and the English-Dutch Navy. A few years later as a lieutenant, he lost his left eye at the siege of the castle Santa Catalina, which lies in the harbor of Toulon. Ever since then he is depicted with a drooping left upper lid (Fig. 6). In addition, he lost an arm during the second siege of Barcelona in 1713. He became most famous during the defense of Cartagena de Indias in 1741. This started as an offense against Captain Robert Jenkins (*la guerra de la oreja de Jenkins*) and the British West Indian expeditionary force sailed toward the coast of what is now Colombia. Admiral Sir Edward Vernon commanded 186 ships, among them a contingent from North America under the command of Captain Lawrence Washington, the brother of George Washington. The Spanish were under the command of the Viceroy of Grenada, Don Sebastian de Eslava, but the second in command was Blas de Lezo, General of the Armada. The English were successful during the first weeks of the siege. They landed on some islands close to Cartagena. Vernon notified Jamaica and England about his victory and a medal was struck to

commemorate his entry into the port. However, the defense of the city was too strong for the English aggressors. Vernon was beaten and had to withdraw. Blas died a few months later in Cartagena, a forgotten man. His burial place is unknown.



(b)

7. Field Marshal Kutusov (1745–1813). Mikhail Larionovich Kutusov was born in St. Petersburg. His father was lieutenant general in the Corps of Engineers and designed the canals in that city. Kutusov joined the army early and served in the Crimea. He was then involved in the campaign against Turkey and in 1788, during the siege of Ochakov on the Black Sea, he was major general and commander of a corps of chasseurs serving under Potemkin. One day the Turks made a sortie and a bullet hit Kutusov severely injuring his head. He immediately lost vision in the right eye, but miraculously recovered from the head wound which had been regarded as fatal. Vision in the right eye remained extremely poor. After this campaign Kutusov became for a short time Russian ambassador to Constantinople and Governor General of St. Petersburg. In 1804 after a prolonged period of pain the right eye lost all vision and became unsightly. He is usually depicted with his head turned right (Fig. 7a). Kutusov acquired great fame in combating Napoleon. He was defeated at Borodino in 1812 (Fig. 7b), but regained his strength and finally forced Napoleon to the celebrated retreat. He carried the war into Germany and commanded the allied Russian and Prussian forces. In 1812 he was elevated to Prince of Smolensk. He died in what is now Czechoslovakia while carrying his campaign into Central Europe.



8. Horatio Nelson (1758–1805). Nelson was born in Norfolk as the son of a clergyman. His uncle, Captain Maurice Suckling, influenced his early career. He became a seaman when still a boy and later advanced as a naval officer. His victorious battles against the French made him the most famous British naval hero. He was elevated to a baron and became Duke of Bronté in the peerage of the Bourbon Kingdom of the Two Sicilies. After his death he was elevated to a British viscount, while his brother received the rank of earl.

He was of unusual personal bravery and received many wounds in the line of duty. After a severe injury to his right elbow in 1797, the right arm had to be amputated below the shoulder. In 1794, when he was only 35 years old, he became captain of the *Agamemnon* and sailed with Lord Hood from Toulon to Corsica. The English conquered the capital, Bastia, in May liberating the Corsicans from their French occupation. In July Nelson participated in the siege of Calvi in the north shore of Corsica. While fighting on land, a shot struck the ground near him and drove gravel

and sand into his chest, face, right brow and lid. He started to bleed profusely from his many wounds. He was bandaged and asked to return to his ship. He noticed that he had lost sight in the right eye. The same day he wrote a message to his commanding officer, Lord Hood, in which he mentions that he 'got a little hurt'. He was confined for only one day and returned the next day to his duty, but the sight in the right eye was lost forever. On August 9, Dr. Harkness, physician to the fleet, wrote: '. . . a wound of the iris which has caused an unnatural dilatation of the pupil and a material loss of sight'.

Most biographers have assumed that during that accident the right eye and crystalline lens were also cut and that this was the cause for his loss of vision. However, the evidence would speak against such an assumption. In his letters to his wife he does say that his 'eye was cut down'. On the other hand, in a letter written to his wife on August 18, 1794, from Leghorn (Livorno), Italy, he mentions that though he has only light perception in his right eye, the 'blemish cannot be perceived unless attention is drawn to it'. He also wrote in a letter that 'the pupil is nearly the size of the blue part, I don't know the name; its use is gone'. It therefore seems unlikely that this was a perforating injury of the eye and the lens. This would have led to a noticeable disfigurement, probably painful complications with inflammations and secondary glaucoma. We must assume that he had a widely dilated pupil (traumatic sphincter palsy) as it apparently replaced the iris. It is quite likely that the cause of his blindness was a traumatic retinal detachment, a retinal hemorrhage, a choroidal rupture or a traumatic optic neuropathy.

At the Battle of Copenhagen (1801), he put a telescope in front of his blind eye claiming he could not see the signal of his commanding admiral, Sir Hyde Parker, to withdraw. His eye bothered him later. In a letter to Lady Hamilton (January 28, 1801) he writes: 'My eye is very bad . . . it is like blood and the film so extended that I only see from the corner farthest from my nose . . .'. He also complained about failing vision in his left eye (1803) and started to use a green shade over his forehead to protect the eye from too strong a light. The failing vision was probably caused by the onset of presbyopia (or on uncorrected hypermetropia) though he may also have had bilateral pterygia (following his prolonged service in the tropics) as Lord Elgin describes Nelson in Naples as 'having a film growing over both eyes' and these can be seen in Lemuel Abbott's portrait of Nelson (1797). Nelson died during his victorious war against the French and Spanish navy in the Battle of Trafalgar near Cadiz at the southern part of Spain, breaking Napoleon's seapower forever (Fig. 8).

9. Gabriele d'Annunzio (1863–1938). D'Annunzio was born in Pescar on the Adriatic Coast and when only 16 his first book of poetry was published. He became quite well known and moved to Rome where he was accepted by the black aristocracy and a group of artists connected with the decadent dandyism of the turn of the century. He was regarded as a prodigy from the Abruzzi. He soon turned toward patriotic themes and became an ardent protagonist and defender of the United Italy. He wrote nationalistic novels and plays and coined the term *mare nostrum* for the Adriatic Sea. He supported with enthusiasm the acquisition of Eritrea, Tripolitania and Libya as Italian colonies. He went into politics and was for a time a member of parliament. For a

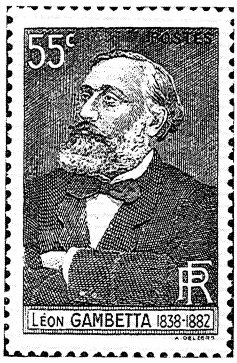
short time he leaned toward socialism, but then elected the old Romans and Dante as his models. He emphasized the importance of classical antiquity. He lived the life of a gran signore. His relationship with the actress Eleonora Duse and other ladies of the aristocracy got him into severe financial difficulties so that he went into exile in France. When World War I broke out he became a fervent Italian nationalist. In spite of his age he joined the Italian armed forces, first the Novara lancers. Later he also fought with the navy and especially with the air force. He flew many missions over enemy country, especially over Trieste which was then the main sea harbor of the Austro-Hungarian Empire. He also flew over the Alps and dropped pamphlets on Vienna. On February 23, 1916 while forced to land at Grado he injured his right eye when he was sharply thrown against his own machine gun. The eye was badly damaged, blind and never regained vision. Because there was danger of sympathetic uveitis, D'Annunzio was brought to Venice where he was treated by Professor Cirincione. He had to stay for six months in total darkness, at first also on complete best rest. The feet had to be elevated and both eyes had to be patched. He was cared for by his daughter, Renata, a nun, who also helped him to write during that time *Notturno*, a monograph consisting of 10,000 words describing his wartime experiences. His daughter had to prepare strips of paper on which he could scribble a sentence at a time. Later he was allowed to take walks, only at night when no light could fall into his eyes. The left eye was saved and the blind right eye did not have to be enucleated. His most famous episode occurred after the war when he with a thousand legionnaires occupied Fiume which had up to then been part of Croatia, as part of the kingdom of Hungary and the Austro-Hungarian Empire. Without firing a shot he ousted the allied commission, established a free state and reigned as a lyric dictator over the area. He introduced the uniform of black shirts and the raised arm salute of the old Romans. At that time he started to cooperate, but also to compete with Mussolini. After 15 months the regular Italian army removed D'Annunzio by a blockade and a short bombardment and incorporated Fiume into the kingdom of Italy. D'Annunzio withdrew to the Lake of Garda where he lived in the Vittoriale, a palatial place that looked more like a museum. Ironically enough, Fiume was after World War II incorporated into Yugoslavia and is now known as Rijeka (Fig. 9).

10. Charles Nungesser (1892–1927). Nungesser was born in Paris. He became a pilot and flew an airplane in Argentina when World War I broke out. He returned to France to serve in the armed forces and became one of the most noted pilots and most famous war aces. On January 29, 1916 his plane crashed on a test flight. He had to be extricated from under the plane and was severely wounded. Both of his legs were broken and his jaw and skull were fractured. At that time he also lost his right eye. He soon returned to the front and in 1918 was credited with 45 air victories. He received the *Croix de Guerre* with 28 palms. After the war he founded a school for pilots in Orly and later went to the United States. He became an air acrobat, was a star in the movie *Sky Raider* and married an American woman, a descendent of John Augustus Sutter. On May 8, 1927 Captain Nungesser with his copilot, Captain François Coli (1890–1927), tried to cross the Atlantic from east to west. Because of

the difficulties with the wind and the weather, this had never been done before. They flew a Levasseur biplane *L'oiseau blanc* and took off from Le Bourget near Paris. They were sighted once, but after that were never seen again (Fig. 10). Rumor has it that the 'white bird' crashed in the woods near Machias, Maine, but no definite and authentic remains have been found. The two pilots and their plane 'vanished like midnight ghosts' (Charles A. Lindbergh).

11. Moshe Dayan (1915–1981). Dayan was born in Palestine and was active in the movement for a Jewish independent state. He was imprisoned by the British authorities and spent some time in the Acre jail. He was released in February 1941 and joined Haganah, a Jewish military force assisting the British army. His unit was attached to an Australian force spearheading the Allied invasion of Syria which was then under the control of Vichy-French forces. After conquering a French police station, he was early on June 2, 1941 hit by machine gun fire. He happened to hold his field glasses in front of his eyes. A bullet splintered the lens and a metal casing became embedded in his left orbit. Dayan was brought by ambulance to the Hadassah Hospital in Haifa where the metal piece and glass fragments were removed from his orbit. The eye was apparently completely shattered. He was then transferred to a hospital in Jerusalem. The orbital wound healed slowly and because of severe orbital fractures a prosthesis could not be worn. Dayan therefore had to wear a black patch over the left orbit (Fig. 11). He had a strong desire to wear an artificial eye and underwent many plastic surgical procedures, first in Jerusalem, then in Paris. The last attempt was made in 1957 by Dr. Jack Penn of Johannesburg, South Africa. However, Dayan thought that he looked worse with the plastic eye which was not in alignment with his right eye and he therefore continued to wear the black patch. He first complained that there was a strain on the right eye and he could not see as well as before. He also noticed the lack of depth perception. Nevertheless, Dayan continued his distinguished military career and became Front Commander 1949–52, Chief of Operations 1952–53 and Combat Leader 1953–54. He was finally appointed Minister of Defense in 1967.

B. *Other types of accidental trauma*



12. Léon Gambetta (1838–1882). Gambetta was born in the small town Cahors in south central France and studied law in Paris. As the name indicates, he was of Italian descent (his name literally means 'little leg'). He became a member of legislative assembly and, as a convinced republican, opposed the second empire. During the Franco-Prussian War he was Minister of the Interior and of War. After the war he became president of the Chamber of Deputies and later Prime Minister (Fig. 12). He died from an accidental gunshot wound to the head. In 1849 during summer vacation he accidentally injured his right eye while working in the shop of the cutler Galtie whose store was next to his father's house. A broken steel drill perforated his eye; the treatment

consisted of bandaging and old-fashioned medications. Vision remained poor in that eye and eventually it became blind. Secondary glaucoma followed which led to a considerable enlargement of the globe so that the lids could hardly be closed over the eye and under psychologic or physical stress, the eye prolapsed forward. Gambetta tried to improve the disfigurement by covering the eye with a white paste, but this helped only little. On May 25, 1867 he wrote his father and informed him that he had his right eye enucleated. He explained that the right eye had begun to fester, affecting the sound eye. Gambetta talked with his friend, Dr. Fieuzal, who sent him to the eminent ophthalmologist, Dr. Wecker. (Louis de Wecker, 1832–1906, was the most prominent ophthalmologist in Paris during the second half of the 19th century. Wecker was born in Frankfurt, Germany, but practiced most of his life in Paris. He wrote, after Mauthner, the second modern textbook of ophthalmology after the invention of the ophthalmoscope.) The operation was performed under general anesthesia in Gambetta's apartment on August 22, 1867 and de Wecker brought three assistants with him. The postoperative treatment consists of 10 days of bed rest in a darkened room. After that Gambetta was fitted with an artificial eye which cost him no less than 900 francs, which today would buy a standard car. De Wecker himself did not accept any money from the patient. Gambetta was put on the proper diet for several weeks and the wound healed quickly. The eye itself was found by Dr. P. Amalric in the museum in Gambetta's hometown. De Wecker's diagnosis written on the container was: retinal detachment due to irido-choroiditis. During the Franco-Prussian War, Gambetta made a famous though unsuccessful balloon flight (October 7, 1870).

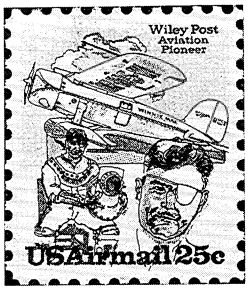
13. Theodore Roosevelt (1858–1919). The 26th President of the United States was born in New York City and prepared himself for the law. He soon entered politics and was for three years in the New York Assembly. He then served on the US Civil Service Commission in Washington and later became Assistant Secretary of the Navy under McKinley. He participated in the Spanish War and became governor of the State of New York. He was elected Vice-President and when McKinley was assassinated in 1901 became President. He was re-elected in 1904 (Fig. 13). He followed a policy of conservation in internal affairs and in foreign policy defended national expansion. After his retirement, he made many scientific expeditions and traveled widely.

When Roosevelt was 13 years old he noticed that he was unable to aim when shooting. At that time it was found that he was myopic and later on he always had to wear glasses (approximately −8.00 sphere OU). Roosevelt was certainly blind, or nearly blind, in his left eye though it is not quite certain when this condition first began. He had practically no vision in that eye in 1908, the last year of his presidency, when he was examined by US Navy ophthalmologist, Dr. Grow. Roosevelt, being very proud of his strength and physical fitness, kept his unilateral blindness a secret which, while he was alive, was known only to a handful of people. In 1904 he had transient loss of vision in his left eye after he had been struck while boxing. This caused retinal hemorrhages, but he recovered nearly completely. He

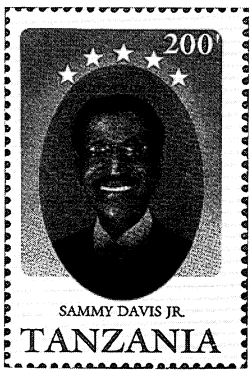
received another trauma to the eye in 1908 while playing tennis. He was hit with a ball hard enough to shatter his glasses and lacerate the skin around his eye. Apparently a cataract developed in the left eye reducing vision to light perception. It is quite likely that this was a traumatic cataract. It cannot be determined whether the left eye also had a retinal detachment.

14. Nils Gustaf Dalen (1869–1937). Dalen was born in Stenstorp, Sweden and studied physics in Stockholm. He invented the sun valve (Solventil) which automatically regulates a light source. It is turned on when the outside light is reduced and turned off at dawn. It quickly was used all over the world for buoys and unmanned lighthouses. In 1906 Dalen became the chief engineer of a company producing acetylene gas. He continued his research on gases and turbines. In 1909 he became the managing director of the company and invented Agamassan, a substance that absorbs acetylene with no danger of explosion. Ironically enough he was injured in 1913 while performing an experiment he had done several times before. A manometer did not register and he checked it closely. He found a crack in the glass and this instrument burst into pieces while he was leaning over it. Glass cut both his eyes. He was hospitalized and both eyes were bandaged. In that condition he received the Nobel Prize for physics which had been awarded to him in 1912 (Fig. 14). In spite of the fact that he was now blind in both eyes he continued to work and to experiment.

15. Marchese Guglielmo Marconi (1874–1937). Marconi was born in Bologna and died in Rome. He was instrumental in establishing the effectiveness of wireless telegraphs and initiated its commercial use. He succeeded in the first transatlantic messages (1902) and later extended his experiments into shortwaves. He was awarded the Nobel Prize for physics in 1909 and in the United States received the Franklin and the John Fritz Medals. He was knighted by the King of Italy in 1929 and became a member of the Italian senate (Fig. 15). On September 15, 1912, while motoring from La Spezia to Genova, he had a head-on collision with another car. He received deep cuts into the right cheek, temple and the right eye was cared for by Professor Baiardi of Torino. Later, Professor E. Fuchs of Vienna was called in consultation and finally the two decided that the eye should be enucleated. It was hopelessly lost and there was danger of eliciting a sympathetic uveitis in the other eye. The operation was performed October 17, 1912 and the postoperative course was smooth.



16. Wiley Post (1899–1935). Post was born in Texas, the son of a farmer. He lived his early life in Texas and Oklahoma and soon began working on oil rigs. He became interested in all kinds of machinery, but especially in airplanes. He started flying as a young man and became more and more daring. In 1925, while drilling on a rig, a chip of iron perforated his left eye. An infection followed and the eye had to be enucleated. From the insurance compensation he bought his first plane and from then on Post flew with one eye without having any difficulties, though once he was nearly refused a pilot's license because of this defect (Fig. 16). In 1930 he won the Chicago-Los Angeles air derby. He also developed parachuting and made more than 100 jumps. In June 1931 he left Roosevelt Field in New York with Harold Gatty as a copilot in order to fly the *Winnie Mae* around the world. He flew a few degrees below the Arctic Circle and covering 15,477 miles returned to New York piloting the plane for 8 days, 15 hours and 51 minutes. This was the first flight around the world in an airplane where the same pilot flew the entire trip. Four years later Post was killed with his passenger, the famous Will Rogers, when his plane crashed after takeoff from Point Barrow, Alaska.



17. Sammy Davis, Jr. (1926–1990). This entertainer lost his left eye in 1954 in a near fatal car accident. He was driving from Hollywood to Las Vegas when he had a head-on collision. His face was thrown against a broken steering wheel. Unconscious, he was admitted to the San Bernadino Community Hospital. Dr. Frederick Hinkley Hull, the local ophthalmologist, took care of him. The left lids were lacerated and there were deep facial wounds. The eye was cut deeply and in several places. Dr. Hull thought that at most 10% of vision could be salvaged in that eye. Because of this poor prognosis and in order to avoid sympathetic ophthalmia, a primary enucleation was performed. Dr. Hull had to use 30 stitches to close all wounds. The passenger in the car broke his jaw and lost all of his teeth. After the sutures were removed, Sammy Davis covered the socket with a patch. He soon performed in this way until a prosthetic eye was fitted. His friends and family were highly supportive. Jeff Chandler and many others offered their eyes for a possible transplant.

Sammy Davis continued undaunted with his career, doing night clubs, television shows, movies, benefit appearances and interviews. He remained an all-around performer (Fig. 17). He died from oral cancer.

C. Especially tragic were those cases in which a blinding perforating injury in one eye was complicated by a blinding sympathetic uveitis in the second eye.

18. Louis Braille (1809–1852). Braille was born in the little town, Coupvray, about eight miles west of Paris. His father was a harness maker and when Braille was three years old he played in his father's shop trying to cut down a belt with a paring knife. He injured his right eye and perforated it. After a few weeks sympathetic ophthalmia developed in the left eye and he ended up blind in both eyes. When he was six he was sent to school in Paris and at the age of 10 entered the Royal Institute for Young Blind Persons (also called Saint Firmin) founded in 1784 by Valentin Haüy.

Braille stayed there for practically his entire life. The sanitary conditions were poor and he probably contracted tuberculosis early in his youth while studying in this damp and poorly ventilated building. Braille soon realized that the preceding attempts to teach blind children to read and write had been of limited success. It was claimed at that time that only three or four blind persons in Paris knew how to read. Braille became a teaching assistant in 1828 and then a professor at the institute. In 1838 he wrote a book on arithmetic for blind persons. This was still written in bossed letters, but Braille found this method too space-consuming and too laborious to be successful.

In 1829 Braille published his first book on his original system of using dots to represent letters, numbers, mathematical symbols and musical notes. He introduced the six-dot system and arranged the signs alphabetically (not phonetically as Barbier had done). In that way the left upper dot (called position 1) represents A, the left upper two dots (called positions 1 and 2) represent B, and the upper two dots (called positions 1 and 4) represent C, and so on. As of 1830 this system was used in the Paris institute and slowly gained general acceptance. The musical symbols were more elaborately published in 1831, so that for instance the first note, the *do* or *c* (ut) occupied three dots (positions 1, 4 and 5). With that, musical literature was accessible to the blind. Braille's book came out in a second edition in 1837 and the method was presented in a more concentrated and logical form. Braille also used a stylus so that the blind could write by using a matrix (Fig. 18).

The first book in braille was produced in 1837. It was hand prepared. The first printed book in braille appeared in 1847. In 1854 the first book in braille in a language other than French was printed. It was in Portuguese and the expenses were paid by the Emperor of Brazil, Dom Pedro II. The braille system soon spread and was used by other European languages though there were numerous modifications, especially in Germany and the United States. The first institute to take up braille outside of France was the famous Institute for the Blind in Lausanne, Switzerland (1852). Slowly the system also extended to the non-European languages though the confusion was great until an international agreement was reached under the auspices of UNESCO soon after World War II.

Braille's tuberculosis became more severe so that around 1845 he had to reduce his teaching load and wanted to retire. He had a severe hemoptysis in 1851 and died one year later. He received a number of posthumous honors. A statue with his bust was erected in his hometown and on the 100th anniversary of his birth his ashes were moved to the Pantheon.

19. King George V of Hannover (1817–1878). With the death of Queen Anne in 1714, Georg Louis the Elector of Hannover, became George I, King of England. This personal union between the kingdom of England and the Dukedom of Hannover lasted until the death of King William IV in 1837. Victoria became Queen of England, but according to the Salic laws a woman could not ascend the throne of Hannover and therefore William IV's younger brother, Ernst August, Duke of Cumberland, became king of Hannover. He had lost vision in one eye during the battle of Tournai (1793). The other eye developed a cataract and had to be operated on (1827) by C.F. von Graefe. The king died 1851. The crown prince and future George V was completely blind. In the history of Hannover he is frequently referred to as 'the blind prince'. For his education a number of persons had to be engaged who would read to his royal highness. The crown prince had lost vision in the left eye as a child from a scrofulous inflammation. The right eye suffered after a trauma to the left eye in London, 1832, from 'a choroidal cataract, atresia pupillae and a severe amaurotic amblyopia' (probably a sympathetic uveitis) according to the court physician, J.G. Spangenberg. The first consultation was with Mr. H. Alexander (the pupil of Phipps) of London in 1826 (Stromeier, *Erinnerungen eines deutschen Arztes* I, p. 308, 1875). A group of German ophthalmologists called to London for consultation (Langenbeck, Sr. and C.F. von Graefe) together with the court physicians were of the opinion that a cataract operation should be tried. In 1838 King Ernst August insisted upon an operation on his son. First Carl Ferdinand von Graefe (1787–1840), the illustrious surgeon and father of a famous son, was called. Because of an attack of typhoid fever (from which he died), Graefe could not leave Berlin. The king then called Friedrich von Jaeger (1784–1872), professor of ophthalmology in Vienna. He traveled to Hannover, but advised against the operation. However, the king insisted and diplomatic pressure was exerted. Jaeger operated and the operation was a dismal failure. The blindness of the prince had been kept a secret in order to assure his succession (Fig. 19). The prince was artistically inclined and especially dedicated to music. He composed several pieces for orchestra and piano as well as songs and even a symphony. Among his 200 compositions, nearly 100 were printed. He was also greatly interested in the theater and other performing arts. Politically he was a reactionary and abolished the constitution of 1848. In the war between Austria and Prussia (1866), Hannover sided with Austria, but was soon occupied by Prussian troops. Hannover was annexed and became a Prussian province whereas the king retreated to Vienna (Hietzing) and died in Paris where he had stayed for the last years of his life.

D. *Intentional trauma*
Occasionally the eyes were blinded in order to punish or revenge.

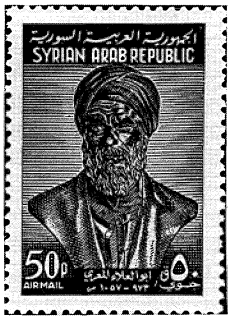
20. Prince Vazul Arpad. Stephen, the Arpad Prince, became the reigning prince upon the death of his father in 997 and was crowned Apostolic King of Hungary by a legate of Pope Sylvester II in the year 1000. The coronation took place at the seat of the archbishop of Esztergom and the pope donated King Stephen with the

apostolic double cross for the Christianization of the Hungarian people. Stephen's only son, Prince Emmeric, died 1031 and this left his cousin, Vazul, as next in line. However, Vazul was eliminated when he was made an invalid. It is not quite clear how this occurred. One version says that Vazul participated in a revolt against the king, was caught and therefore not only blinded but also made deaf by pouring molten lead into his ears. Another version claims that Vazul, who had been exiled to Neutra by the king for bad behavior, was eliminated by an emissary of the queen who favored the son of her sister, Gisela, as the successor to King Stephen. The king died in 1038 and Peter, the son of the Doge of Venice, became indeed King of Hungary. The painting shows the funeral of Prince Emmeric and the blinding of Vazul. It is taken from the illuminated chronicle of King Louis, circa 1370 (Fig. 20).

II. Systemic infections

During the Middle Ages up to the time of sulfonamides and antibiotics, infections were the most frequent cause of blindness. Corneal scars, leukoma adherens and staphyloma were frequent complications of acute exanthematous diseases, e.g. smallpox and measles. Tuberculosis often caused severe uveitis and endophthalmitis, while syphilis could lead to optic atrophy and/or chorioretinitis.

A. *Smallpox*



21. Abu-Al-Ala Al-Maarri (973–1057). Abu-Al-Ala was born in northern Syria. At the age of four he became blind after an attack of smallpox. He went to Aleppo for his education and then traveled, visiting Baghdad twice. There he probably was in contact with Hindus because he converted to vegetarianism (Fig. 21). He returned to his hometown, Maarrat, and lived in seclusion. He developed a pessimistic and skeptic philosophy, but was a prolific poet. He had a prodigious memory and wrote more than 1600 poems. Characteristic are the two lines from one of his epigrams:

> *We mortals are composed of two schools –*
> *enlightened knaves and religious fools.*

He had a somewhat epicurean aspect to life and apparently stimulated Dante to write his *Divine Comedy*. With Al-Maarri the great period of Arabic poetry closed.

22. Turlough Carolan (1670–1738). This Irish harper and composer was called 'the last of the Irish bards of any distinction' by Goldsmith, who wrote an essay about him. Carolan became blind at the age of 18 after he had contacted smallpox. Because of his obvious musical talent, he was apprenticed to a harper and at the age of 21 he set out with a harp, a horse and a little money. He remained an itinerant musician most of his life. He married Mary Maguire, had six daughters and one son, who also became a harper. Carolan was not only a musician and composer, but also a poet. He composed upward of four hundred pieces, enriching and correcting Irish national music (Fig. 22).

23. Taha Husayn (1889–1975). Husayn was born in 1889 in a small village in upper Egypt near the town of Mufaghah west of the Nile River. His father held an insignificant position in an agricultural company for the manufacturing of sugar and Taha Husayn was the seventh of his many children. At the age of three, he had smallpox causing permanent blindness. The eye condition was aggravated by the clumsy ministrations of a local barber. Husayn compensated for his defect by an unusual intelligence, rare memory and scientific ambition (Fig. 23). In his memoirs he describes touchingly how as a small child he slowly realized that he was missing one sense. He became self-conscious, especially when eating, but found solace in the life of the Syrian poet, Abu-Al-Ala. He memorized the *Gur* at an early age and knew many Arabic poems by heart before entering Al-Azhar University at the age of 13. He was taught by the most famous scholars of his time, such as Sayed Al-Marsafi. In 1908 he entered a private university where he studied under famous Egyptian scholars and orientalists. During his stay at the university, he learned French and obtained his Ph.D. in 1914. His thesis was about Abu-Al-Ala Al-Maarri (see also No. 21) and was later printed under the name of Dhikra Abi Al-Ala. The university sent him to Montpellier, France, where he stayed for one year, then he had to return to Cairo due to lack of funds. Later he returned to Paris and learned Greek and French with the help of his French wife and obtained another Ph.D.; the thesis was concerned with the social philosophy of Ibn Khaldoun. In 1924 the private university was changed into a state university and Taha Husayn became the professor of Arabic literature and the Dean of the School of Liberal Arts in 1934. After that he was appointed consultant to the Ministry of Education, but in 1942 returned as President of Alexandria University where he completed the foundation of the university. In 1950 he became the Minister of Education and in 1959 he was honored by the highest medal of Egypt. He received several honorary Ph.D.'s from universities in the Middle East and in Europe; he was also made a Bey and a Pascha while Egypt was still a kingdom and was called the 'Dean of Arabic Letters'. During his life he was very productive and industrious. He wrote approximately 32 variegated and highly regarded books, and translated several books from French and Greek. His auto-

biography (Al-Ayyam) was published in three volumes. Taha Husayn was buried in Cairo.

B. *Measles*

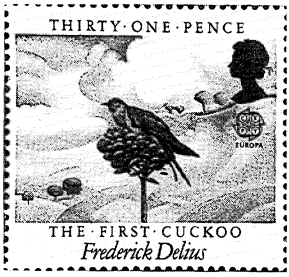
24. Helen Adams Keller (1880–1968). Keller was born in Tuscumbia, Alabama on June 27, 1880. Because of a severe attack of measles she lost at the age of 19 months her vision, her hearing and soon also her voice. When she was about six years old her parents appealed to Dr. Alexander Graham Bell for counsel and, as a result, Miss Anne Mansfield Sullivan (later Mrs. John Macy) came in 1887 to Alabama to instruct the child. Miss Sullivan was at that time 20 years old and had previously been nearly blind. She was a recent graduate of the Perkins Institute for the Blind in Boston. The education of Miss Keller is the most extraordinary example of educating a blind, deaf-mute child. Not only was Miss Keller exceptionally intelligent and talented, but Miss Sullivan was a marvelous teacher. Miss Keller learned to read, write and talk. She entered Radcliffe College and graduated cum laude in 1904. She became proficient in several languages and wrote many books. Miss Sullivan became the constant companion of Helen Keller, who called her 'teacher'. After the death of Mrs. Sullivan Macy on October 20, 1936, Miss Polly Thomson became her companion. Helen Keller learned first the manual alphabet for the deaf, but instead of looking at the fingers she learned to feel them by placing her own fingers lightly on the hand of the person communicating with her. She first read books with bossed print and then learned various types of braille (Fig. 24). Her education in turn was based on the pioneer work of Dr. Samuel Gridley Howe (1801–1876) who educated a blind, deaf-mute girl, Laura Bridgman. Dr. Howe became head of the Perkins Institute and was later succeeded by his son-in-law, Michael Anagnos, who sent Miss Sullivan to Tuscumbia. Helen Keller is buried in the Washington National Cathedral Church of Saints Peter and Paul. Along the north outer aisle are ten limestone corbels as part of the Forbes Memorial Carvings. They are fashioned to the likeness of outstanding modern Christians. One of these portrait sculptures is of Helen Keller.

C. *Influenza*

25. Jean-Paul Sartre (1905–1980). This French philosopher and novelist developed at the age of four a scar (leukoma) in the right cornea. This followed an attack of influenza (grippe). The eye became amblyopic and exotropic (Fig. 25). Many photographs showing Sartre from in front reveal this right exotropia measuring about 40–45 prism diopters. It is already apparent in a picture taken when he was attending the first grade of the lycée Henri IV and is especially obvious in a portrait by William Leftwich that appeared in 1946 in *Time Magazine*.

D. *Syphilis*

26. Camilo Castello-Branco (1825–1890). Castello was born in Lisbon and became an orphan at the age of eight. He was brought up in a small village by his sister, the wife of a physician. He himself lost his first wife before he was 20. He left the village in order to study medicine in Oporto. His life was quite boisterous and full of adventure. He was twice imprisoned for love affairs and later on convicted for abducting an heiress as a bride for his son. Castello was a tempestuous author who wrote numerous novels. All of them are filled with ultraromantic fantasies and are full of action. He has been called 'the modern Portuguese genius personified'. In 1855 he was created Viscount de Correa Botelho (Fig. 26). For the last two decades of his life he slowly lost vision and became completely blind during his last years. He was seen by many physicians, Portuguese and foreign. In a letter to Tomas Ribeiro of July 5, 1888 he gives the full diagnosis as it was established by the famous Portuguese ophthalmologist Gama Pinto: atrophy of the optic nerves after an acute attack of peripheral chorioretinitis with syphilitic optic neuritis, suddenly precipitated by the treatment with arsenic. The blindness aggravated his natural tendency for depression. Castello committed suicide by shooting himself in the head with a pistol. Two of his sons had become blind before him.



27. Frederick Delius (1862–1934). The English composer of German descent became blind in his later years. Yet, he continued to compose and dictated musical scores to a young musician, Eric Fenby. Delius was born in Bradford, England and died in Grez-sur-Loring, France. He apparently contracted syphilis around 1884 when he was in Florida. His symptoms first appeared around 1924, when he had returned to Grez after WWI. He slowly succumbed to the infection and was finally overcome by blindness and general paralysis. He rapidly became a helpless invalid tended by his devoted wife, while the young Yorkshire musician became his amanuensis. The stamp, 'On hearing the first cuckoo in spring', shows a piece for small orchestra which Delius composed 1912 and dedicated to Balfour Gardiner (1877–1950), the English composer (Fig. 27).

28. Candido Mariano da Silva Rondon (1865–1958). Rondon was born in the State of Mato Grosso, attended military schools and finally the military academy. Already as a young man he participated in the war against Paraguay. He became a professor at the military school and participated in the republican revolt of 1889 marching under Benjamin Constant. He was a member of the Corps of Engineers and rose in rank until he

became a general. In 1939 by a special act of the National Congress he was elevated to the rank of marshall (Fig. 28). Rondon's main interests were the Indians of the Amazon and of Northwest Brazil. He discovered new aspects of that country and pacified many wild Indian tribes. He managed to have an excellent relation with them, as he himself was part Indian. He spoke the native languages and collected the first dictionary of the Pareci. He initiated and supervised the first telegraph lines into the Amazon country which the Indians called the 'language of Mariano'. He put together the first complete map of Brazil and by peaceful means conquered for the State many thousand square miles of wilderness. His social and scientific contributions cannot be overestimated. He was proposed for the Nobel Peace Prize, but died before the committee made a decision. He conducted many expeditions into the Amazon. One with Teddy Roosevelt, the ex-President of the United States, in 1913/14 and another with the renowned French poet, Paul Claudel, who was at that time ambassador of France. His motto when dealing with the Indians was 'to die if necessary, to kill never'. In 1959 the Guapare territory changed its name officially to *Rondonia*. Rondon lost vision when he grew older and finally became blind. His physician, Sylvio Abreu, Jr., described his signs and symptoms. One eye had become blind when Rondon was still quite young, but slowly the vision in the other eye was also lost. The diagnosis was atrophy of the optic nerve in both eyes, though it was never established whether this atrophy was vascular or syphilitic.

E. *Tuberculosis*

29. St. Francis of Assisi (1181–1226). After a revelation he dedicated himself to the care of the sick, especially lepers, and the outcasts. He founded the Franciscan Order. He is characterized by his enthusiastic love of poverty, his constant joyousness, his love of nature and his serious intent to imitate the life of Christ (Fig. 29). During the last years of his life he lost all vision. He had never been robust and apparently contacted tuberculosis when he was exposed and received the stigmata. His eye condition has been diagnosed as tuberculous iridocyclitis with secondary glaucoma and cataracta complicata. In 1224 when he was completely blind he was treated by an oculist from Rieti. He bled the patient, applied compresses, but also burnt him with a branding iron cauterizing the temples, the ears (thereby piercing them) and the eyebrows. Francis tolerated these procedures with true Christian equanimity.

III. Other systemic diseases

A. *Rheumatoid arthritis*

30. Galileo Galilei (1564–1642). This Italian astronomer and philosopher became blind in old age. He was born in Pisa where he also attended the university and became a member of the faculty. He worked first on the pendulum and on the

telescope. He enthusiastically followed Copernicus and the new concept of the solar system. He spent some time in Rome and then in Florence. By a papal edict he was prohibited to publish his ideas about the movement of the earth. He was tried by the Inquisition and was sentenced and forced to repent. According to legend, he sank to his knees uttering 'and it (the earth) moves in spite of it all'. When freed he spent his remaining years in Florence. His last telescopic discoveries were made in 1637 only a few months before he became blind in his second eye. His last ideas and inventions were dictated to his disciples, Viviani and Torricelli.

On January 2, 1638 Galileo wrote to his friend, Elia Diodati (1576–1661) in Paris about his complete loss of vision 'da un mese in qua del tutto cieco' and he tells that he could not use the telescope anymore. In a previous letter (February 11, 1637) to Dino Peri (1604–1640) he first mentions that his right eye has its ups and downs. He was prescribed to take aloe by mouth and apply warm eye washing at night. In November 1637 a dense fog also developed over the left eye. It turns out that he had eye troubles already in 1637 and he suffered from rheumatoid arthritis when he arrived in Padova. The cause of his blindness has been explained in a number of ways: The famous Italian ophthalmologist, Pietro Gradenigo (1831–1904), who taught at the University of Padova, wrote a paper about Galileo's blindness in which he tried to prove that the cause was chronic glaucoma. Since then a consultation report on Galileo's eye condition has been found. The famous Roman surgeon, Giovanni Trullio (1598–1661), visited and examined Galileo on February 20, 1638. He wrote a long report in which he discusses the findings and advises the treatment. His conclusion was that a 'suffusio' was obstructing the pupil. This was at that time the term for a cataract. A more modern interpretation assumes that Galileo suffered from bilateral iridocyclitis as a complication of his rheumatoid disease. This iridocyclitis then produced a complicated cataract, synechiae and an occlusion membrane (Fig. 30).

31. Nikolay Alekseyevich Ostrovskiy (1904–1936). Ostrovskiy was born in a little village in Volhynia, in the Ukraine, the son of an unskilled laborer. When World War I was over and Ostrovskiy was still a young man he joined the Red Army and participated in the civil war. He was seriously wounded in the fights around Lvov in Eastern Poland. At that time he lost vision in his right eye. He joined the Communist Party and participated in many endeavors to fulfill the goals of the first five-year plan. During that time he came down with typhus and while working in the ice-cold water of the Dnjepr he had his first attack of acute rheumatoid arthritis. The arthritis soon progressed and involved many of his joints. At first he had difficulties with his knees, but soon he also came down with an ankylosing arthritis of the vertebral joints. He had difficulty walking

and experienced severe pain. Even lying down became a torture. The treatment must have been at least as painful as the disease. He received many injections into his inflamed joints, mostly antiseptic medications, such as iodoform and iodine solutions. He was sent to many spas and resorts, spent winters in the south, but the disease progressed relentlessly. In spite of his physical difficulties Ostrovskiy became prominent in the intellectual life of the Communist Party (Fig. 31). He wrote novels and pamphlets vigorously defending the Bolshevik ideology. He advanced steadily in the hierarchy of the Party. His novels (especially *How the Steel was Tempered* and *Born of the Storm*) made him famous. He became a friend of Gorki and corresponded with many writers all over the world, e.g. Romain Rolland. In his hovel *The Making of a Hero* he describes a man going blind. His arthritis progressed in spite of all treatment. He soon had to use a wheelchair and finally ended up completely bedridden. In 1928 his good eye started to cause him trouble and he slowly lost vision due to chronic iridocyclitis. He was mainly treated with atropine drops and in 1929 he confessed in a letter that his severe stomach-aches were due to swallowing atropine which was dropped into his eyes. His ophthalmologist, Dr. Averbakh, contemplated an operation on his left eye, probably the extraction of a complicated cataract. However, the continuous and active uveitis did not allow any surgical procedure. Shortly before his death the enucleation of his right eye was contemplated, but was never carried out. At the end Ostrovskiy was blind and incapable of moving any joint except his fingers and elbows. Nevertheless, he remained in good spirits and kept on dictating. He continued to write as long as he could, even though he was unable to see. He was fascinated with the newly invented radio and built himself a small set. He finally died in Moscow receiving the Lenin Prize posthumously.

B. *Porphyria*

32. King George III of England (1738–1820). The King became ill soon after his 50th birthday and actually never completely recovered. Finally, a regent had to be appointed (Fig. 32). His disease consisted of a number of physical signs combined with mental derangement. Delirium, insomnia and paralysis ensued. The condition has now been recognized as prophyria, an inborn metabolic disorder, which significantly affected the fate of the royal houses of Stuart, Hannover and Prussia. His first eye troubles were noted in July 1804 and were diagnosed as an inflammation threatening total loss of vision. His oculist, J.W. Phipps, and later Sir Jonathan Wathen Waller, applied the usual remedies, mainly leeches, but the King's vision continued to deteriorate. In 1805 his handwriting began to change and he needed an amanuensis. In 1809 he was nearly blind and when attempting to write a letter he could not even see that the pen had become dry. His contemporaries often referred to him as 'the blind King'. Interestingly enough, the King's last oculist was John Taylor, III, a grandson of the infamous chevalier. Taylor was appointed when Baron de Wenzel died and retained his position upon accession of George IV.

IV. Oular diseases

A. *Glaucoma*

33. John Milton (1608–1674). Milton became blind early in adulthood and from then on had to dictate his works (Fig. 33). Many passages in his letters, poems and notes refer to this blindness. Similarly, a number of his contemporaries and successors describe his blindness. The best description is given by Milton himself in a letter he wrote on September 28, 1654 to his Greek friend, Philaras, who apparently was traveling to Paris and was supposed to obtain advice from a famous French surgeon. Milton indicates that he had noticed for ten years that his eyes were getting weak, that he has pain on reading and that he sees colored rings around candlelight. The left eye went out first though he still sees some phosphenes. He complains about the 'sleepy heaviness of his eyes'. He says that he prefers a darkened room and that minute portions of light cannot be seen anymore. In his second defense of the people of England (a series of tractates he wrote against accusations from France and the Stuarts), he maintains that too much reading in childhood weakened his eyes and caused headaches. He also admits that he tampered with 'physick' and we have to assume that he used a frightful and rhapsodical mass of nostrums. These themselves may have done more harm than good. There is no question that by 1652 at the age of 43 Milton had become completely blind. His eye condition was called gutta serena or dim effusion. He alludes to it in *Paradise Lost*. This only meant that from the outside the eyes appeared normal and did not show any pathologic changes. This is the condition the Germans refer to as *Schwarzer Star*. The cause of his blindness will always remain baffling and elusive. Most authorities are of the opinion that Milton suffered from glaucoma. W.H. Wilmer of Johns Hopkins University elaborated and explained this carefully. The entire course of the disease and the final effects would speak for such an assumption. Another possibility would be that Milton had bilateral myopia and retinal detachments. It is known that Milton's father could read fine print at the age of 84 without using spectacles (pointing toward moderate myopia) and his mother had weak eyes. However, such a disease would lead to a rather sudden loss of vision and probably would engender secondary complications (cataract, glaucoma, inflammation, etc.). All other speculations are too remote to be taken seriously (congenital syphilis, diffuse chorioretinitis, pituitary tumor, etc.). Milton refers repeatedly and poetically to his blindness. In *Sonnet XIX* he writes:

> *When I consider how my light is spent,*
> *E're half my days, in this dark world and wide.*

In *Paradise Lost* he gives a list of the objects he no longer sees: the light of evening, vernal bloom, summer's roses, flocks, herds and the human face divine. And in *Samson Agonistes* he writes: 'O loss of sight, of thee I most complain' and includes a hymn to light 'Hail, holy light'.

34. Johann Sebastian Bach (1685–1750). Bach's eyesight had been poor nearly all his life. It was said that he weakened his eyes by the lifelong strain of copying music. This is already obvious in Haussmann's portrait (Fig. 34). The symptoms, however, became more and more distressing and he developed a serious and painful eye disease. One writer on his medical history suggests 'his age, the sudden onset of violent pain in the eye, the lack of perception in the last stages and finally, the stroke preceding his death – point to glaucoma, possibly hemorrhagic'. It is therefore not surprising that Bach decided to have his eyes operated on when the itinerant ophthalmologist, chevalier John Taylor, came in 1750 through Leipzig. Taylor had a good reputation. Born in Norwich, England, he had studied in Leiden, the Netherlands (1725) and had since been traveling all over Europe. He had become the surgeon oculist to King George III and had operated on many famous patients. How was Bach to know that this Taylor was the greatest charlatan and quack of the century. Taylor was traveling in high style. He entered the city with two coaches and many servants in livery. Several gentlemen accompanied him and the sides of his coach were painted over with eyes and with his motto *Qui dat videre, dat vivere*. He showed off his magnificent array of gold instruments, he was wearing splendid clothes and valuable jewels. He always gave a lecture on 'the nature and cure of the diseases of the eye'. He carried with him numerous public and private testimonials describing his successes. The operation on conductor Bach was duly noted in the local newspaper of April 1, 1750. In that note it was also stated that Bach had recovered full eyesight which should be welcome news to the many admirers of the world famous composer. Not enough thanks can be given to Dr. Taylor. If Bach derived any relief from the operation, it must have been short-lived. A second operation had to be performed a few days later and it was again unsuccessful. In addition, Bach was the subject of Taylor's postoperative treatment 'local irritations of the eye by repeated incisions and cataplasms with excessive use of the entire dubious armamentarium of the times including calomel, cantharides, bleeding, etc.' Bach, however, did not respond, a chronic inflammation set in and Bach remained blind. Taylor left Leipzig a few days later and went to Berlin. There too his stay was short and a few days later the King of Prussia asked him to leave the city forever so that his subjects would no more suffer the misfortune to be treated by Taylor. Bach was not only blind, but had been considerably weakened by this ordeal. He dictated his last works in a darkened room. His religion gave him strength, but some of his works allude to the fact that he had become blind and sick. One of his last organ concerts is called *Wenn wir in Höchsten Nöten sein*. The vainglorious and bombastic Taylor was not ashamed to publish his autobiography in which he describes his triumphs and successes. Alluding to the operations on Bach, he wrote in 1760 'but to proceed, I have seen a vast variety of single animals, such as dromedaries, camels, etc. and particularly at Leipsick, where a celebrated master of music, who had already arrived to his 88th year, received his sight by my hands . . .'. Taylor does not mention Bach by name, nor does he cite his age correctly. Ironically enough, Taylor, who died in 1772 (either in Paris or in Prague, nobody knows exactly where) also was blind for a considerable time before his death.

B. *Cataract*

35. The Monk Jianzhen (688–763 A.D.). Jianzhen (Chian-Zhen) lived during the Tang Dynasty and was born in Yangzhou in the Jiangsu Province. He became a Buddhist monk in the temple Dayun of Yangzhou when he was 14 years old. He was extremely intelligent and diligent and quickly rose in the Buddhist hierarchy. At the age of 40 he was regarded as one of the great masters and he became a leader of the people in the Yang and Huai River basins. He was not only extremely knowledgeable in theology, but acquired great wisdom in philology, architecture, the arts, especially sculpture, logic and dialectics. He was also an outstanding physician with a deep knowledge of traditional Chinese medicine. Jianzhen traveled far and wide throughout China acquiring great experience in medicine and in Chinese pharmacology by studying the various herbs and plants. When Jianzhen was over 50 years old, two Japanese monks, Elei and Fusyo, who had been students of his in China for ten years, invited him to come to Japan and preach Buddhism. Such a crossing of the sea to Japan was at that time most difficult and dangerous. Jianzhen tried it six times always accompanied by numerous students, but succeeded only in 753 to reach the Japanese shores. He acquired a high position and received rich honors from the Japanese emperor. A temple, Tang Zhoti, was established in his honor and there he died at the age of 76. Before his death one of his pupils built him a statue of lacquer which is still well preserved and a national treasure and historical relic in Japan (Fig. 35). Jianzhen taught not only religion, but also medicine while in Japan. He wrote numerous medical books among which a collection of prescriptions for heart diseases has been preserved. While preparing for his crossing to Japan, Jianzhen slowly lost his vision and finally became completely blind so that when he arrived in Japan he had lost all his sight. The cause of the eye disease is unknown. Some presume that it could have been a cataract as he consulted a Tartar doctor and these physicians were at the time known to be experienced in couching cataracts. However, nowhere is there a mention of an operation on his eyes. Other Chinese physicians have speculated that the condition was an angle closure glaucoma precipitated by the mental and physical strains while preparing for the Japanese expedition.

36. King John of Bohemia (1296–1346). John belonged to the House of Luxembourg and was the son of the German emperor, Henry VII. His mother was Margaret, daughter of John I, Duke of Brabant. He became Count of Luxembourg and was offered the crown of Bohemia in 1311. John fought and campaigned all over Europe, not only in Poland, Lithuania and Silesia, but also in Italy and France. His eye troubles began in 1337 when he lost vision in his right eye, apparently due to a severe inflammation. This happened in Breslau when he was on his second campaign against Lithuania. Around 1350 the king became blind, but

he continued to lead an active life fighting battles in many places. He was successful in having his son, Charles, elected German emperor (1346). He helped Jean Philippe, King of France, against the English and fought in the Battle of Crécy where he found his death on August 16, 1346 as a fitting conclusion to his adventurous life (Fig. 36). Because of his eye trouble, King John asked many physicians for advice. Once he let an ophthalmologist come from France and as the physician could not help him he had him sewn into a sack and thrown into the river. He would have used the same treatment later for an Arabian physician, but the physician had only dared to come because he had previously received a guaranteed safe return. John went to Montpellier in 1340 and consulted Guy de Chauliac, but he could not help him either or perhaps did not dare to treat him. However, he put him on a strange diet. The king then consulted a Jewish physician also in vain. In the meantime, he had become completely blind.

37. Georg Friedrich Händel (1685–1759). Händel was born in Halle, Saxony, his father being a barber surgeon. He learned early in youth to play the organ and the oboe and started composing at the age of 11. He soon turned to the opera and oratorios. He spent several years in Italy and in England and became a naturalized British subject (Fig. 37). We find the first indication of failing eyesight in a handwritten note on the score of his last oratorio *Jephtha* early in 1751. In this note he remarks (in German) in the middle of the chorus in the second act 'unable to continue because of weakening (in German he uses the word: relaxation) of my sight in the left eye'. Händel had a little stroke in 1737 which paralyzed his right hand for several months. He took the cure and recovered reasonably quickly. It is unlikely that this was connected in any way with his eye condition. In June or July of 1751 Händel went to seek the advice of Samuel Sharp (1700–1778) at Guy's Hospital. Sharp was at that time a famous ophthalmologist and surgeon in London, author of the well-known *A Treatise on the Operations of Surgery*. Some of the most famous and illustrious contemporaries were his patients, e.g. Dr. Samuel Johnson. When he examined Händel he found the left eye blind and the right eye nearly blind. He told him that an operation would be contraindicated and his diagnosis was gutta serena. Händel therefore went into the country and took the cure. Especially moving is the fact that Händel wrote the music to *Samson*, a poem by the blind Milton, in which he says:

O loss of sight! Of thee I most complain
O worse than beggary, old age or chain
My very soul in real darkness dwells
Total eclipse! No sun! No moon!
All dark amidst the blaze of moon.

Early in 1753 he was operated on by William Bromfield, Esq., the surgeon of the Princess of Wales. He underwent three painful operations and both cataracts were couched. There was temporary improvement in one eye, but after a few months

Händel became completely blind, but he continued in his creative activities, played the organ and directed the orchestra. The cataracts were not his only problems. He may also have suffered from hypertensive retinopathy and embolic infarcts. In the summer of 1758 he went to Tunbridge Wells to be treated by the chevalier John Taylor, Sr. Taylor mentions in his memoirs that he actually operated on Händel. There is, however, no objective evidence of that. Taylor was a skillful surgeon, but a notorious liar and always eager for self-aggrandizement and advertisement. He was a typical itinerant surgeon who nowadays would be called a buccaneer surgeon. Taylor mentions in his diaries that Händel suffered from a 'paralytic disorder in the head', but his 'pupils reacted'. He found 'the bottom defective'. This latter statement is unintelligible as it was obviously impossible for Taylor to examine the back of the eye. If Taylor indeed treated or operated on Händel, he has the dubious distinction of having had the two most famous musicians of the century (Bach and Händel) as his patients and to have served them both so miserably. Händel remained blind until he died suffering from frequent episodes of depression.

38. Montesquieu (1689–1755). The full name of this French philosophical historian was Charles Louis de Secondat, Baron de la Brède et de Montesquieu. His most famous works were the satirical *Persian Letters* and a fundamental philosophical analysis of laws, *L'Esprit des lois* (Fig. 38). In 1745 we find the first indication that his vision was failing. Two years later a cataract was discovered in his better eye. He was at that time in Paris and an operation was suggested, but he procrastinated. In 1749 his vision had not improved and he wrote 'if I would have eyes I would rather live in Rome than in Paris, but in Rome everything is external and one feels continuously the privations when one doesn't have any vision'. This letter was directed to one of the many ecclesiastical friends he had in Italy. Montesquieu had always been highly myopic and the myopia seemed to be progressive. Montesquieu was under the care of the surgeon Claude Deshais-Gendron (1663–1750) who was famous as a cancer surgeon and who advised the amputation of a cancerous organ as the only cure for that disease. He and his nephew, Louis Florentin, graduated from the medical school in Montpellier. The nephew was professor and demonstrator of ophthalmology at the College of Surgery in Paris, probably the first time that such a title had been awarded. Both treated Montesquieu though it is not sure whether they operated on him. In any case, Montesquieu died blind.

39. Leonhard Euler (1707–1783). Euler was born in Basel, Switzerland. His father, Paul, was a Calvinist pastor who had studied mathematics under Jacques Bernoulli. Euler graduated from the University of Basel in 1723. He studied geometry under Jean Bernoulli, Jacques' younger brother, who was at that time the greatest mathematician in Europe. Euler became a close friend of Jean's sons, Daniel and Nicolas. In

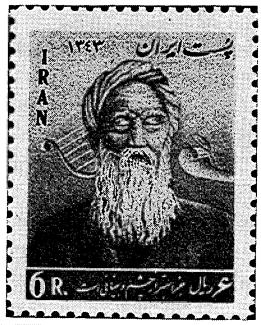
1727 he was invited by Catherine I to come to St. Petersburg where he became professor of physics and then of mathematics. In 1741 he went to Berlin and was appointed by King Frederick the Great to the Prussian Academy, whose president he became. He returned to St. Petersburg 25 years later and died there (Fig. 39). Euler is recognized as the greatest mathematician of the 18th century. He was extremely prolific and it has been calculated that only to copy his output would take 50 years provided that one would write eight hours a day. He was interested in all aspects of mathematics and physics. He also applied himself to practical mechanical problems and wrote books on shipbuilding, gunnery, water machines, and the theory of music. He was unusually versatile and was most knowledgeable in anatomy, chemistry and botany. He played an important political role and was a valuable link in the diplomatic and scientific relationship between the German princes and the Russian czars. His importance to ophthalmology is twofold:

1. He wrote a three volume book on dioptrics which was published in 1767–1771 in St. Petersburg. This book represents the link between Newtonian optics and the culmination of optical sciences in the 19th century by Gauss. Previously, Euler had rejected Newton's idea that it would be impossible to construct an achromatic lens (1747, Transactions of the Berlin Academy). Euler had assumed that the human lens is also achromatic, but he correctly postulated an achromatic lens consisting of material of different refractive indices.

2. Euler became completely blind. In 1735 he lost one eye due to an inflammation which was attributed to working too strenuously. In 1772 he lost vision also in his right eye after he had been operated on for a cataract by the famous surgeon, Baron von Wenzel. Michael Baron von Wenzel was one of the most famous, nearly notorious, itinerant cataract surgeons in the second half of the 18th century. He was born in Germany and died in 1790 in London. Though not highly educated, Wenzel was certainly a skillful and quite successful surgeon. He extracted the cataract by using a semicircular incision at the lower limbus. The capsule was slit with a needle and the cataract extracted with a hook. The whole operation usually lasted 30 seconds. He traveled all over Europe extracting cataracts on anybody who would hold still long enough. Wenzel boasted about his results and his famous patients to attract new customers. He was later joined by his son, Jakob, who also performed cataract extractions. The Wenzels devised their own cataract knife and Jakob finally settled in Paris where he became the ophthalmologist to Emperor Napoleon and wrote a number of interesting and important ophthalmic books. The operation on Euler gave only transient improvement and soon thereafter Euler became completely blind. However, he kept on working. It is difficult to imagine how a mathematician at that time could work without any vision. Euler had a fantastic memory (he could recite Virgil's *Aeneid* by memory) and he had excellent assistants who wrote down his calculations and thoughts, especially Johann Albert and Nikolaus Fuss. He stopped calculating only when he died.

C. *Congenital defects*

40. Roudaki Samargandi (Abu'Abdullah Ja far Ibn Muhammad Roudaki) (859?–941?). Roudaki was born in the village Roudak (or Rudag) of Samargand (Transoxiana) named 'Banja'. He was the first great poet of Iran and was called 'the master of poets'. He certainly was blind early in life and some of his bio-



graphers claim that he was born blind. It is said that at the age of eight he memorized the entire Qur-an and started to compose poems. He had a fascinating and pleasant voice and because of it he became involved in music. His teacher was 'Abu Al-Abk Bakhtiar' the master of music at that time. Roudaki went to the palace of Amir Nasr Ibn Ahamd Samani. He was honored and encouraged by him. The king was fascinated by Roudaki's talent and taste and showered him with gifts and wealth. Roudaki wrote many poems to praise the king. He translated the book *Kalilah and Dimnah* and other stories into Persian. It has been estimated that his poems consisted of 100,000 verses, but only a few of them have been preserved. Roudaki wrote 'wisdom is more valuable than the eyes or vision' and this motto was used when the Institute for the Rehabilitation of the Blind of Iran was opened in 1964 (Fig. 40). Roudaki was a follower of Ishmaelitism, but when this fell from favor he lost his position at court. He died a pauper and is buried in the city of Samargand.

41. Sur Das (1478–1558). Sur Das was one of the foremost poets of the Hindi language. We have no direct documents about his life, but know about him only indirectly through the *Varta* literature, which was completed about 100 years after Sur Das' death. Sur Das was born near Delhi, the eighth son of poor parents. He lived in abject conditions and could not get the affection of his parents. We know that Sur Das was blind, but it is not established whether he was born blind or became blind as a child. There is no question that he composed his best poetry during his blind period, but his allusions to form, color and shape have led to the assumption that at one time he was able to see (Fig. 41). His blindness is also shrouded in mythology. Sur Das was the youngest son and his seven older brothers died in a war fighting against Moguls. Deprived of his guides the blind Sur Das kept roaming the countryside for a number of days and accidentally fell into a well. He spent six days in the well, but on the seventh Lord Krishna appeared before him in a human body and restored his sight so that he could see Lord Krishna in person. Lord Krishna blessed him so that Sur Das woul attain top position in poetry. At that moment Sur Das begged him for a blessing so that his eyes would no longer be able to see anything after he had seen Lord Krishna himself. Lord Krishna got him out of the well and fulfilled his wish so that he once again became blind. All his poems are written in honor of Vishnu. They are songs and hymns of various length, but usually short and most of them are *Padas* with simple stanzas of four lines of which Sur Das is said to have composed 125,000.

42. Theis, The Blind (1747–1824). His full name was Mathias Schou. He was a wandering minstrel and itinerant fiddler in Luxembourg who was popularly known as *Blaunen Theis*, i.e. Theis (an abbreviated form of his first name), the blind. He was apparently blind since birth. He walked from town to town and from kermis to kermis playing folk songs and dance music. He was always guided by his wife, Barbe (or Bärbel), and accompanied by his faithful dog. His songs and poems were all written in the local language Letzeburgesch, a Teutonic dialect, which at that time was suppressed by the prevalent French and later by high German. Theis was immortalized by one of the first and most prominent poets of the Letzeburgesch language, Edmond de la Fontaine, who was commonly known as Dicks. Dicks was the son of a provincial governor G.I. de la Fontaine. He himself graduated from law school and became the owner of a large plant and a justice of the peace. In his many publications (mostly songs and plays) he developed into one of the classicists of the Letzeburgesch language, which since 1939 has become the official language of the Grand Duchy. The stamp is a reproduction of a portrait which now hangs in the State Museum of Luxembourg (Fig. 42).

43. Jorge Louis Borges (1899–1986). Borges was born in Buenos Aires. His father had German and English blood. He was educated in Europe and spoke many languages. Borges became one of the most successful and original Latin-American writers. In the 40's he became director of the Argentine National Library, but was dismissed by the dictator Peron. Later he became professor of English at the University of Buenos Aires. He received numerous honors and international awards. Borges died in Geneva at the age of 86 (Fig. 43). Since childhood his vision had been poor and in time became worse. He thought that it was a hereditary defect, as his father's vision was poor. Homero Gugliemini writes that the father, Jorge Guillermo Borges (died 1938), was in his 20's nearly blind because of cataracts which completely obscured his pupils. Cataracts had already then in an inexorable way afflicted the son's eyes. One of his paternal great-grandfathers, Edward Young Haslam, had an eye operation which was reported in Lancet. As of 1927, Borges underwent eight eye operations and as of the late 1950's he was completely blind.

Borges refers in his poems frequently to his blindness. He wrote two poems entitled *A Blind Man* and one *On My Blindness*. The following famous passage comes from his poem *A Blind Man*:

I do not know what face is looking back
whenever I look at the face in the mirror;
I do not know what old face seeks its image
in silent and already weary anger.

D. *Chronic uveitis*

44. Joseph-Antoine Ferdinand Plateau (1808–1883). Plateau was born in Brussels and became an orphan at the age of 14. He studied at the University of Liège and graduated there in 1829 as doctor of philosophy (mathematics and physics). He worked later in Brussels, but soon became professor of physics and astronomy at the University of Ghent, where he also died (Fig. 44). His inaugural thesis was concerned with physiologic optics. It discussed the 'influence of light on the visual organ'. In it he reported on some excellent and important experiments concerning afterimages, simultaneous contrast, colored shadows and color perception. He continued to work in physiologic optics and concerned himself mainly with the radiation of light and color perception. From this developed the Talbot-Plateau law which states that the effect of color briefly presented to the eye is proportional to the intensity and the duration of the stimulus. When investigating afterimages and following the example of Newton, Plateau gazed for 25 seconds into the sun (1828). This blinded him for several days, but he regained vision. In 1840 he first noticed blurred vision in both eyes which was diagnosed as choroiditis. The disease progressed quite rapidly and caused secondary cataracts. In 1843 he became completely blind. Plateau ascribed his blindness to the 1828 experiment. The whole scientific world of the 19th century was moved by this tragic story of the visual scientist who became blind as a result of his own experiments. His destiny was thought to be similar to that great deaf composer, Ludwig von Beethoven. Nevertheless, he continued to work and even performed experiments with the help of his friend and fellow physicist, Duprez. He later became more interested in the physics of liquids and in other aspects of science. He wrote numerous books and monographs and developed into the most outstanding physicist Belgium has produced. Some of his short papers are of fascinating interest. In one of them, for instance, he disproved on theoretical grounds the old myth that the tomb of Mohammed was floating in air due to a magnet lifting it. Plateau received many honors and early in life became a member of the Royal Belgian Academy of Sciences. The cities of Ghent and Brussels honored Plateau by naming streets after him.

45. James Joyce (1882–1941). Joyce was born in Dublin and already as a child had weak eyes. He was probably quite myoptic and had to wear glasses all his life (Fig. 45). In 1902 and 1903 he had severe attacks of toothaches which incapacitated him for days and weeks. The pain was so severe that he could hardly eat. In 1907 he had his first attack of iritis and from then on suffered considerably from this disease. He had multiple attacks in both eyes and often had excruciating pain. He tells us that he sometimes had to roll on the floor because the pain was so severe. He consulted numerous physicians. In a letter in 1922 Joyce

speaks of 'my 35th doctor'. Most of these physicians were in Switzerland, France, England and Germany. The most famous ophthalmologists of that time examined him and many treated him. He was put on atropine and scopolamine, salicylates, and hot baths, leeches and various sedatives. He had his first operation, an iridectomy on the right eye, in 1917 for secondary glaucoma. Numerous other operations for secondary glaucoma and cataracts followed. In 1923 all of his teeth were extracted because they were thought to be a focus of infection. Among his physicians were Merigot de Treigny, Hartmann and Morax in Paris, Staehli, Siedler, Weber, Haab Jr. and Gamper in Switzerland and Pagenstecher in Germany. Joyce finally turned to Professor A. Vogt in Zurich and an operation on an aftercataract in the left eye was performed in 1930. The postoperative course was stormy. The wound burst, there was severe hyphema and bleeding into the vitreous. Nevertheless, the eye did clear somewhat and the patient could gain enough vision to move around by himself and read with a magnifying lens. Joyce had decades of poor vision and several years of practically no vision at all. During that time 'I had to be helped across the street and kind people hailed taxis for me'. Like Homer, who was blind when he wrote his *Odyssey*, Joyce was practically blind when he wrote his *Ulysses*.

E. *Purulent infections*

46. Hannibal (247–183 BC). This famous Carthaginian general was the son of Hamilcar Barca and the brother-in-law of Hasdrubal. During the second Punic War he occupied Spain and crossed the Alps. He beat the Roman legions near Trebia (218 BC) and then reached Etruria (Fig. 46). Instead of taking a long but easy route he chose a short but difficult one. He had to traverse the marshes where the Arno River had flooded. For four days and three nights his soldiers marched through water and mud sometimes reaching up to their hips. On this journey he came down with an eye disease whereby he lost the use of his right eye and for a while had to be carried in a litter. This may have been the reason why he delayed attacking Rome.

Titus Livy, the famous historian (59 BC to 17 AD), reports in Roman history *Ab urbe condita* that Hannibal's eyes had already suffered from the sudden changes in temperature. He mounted the only elephant that had survived the mountain crossing in order to be above the water. Finally, the lack of sleep, the humidity of the nights, and the foul atmosphere of the marshes made his condition more violent than before and as he did not have the time nor the opportunity to take care of his eyes, he lost one of them. (Livy uses here the Latin word, *altero*, in the sense of 'one of two'.) Juvenal, the satirical poet, calls Hannibal in his satire X the *Dux luscus*, i.e. the one-eyed leader.

After numerous initial successes Hannibal was finally beaten and Carthage destroyed. Hannibal fled to the Court of Prusias, the king of Bithynia. However, when the king came under the influence of the Romans, Hannibal committed suicide.

47. Elizabeth Blackwell, MD (1821–1910). Elizabeth was born in Bristol, UK. Her father, the owner of a sugar refinery, emigrated for economic reasons to the United States when Elizabeth was a small child. They finally settled in Cincinnati. The family was strongly Christian (Unitarian) oriented and became active in antislavery movements. Harriet Beecher Stowe was one of Elizabeth's tutors. Her father died when Elizabeth was still quite young. She then worked for a while helping a physician in Philadelphia and upon his recommendations applied for admission to the Geneva College of Medicine in the State of New York. This was the first time a woman had applied to any American medical college. After much deliberation, the dean and the president decided to put her admission up for a vote among the student body and she was overwhelmingly accepted in October 1847. She graduated as the first American-trained physician in 1849 (Fig. 47). Dr. Blackwell went to Europe for her postgraduate training as this was not possible in America. After a short visit to England, she went to Paris to work in the maternity hospital. There she could not work as a physician, but had to perform the duties of a nurse under the most rigorous and difficult conditions. On Sunday, November 9, 1849, while working in the newborn nursery she cleansed the eye of a baby who had gonorrheal ophthalmia. Unfortunately, some of the fluid squirted into her left eye and one day later she came down with a severe ocular inflammation on that side. At that time treatment for this condition consisted of syringing the eye every hour, cauterizing the lids, leeches to the temple, belladonna ointment twice a day, footbaths and strict diet. A fellow intern, Dr. Hippolyte Blot, took a leave of absence and attended to the patient uninterruptedly for three weeks. She had to remain in bed and in a darkened room with both eyes closed. In spite of this treatment, the left eye became blind and somewhat painful. In order to recuperate, Dr. Blackwell left for a fashionable spa in Prussia. The resort was called Gräfenberg and was close to city Freiwaldau, near the Austrian border. The place was run not by a physician, but by the 'high priest of water', Priessnitz. The cure consisted of water (internally and externally), fresh mountain air and exercise. Dr. Blackwell improved for a short time, but then the pain recurred in an aggravated form and she hurriedly took the next train back to Paris. There she sought the advice of the most famous French ophthalmologist of that time, Louis Auguste Desmarres (1810–1882). Desmarres had been the most prominent pupil of Julius Sichel. He founded his own eye clinic, became professor of ophthalmology in Paris and wrote an excellent textbook which made him famous all over Europe. Desmarres advised enucleation of the left eye and the operation was performed August 15, 1850. Again, the patient had to remain in bed in a darkened room for several weeks. She was then fitted with a glass eye which seemed to be cosmetically quite acceptable. Fortunately, the right eye remained normal. Dr. Blackwell returned in 1859 to London and became the first registered female physician in England working mainly at the St. Bartholomew Hospital. She became well known and befriended not only Florence Nightingale, but also Lady Byron. She became so famous that *Punch* published a poem about her ending with:

Reflect on the example, pray
of excellent Miss Blackwell.

She then returned to New York where she opened practice and founded with her younger sister, Emily (who had graduated from the College of Medicine of the Western Reserve University in Cleveland), and a Polish physician, Dr. Marie D. Zakrzeweska, the New York Infirmary for Women and Children (1857). In 1869 she returned to England to teach medicine (holding the chair of gynecology at the London School of Medicine for Women) and to help educate young ladies. She died in Hastings, England where she had practiced.

F. *Herpes zoster*

48. Anton Pavlovich Chekhov (1860–1904). Checkhov grew up under rather moderate circumstances. He graduated as doctor of medicine from the University of Moscow in 1884, but practiced little. He soon started to write becoming one of the foremost Russian dramatists and novelists. He is best known for his plays (The Sea Gull, Uncle Vanya, The Three Sisters and The Cherry Orchard) (Fig. 48). Checkhov had poor eyes and had to wear glasses all his life. He claimed that his two eyes were different, one myopic and the other farsighted. Once he also maintained that one eye was astigmatic. In a letter of June 27, 1896 he tells that the year before he nearly lost vision in his right eye. At that time he experienced neuralgia, a rash on the cornea, paresis of accommodation and pain. All of these signs and symptoms are compatible with a herpes zoster infection of the right ophthalmic nerve with involvement of the cornea. He was treated with electricity, arsenic and sea baths. He changed his spectacles often and possessed a 'heap of them'. He had to use a magnifying lens for the right eye as it 'does not know how to read anymore'.

49. King Abdul Aziz Ibn Saud (1876–1953). Most of his youth was spent in Kuwait where the Saudis lived in exile after having been driven from Riyadh. His first great accomplishment occurred in 1901 when he with only 40 companions recaptured the city and fortress of Riyadh from the Rasheeds. He then became king and continued his conquest and acquisition of land by war or diplomacy until the entire Arabian peninsula was one unified state (Fig. 49). During World War I he aligned himself with the British forces and fought the Turks until the Ottoman empire broke down. He finally also expelled the Hashimites from Mecca and Medina. It was in these campaigns while fighting King Hussein in 1922 that he suffered a herpes zoster (shingles) infection on the left side of his face. This was an extremely painful affair and incapacitated the king for several months. Four months later he came down with another severe eye infection on that side and a film

developed over the eye. He was treated by his Syrian doctor who with medications eased the infection and alleviated the pain. Specialists from Egypt came and operated on his eye trying to restore vision, but it was obviously too late. For the rest of his life the blind left eye was closed by the droopy upper lid. This gave him a sometimes deceptively raffish and foreboding facial expression. Most of his photos and portraits are taken from the right in profile. During World War II the king was firmly on the side of the Allied Forces and he could consolidate his country. The discovery of oil in 1939 slowly brought him closer to the Americans. The increase in the price of oil after 1973 helped to raise the standard of living in Saudi Arabia to that of any progressive industrialized state. With his diplomacy and skill, King Adbul Aziz established a solid monarchy and made the Kingdom of Saudi Arabia one of the few stable countries in the Middle East.

G. *Retinal detachment*

50. Joseph Pulitzer (1847–1911). Pulitzer was born in the little town Mako in Hungary. His father was of Jewish-Magyar descent while his mother was German. He developed into a rather frail youth who already early in life had weak eyes. His attempts to enlist into the Austrian Army, the French Foreign Legion and the British Army were rejected because of his physical defects. In 1864 he signed up with an agent for service in the army of the Union and emigrated to the United States. He served for one year in Lincoln's cavalry. After his discharge he moved to St. Louis where he worked at numerous odd jobs until he finally gravitated more and more to journalism. He became an editor and soon was not only a newspaper man, but also a newspaper proprietor. The first major newspaper he owned was the *St. Louis Dispatch*. He later moved to New York and owned there mainly *The World* (Fig. 50). On a day in November 1887, Pulitzer suddenly noticed one morning that he could not see the pieces of paper put on his desk. At first he thought that this was a transient phenomenon, but as his vision did not improve after a few days he visited Dr. Herman Knapp, to whom he was referred by his family physician, Dr. James W. McLane. Dr. Knapp was at that time one of the most prominent ophthalmologists in New York. He had come to the United States from Heidelberg where he had been professor of ophthalmology. In New York he had established his own eye hospital and was the chief editor of the *Archives of Ophthalmology and Otolaryngology*, which, at that time appeared simultaneously in English and German. Dr. Knapp examined Pulitzer and diagnosed retinal hemorrhages. He prescribed one week of bed rest in a darkened room and put him on a specific diet and exercises. However, Pulitzer's vision did not improve. Pulitzer, therefore, traveled to Europe to consult the most prominent European ophthalmologists. He first went to Paris and saw there a number of physicians, among them: Charcot, Brown-Sequard, DeWecker, Landolt, Meyer and Dupuy. He then went to London to consult with Sir Andrew Clark. None of these physicians could help him in any way. He finally spent some time in the south of France at the Riviera and when he was at Cap Martin he called for a German professor. However, when the physician arrived he was in no mood to see

him and his constant companion, Dr. Georg W. Hosmer, had to tell the doctor that 'Mr. Pulitzer is too sick to see a physician'. Pulitzer then tried to embark on a cruise around the world as he had been advised by some of the consulted physicians. When he boarded the ship in Constantinople he realized that he had become completely blind and in a panic returned to Europe. He landed in Naples and proceeded immediately to Germany where he saw in Wiesbaden the famous professor, Hermann Pagenstecher. Pagenstecker diagnosed retinal detachments and advised him to return to the USA and consult with Dr. Silas Weir Mitchell, the famous neurologist in Philadelphia. Mitchell had become well known for his contributions to experimental ophthalmology. He was one of the first to produce an experimental cataract (by sugar-poisoning frogs). He was a firm believer that eyestrain is the cause of all headaches. Pulitzer returned to America and Mitchell was invited to visit him in New York. Mitchell dined with the Pulitzers. Mrs. Pulitzer (Kate Davis) was a distant relative of Jefferson Davis. After the examination, Mitchell advised Pulitzer to retire and follow a restful life separated from all 'agitations and excitements'. Pulitzer did indeed retire in 1890, but could stand it for only six months. He promptly returned to the world of journalism and remained active, always interested in politics and usually fighting his most important opponent, Charles A. Dana. He kept on traveling all over the world until he finally died in New York leaving in his will not only a considerable endowment for the College of Journalism of Colombia University, but also enough money for several important prizes.

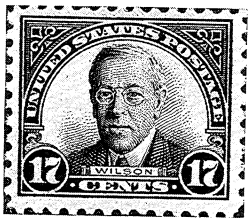
H. *Uveal melanoma*

51. Sir Joshua Reynolds (1723–1792). Reynolds was born in Devonshire and soon became well known as a portrait painter. He went with the English Navy to Spain and Italy and stayed for more than two years in Rome. He finally returned to London and became the most fashionable portrait painter of his time. He became the first president of the Royal Academy of Arts and the first painter to be knighted (Fig. 51). Reynolds had become nearly deaf when he had a severe cold in Italy and in the summer of 1789 his sight began to fail. We find a note in his appointment book for Monday, July 13, 1789 in which he says: 'My eye begins to be obscured'. In ten weeks the sight of the left eye was gone and he was afraid to use the right eye too much. He practically stopped painting. In October 1790 he had severe pain in the left eye and he became depressed. Toward the end of 1791 his general health failed and he lost all appetite. In December his eye became swollen and appeared as though extravasated blood protruded from it. A surgeon, Mr. Cruikshank, was called in and bled him with leeches and blistered him repeatedly. In January 1792 Reynolds became bedridden and an enormously enlarged liver was discovered. After his death an autopsy was performed by John Hunter. The only diseased part was the liver, which was of an uncommon magnitude and of a scirrhous consistency.

I. *High myopia*

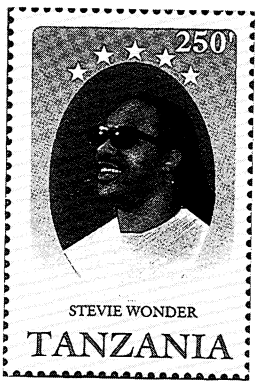
52. Edgar Degas (1834–1917). Degas was a Parisian who for a time attached himself to the impressionists. He became especially famous for his pastel painting of the ballet (Fig. 52). His eye problem was first noticed in 1870 when he was 36 and he served in the Franco-Prussian War. Being in the infantry he found that he could not see the target with his right eye. He claimed that his eyes suffered from the severe cold when he stood sentinel during the siege of Paris. For the rest of his life Degas had eye problems. He also blamed the bright sunlight reflected from the water to which he was exposed while painting. When he visited his brother in New Orleans (1872) he remarked that his eyes were greatly in need of care and that he hardly used them at all. His poor vision caused him to become depressed. He thought of himself as one of the infirms quickly passing into the ranks of the blind. The right eye became permanently blind and his ophthalmologist prescribed a week of rest. He later developed a blind spot in his left eye. In 1891 he was examined by the famous ophthalmologist, Edmund Landolt, a born Swiss-German who had settled in Paris. The treatment consisted of tinted lenses, forced rest and a stenopeic slit in front of the left eye. Eventually vision in his left eye got so bad that he had to be led whenever he wanted to walk the streets of Paris. We do not know the nature of Degas' eye disease. Macular degeneration is one possibility. Trevor-Roper suggested myopic degeneration of the retina and Ravin proposed a hereditary optic atrophy.

J. *Vascular accident*



53. Thomas Woodrow Wilson (1856–1924). The 28th President of the United States was strongly influenced by his Scotch Presbyterian ancestors. Wilson studied at Princeton and at the University of Virginia. He became a member of the Princeton faculty in 1890 and in 1902 became president of the college. On May 28, 1906 Wilson woke up and noticed a marked loss of vision in his left eye. He went to the famous Philadelphia ophthalmologist, George E. de Schweinitz, and also saw an internist, Alfred Stengel. Wilson mentions in a letter 'a hemorrhage of one of the blood vessels of my left eye', while his wife wrote '. . . Woodrow woke up perfectly blind in one eye!' – He was told that he had arteriosclerosis and was asked to rest. He took a leave of absence, traveled to Europe and saw the ophthalmologist George A. Berry in Edinburgh. The eye condition and the blood pressure improved. The intraocular hemorrhage was either the sign of a hypertensive retinopathy or a manifestation of a retinal (central or branch) vein occlusion. It is unlikely that it was an embolic phenomenon indicating, as has been previously assumed, that it was part of a stroke. Wilson was elected president in 1912 (Fig. 53). He had a severe stroke in 1919 during his second term. He received the Nobel Prize for peace in 1920, but he could not induce the senate to accept the League of Nations.

K. *Retinopathy of prematurity*

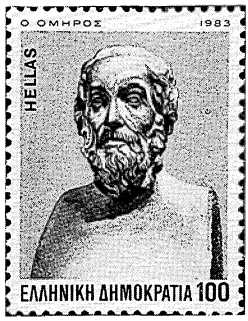


54. Stevie Wonder (1950–). This superstar was born on May 13, 1950 in Saginaw, Michigan. He was born one month prematurely and was placed in an incubator in the special care unit of the hospital. During that time he developed retinopathy of prematurity and became blind in both eyes (Fig. 54). His mother was Lula Mae Hardaway and on the birth certificate his family name is given as Morris, though his natural father's name was Judkins. In 1953 the family moved to Detroit and his mother, who had raised Steve and his half-brother alone, got back together with Paul Hardaway. At an early age it was obvious that he was musically talented. He became known as *Little Stevie Wonder*, because of his unusual voice. He had remarkable auditory perception and played several instruments (piano, harmonica, bass drums and others). He attended Detroit public schools, but later was enrolled in the Michigan School for the Blind. He associated himself with Berry Gordy, Jr., a former professional boxer, and his Motown recording company. He became one of the greatest rock and roll musicians. One of his record albums is called *Talking Book*. As an outstanding entertainer, he moved in 1973 to New York. In that same year he was severely injured in a car accident from which he miraculously recovered.

L. *Amblyopia*

55. George Herman Ruth [Babe Ruth] (1895–1948). This most famous baseball player was born in Baltimore and attended St Mary's Industrial School. He was an excellent baseball pitcher and was recruited by the Orioles. He later joined the Boston Red Sox and finally the New York Yankees where he stayed most of his professional life (Fig. 55). He was also a powerful hitter and this made him famous all over America. In 1927 alone he hit 60 home runs. He established more than 50 hitting records, many of which are still standing. He later joined the Boston Reds and then managed them. Babe was a heavy smoker, excessive drinker and renowned womanizer. He died from a carcinoma of the larynx, for which he was operated on in the old French Hospital by Dr. Phil McDonald. It was a well kept secret and is not mentioned in any of his biographies that Babe had an amblyopic left eye with a vision of less than 20/200. His right eye was perfect and as he was left-handed batter he used primarily his right eye to watch the ball coming at him at a speed of nearly 100 miles/hour. His ophthalmologist was Dr. Truman L. Boyes, who was for some time chief of the New York Eye and Ear Infirmary. Dr. Gerald B. Kara, who was then Dr. Boyes' assistant, reported Babe Ruth's eye condition.

M. *Etiology unknown*



56. Homer (around 1000 B.C.). It seems impossible at the present to decide whether Homer was a historical figure or only a figment of the imagination of later authors (Fig. 56). There is, however, a body of evidence which seems to indicate that Homer was born in Smyrna. His mother was supposed to be Kretheis, while his father, an adventurer, had left for Egypt never to be heard of again. Homer undertook many voyages and apparently had difficulties with his eyes when he first visited Ithaca. He seemed to recover, but lost his sight again when traveling to Colophon. From then on he apparently remained completely blind. The reason for this loss of vision is explained in different ways. Sometimes it is described as a gradual disease, in other places it is assumed that he lost vision because of Achilles or through the anger of a deified Helen. The evidence remains indirect and circumstantial. Some believe that Homer is identical to the blind singer of Chios who wrote a hymn to Apollo. The Greek historian Thukydides claimed that there was no doubt that the author of this hymn was Homer and we know that Homer spent some time in Chios where his son-in-law lived. Whatever the weight of the evidence, the idea of a blind Homer has intrigued many historians and writers. Robert in a recent biography of Homer reprints as a motto the remark by a French writer: 'The blind Homer is indeed an unusual phenomenon. His sky is beyond the reach of the eyes'. Among the poets attracted to this idea was André Chenier, the prominent French lyricist of the 18th century. Chenier, born in Constantinople had a Greek mother and was therefore attracted to Greek mythology. In one of his poems he describes the blind Homer arriving at Syros remembering with melancholy his youth when he was still able to see.

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Bibliography

1. Amalric, P.: La cécité de George III. *Point de Vue*, No. 16, March 1986, page 15.
2. Idem: L'œil d'Horatio Nelson. *Point de Vue*, No. 16, March 1986, page 20.

3. Idem: L'œil de Gambetta. *Coup d'œil*, Nos. 10 and 11, 1987.
4. Arrington, G.E., Jr.: George Frederick Handel: A Genius in Darkness. *Virginia Med. Monthly* 87: 2 (1960).
5. Barras, T.C.: Vice-Admiral Lord Nelson's Lost Eye; *Trans. Ophth. Soc. UK.* 105: 351 (1986).
6. Bellwald, L.: *Jean L'Aveugle*, Comte de Luxembourg, Roi de Bohème; ses ennuis oculaires face à l'oculistique de son temps. Luxembourg, 1987.
7. Brown, E.G.: *Milton's Blindness*. New York: Columbia University Press, 1934.
8. Casanovas, J.: The eye disease of Francis Assisi. *Hist. Ophth. Internat.* 3: 145 (1983).
9. Chance, B.: Sir Joshua Reynolds and his blindness and death. *Ann. of Med. History* 1: 487 (1939).
10. Chen, Y. (Eugene Chen): The courageous and brilliant blind monk Jianzhen. *Chinese Med. J.* 93: 130 (1980).
11. Coats, G.: The chevalier Taylor's grandson. *Ophth. Hospital Reports* 20: 146 (1917).
12. Coulomb and Cabanes: Les borgnes célèbres. *Arch. d'Opht.* 34: 417 (1914/15).
13. Dirckx, J.H.: Hannibal's ophthalmia. *The Pharos*, Fall 1983, page 28.
14. Esser, A.A.M.: Der Name Homer und die Ophthalmologie. *Klin. Monatsbl. f. Augenhk.* 80: 257 (1928).
15. Idem: Die Augenkrankheit Hannibals. *Klin. Monatsbl. f. Augenhk.* 86: 677 (1931).
16. Fabricant, N.D.: The ocular history of James Joyce. *Eye, Ear, Nose & Throat Monthly* 36: 732 (1957).
17. Frosch, W.A.: The 'Case' of Georg Friedrich Händel, *New Engl. J. Med.* 321: 765 (1989).
18. Gradenigo, P.: La malattia que determinó la cecità di Galileo. *Atti di Reale Instituto Veneto di Scienze, Lettere ed Arti* 56: 421 (1897/98).
19. Grondona, F.: In tema di eziogenesi della cecità di Galileo; in: *Atti del symposium internazionale di storia, metodologia, logica e filosofia della scienza*, Florence 1967.
20. Kara, G.B.: Babe Ruth's vision. *Argus* 13(7): 6 (July 1990).
21. Knötel, A.F.R.: *Homeros, der Blinde von Chios und seine Werke*. Leipzig: Grunow, 1894–96.
22. Lyons, J.B.: James Joyce's Miltonic affliction. *Irish J. Med. Sci.* 4: 157, 203 (1968).
23. Marmor, M.F.: Wilson, stroke and zebras. *New Eng. J. Med.* 307: 528 (1982).
24. Idem: The eyes of Woodrow Wilson. *Ophthalmology* 92: 454 (1985).
25. MacDiarmid, D.C.: Two historical ophthalmic cases. *Trans. Ophth. Soc. New Zealand* 1954: 44–53.
26. Ober, W.B.: Bach, Händel and Chevalier John Taylor, M.D., ophthalmiameter. *New York State J. Med.* 69: 1797 (1969).
27. Packo, K.H.: *Shaded Windows to the Soul*. Baltimore: The Williams and Wilkins Co., 1986.
28. Pugh, P.D. Gordon: *Nelson and His Surgeons*. Edinburgh/London: E. and S. Livingstone, Ltd., 1968.
29. Ravin, J.G.: The blindness of Degas. *Ophth. Forum* 1(5): 58 (1983).
30. Ridgeway, W.G.: The ocular problems of some famous men. *Missouri Medicine* 58: 1133 (1961).
31. Robert, F.: *Homère*. Paris: Presses Universitaires de France, 1960.
32. Rogers, L.: John Milton's blindness. *Brit. Med. J.* 2: 1275 (1936).
33. Snyder, C.: Johann Sebastian Bach and Chevalier Taylor; in: *Our Ophthalmic Heritage*. Boston: Little Brown & Co., 1967.
34. Idem: The Eyes of Theodore Roosevelt; in: *Verh. des XX. internat. Kongresses für Geschichte der Medizin*. Hildesheim: Georg Olms, 1968.
35. Sorsby, A.: On the nature of Milton's blindness. *Brit. J. Ophth.* 14: 339 (1930).
36. Stöckel, A.: *Von Homer bis Helen Keller*. Bonn, Deutscher Blindenverband, 1983.
37. Strebel, J.: Diagnose des Augenleidens des hl. Franziskus von Assisi. *Klin. Monatsbl. f. Augenhk.* 99: 252 (1937).

38. Sullivan, E.: Ocular history of James Joyce. *Survey of Ophthalmol.* 28: 412 (1984).
39. Trevor-Roper, P.D.: *The World Through Blunted Sight*, 2nd ed. London: The Penguin Press, 1988.
40. Verriest, G.: Life, eye disease and work of Joseph Plateau. *Docum. Ophth.* 74: 9 (1990).
41. Vetter, Th.: Montesquieu, une vocation contrariée et le prix de la gloire. *L'Ophtalmologie des Origines à nos Jours* 2: 67 (1979) (Laboratoire H. Faure, Annonay, France).
42. Weinstein, E.A.: *Woodrow Wilson*, A Medical and Psychological Biography. Princeton University Press, 1981.

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The wanderings of a literary ophthalmologist: A. Conan Doyle, Houdini, and Ada Besinnet

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Key words: History of ophthalmology, Medicine and literature, Spiritualism

Abstract. Sir Arthur Conan Doyle, the creator of Sherlock Holmes and Dr. Watson, was a general practitioner, then studied ophthalmology. Doyle and Houdini, the famous magician, shared an interest in Spiritualism. They began as friends, but ended on opposite sides of a controversy over Spiritualism. Their differing viewpoints clashed when Besinnet, a well known medium, was involved.

Sir Arthur Conan Doyle had a brief career in ophthalmology prior to the meteoric success of his fiction. The phenomenal success of his creations, Sherlock Holmes and Dr. Watson, enticed Doyle to stop practicing medicine in order to dedicate himself fully to writing and other interests.

A charming review of Doyle's period of time in ophthalmology has been published by Charles Snyder. The title is a quotation from one of Doyle's stories, 'There's Money in Ears, but the Eye is a Gold Mine': 'Of all the men who left ophthalmology in search of greener fields, and succeeded in finding them, no one is better known than Sir Arthur Conan Doyle, creator of Sherlock Holmes and Dr. Watson. The lasting reputation Doyle gained as a writer of popular fiction has served to dim the fact that prior to his success he had a career, a happy one, of almost ten years' duration in medicine and that for a portion of that time, he gave serious attention to ophthalmology.'[1]

Doyle lived from 1859 to 1930. He graduated from the University of Edinburgh medical school in 1881. He served as a general practitioner for nearly ten years, when he met a dermatologist who told him he was wasting his time in the provinces. The dermatologist had also practiced in the provinces, then set up an office on London's famous Harley Street. He asked Doyle if there was any branch of medicine that particularly appealed to him. Doyle responded 'I had been interested in eye work and had amused myself by correcting refractions'. The dermatologist replied 'Go to Vienna, put in six months' work, come back and start in London. Thus you will have a nice clean life with plenty of leisure for your literature.'[2]

Doyle spent only two months in Vienna (not the four he mentions in his autobiography). He wrote 'I attended eye lectures at the Krankenhaus, but could certainly have learned far more in London, for even if one has a fair

Fig. 1. Sir Arthur Conan Doyle (1859–1930), circa 1922.

knowledge of conversational German it is very different from following accurately a rapid lecture filled with technical terms. No doubt "has studied in Vienna" sounds well in a specialist's record, but is usually taken for granted that he has exhausted his own country before going abroad, which was by no means the case with me. Therefore, so far as the eye work goes, my winter was wasted.'[3]

He spent a few days with Landolt in Paris, then returned to London, where he established an office close to Harley Street. Every morning, Doyle tells us, 'I reached my consulting room at ten and sat there until three or four, with never a ring to disturb my serenity . . . so long as I was thoroughly unsuccessful in my professional venture there was every chance of improvement in my literary prospects.'[4] Prior to his venture into ophthalmology, his Sherlock Holmes had been a success in *A Study in Scarlet* and in *The Sign of the Four*. While waiting for the nonexistent patients, he wrote many of the stories that were collected as *The Adventures of Sherlock Holmes*.

While recovering from a severe bout of influenza, Doyle says, 'I surveyed my own life, that I saw how foolish I was to waste my literary earnings in keeping up an oculist's room in Wimpole Street, and I determined with a wild rush of joy to cut the painter and to trust for ever to my power of writing.'[5]

I would like to tell you a story from Doyle's later years. Here is how it unfolded to me.

The elderly lady on the phone said, 'I read in the newspaper that you are the archivist of a group of Sherlock Holmes devotees. A large collection of letters from Sir Arthur Conan Doyle has been sitting in the attic of this house for over fifty years. I am getting old now and the grandchildren are not interested in that kind of thing. I would like someone who is interested to have them. Would you like to look them over?'

I raced over to visit her at the quaint brick house with a commanding view of the Maumee River near its entry into Lake Erie. The building had once been the home of Ada Besinnet Roche, an internationally known medium and psychic, and her husband, William Roche, a newspaper reporter. There the kind lady brought out a vast hoard of papers which I immediately decided I had to have. We agreed on a price based on recent sales of similar items, and she seemed pleased. It would pay for a new roof on the house. I was pleased as well, having obtained what is perhaps a unique collection of Conan Doyle material.

Included are eighteen letters from Doyle, two of the author's calling cards, a letter from Lady Conan Doyle, six letters from Harry Houdini, a huge spiritualism correspondence, broadsides, newspaper clippings, and theater playbills. As this article will indicate, the gathering as a whole offers interesting insights into Doyle's views on religion and documents informatively his relationships with both Houdini and one of the best known spiritualist mediums.

Ada Besinnet (c. 1889–1936) was the youngest child of French-American parents. Around 1900, after the death of her mother, her father brought her from Rochester, New York, to Toledo, Ohio, where she was placed with a foster family. The family was interested in spiritualism and soon Miss Besinnet began to evidence what her foster mother felt were psychic powers. The manifestations included strange singing and rapping noises coming from her room at night. The family doctor was informed about these, and although he was skeptical about the spiritualism question, he was eventually persuaded enough by the phenomena to write about the young lady to both Conan Doyle and to the American Society of Psychic Research.

In response, the Society's president visited Toledo to test Miss Besinnet, remaining for a month. In 1910 she traveled to New York for two months of further evaluation by officials of the Society, and these sessions produced in the literature two exhaustive articles which concluded that her psychic powers appeared to be valid.[6] Her abilities in that direction were later

Fig. 2. Miss Ada Besinnet at Toledo News-Bee, April 27, 1923.

investigated by William Roche, a newspaperman, who became absolutely convinced that she was a genuine medium. He joined her psychic circle and they were married in 1931. Over the years, Miss Besinnet gave many séances in her Toledo home, some of which were attended by prominent persons, including President William Howard Taft.

In 1921 Miss Besinnet spent six months in England at the invitation of the British College of Psychic Science, at whose London headquarters she gave over one hundred séances. The collection is rich in material related to this visit and includes many letters from the director of the College. Three of the séances were attended by Sir Arthur and Lady Conan Doyle. They were greatly impressed and invited the medium to their Sussex home for a weekend. There she gave the Doyles and some of their friends, a special séance in which contact was established with her hosts' departed relatives, a

session which Doyle later described in the College's transactions. Reporting his absolute confidence in her character, he wrote of her materializations:

> . . . in three cases, that of my mother, of my wife's mother, and of my nephew, the likeness was absolutely startling, and was seen so clearly and so coolly, that I could take my oath upon it in any Court of Law.[7]

Sir Arthur's admiration for Miss Besinnet is documented in many of his books, including *Our American Adventure*, *Our Second American Adventure*, *Memories and Adventures*, and *The History of Spiritualism*.

In 1922 Conan Doyle traveled to America for the first of two extended speaking tours on behalf of spiritualism. His itinerary included a stopover in Toledo and his stay there occasioned much commentary in that city's newspapers, numerous examples of which are presented in the collection in the form of clippings. Typical of these is a 2 page article from the *Toledo News-Bee* of May 20, which reported at length the substance of a two-hour lecture on 'The Proof of Immortality' which he delivered before a capacity audience of three thousand people. According to that account, Doyle expressed the belief that spiritualism was the most important subject in the world, that:

> either this revelation is the greatest delusion ever known or it is the greatest advance that the world has ever made. It is for me to lay the facts before you and for you to act as the jury, whose verdict I am prepared to accept.

He gave his qualifications to speak on the subject, which he indicated he had studied and experimented with since 1886. Citing his scientific training and his knowledge of detective work, he went on to say:

> I take not one shilling of the proceeds of my lectures, so that I have no material interest. I realize that it is an enormous subject and that I am only ankle deep.

He told of his personal experiences, of messages which came via séances, and he described his studies with famous spiritualists:

> I thought that these were eminent men, but that they had a weak spot in their brains. But there came a time when I began to think that maybe the weak spot might be in my own brain – and that is the beginning of wisdom. Still I could not see the relation between floating tables and chairs and the immortality of the soul.
>
> Then came the war, and in England, we were harder hit, I think, than you realized. Our household sent eleven men to the front and ten died. Many households lost all their men. It became an earnest question, what has become of our boys? I began to think of the question, 'Do the dead live?'
>
> A friend of my wife's had the gift of automatic writing. We got messages from four of our boys, messages that could not be attributed to the subconscious self or to anything but these boys, personal messages.
>
> Then it broke on me that it's the biggest thing the world has ever known.

Doyle claimed that he did not exaggerate and warned: 'Approach this from a religious angle, or leave it alone. It is not safe any other way'. Recounting his experiences with various mediums, he gave particular attention to Miss Besinnet:

> I had the privilege of sitting with the great medium who comes from your city Miss Ada M. Besinnet. At the end of a very wonderful sitting came my mother's face. She died while I was in Australia. My wife and I could count the very wrinkles in her face and the gray hairs at the temples during the five or six seconds or more that the face was visible. Then I received a written message, in a scribble that might have been anyone's, but that was signed by the name my mother always used in signing her letters to me. What could that American girl have known of that pet name?

Doyle also discussed death at length, calling it a sweet, languid, drifting feeling:

> When you die the etheric body starts an existence of its own. It carries with it your intelligence without change. It carries your character with your virtues, your weaknesses. The first thing after death is the smiling faces of those one would most wish to see. They come to help you over. For a really good man, the happiest moment of life is the moment he leaves it. Do not fear death, he said:
>
> The worse would be waiting for a while in a spiritual hospital. The wickedness of human nature is much overdone. It is a bogey of the church, instituted for a good purpose but overdone.

During his stay, Sir Arthur was willing to speak at length with local reporters, and most newspapermen found him candid and a good subject for a story. One, however, encountered problems:

> Interviewing Sir Arthur Conan Doyle is much like seeking conversation with one of the spirits he claims to have received messages from.
>
> The famous author of Sherlock Holmes is never interviewed. A question might be interjected occasionally but he is given little opportunity of asking questions.
>
> Sir Arthur monopolizes the conversation and keeps on talking while other interrogations are shot at him, but he seems to grasp them and had a ready answer, even though he had been talking away while being addressed by the interviewer.[8]

Another reporter learned that Doyle had communicated with twenty-three dead friends and relatives, and quoted him as saying that the most important thing those communications produced was the description of life after death: 'Everything seems to be duplicated there as it is here. People retain their religious beliefs. They all understand and love one another.'[9]

> There is just as much difference of opinion between persons 'on the other side' about the possibility of communicating with those of us who are still alive as there is in this world over talking to the dead. When asked about

details of conversations, Doyle said that it was often difficult to contact those that he wanted most to hear from. He said that some spirits have been reluctant to release information about other spirits. He also said that the spirits are as much in conflict over contact with this world as we are about contacting them.[10]

Doyle included Toledo in his itinerary specifically because it was the home of Miss Besinnet, and he stayed an extra day after his lecture to attend one of her séances. Her future husband described the sitting in the lead article on the front page of a Toledo paper, Sir Arthur having told him that it was his duty to report whatever would happen:

It was probably the most interesting séance that anyone there ever had witnessed. All of the usual physical phenomena were produced with more than ordinary vigor and distinctness, and there were some very unusual developments . . . Sir Arthur Conan Doyle saw and talked with his son, Kingsley, and with his nephew, both killed in the World War. He saw his mother's face and many other faces, some of which he was unable to identify. Lady Doyle saw and talked with Kingsley and with her mother and recognized the faces of her relatives.

All members of the Doyle party received spoken messages and Sir Arthur and Lady Doyle had written messages which, according to their custom, they reserved to read and consider later.

'It was one of the most remarkable experiences that I have ever had,' said Sir Arthur. 'Miss Bessinet's powers were great when I first saw her work in England and were much stronger tonight than I had ever seen them before. She should be guarded and looked after very carefully, for she is very valuable.'[11]

Many of the Doyle letters in the collection deal with travel arrangements and the like, but some are more substantive in content. One, a long communication intended to serve as a preface to a book that Miss Besinnet's future husband was preparing, is a revealing summary of Doyle's views on religion, indicating clearly the extent of his dedication to spiritualism. As such, it is worth quoting at length:

I rejoice that you, who have had the unique opportunity of studying the mediumship of Miss Ada Besinnet have put the matter into literary form, for I am convinced that you are dealing with one of the greatest all-round mediums in the world, and I am haunted by the fear that these Apostolic gifts have been sent only for a season into the world, and that when the time comes and the great Creative Force thinks that mankind has had all the evidence he can reasonably require the manifestations may be withdrawn, and the sullen waters of materialism close once more over this temporary revelation of the spiritual. That is what I fear. If it should be so then the whole hope of the future lies in our recording what we can now see and hear, so that they may have solid evidence for the truth. On the other hand we may develop, our methods may become clearer and

> easier and the whole world may be faced by the undeniable facts which made conversion imperative. Either alternative may occur, but there will be no state of stagnation. Things will change. Already we can observe that the early physical phenomena are far less common than of old, while the spiritual phenomena, messages, etc. are both more common and, as I think, of a higher quality. We are moving all the time, tho' the goal is still obscure.
>
> My general impression of that goal is a condition where religion shall be a state of knowledge rather than of faith, and where only a very ignorant and foolish man could be irreligious. It will be a condition also where the human race, while at the same time there will be a knowledge of other-world conditions which will cause us to accept the fate which we evidence here without refining and without wishing to curtail it. These are the primary gifts but there will be such a number of bye [sic] products that it will represent the greatest change ever known from the human point of view, and will be regarded by historians of the future as the definite end of the dark ages.

In 1923 Sir Arthur toured the country a second time, and once again visited Toledo to attend a séance. He described the occasion in *Our Second American Adventure*:

> But one very great pleasure remained. It was within a hundred miles of that great medium Miss Ada Besinnet, and she had set a night apart for me – an invitation not to be resisted . . . . We were greatly favoured that evening, for we had the whole gamut of the medium's powers, the powerful voices, the wonderful musical performances, the brilliant lights, the fitful materializations, the written messages, the continuation of the songs when a bandage was over the lady's lips, and finally the whole table was lifted bodily into the air. It was a very impressive exhibition.[12]

This particular séance was once again front page news in Toledo newspapers.

Also in the collection are several letters Doyle wrote to Miss Besinnet during this second tour, asking her to come to New York for yet another sitting and offering to pay her travel and hotel expenses. She complied and gave a séance at the Biltmore Hotel which Doyle later described:

> For three hours we have every conceivable evidence from those whom the world regards as 'dead' – we saw them, we had messages from them, we had manifestations of their physical power, which culminated in their raising the heavy table into the air. As we came out, dazed with our experience, into the brilliant Fifth Avenue with its hurrying crowds, I said to Bowman, 'Is it not marvelous to think of the ignorance of these people as to the possibilities of the world that they are in!'[13]

Most of those Fifth Avenue pedestrians may indeed have lacked Doyle's first-hand experience with mediums such as Miss Besinnet, but it is likely that more than a few were at least familiar with the séance process, for

spiritualism aroused a great deal of public interest in the years immediately following World War I. American families had suffered losses also, and not just in battle: several million people died here in the great influenza epidemic of 1918. Many of the grief-stricken survivors were attracted by the promise spiritualism offered of contact with departed loved ones. One such was the famous stage magician and escape artist, Harry Houdini (1874–1926), who attended countless séances with many mediums in an unsuccessful attempt at communication with his dead mother.

In Houdini's case, the attraction was a mutual one, for some spiritualists believed that his success at escaping from restraints of all kinds – handcuffs, leg manacles, straitjackets, jails, packing crates, locked milk cans, tanks of water, and even ice-covered rivers – was the result of psychic powers, including the power of dematerialization. The performer himself never claimed such abilities, allowing only that his methods were entirely rational and were helped by great physical strength and a lifetime of intensive practice. He was, however, an avid student of spiritualism, and bought every book and article about the subject that he could find.

Doyle first met Houdini while the latter was touring England in 1920. Their mutual interest in spiritualism formed the basis for a close friendship and a lengthy correspondence which lasted for several years.[14] Included in that correspondence was a letter of introduction to the Toledo medium written by Doyle on the performer's behalf, but not used by Houdini until a few years after it was penned:

Dear Miss Besinnet:

I have now done a preface for Mr. Roche's book and I hope it will help its publication.

Mr. Houdini is deeply interested and quite sympathetic but has never had a chance of getting good evidence. I hope you will do me the favor to include him on a sitting for he deserves more than has come to him, for he is a patient and sympathetic observer.

Yours sincerely,

Arthur Conan Doyle

June 3 [1922]

Houdini visited Doyle in Atlantic City at the conclusion of Sir Arthur's first American tour. The meeting created a rift in their relationship when Houdini disputed the validity of a message from his mother received by Lady Conan Doyle during a demonstration of automatic writing.

Houdini's career, like that of most stage celebrities, had its peaks and troughs. In the 1920s, when audiences began to tire of his escape acts, he looked for a new subject and found it in spiritualism. His stage show became an exposé, showing in broad daylight how tricks could be done in a

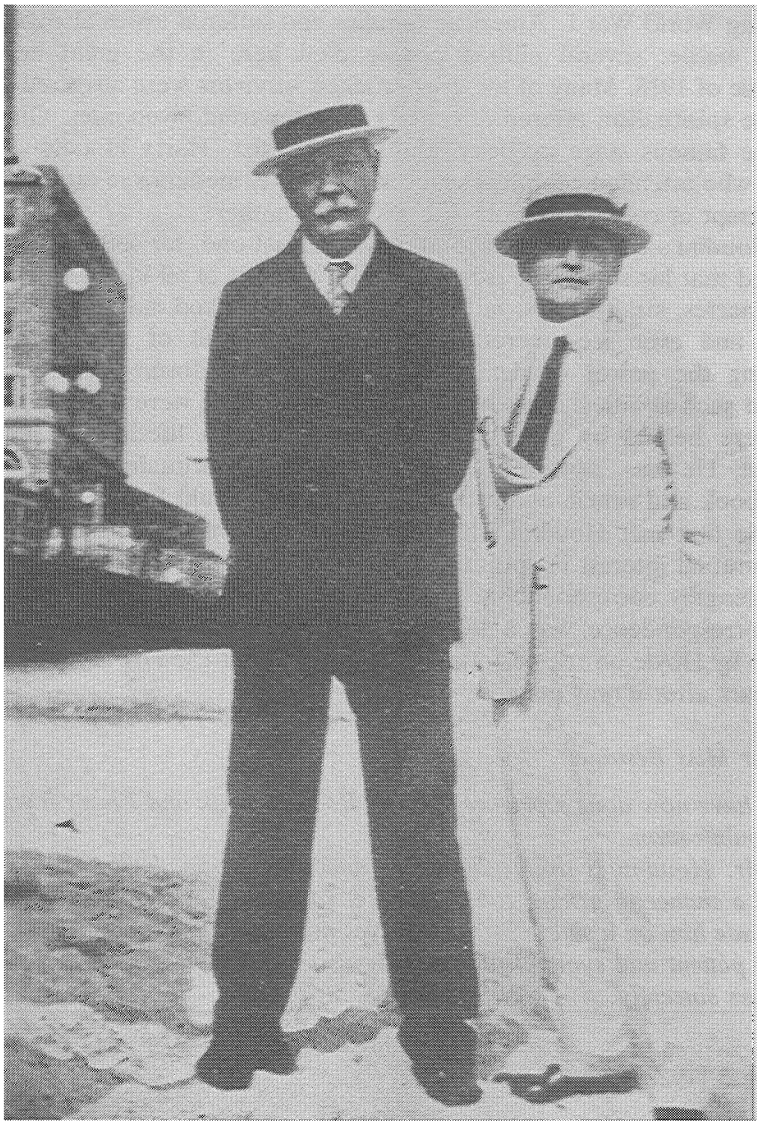

Fig. 3. Sir Arthur Conan Doyle and Houdini.

darkened séance room. He traveled widely to expose fraudulent mediums, and made statements that caused the rift with Doyle to become unbridgeable, as in the following 'fact sheet':

> I am not combating the religion of spiritualism – I am simply exposing the fraudulent mediums, as at no time have I stated that there was no such

thing. I claim they have never proved their contention that intercommunication with the dead is possible . . . .

Sir Arthur Conan Doyle, while on his two visits here, was hoodwinked from New York to San Francisco and back again. He is sincere, but deluded. He has written me several times that 'it is ridiculous for me to go searching for an honest medium, when I possess the power myself'.

The great mediums of America today, Dr. P.L.O. Keller of Lily Dale and Washington, D.C., Mrs. Laura B. Pruden, of Cincinnati, Miss Ada Besinnet, of Toledo, all produce what they term 'writing on slates'. I would gladly pay any medium in the world, the sum of ten thousand dollars if they will simply put the sign of a cross on a slate that I present.[15]

Houdini was a member of two prestigious committees formed by the *Scientific American* and the *Journal of Abnormal and Social Psychology* to investigate mediums. In those capacities, he also challenged any medium to present any physician, 'psychical' manifestation that he could not reproduce or explain as been accomplished by natural means. He offered to wager up to $10,000 and the two journals named offered an additional $5,000 each, but no medium ever successfully met the challenge.

Houdini wrote to Miss Besinnet several times, and his letters are preserved in the collection. On March 30, 1925, he asked to attend one of her séances, saying 'I assure you I am far from being skeptic and my mind is wide open and perfectly willing to believe'. Two weeks later he repeated his request, stating that he would abide by any conditions she might wish to impose. In a third letter, dated June 19, 1925, he again asked for the favor of a séance and enclosed a copy of the letter of introduction from Doyle. His final letter to her, dated July 13, 1925, was more pointed:

My dear Miss Ada Besinnet:-

Having written you a number of letters asking for a séance and having sent you a copy of a letter of introduction given to me by Sir Arthur Conan Doyle, and for which I hold registered receipts, I hereby challenge you to $10,000, *the money to be given to charity, if you will permit me at three of your séances and if I do not detect you in every manifestation you present . . .*

Doyle advised the medium to ignore Houdini, which she did. When the performer then sent copies of his challenge to the Toledo newspapers, a storm of controversy resulted, but no confrontation occurred. Houdini continued to battle mediums until his death the following year.

Sir Arthur Conan Doyle died in 1930 at the age of 71. In accordance with his wishes, plans for a large church service were dropped in favor of a brief burial ceremony in the garden of his country estate. The village of Crowborough, as he desired, took no special notice of his death, except for the

golfing club of which he had been captain, which flew the Union Jack at half mast.

The Doyle family expected Sir Arthur to contact them quickly. Adrian Conan Doyle told a reporter:

> My mother is confident that he will reveal himself shortly. This wonderful faith buoys her . . . A séance may be necessary to establish the communication. When we do hear from him the communication will be treated as private unless, which is quite possible, he wishes to give the message to the world.[16]

The Associated Press quoted Adrian further:

> My father fully believed that when he passed over he would continue to keep in touch with us. All of his family believe so, too. There is no question that my father will often speak to us just as he did before he passed over. We shall always know when he is speaking but one has to be careful, because there are practical jokers on the other side, as there are here.[16]

Sir Arthur's attorney released the contents of the author's last letter, written less than a month before his death. In it Doyle spoke of his friendship with Houdini and of his hopes of meeting him again soon:

> I expect to talk it all over with Houdini in person before very long. I view the prospect with perfect equanimity, that is what psychic research does for one.[17]

Miss Besinnet wrote a letter of sympathy to the Doyle family, to which Lady Conan Doyle replied:

> *Dear Miss Besinnet,*
>
> *I want to thank you very much for you kind sympathy and for sending me the message and paper cuttings. I am so glad to have them and the message was most interesting.*
>
> *The tributes of love and admiration which have poured in for my beloved husband have helped and comforted me more than I can say.*
>
> *Jean Conan Doyle.*
>
> Is there any chance of your coming over to England and giving sittings at the Psychic College? No doubt you know that it is under Mrs. De Crespigny's chairmanship now and my son also helps there.

But Miss Besinnet was content with Toledo, and she continued to give séances there to a group of loyal followers until her death a few years later.

Acknowledgement

Our thanks to Dame Jean Conan Doyle for permission to quote herein from the letters of Sir Arthur Conan Doyle.

Notes

1. Snyder, C., There's Money in Ears, But the Eye is a Gold Mine. *Arch Ophth.*, 1971; 85: 359–365.
2. Doyle, A.C., *Memories and Adventures*. Boston: Little, Brown, and Co., 1924, pp. 84–85.
3. *Ibid.*, p. 88.
4. *Ibid.*, pp. 89-90.
5. *Ibid.*, p. 91.
6. Hamilton, W.H., Smyth, J.S., Hyslop, J.H. A Case of Hysteria. *Proceedings of the American Society of Psychical Research*, 5: 1–656, 1911; Hyslop, J.H. The Burton Case of Hysteria and Other Phenomena. *Journal of the American Society for Psychical Research*, 5: 289–319, 1911.
7. Doyle, A.C., letter, in McKenzie, J.H. Report of Miss Ada Besinnet's Mediumship. *Quarterly Transactions of British College of Psychic Science*, 1: 78–79, 1922.
8. *Toledo Times*, May 20, 1922, p. 2.
9. *Toledo News-Bee*, May 18, 1922, p. 4.
10. *Toledo Blade*, May 18, 1922, p. 1.
11. *Toledo News-Bee*, May 22, 1922, p. 1.
12. Doyle, A.C., *Our Second American Adventure*, Boston: Little, Brown, and Co., 1924, p. 48.
13. *Ibid.*, p. 246.
14. Ernst, B.M.L. and Carrington, H., *Houdini and Conan Doyle, The Story of a Strange Friendship*. London: Hutchinson & Co., 1933.
15. Gibson, W.B., *The Original Houdini Scrapbook*. New York: Corwin Sterling, 1976, unpaginated.
16. *Toledo Blade*, July 9, 1930.
17. *Toledo Times*, July 8, 1930.

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Herman Snellen (1834–1908) and Müller's 'Reform-Auge'
A short history of the artificial eye

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Key words: History of ophthalmology, artificial eye, Herman Snellen, Müller's 'Reform-Auge'

Abstract. The shell prothesis, originally meant to be placed over the atrophic eye, caused serious problems when used after enucleation, which became more common practice in the second half of the last century. In the nineties of the last century Snellen Sr. tried to solve these problems by designing a light prothesis that filled up the empty space. At the insistence of Snellen, the Müller brothers in Wiesbaden succeeded in 1892 to blow a hollow artificial eye which proved to be a real success.

The ancient world

Around 2000 B.C. the dead in Egypt were provided with artificial eyes in order to find their way to the hereafter. The eye contours were made of bronze filled in with plaster or precious stones. The eyes were not placed on

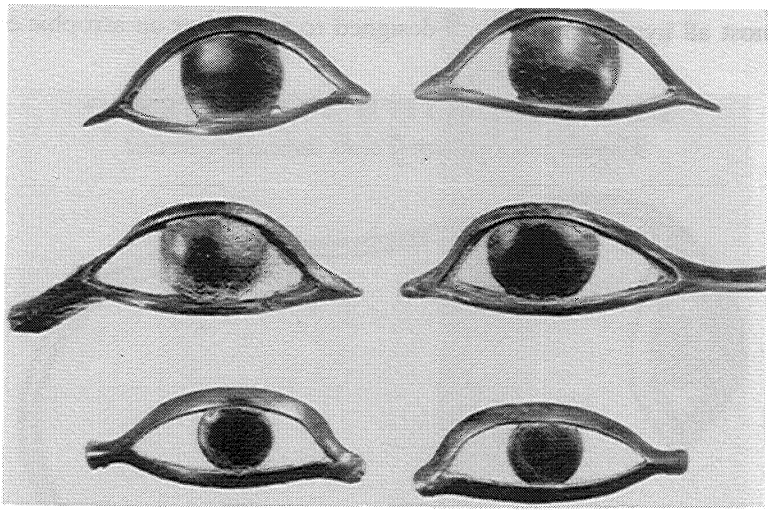

Fig. 1. Artificial eyes from Egyptian mummies. The edges with the typical Egyptian make-up stripes at the outer canthi are made of bronze. Iris and pupil are made of black stone, whereas the sclera is made of white alabaster embedded in plaster. (Rijksmuseum voor Oudheden, Leiden, The Netherlands)

the deceased, but were fixed to the wooden coffin instead [1]. As most coffins decayed during the centuries, the artificial eyes come to light at excavations as isolated finds (Fig. 1).

The Romans decorated their statues of heroes and gods with artificial eyes made of silver, bronze or precious stones. The artist making and repairing these eyes was called *faber ocularius*, in contrast to the eye-doctor who was called *medicus ocularius* [1].

Artificial eyes with the purpose of covering up a lost eye are said to date back to the times of Ptolemaeus Philadelphius, king of Egypt (283–247 BC). The artificial eyes consisted of a metal plate with a painting of an eye on it. Two types can be distinguished: ekblephara and hypoblephara, intended to wear in front of, or under the eye-lids respectively [2].

From the Renaissance to circa 1850

The famous French surgeon, Ambroise Paré (1510–1590) describes an ekblepharon consisting of a plate covered with chamois-leather on which an eye, eye-lids and eye-lashes were painted, fixed to a thin iron bar bent around the head (Fig. 2) [3]. From a cosmetical point of view this contraption was not a success. Hazard-Mirault (1755–1822) modified Paré's concept by attaching a flat enamel eye to a piece of chamois-leather on which eye-lids of plaster and other ingredients were modelled. Hazard-Mirault was pleased with the result, but he stated that in the long run the fixed gaze of the eye became almost unbearable!

Almost all hypoblephara were designed to wear over an atrophic eye, as

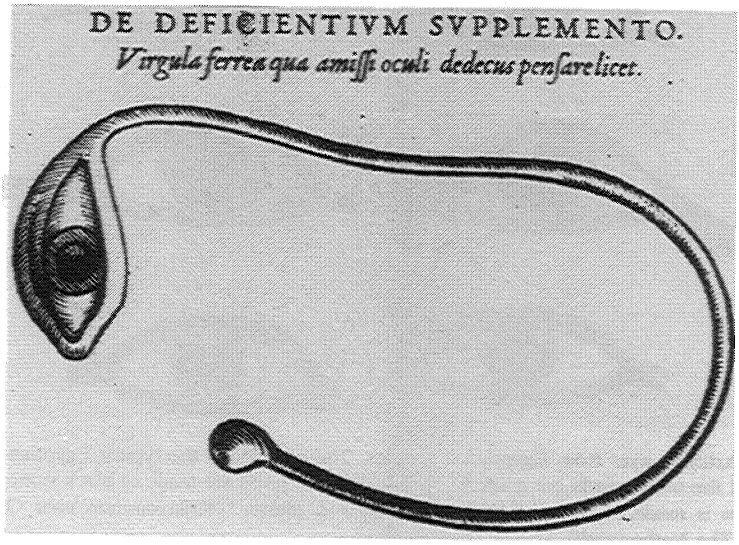

Fig. 2. The first publication of an ekblepharon by Ambroise Paré [3]

enucleation was not common practice until the mid of the last century. In 1818 Hazard-Mirault wrote that enucleation in order to make room for an artificial eye wasn't worth the pain and misery: 'Nous ne conseillerons jamais une opération aussi cruelle pour un aussi faible avantage'. Initially, a hypoblepharon consisted of a painted and/or enamelled metal shell. Later hypoblephara were made of porcelain or glass. In the middle of the last century protheses of enamel and of glass were used side by side. Up to that time the finest enamel protheses were made by the family Boissonneau in Paris. The Boissonneaus dominated the European market during several generations. They called themselves 'oculariste'. Contacts with eye-doctors ('oculistes') were scarce [4].

Burow [5] is hilarious about the crazy questionnaire Boissonneau's potential customers had to fill out before they were approved to get an artificial eye delivered. Boissonneau was among others interested in age, physical condition, refraction of the healthy eye and above all, the financial status of his potential customer. A customer without means had to pay 25 Frcs, 'bei Reichen steigert sich der Preis bis ins Unbegrenzte' (for the rich the price rises into infinity).

1850–1892

Enamel protheses, although quite attractive, were very expensive and didn't last long. After several months they got dull and had to be replaced. Glass shell protheses were considerably cheaper and consequently superseded the enamel protheses in the course of the nineteenth century. As was mentioned before, both shell models, enamelled metal and glass protheses, were meant to be placed over the atrophic eye. When in the second half of the last century enucleation became more common practice, shell protheses turned out to be unsuitable following enucleation. The edges of the shells were painfully sharp and secretion and tears accumulated in the space behind the shell. After enucleation a prothesis was required that filled the empty space completely [4]. Initially, massive glass eyes were tried, marbles that had been hollowed out at the back in order to reduce weight, but these eyes were too heavy [6]. Also spheres of glass were placed in the orbit to support the shell prothesis, but all spheres were finally rejected [7].

1892–1900

In 1892 Snellen Sr. (1834–1908) tried to solve the problem designing a prothesis that should fill the empty space completely, but at the same time should not be too heavy. Initially Snellen enlarged the shell prothesis by adding plaster, later guttapercha, a material that had recently come into use in dentistry (Gilbert's temporary stopping). Such a prothesis, however, still

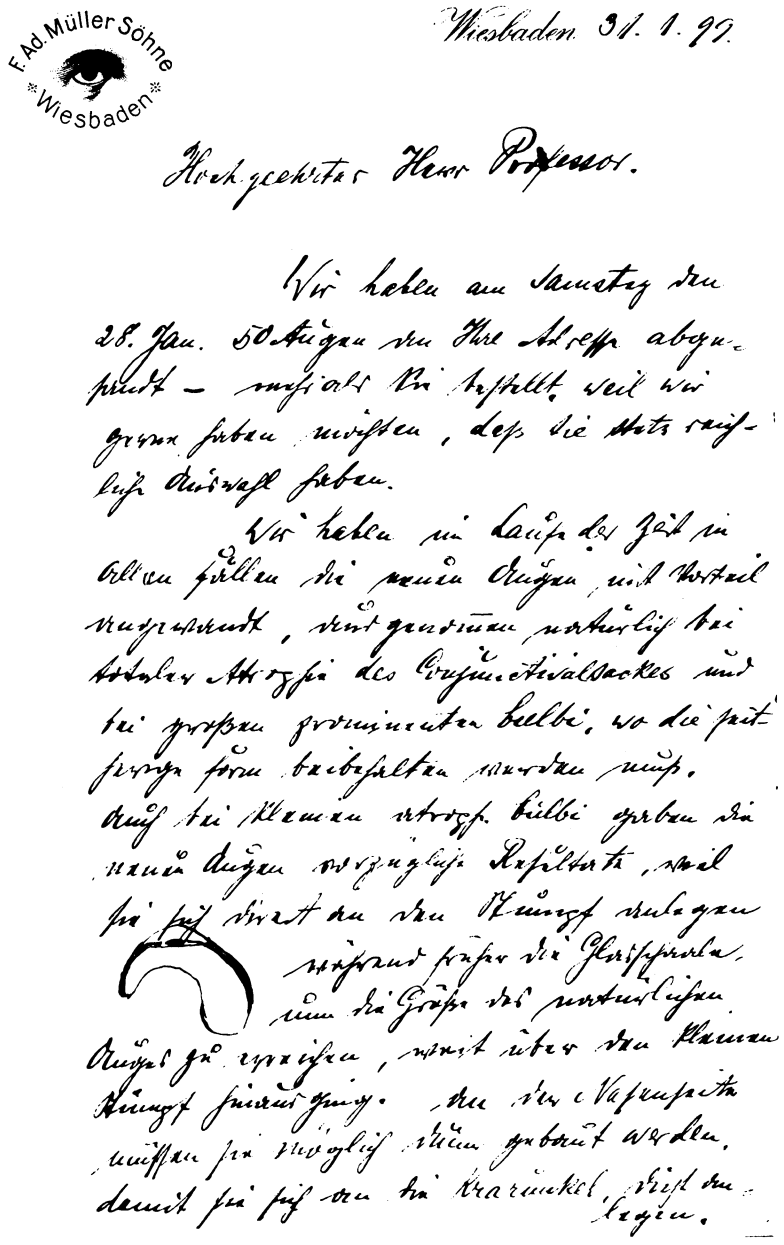

Fig. 3. The fist page of a letter which Müller sent to Snellen concerning the 'Reform-Auge'. (Historical Collection of the former Royal Netherlands Ophthalmic Hospital, Utrecht)

proved to be too heavy. Next Snellen set his mind on a hollow glass prothesis, for which he contacted the Müller brothers in Wiesbaden, who were at that time already the best makers of glass protheses on the Continent. The Müllers initially rejected Snellen's ideas because they had already made an unsuccessful attempt following a suggestion of Zehender. Yet, the Müllers agreed to try again and after many failures they succeeded in 1892 in producing a hollow prothesis which satisfied the patient. The sealed air chamber proved to be the crucial point as it sometimes caused explosion or implosion of the prothesis. Once this problem was solved the production of a safe prothesis could be started. The Müller brothers patented the manufacturing process under the name 'Reform-Auge' [4]. In his lectures at congresses and in scientific journals Snellen repeatedly enumerated the advantages of the new artificial eyes compared to the shell model. At the 14th meeting of the Netherlands Ophthalmological Society at Rotterdam in 1898 he stressed the drawback of the old type of artificial eye, particularly the danger of sympathethic ophthalmia. His adage was that there should be no cavity behind the artificial eye. His appraisal for Müller's new 'Reform-Auge' was a bit overdone as he mentions as some of the advantages that the eye does not sink in water, is easy to clean, has not to be taken out during the night and that it does not cause tearing and secretion. Within a short time the double-walled artificial eye was generally accepted. At the 13th International Medical Congress at Paris in 1900 Müller's new artificial eye was a main topic in the section Ophthalmology. Similar protheses we still use to-day.

In the historical collection of the former Royal Netherlands Ophthalmic Hospital at Utrecht* several letters are being kept that remind us of the history of the 'Reform-Auge' (Fig. 3). In one of the letters, dated January 18th, 1899 Priestley Smith of Birmingham writes to Snellen that some years earlier he asked Mr. Pache 'our best maker of artificial eyes' to blow an eye according to the principle of Snellen/Müller. At that time Mr. Pache said that this was not possible. Now, however he has succeeded and now Pache wants 'to patent the principle in England! This seems to me unfair'. Priestley Smith sends a cheque of £1.10.0 for six 'Reform' eyes to Snellen. 'This is a matter of trade and I believe when an article has once been sold in this country it cannot be patented'. From another letter, dated December 3rd, 1898 it appears that Müller is informed that 'Augenmacher Pache in Birmingham' tries to make similar eyes, but in his opinion P. will not succeed because the English glass is too heavy. The glassblowers in England use lead-glass instead of the lighter soda-lime glass of which the Müller-eyes are made.

About a century ago the problem of a good prothesis was definitely settled. It is an indication that Snellen was right in the nineties of the last century when he urged the Müllers to blow the 'ideal' artificial eye.

* The temporary address of the collection is: Plompetorengracht 9–11, 3512 CA Utrecht, The Netherlands.

References

1. Hirschberg, J.: *Graefe-Saemisch, Handbuch der Gesammten Augenheilkunde*. Berlin: Julius Springer Verlag, 1918, XIV Bd., §413.
2. Hazard-Mirault: *Traité pratique de l'oeil artificiel*. Paris, 1818.
3. Paré, Ambroise: *Opera omnia a Jacobo Guillemeaux, Chirurgo*. edita, Parisiis, 1582.
4. Snellen H.: Operationslehre. *Graefe-Saemisch, Handbuch der Gesammten Augenheilkunde*, 1902, 2.Aufl., IV Bd., Kap. II, §81.
5. Burow, A.: Notiz über künstliche Auge. *Arch f Ophthalmologie*, Bd. 6, Abt. 1, pp. 111–116, 1860.
6. Ritterich, F.P.: *Das künstliche Auge*. Leipzig, 1852.
7. *Letter of Müller to H. Snellen*, dated 12-7-1898. Historical Collection of the former Royal Netherlands Ophthalmic Hospital, Utrecht.

Address for correspondence: I. den Tonkelaar, F.C. Donders Institute of Ophthalmology, P.O. Box 85.500, 3508 GA Utrecht, The Netherlands.

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Willem Vrolik on cyclopia

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Key words: History of ophthalmology, congenital malformation, cyclopia, synophthalmos, mammal, human foetus, neonatus

Abstract. One of the founders of the Museum Vrolikianum, Professor Willem Vrolik (1801–1862), was very interested in teratology, especially in a congenital malformation termed cyclopia. In 1834 he published a paper on cyclopia. This work was mainly based on studies of cyclopic specimens present in the collection of his father, Professor Gerardus Vrolik. In this study he proposed a classification system for cyclopes, in which he divided them into five main types. This study also formed the basis for the chapters on cyclopia in his *Handbook of pathological anatomy* (1842–1844) and his *Tabulae ad illustrandam embryogenesin hominis et mammalium* (1844–1849). In these studies the specimens of cyclopes of man and mammals, still present in the collection of the Museum Vrolik in the Department of Anatomy and Embryology of the University of Amsterdam, were described and illustrated with beautiful lithographs. The collection consists of five human cyclopes and nineteen other cyclopic mammals. These mammals are pigs, lambs and a cat.

Introduction

A congenital malformation, which is characterized by the appearance of only one eye, is termed in the classical teratological literature cyclopia [1]. This deformity attracted much attention from earliest times [2]. It was already known in Assyrian – Babylonic childbirth omens [3]. In many countries stories existed about one-eyed men. It seems reasonable to assume that the observation of cyclopic children gave rise to the belief that there really were one-eyed persons [4]. In Greek mythology the cyclopic giant Polyphemus' only eye was destroyed by Ulysses and his companions with a burning stake so that they could escape from the island of the cyclopes [5]. Many authors relate these mythological figures to human congenital malformations [6–8]. However, there are also authors who are convinced that fossils of animals were the examples for these mythological figures. The finding of the skeletal remains of a pygmy elephant from the glacial period in Sicily, in Messina, Palermo and Trapani, may have given rise to the idea of the fabulous cyclopic giant [9, 10]. In fact, the entrance to the nasal cavity in these fossil skulls had the appearance of one large orbit. In China and India also a medial frontal eye was known [9]. This eye could be related to

the frontal eye of fossil and existing amphibians and reptiles. This third eye is also rudimentarily present as the pineal organ in man. This explanation cannot be true for the mythological figures of Greece which had only one eye. Two explanations are possible: either the Greek writers were really familiar with the teratological human cyclopes, or the Greek authors with their stories about Polyphemus, and the Arabic poet who wrote Sinbad the Sailor, influenced the medieval writers. In the Middle Ages there was no doubt about the fact that cyclopes lived in the unknown parts of Asia and Africa. The place were the 'Monoculi' lived was described exactly in the *Cosmographia Universalis* of Sebastian Munster [3].

The oldest case of cyclopia is described in a letter in Italy in 1619: 'Landi conte Ippolito, Lettera al figlio Ottaviano da Vienna li 8 settembre' [11]. A wellknown case of cyclopia is the specimen described by Licetus. However, this author did not regard cyclopia as a congenital malformation [11]. In the 18th century the ideas about teratology became increasingly scientific and scientists started to collect specimens of the congenital malformations of man and animals [12]. It was, however, not until the end of the 19th century that histological studies were performed on these specimens. Based on his own observations and many studies by others, I. Geoffroy Saint-Hilaire [13] in 1832 classified anomalies in the face of man and animals into two 'families': cyclocephaly (kyklos = circle) and otocephaly (otos = ear). In the first case there is approximation or variable union of the orbits and their contents, with the ears remaining normally situated, while in the second malformation there is approximation or union of the external and middle ears at the midline, reduction or absence of the mandible and sometimes approximation or fusion of the orbits or ocular structures as well. In this period it was Willem Vrolik in the Netherlands who studied cyclopia and furnished the pathological collection of his father, Gerardus Vrolik, with specimens of human and animal cyclopes.

The Museum Vrolikianum

At the end of the 18th century Gerardus Vrolik (1775–1859) started to collect specimens for what was later called the Museum Vrolikianum [14–17]. He studied medicine at the University of Leiden and graduated as doctor of medicine on a dissertation: *De defoliatione vegetabilium et de viribus plantarum* [On the falling of leaves and on evergreen plants]. In 1796 he was appointed Professor of Botany at the Athenaeum Illustre, the predecessor of the University of Amsterdam. In 1798 he succeeded Professor Andreas Bonn as Professor of Anatomy and Physiology. Moreover he was given the chair and a clinic for obstetrics in the Binnen-Gasthuis in Amsterdam. In this position he was the first doctor with a clinic for obstetrics in the Netherlands [18]. His scientific interests were very diverse and he published many papers on many subjects, including teratology [19].

His son Willem Vrolik (1801–1863) studied medicine at the Athenaeum Illustre in Amsterdam. In 1819 he continued his studies at the University of Utrecht. In 1823 he graduated in Utrecht as doctor of medicine on a dissertation: *De mutato vasorum sanguiferorum decursu in scoliosi et cyphosi* [About the changing position of bloodvessels in scoliosis and kyphosis]. He was a general practitioner in Amsterdam until he was appointed Professor Extraordinary of Anatomy and Embryology at the University of Groningen. His professorship at the University of Groningen was to be for a short period, as he was appointed Professor of Anatomy, Physiology, Natural History and Theoretical Surgery at the Athenaeum Illustre in Amsterdam in 1831. During his professorship in Groningen he studied the Cabinet of Petrus Camper [20].

Willem Vrolik and cyclopia

During his study of the Camper Collection in Groningen Vrolik became interested in teratology, as there were many specimens of congenital malformations in the collection. He intended to publish a paper on these specimens [21]. Unfortunately his stay in Groningen was too short for him to accomplish this task [22]. However, during this period J. Wedekind graduated as doctor of medicine under Willem Vrolik on a dissertation *De Cyclopia* [23]. During Vrolik's professorship in Amsterdam in 1834, he published, a paper on cyclopes: 'On the nature and origin of cyclopia' [24]. In this paper the author gives a definition of a cyclops: 'Cyclopes are monsters in which the organs of both smell and vision are malformed in such a way that the first is either missing or not present in its common place, and the second is more or less present in a single form'. In this paper Vrolik discusses the theories that existed about congenital malformations in the preceding centuries and his conclusions are that scientific studies have shown that cyclopes are 'malformations of a natural form, which can be differentiated into several stages'. He divided cyclopes into five main types:

Type 1: The eyes are not visible externally, sometimes the nose is missing altogether, sometimes there is a trunk (proboscis) in the position of the nose.

Type 2: In the single orbit an externally visible single eyeball is present, sometimes above this orbit there is the appearance of an external nose with the shape of a trunk.

Type 3: Externally a single eye is present, internally it is double; sometimes with a trunk, sometimes without a trunk.

Type 4: Distinctly separate eyeballs, sometimes close together, sometimes separated by a dam. Above this a bent trunk is present.

Type 5: The trunk is directed downwards and supported by a bony tube, in this way having a more natural shape. The eye is sometimes single, sometimes double.

The classification of cyclopes into these five main types by Vrolik originated in the study of specimens of human and other mammalian foetuses in the Museum Vrolikianum and of many reports in the literature. He came to the conclusion that the nature of cyclopia was based on the poor development of the organ of smell as well as the organ of vision. He stated: 'So if only one of both eyes is poorly developed, and the other is developed normally,

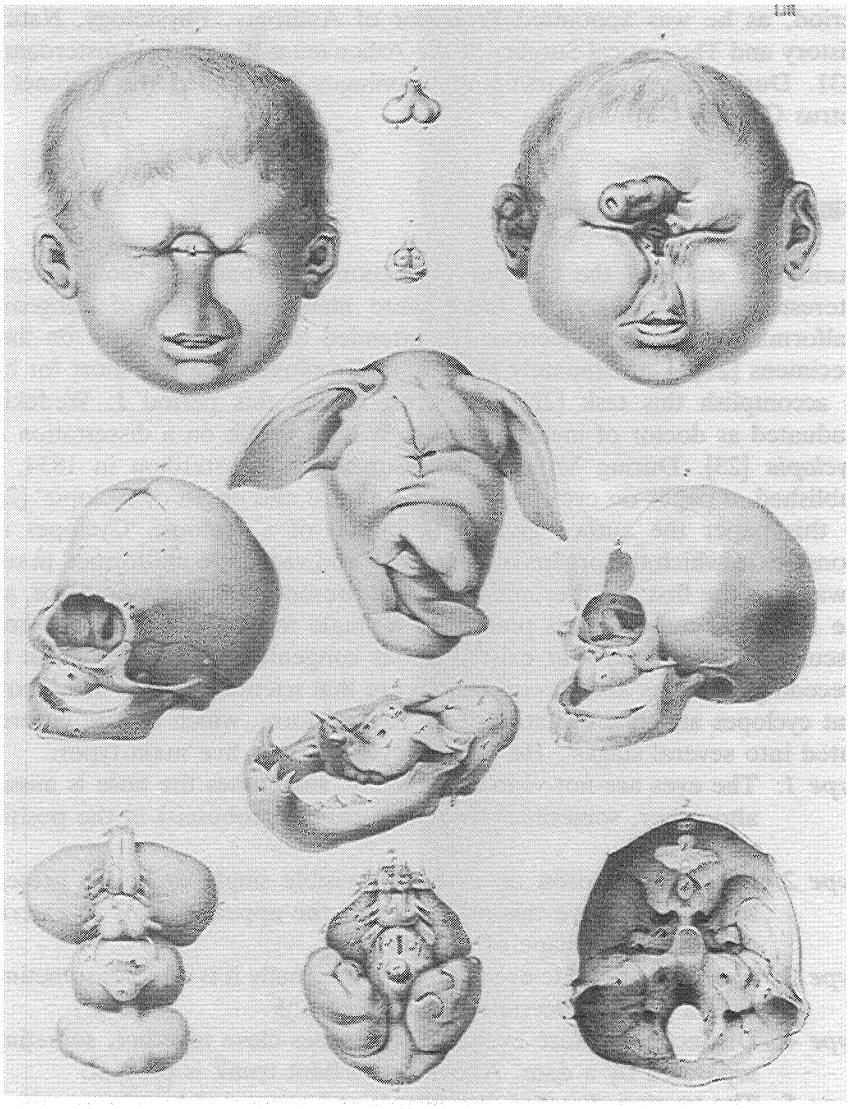

Fig. 1. Human cyclopes (1, 8) and their respective skulls [2, 11]. Tabula LIII [26].

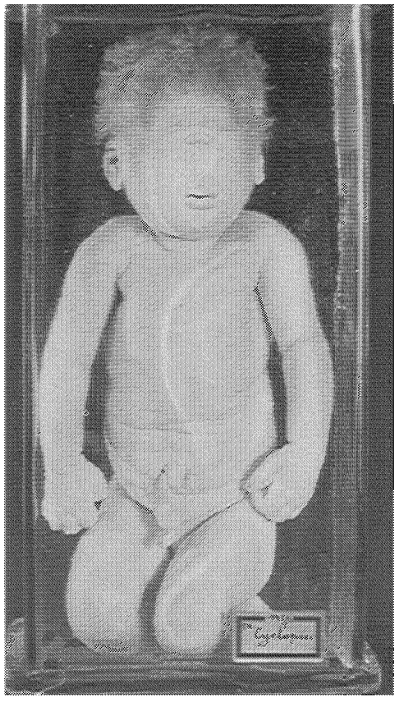

Fig. 2. Specimen of a human cyclops without a trunk (cf. Fig. 1, No. 1). Type 1.

Fig. 3. Frontal view of a specimen of a human cyclops with a trunk (cf. Fig. 1, No. 8). Type 1.

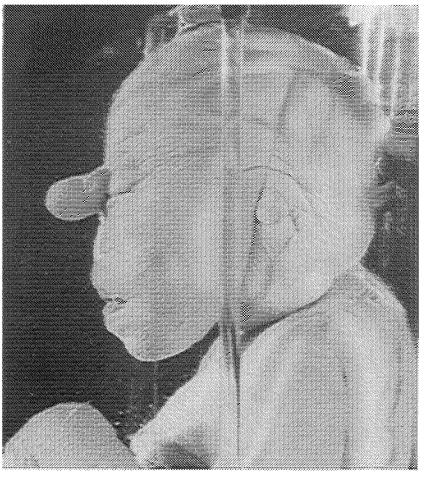

Fig. 4. Lateral view of the specimen seen in Fig. 3.

cyclopia does not exist, but only a malformed eye or nose exists. However in this respect the two malformations are mutually independent of each other. As soon as the eyes are more or less malformed, the nose cannot have a normal form; but if a nose is lacking the eyes may have a normal form. Also the statement is incorrect that absence of the globes always gives cyclopia. Suppose that the situation exists that there are two orbits without globes,

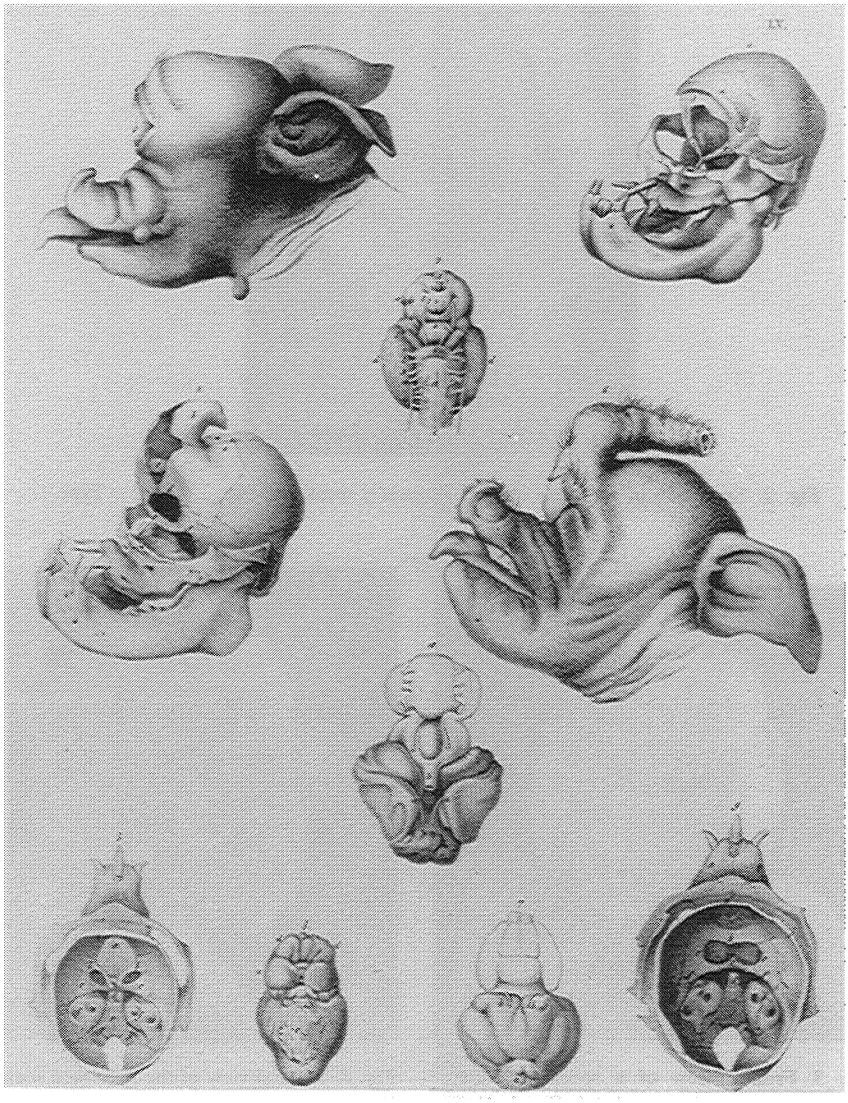

Fig. 5. Cyclopes of pigs. Tabula LV [26].

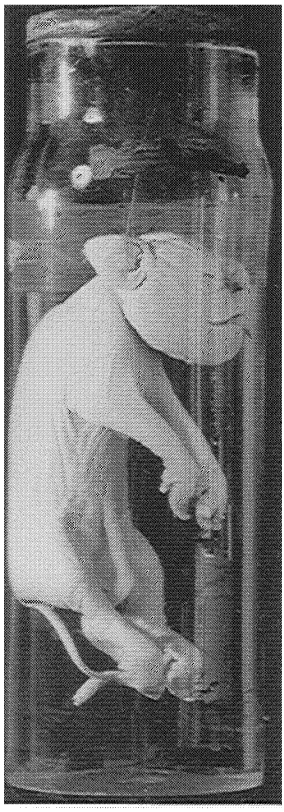

Fig. 6. Lateral view of a specimen of a pig cyclops with a trunk. Type 2.

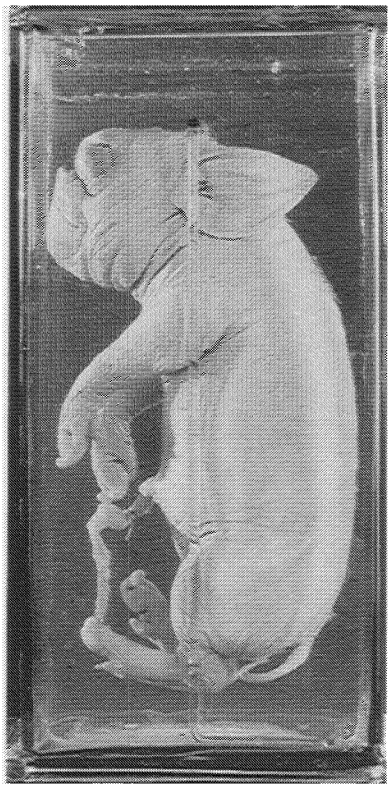

Fig. 7. Lateral view of a specimen of a pig cyclops with a trunk (cf. Fig. 5, No. 6). Type 2.

Fig 8. Frontal view of the specimen seen in Fig. 7.

then the nose is in its original position and cyclopia does not exist. If there is only one orbit found and in this there is a globe of any form, or even only a mass of muscle in its position, then this monster is a cyclops, no matter whether there is any proof of an external nose or not.'

The paper about cyclopia in 1834 was the basis for a chapter in his *Handboek der ziektekundige ontleedkunde* [Handbook of pathological anatomy / 25], and for several plates with descriptions in his *Tabulae ad*

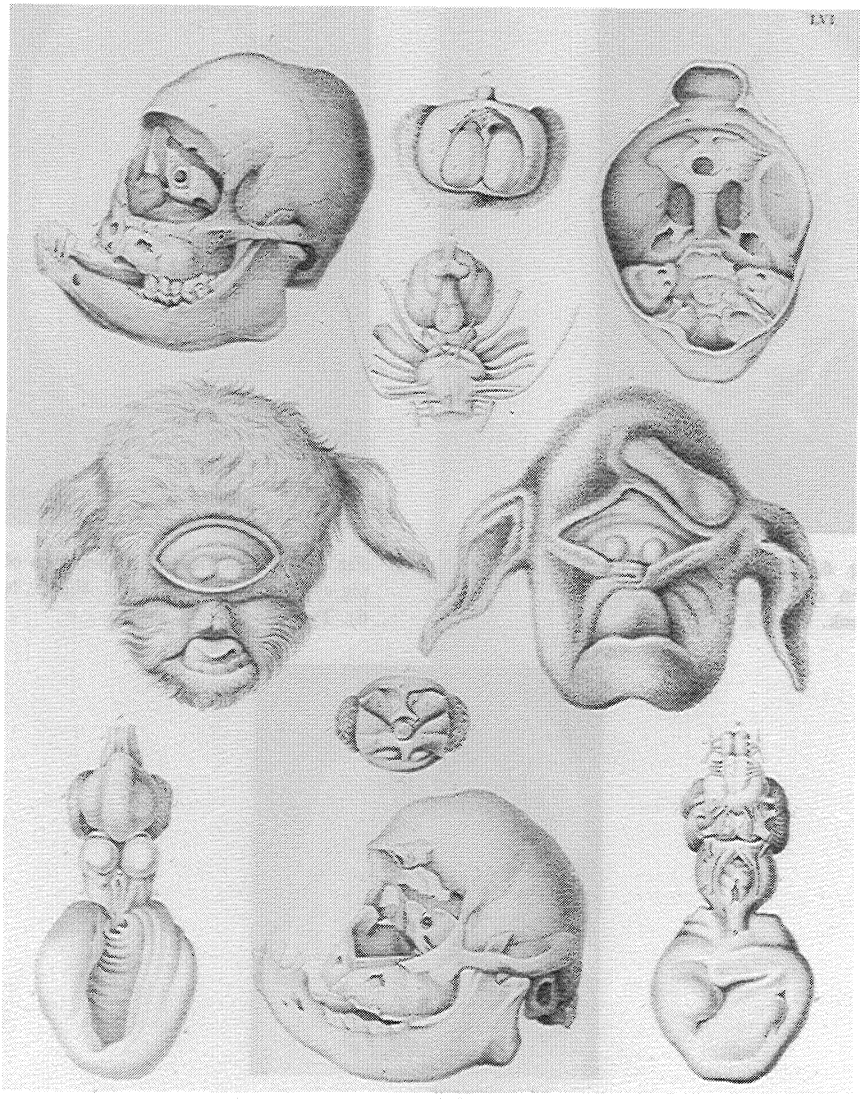

Fig. 9. Cyclopes of lambs. Tabula LVI [26].

Fig. 10. Frontal view of a specimen of a lamb cyclops. Type 2.

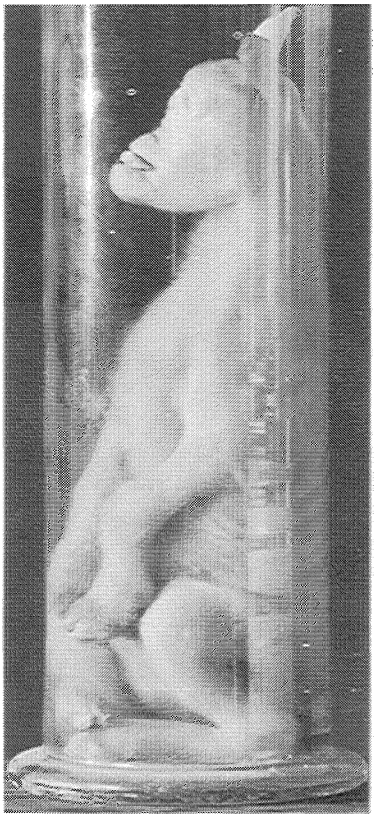

Fig. 11. Lateral view of a specimen of a lamb cyclops (cf. Fig. 9. No. 1). Type 2.

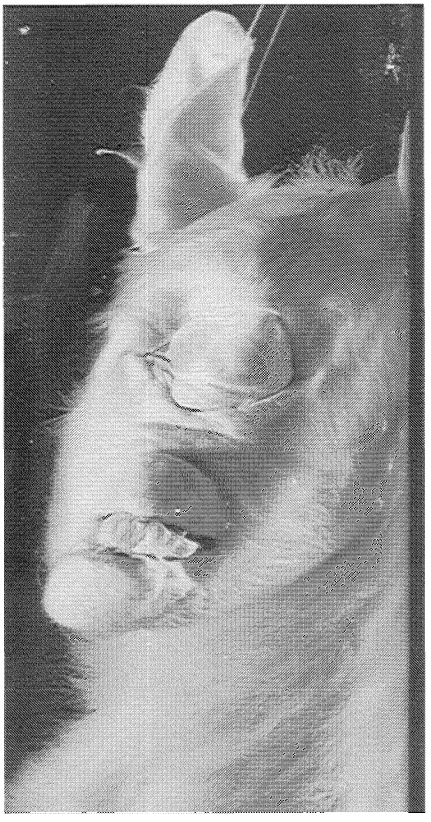

Fig. 12. Frontal view of the specimen seen in Fig. 11.

illustrandam embryogenesin hominis et mammalium tam naturalem quam abnormen [Plates demonstrating the normal and abnormal development of man and mammals / 26]. The Dutch name of this book is: *De vrucht van den mensch en van de zoogdieren afgebeeld en beschreven in hare regelmatige en onregelmatige ontwikkeling*. It consists of 100 plates with descriptions in Latin and Dutch, and was published in instalments between 1844 and 1849. The plates LIII–LVII show cyclopes of humans (Fig 1), pigs (Fig 5) and lambs (Fig 9). Plate LVIII shows cyclopia combined with other malformations of the head in a rabbit, pigs, lambs and man. The descriptions were also used for part of the chapter 'Teratology' in R. Todds' *Cyclopaedia of anatomy and physiology* [27]. The Handbook and the Tabulae are still important on account of their information about the cyclopic specimens in the Vrolik Collection (Figs. 1, 5, 9), as the Catalogue of the collection [28] only provides information in general terms and there are many references to the aforementioned books. Volume E of the catalogue has the subtitle: 'Partie Tératologique'. In this volume 539 specimens are described. The numbers 205–244 are listed under cyclopia. The numbers 205–213 are preparations of human newborns (skulls, brains, eyes etc.). The numbers 214–244 are preparations of eight pigs, ten lambs and one cat. The numbers 253–255 are two newborn pigs and one newborn lamb with cyclopia and other malformations. Vrolik classified all the human newborns with cyclopia in the collection as type 1 (Figs 2, 3, 4). The 19 specimens of other mammals represented the types 2 to 5 of Willem Vrolik's classification system (Figs. 6, 7, 8, 10, 11, 12).

On the classification of cyclopes

In *The illustrated guide to malformations of the central nervous system at birth* [29] a publication of the EUROCAT, the acronym for the EEC concerted Action Project Registration of Congenital Abnormalities and Twins, cyclopia is listed under arhinencephaly. According to this publication arhinencephaly, the absence of the first cranial nerve and tract, is not a single malformation but a group of disorders. There is a spectrum of anomalies from a normal brain, except for the first cranial nerve tract, to a single ventricle (holoprosencephaly). Clinically, there is a spectrum of facies associated with arhinencephalic disorders. These include cyclopia, ethmocephaly (ethmos = sieve; nasal proboscis above the orbits), cebocephaly (kebos = longtailed monkey; nose atrophic, usually with one median nostril, but normally situated) and median facial deformities. The concept that cyclopia is part of a spectrum of anomalies was already introduced by Geoffroy Saint-Hilaire [13]. The classification system of this author, which divided facial defects into 2 families: cyclocephaly and otocephaly, was adopted and modified in 1934 by Wright and his associates [30, 31]. These

authors drew up a '2-dimensional' classification scheme for the cyclopia-otocephaly syndromes. In one dimension they classified a series of defects associated with the mandible; in the second they placed a series of premaxillary and associated defects. As Wright and Wagner [31] checked their system on the basis of 316 abnormal specimens of guinea pigs, and the authors themselves noted several exceptions, the classification scheme was not generally accepted. In the volume on congenital malformations of the head in the most quoted handbook of teratology [32], Schwalbe and Josephy adopted the classification system of Bock [33] by dividing these malformations into 8 types. The list of types is as follows:

1. The eyes are close together, each having its own orbit. The nasal cavity is single and very narrow.
2. The bulbi are very close to each other, although two orbits are still present, the nose with its single cavity is displaced upwards as a proboscis.
3. As 2, but the bulbi lie close together in one orbit.
4. As 3, but the bulbi are fused by the sclerae.
5. The optic nerves are close together, the fused scleral tissue is thinner, cornea, iris, lens, ciliary body and retina are double.
6. Cornea single, the other parts double. The optic nerves separated by a thin layer of connective tissue.
7. One cornea, two centrally fused lenses, sclerae and choroids. The retina and optic nerve are single.
8. The eye has no obvious doubled parts.

The first type corresponds with the cebocephaly, the second type with the ethmocephaly of Geoffroy Saint-Hilaire [13]. The types 3–7 are classified as *Cyclopia incompleta*, type 8 as *Cyclopia completa*.

According to Duke-Elder [2] cyclopia is part of an anomaly involving not only the eyes themselves but also the anterior part of the brain and the mesodermal structures in the midline. True cyclopia or complete fusion of the two globes is very rare. More common is a partial fusion wherein some or all ocular structures are paired within a single globe. This situation can be termed synophthalmos [2]. In this author's view the anomaly is associated with deformities of the telencephalon and also with extensive defects of the skull in the midline, so that an embryo will develop into a cyclops with a single median eye if for any reason the early optic primordia (lateral diverticula of the prosencephalon) become too intimately fused across the midline. So failure or disturbance of the activity of the prosencephalic organizing centre will result in a continuous series of malformations, from the extreme condition of aprosopos (a = without, prosopos = a face), a gross and hideous deformity with complete failure of development of most of the brain and the face, through complete or partial fusion of the two eyes and orbits to failure of development of one nostril. This organizing centre may be responsible for the induction of the prosencephalon or forebrain and the

olfactory and visual apparatus. Derivates of the neural crest also probably play an important role in this organizing centre [32].

Duke-Elder's [2] classification system is rather simple. This author divided congenital deformities of the eye into 3 groups, one group being: 'Abnormalities occurring in association with the development of the primary optic vesicle'. This group is subdivided into the subgroups: 1: Anophthalmos, and 2: Cyclopia and its related anomalies. In the section 'Nomina dismorphica specialia' of the *Nomina Embryologica* [33], cyclopia is classified as a 'defectus ocularis', and otocephalia is still classified as a 'defectus auricularis'. So the embrylogy subcommittee [33], consisting of specialists in embryology responsible for an up-to-date classification system for congenital malformations, still prefer the classical classification of cyclopia, in contrast to many other authors.

This short survey of the literature shows that the classification and nomenclature of cyclopia and related anomalies of the face are still confusingly intertwined and there is no general agreement about a useful classification system for cyclopes. From a clinical point of view cyclopia can be classified under the arhinocephalic disorders [29], and this is not in conflict with the ideas that Willem Vrolik generated, based on the study of the specimens in the Museum owned by himself and his father. From a historical point of view, the work of Willem Vrolik on cyclopia is still interesting as the specimens in the Vrolik Collection, especially the animals, are still referred to in the literature [34].

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References

1. Hamilton WJ, Boyd JD, Mossman HW. Human embryology: Prenatal development and function. Cambridge: W Heffer & Sons, 1966: 369–370.
2. Duke-Elder S. System of ophthalmology, Vol. III: Normal and abnormal development, Part 2: Congenital deformities. London: Kimpton, 1963.
3. Beins JFA. Misvorming en verbeelding. MD Thesis. University of Groningen. Amsterdam: van Oorschot, 1948.
4. Warkany J. History of teratology. In: Wilson JG, Clarke Fraser F, eds. Handbook of teratology, Vol. 1: General principles and etiology. New York: Plenum Press, 1977: 3–45.
5. Schwab G. Die schönsten Sagen des klassischen Altertums. Reutlingen: Ennslin und Laiblin Verlag, 1955.

6. Popp H. Mythologie und Pathologie. Die medizinische Welt. 1939; 13: 431.
7. Regnault F. Les origines de la tératologie. Paris: Le Naturaliste, juillet 15, 1901.
8. Schatz F. Die griegischen Götter und die menschlichen Missgeburten. Wiesbaden: JF Bergman, 1901.
9. Dacqué E. Urwelt Sage und Menschheit. München, 1925.
10. Wendt H. Die Entdeckung der Tiere. München: Christian Verlag, 1980.
11. Taruffi C. Storia della teratologia. Bologna: Regia Typografia, 1881–1894; Vol 3: 365–388.
12. Schumacher GH, Gill H, Gill H. Zur Geschichte angeborener Fehlbildungen unter besonderer Berücksichtigung der Doppelbildungen, 2: Vom 18 bis 20 Jahrhundert. Anat Anz 1987; 164: 291–303.
13. Geoffroy Saint-Hilaire I. Histoire générale et particuliére des anomalies de l'organisation chez l'homme et des animaux, 3 Vols and Atlas. Paris: Ballière, 1832–1837. Vol. 2: 423–424.
14. Baljet B. Willem Vrolik als zoöloog. Vakbl Biol 1983; 63: 214–217.
15. Baljet B. Willem Vrolik als teratoloog. Ned Tijdschr Geneesk 1984; 128: 1530–1534.
16. Baljet B. The Vrolik Collection. In: Blom P, Van de Berg T, eds. Out and about in Amsterdam. Amsterdam: Nederlands Theater Instituut, 1985; 40–47.
17. Baljet B. The Vrolik Collection. Actes du 3éme Colloque des Conservateurs des Musées d'Histoire des Sciences medicales 1988; 241–253.
18. Baljet B. Uit de geschiedenis van het Museum Vrolik, de Snijkamer en het Theatrum Anatomicum te Amsterdam. In: Gids voor het Museum Vrolik. Universiteit van Amsterdam, 1990; 7–24.
19. vd Hoeven J. Levensberigt van Gerardus Vrolik. Jaarboek van de Koninklijke Academie van Wetenschappen 1859; 116–134.
20. Daniëls CE. Het leven en de verdiensten van Petrus Camper. Utrecht: JW Leeflang, 1880.
21. vd Hoeven J. Levensberigt van Willem Vrolik. Jaarboek der Koninklijke Academie van Wetenschappen 1863; 83–99.
22. Jonckbloet WJA. Gedenkboek der Hoogeschool te Groningen ter gelegenheid van haar vijfde halve eeuwfeest. Groningen: Wolters, 1864.
23. Wedekind J. De Cyclopia. MD Thesis. University of Groningen, 1830.
24. Vrolik W. Over den aard en oorsprong der cylopie [On the nature and origin of cyclopia]. Nieuwe Verhandelingen der Eerste Klasse van het Koninklijk Nederlands Instituut 1834; 5: 25–112.
25. Vrolik W. Handboek der ziektekundige ontleedkunde, deel 1. Amsterdam: Sulpke, 1840; deel 2. Amsterdam: Sulpke, 1842.
26. Vrolik W. Tabulae ad illustrandam embryogenesin hominis et mammalium tam naturalem quam abnormen. Amsterdam: Londonck, 1844–1849.
27. Vrolik W. Teratology. In: Todd R. ed. Cyclopaedia of anatomy and physiology 1852; 4: 942–976.
28. Dusseau JL. Musée Vrolik, Catalogue de la collection d'anatomie humaine, comparée et pathologique de M.M. Ger. et W. Vrolik. Amsterdam: WJ Roever Kröber, Tome I–V, 1864.
29. Nevin NC, Josephine AC. Illustrated guide to malformations of the central nervous system at birth. London: Churchill Livingstone, 1983.
30. Wright S. Eaton ON. Factors which determine otocephaly in guinea pigs. J Agr Res 1923; 26: 161–181.
31. Wright S, Wagner K. Types of subnormal development of the head from inbred strains of guinea pigs and their bearing on the classification and interpretation of vertebrate monsters. Am J Anat 1934: 383–447.
32. Schwalbe E, Josephy H. Die Cyclopie. In: Schwalbe E (Hrsg) Die Morphologie der Missbildungen des Menschen und der Tiere. Teil III: Die Einzelmissbildungen. Jena: Gustav Fischer, 1913: 204–270.

33. Bock CE. Beschreibung eines atypischen Cyclops. Klin Mbl Augenheilk 1989; 27: 508–513.
34. Beauchamp GR, Knepper PA. Derivates of the neural crest and their pathology. J ped Ophthalmol and Strab 1984; 21: 209–214.
35. Nomina Embryologica, 3rd ed. Edinburgh: Churchill Livingstone, 1989.
36. Kalter H. Teratology of the central nervous system. Chicago: University of Chicago Press, 1968.

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The terms *glaucoma* and *cataract* in the ancient Greek and Byzantine writers

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Key words: History of ophthalmology, glaucoma, cataract

Abstract. The authors deal with the meaning of the terms *glaucosis* and *hypochyma*, in the texts of ancient Greek and Byzantine medical writers. The analysis of these texts shows us that the meanings of these terms do not correspond to the modern ones. In the texts the term *glaucosis* corresponds to the modern cataract, and the term *hypochyma* to the pathological formation of a kind of membrane which appears in the space of the pupil, due to coagulation of a fluid.

It is well known that many contemporary medical terms have been preserved exactly as they were referred to in the books of the ancient Greek and Byzantine writers. However, it is less well known that these terms very often do not represent today the same pathological entity as in ancient times. Based on these ideas, we started a search for two ophthalmic diseases, *glaucoma* (γλαύκωμα) and *cataract* (καταρράκτης) in the ancient Greek and Byzantine writings.

1. In the Hippocratic writings

We meet the term *glaucosis* for the first time in the book 'Concerning Vision' of the *Corpus Hippocraticum*, which seems to be related to today's term cataract, rather than to glaucoma. This view is supported by a related study by the French ophthalmologist Sichel (1841), where he holds that the term *glaucos* of the Hippocratic doctors refers to the greenish-blue color of the pupil, resembling sea-water in color.

In the same book (Concerning Vision), the description of another pathological condition is prominent, one which probably corresponds to today's *cataract*. The relevant portion of the text translates as follows:

> The eyes, which are destroyed suddenly, take on a bluish color. When this condition sets in, there is no possible treatment. The eyes, which are destroyed gradually, take the color of the sea and many times the other eye, after a considerable time, is destroyed.

Apparently, in the Hippocratic writings the term *glaucosis* bears no relation to today's disease of *glaucoma*. For today's term *cataract*, with its present

meaning, there is no clear description, except a vague pathological condition, as stated by Sichel.

2. In the writings of the Alexandrian and Byzantian times

In the Alexandrian period, when medicine continued to accept the Hippocratic humoral theory, we meet for the first time the term *hypochysis*. This term was translated in the Arab countries as 'flowing down of water' (the blue water) and again much later, the Carthaginian monk Constantinos Africanos (1018–1085) translated this from the Arabic writings as *cataract*.

In spite of the ancient Indian teaching of Susruta that cataract is a disease of its own lens, the Greek view remained doctrine for 16 centuries in the Alexandrian School. Thus the persistence of the humoral theory of the Hippocratics in the Alexandrian School contributed to the confusion surrounding these two diseases and their terms *glaucosis* and *hypochyma*.

The progress of anatomical knowledge in that period, offered considerable assistance in the comprehension and elucidation of these two pathological conditions, as in the surgical approach to cataract. With this knowledge, later doctors could distinguish four coats in the eye bulb: the cornea with sclera, the conjunctiva, the choroid and the retina, as well as three fluids: the aqueous humor, the vitreous and the crystalline.

Nevertheless, despite the fact that in this period the presence of the lens in the eye bulb was known, its function and anatomy were a matter full of imagination and prejudices, as they were also in the teachings of Celsus (25 BC–50 AD). According to Celsus, the lens sat in the center of the eye bulb and was considered to be the essential organ of vision. And further, with the term *hypochyma*, they did not consider the disease as phacic, but due to the accumulation and solidification of an 'evil humor', between the cornea and crystalline.

Celsus, Roufos of Ephesus and later Galen classified the diseases localized behind the iris and causing blindness, in two groups: *glaucosis* (*or* glaucoma) and *hypochysis* (*or* cataract), certainly without these terms corresponding to their meaning today.

In the related writings of authors whom we shall cite later, we refer to these two terms and shall try to distinguish their corresponding meanings.

1. Galen (130–210 AD) believes that *hypochima* is created between the cornea and crystalline and destroys the sight until such time as it is operated on. The relevant writing in translation is as follows:

> The hypochymata, which are created between the crystalline and cornea, so-named by the doctors, hinder the vision, until they possibly are operated on.

In another section of the writing, he gives the following definitions (here translated):

> Hypochyma is the coagulation of the aqueous humor, at times more or less. It hinders the vision and differs from glaucoma, in that hypochyma is a coagulation of the aqueous humor and glaucoma a change of the physiological color or the fluids of the bulb to glaucos and that in glaucoma the vision disappears while in hypochyma it partly remains.

In a third part of the writing, he mentions the following:

> Some say that there is hypochyma when what has happened is the interposition of fluid in the area of the pupil which often coagulates, thus hindering the vision or abolishing it completely. And glaucoma is the change of the crystalline fluid to a white and waterish color, because of which the vision is impaired.

It is perhaps worth noting here something which is not known generally, but is very important: that the right anatomical place of the crystalline in the eye bulb was known by Galen. This knowledge has been forgotten for many years so that later the Arab doctors, as well as Vesalius (1514–1564) believed that the lens sat in the center of the bulb, up until 1600, when Fabricius ab Aquapendente (1537–1619) defined the correct anatomical place of the lens behind the iris, as had been determined by Galen. Thus, according to Galen,

> glaucosis is the change in the color of the lens to white, or glaucos, so that vision is hindered absolutely.

In other words, glaucosis corresponds to cataract, according to today's meaning, rather than to today's glaucoma.

The term *hypochyma*, in addition, does not correspond to the disease *cataract* in today's meaning, but is a coagulation of the aqueous humor or an exuding of pathological fluid, which is interposed between the lens and the cornea and is coagulated there, thus impairing the vision to some degree or causing it to disappear altogether.

2. Roufos of Ephesus (98–117 AD) expresses the view, that the ancient doctors consider *glaucoma* and *hypochyma* as one disease. Later the subject was clarified and it was obvious that they referred to different diseases. Roufos considers as *glaucoma* the change in the color of the lens to glaucos, which is due to humidity and as *hypochyma* the coagulation of fluid which is collected between the cornea and the lens. The relevant writing is as follows:

> On the one hand, the ancient doctors considered glaucoma and hypochyma as one disease; on the other, later they considered glaucoma as a disease of the crystalline, which was transformed to glaucos because of moisture; and the hypochymas were due to the interposition of fluids which coagulated between the cornea and crystalline. And all glaucomas are incurable, while hypochymas are usually, but not always, curable.

3. Orivassios (325–403 AD) repeats the same writing from Roufos with some variation, as can be seen in the following translation:

> Glaucoma and hypochyma, the ancient doctors on the one hand consider to be one disease. On the other hand, later doctors consider glaucoma as a disease of the crystalline fluid which produced a change in the physiological color to glaucos. In addition they consider the hypochymas as an infusion of fluids which have coagulated between choroid and crystalline. All glaucomas are incurable and hypochymas are usually curable, though not always.

4. Paulus of Aegina (625–690 AD) repeats for *glaucoma* and *hypochyma* the same terms as given by Roufos. As the description of the causes of *hypochyma*, he writes:

> Hypochyma is the creation of standing fluid by the cornea in the space of the pupil which hinders the vision, or the acute vision, and this happens because of freezing or weakening of the visual power; precisely because of this it happens more in elderly people and to those suffering from long-term diseases. It can happen also because of strong vomiting or an injury, and from many other causes.

From this text it is obvious that the ancient physicians had knowledge of the traumatic cataract.

5. Aetios Amidinos (502–574 AD) relying on the writings of the ancient doctor Dimosthenis,* expresses the view of the existence of *two kinds of glaucosis* which correspond to today's meaning of cataract. The first is due to the dryness and coagulation of the lens. The second is due to a pre-existing hypochyma, when the fluid which is interposed between cornea and lens becomes coagulated in the space of the pupil and creates glaucosis, which is incurable. In addition, Aetios writes:

> In the first stages, the hypochyma produces the sensation of flying gnats, hairs or spider's web. The patients even see circles around the flame of a lamp. At other times, the pupil is seen clear, or at still others it takes the color of the sea. As the disease progresses, the symptoms increase and finally the patient is unable to see, though the color of the pupil becomes whiter. The colors taken by the hypochymas are many, some being blue, others like glass, others white and others take a more bluish color. Others have an absolutely glaucous color and become incurable.

In this description of *hypochyma* which comes from Dimosthenis one can perceive today's glaucoma. We must note that the first description of the rainbow colors seen by the glaucomatous patients around the flame of the lamp, were made by *Dimosthenis* a symptom which, many centuries later was described and determined as a characteristic of the glaucomatous hypertony in 1818 by Antoine-Pierre Demours (1762–1826).

* He was called *ophthalmicos* (*οφθαλμικός*) and has written many ophthalmological books, unfortunately preserved only until 1500 AD.

6. Theophanis Nonnos (10th century AD) writes relative to glaucoma and hypochyma:

> Glaucoma is a disease of the crystalline fluid which is changed to glaucos because of chilling, and hypochyma is an infusion of fluid, which is coagulated between the crystalline and choroid.

7. Michael-Constantinos Psellos (11th century AD) gives the terminology of the different diseases in verses, in the writing of his *Medical Book* (*Πόνιμα 'Ιατρικόν*). For glaucoma and hypochyma:

> Glaucoma is an awful and incurable disease,
> With certain alteration of liquid in the crystalline,
> And change of the color visible,
> And hypochyma, between cornea and crystalline,
> A moist formation, which is poured there.

8. Leon, the philosopher (12th century AD) writes concerning hypochysis and glaucosis:

> Hypochysis is a condition when there is gathered an inflamed, clouded and thick liquid between the choroid and cornea which obscures the pupil and does not permit vision. Glaucosis is present when the crystalline becomes whiter and damages the vision. This happens often to the elderly and the disease in incurable.

9. Joannis Actouarios (13th century AD) was the last eminent Byzantine writer who, in his books, gives similar definitions to those of Leon, the philosopher for the glaucomas and hypochymas. According to Actouarios, as cited by Neuburger in his *History of Medicine*, most of the hypochymas are curable, though all glaucomas are incurable, because the substance of the lens is destroyed by a foreign moisture.

Conclusion

We have *confirmed* by our research in ancient Greek and Byzantine writers, observations which have been stated, at different time intervals by others, and have *demonstrated* that the terms *glaucosis* and *hypochyma* (cataract), do not correspond to today's meanings. Thus, today's disease glaucoma, is confused in the ancient Greek and Byzantine writers, where the term *glaucosis* corresponds to today's cataract (*hypochyma*). And the term *hypochyma* according to the views of the same authors, corresponds to a pathological condition, due to the formation of a kind of membrane, in the space of the pupil, which is produced by the coagulation of fluid between the cornea and crystalline.

In addition, according to the meaning of the ancient Green and Byzantine

writers, in an operation for hypochyma, they did not impair the lens, but put aside this clouded membrane, which was on the space of the pupil, because they could not believe that they were touching the same lens which they held was the essential organ of vision.

Further, the writings of *Aetios Amidinos*, who had studied manuscripts of the ancient *ophthalmicos* Dimosthenis, we find citing that this doctor has observed in certain patients that they were seeing luminous circles around the flame of a lamp, without defining the disease, which had caused them. This characteristic symptom of hypertension by the glaucomatous eyes, is described, as known, many centuries later by Demours, in 1818.

Finally, since we are talking about hypochymas, we must complete the picture, remembering an observation by others, that the knowledge of the actual place of the lens in the eye, which we find from the beginning in Galen, was a knowledge, which was absolutely forgotten and ignored for many years, until the 17th century (1600), when finally Fabricius ab Aquapendente (1537–1619) defined its actual anatomical place in the eye bulb.

Thus, we see these two medical terms, *glaucosis* (glaucoma) and *hypochysis* (hypochyma *or* cataract), to have in the ancient Greek and Byzantine writers absolutely different meanings than in today's terminology, and the only reason to account for this, is the habit, which has predominated among later doctors of using traditional terms for diseases, unrelated to those used in ancient times.

References

1. Aetii Amideni: *Libri Medicinales* V-VIII, Ed. Alexander Olivieri. Berolini In Aedibus Academiae Literarum, 1950.
2. Anonymi: *Introductio Anatomica* ect., Ed. Dan. Wilh. Trilleri et Jo Steph. Lugduni Batavorum: Bernard, 1744.
3. Gabrielides, A.: *Conjunctivitis by Ancients Greeks*. Library Medical Progress, 1926.
4. Gabrielides, A.: Cataract by Ancients Greeks (Glaucoma and Hypochyma), *Medical Chronical* 4(2) 3–13 and 1–10, 1931.
5. *Corpus Hippocraticum*: *Omnia Opera* Hippocratis, About Vision. Venetiis: Aldus, 1526.
6. Galen Claudius: *Claudi Galeni Opera Omnia*. Ed. D. Carol. Gottlob Kühn. Lipsiae, Vol. III 1822; Vol. VII 1824; Vol. XIV 1827; Vol. XIX 1830.
7. Ideler, L.I.; *Physici et Medici Graeci Minores*. Vol. II. Berolini Typis et Impensis G. Reimeri, 1842.
8. Lascaratos, J., Marcetos S.: History of Glaucoma and Cataract. *Greek Journal of Ophthalm.* 18(4): 219–241, 1981.
9. Lascaratos, J.: The cataract operation in ancient Greece. *Histoire des Sciences Medicales* 17 (2): 317–322 (1982).
10. Lascaratos, J.: The surgery of cataract in ancient populations. *Greek Journal of Ophthalm.* 19(3): 121–147.
11. Leonis Philosophi et Medici: Conspectus Medicinae. Anecdota Medica Graecia. Ed. F.Z. Ermerins. Amsterdam: A.M. Hakkert, 1963.

12. Meletii Monachi: *De Natura Hominis*. Chapter b: 'On Eyes'. Ed. J.P. Migne. Paris, Patrologia Latina, Vol. 64: 1161–1169.
18. Nemesii Episcopi Emeseni: *De Natura Hominis*. Ed. J.P. Migne. Paris, Patrologia Latina, Vol. 40: 637–649, 1858.
14. Neuburger, M.: *History of Medicine*, Vol. I. London/Oxford: University Press, 1910.
15. Nonni Theophanis: *Epitome De Curatione Morborum Graece Ac Latine* etc. Eds. Steph. Bernard, Tomus I. Gothae-Amstelodami, 1794.
16. Oribase: *Oeuvres d'Oribase* etc. Eds. Bussemaker et Ch. Daremberg. Vol. V. Paris, 1873.
17. Paulus of Aegina: *Pauli Aeginetae Medici Optimi*. Libri VII, etc., Venetiis: Aldus, 1528.
18. Pergens E.: L'Ophtalmologie d'Ambroise Paré. *Ann. d'Oculist.* 116: 81–111 (1896).
19. Pollucis Iulii: *Onomasticon*. Ex Recensione Immanuelis Bekkeri. Berolini, 1846.
20. Psellos: Ponima Iatrikon. *Anecdota Graeca* etc. Ed. J. Fr. Boissonade. Vol. I. Hildesheim: Georg Olms Verlagsbuchhandlung, 1962.
21. Roufos of Efessos: *Diseases-Medicines* etc. London: Gulielmus Clinch, 1726.
22. Roufos of Efessos: *Oeuvres de Rufus d'Ephése*. Texte collationné sur les Manuscrits, traduit pour la première fois en Français. Paris: Ch. Daremberg, 1879.
23. Sichel: Mémoire sur le Glaucome. *Ann. d'Oculist.* 6: 213–236; 6: 249–271.
24. Stewart Duke-Elder: *System of Ophthalmology*. Vol. XI, (1969) 65, 380.

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Ophthalmological therapy in hospitals (*xenones*) in Byzantium

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Key words: History of ophthalmology, Byzantine hospitals

Abstract. Based on the *typikon* of the Imperial Monastery of the Pantocrator of Constantinople (12th century) and the manuscripts used in the Byzantine hospitals as well as the published *Lives of the Saints* and other related sources, it is undeniable that special ophthalmological departments existed in the xenones of Byzantium. It is also proven, that specific ophthalmological therapy was practised here including surgery and particularly in the cataract operation. This last operation is attested to, not only by the medical writings of Byzantine writers but also from the therapies of the physician-saints Cosmas and Damian.

A complete picture of Byzantine ophthalmological medical knowledge as well as applied medical therapies is available through the systematic study of written works, the most relevant being those of Oribasios, Aetius of Amida, Alexander Trallianos, Paul of Aegina, Theophilus Protospatharios, John Actuarios, Theophanes Nonnos, Meletios Monachos (the Monk), Nemesios the Bishop of Emesa, and others. These authors, deeply influenced by ancient Greek tradition, combine the ancient works with the fruits of their own practical applications in ophthalmology. In this rich medical oeuvre we find the complete description of many ophthalmological diseases and conservative therapies in the works of Aetios of Amida (which encompass a complete medical ophthalmological textbook of the period), the opthalmological therapies of Nonnos Theophanes (who recommends a pharmaceutical textbook of this period), the techniques of ophthalmological surgery described by Paul of Aegina, the differential diagnostics of John Actuarios and finally the rich ophthalmological work of Alexander Trallianos. He prepared a monograph of eye diseases, based chiefly on the medical tradition of ancient Greece in the field of ophthalmology and provided, apart from Greek theoretical medical instruction, practical hospital medical experience [9, 12, 13, 16, 17].

According to the opinion of the Byzantinologist, Professor Phaidon Koukoules, ophthalmology amounted to a separate and special field in Byzantium. 'Among the specialist doctors,' he writes, 'are also those who cure suffering or weak eyes', as the Byzantines termed them, that is those who completely lacked their sight. For the relief of suffering eyes, ophthalmologists recommended that sufferers avoid looking at very bright objects and that they look rather at various flowers or bushes or to look at bluish

fabrics. In those days dark glasses did not exist. So doctors used to recommend to recently cured patients that they avoid exposing their eyes to sun light and to cover them with a cloth. Ophthalmologists who were also called ophthalmists (*οφθαλμικοί*) apart from other illnesses of the eyes, also cured the disease which the Ancients called *epargemon* or commonly leukoma, or in medical language *epichysis* or *nebula* and which is called *athela* these days. This disease is cured either by applying the juice of bitter lettuce in drops to the eyes, or according to *iatrosophia*, (*ιατροσόφια*)[1] annointing the suffering eye with nitre ground with oil in a mortar or with lizard stool or the eggs of the nightcrow (nycticorax). Always according to the *iatrosophia*, they used Attic honey with vulture gall for the amaurosis of the eyes and they dripped melted wax mixed with mother's milk into the canthi against painful eyes. Another illness cured by ophthalmologists was the fig (*σύκον*), commonly called *sykamino* (*συκάμινο*)[2] or *sykaminea* (*συκαμινέα*) and was sort of sarcoma or ulcer.

In order to cure it, doctors bathed a fine bandage or fabric in white vinegar in which salt had been dissolved. Aristophanes' critic describes a case of a man who had mucus in his eyes as 'watery eyes'. I have no doubt that this term is a popular one because even today in Pontos the mucus is called *xygra* (*ξύγρα*), i.e. watery eye (*διύγρα*). The same infection was called mucus of the eyes of the Byzantines. It is also noteworthy that Michael Psellus writes that lychnite stone (*λυχνίτηζ λίθοζ*)[3] when hung from the neck prevents 'rheumatism' of the eyes [3].

Thus does Koukoules describe certain scientific ophthalmological knowledge during the Byzantine empire and also certain popular beliefs which were widespread among the people of that time. The existence of the specialty of ophthalmology during this period is attested to in the *Pandektes*, where the punishment of an ophthalmologist is mentioned. This doctor forced a patient to sell his lands and holdings in order to pay him, in spite of the doctor's having prescribed drugs unsuitable to the disease (Pandektes 50, 13, 3) [3, 11].

It is not surprising therefore that this rich ophthalmological tradition which is evident as much from the existing medical bibliography of the Byzantine authors as from the knowledge which reached us via the iatrosophia, led to particular applications of ophthalmological therapies in hospitals during Byzantium. Indeed it is known from the hospital records (*typikon*, i.e. constitution) of Byzantium that they were provided with a special ophthalmological department. The study of the *typikon* of the Royal Monastery of the Pantocrator (Fig. 1) which was founded in the 12th century by Emperor John II Comnenus, shows that the hospital provided fifty beds, ten of which were intended for the wounded and eight for those suffering from ophthalmological diseases and stomach ailments and other acute and painful pathological illnesses. Twelve beds were also intended for

[1] Manuscripts containing popular medical knowledge based on ancient Greek and Byzantine medicine as it developed in its application by the people, mixed with superstitions, astrological references and exorcisms.

[2] Sykaminos, a mulberry tree.

[3] A precious stone of ancient times, red in colour, perhaps a ruby.

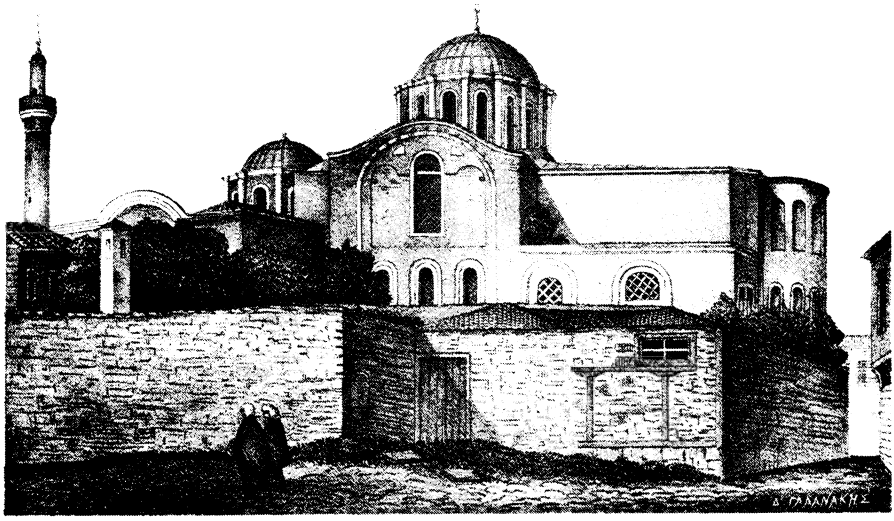

Fig. 1. The Monastery of the Pantocrator of Constantinople.

the treatment of women and the remainder for those suffering from simpler pathological ailments.

The same *typikon* determines that if beds are left over for the use of the wounded or for sufferers of ophthalmological or acute diseases, they can be used by other categories of patients. These fifty beds were divided amongst five wards and in each ward a camp bed was available for emergency patients when all the other beds were taken. According therefore to the contemporary records, the hospital was comprised of a surgical ward, a pathology ward, an ophthalmological ward and finally a gynaecological ward which appeared to cover all female illnesses so that they could be treated in a place apart from men.

Codellas, after studying the hospital *typikon*, concludes that there was even a psychiatric ward as well as an outpatient ward [1,2]. The original plan of the Monastery of the Pantocrator was the work of the Byzantine architect Nicephorus. When we compare the plan drawn by Prof. Aristotle Kouzis (Fig. 2) to the plan drawn by the academic and architect Anastasios Orlandos (Fig. 3) based on the information of the hospital *typikon*, we remark the following. In describing his thoughts regarding the reconstruction of the architectural plan of the hospital of the Pantocrator, Orlandos writes that the ophthalmological ward was covered by a large hemispherical dome which was supported on eight pillars and had small round skylights of the sort more commonly found in baths, plainly there to provide light [18].

Codellas [1] writes that the ophthalmological department comprised a complete unit in itself. This unit, according to the same writer, accepted all patients who suffered from every sort of ophthalmological disease or who

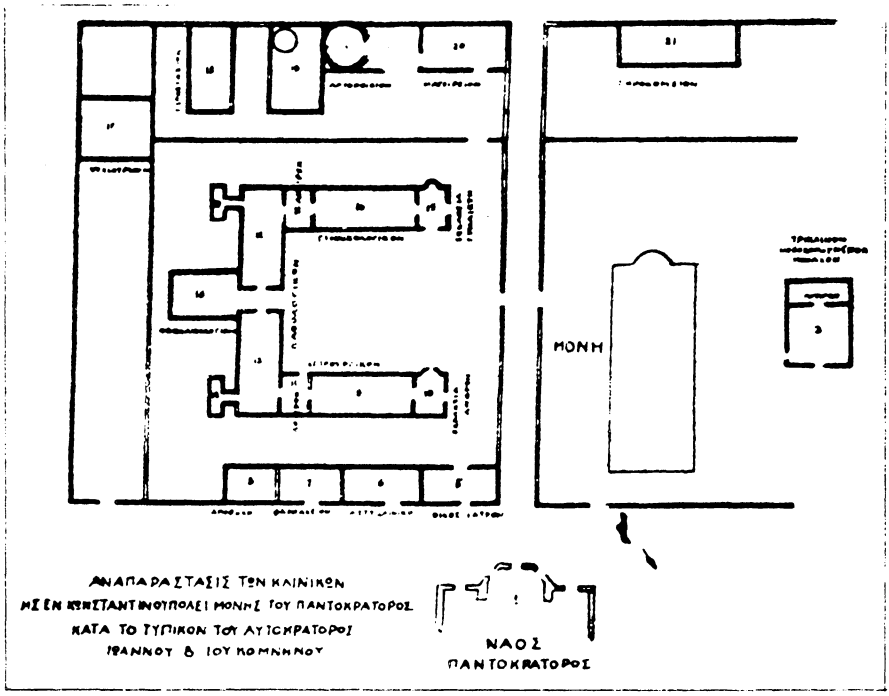

Fig. 2. Floor plan of the hospital of the Pantocrator, drawn by Prof. A. Kouzis.

needed an operation in the eyes. Curiously he also remarks here that patients who had received a cathartic also slept in this unit, as well as those who suffered fro colicky conditions and that this was in order that they did not disturb the seriously ill patients of other wards. Under the plan of St. Gall (800 AD) patients who were to undergo phlebotomy were also put into this ward [1]. It must be considered certain that in these hospitals these therapies were effected according to the recommendations of Byzantine and ancient Greek medical writings, especially those of Galen. Many manuscripts which have been written specifically about the therapy in the hospitals, the so-called xenonica, have survived the ravages of time and are to be found in many contemporary libraries such as for example the manuscript of the Vienna Library and that of the Vatican Library entitled, *Protomenites of the Royal Xenon of Myrelaion Romanus of the Kouvouclesiou on the Acute and Prolonged Diseases*. Other well-known xenonica are: *The Iatrosophion of Xenones*, *Concerning the Great Apozema of the Xenon*, found in the National Library of Paris, *The Apotherapeutic of Theophilos Compiled from Various Xenonica*, in the Laurentian Library and *The Handbook of Therapeutics and Cures Compiled by Various Authors* in the Paris, Munich and Vienna libraries [1, 4–8].

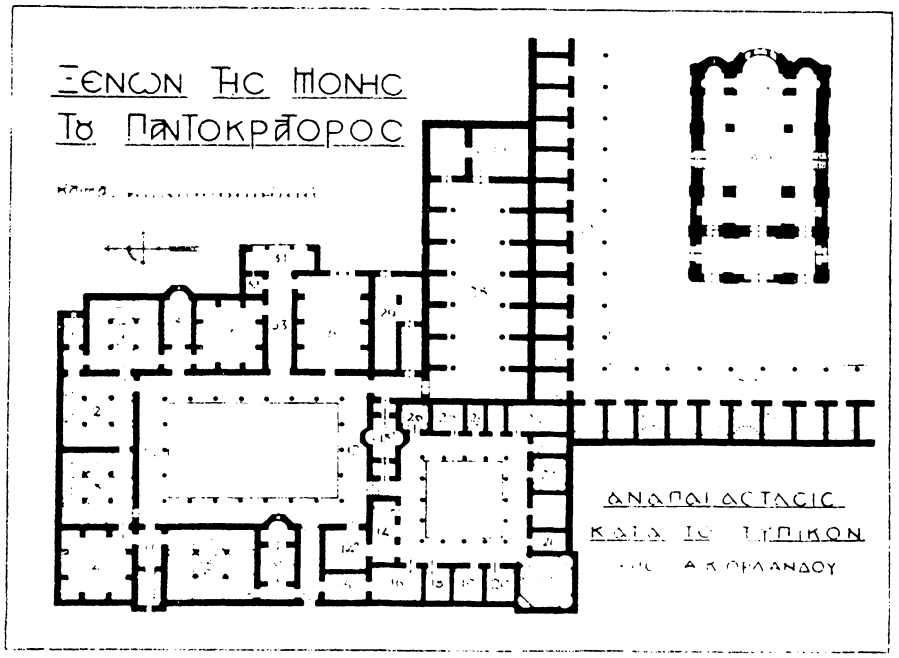

Fig. 3. Floor plan of the hospital of the Pantocrator, drawn by A. Orlandos.

For example we mention that in this last handbook the dull-sighted calligraphers, when their sight grew worse, used the salt of Hippocrates, which helps vision and discernment. In the same text the use of salt made up by Saint Gregory the Theologue prevents the development of ophthalmia. A therapy for trachoma and for small insects which enter the eye (foreign bodies) is recorded along with the recipes for prescriptions to be used [1, 4–8].

Regarding the existence of an ophthalmological ward in the hospitals of Byzantium we have another important piece of information from the book *A Narrative of the Miracles of the Glorious Miracle Worker and Saint, the Grand Martyr, Artemios* (Miracula Sancti Artemii) [15, 19]. According to this narrative, Stephanos, who was the deacon of the Hagia Sophia in Constantinople, suffered from a hernia and was placed in the surgical ward of the Sampson Xenon for therapy. According to Stephanos' narrative . . . 'after I was disappointed by many cures which were tried on me, I allowed myself to be operated on by the surgeons of the Sampson and I was laid in a bed in this hospital near the door of the ophthalmological ward'. It is mentioned that Stephanos underwent a *Cauterization* with a cold cauterizing tool (a cautery) for three days and nights and on the fourth day he was operated on [15, 19]. He underwent a form of *cryopexy* according to the text [19].

Magoulias incorrectly writes that hot and cold compresses were applied in turn [15]. It is also known from the miracles of the physician-saints, Cosmas and Damian (Anargyroi),[4] that the author Stephanos of Tarsus was cured by an operation which was carried out by an iron instrument (miracle number 21) [20]. Plainly this instrument was a *kentitirion* which served to perform the couching of the cataract lens, an operation well known from Paul of Aegina and Leon the Iatrosophist [10, 14].

According to the information from historical sources, from the writings used in the xenones, the well known *xenonica*, the medical writings of the Byzantine doctors and the information from the Lives of the Saints (after the extreme element of miraculous cures has been removed) we conclude that during Byzantium, there were specialist doctors called *opthalmikoi*. And further that in the hospitals of Byzantium there were separate ophthalmological departments where specialist ophthalmological therapies, both conservative and surgical were practised.

References

1. Codellas, P.S., The Pantocrator, the Imperial Byzantine Medical Center of XIIth Century A.D. in Constantinople. *Bull. Hist. Med.* 12: 392–410 (1942).
2. Gautier, P., Le typicon du Christ Sauveur Pantocrator. *Revue des Etudes Byzantines* 32: 1–145 (1974).
3. Koukoules, Ph. (1957). *Byzantine Life and Civilization*. Collection de L'Institut Français d'Athènes, VI, Athens.
4. Kousis, A., Contribution à l'étude de la médecine des Zénons pendant le XVe siècle basée, sur deux manuscrits inédits. *Byzantinisch-neugriechische Jahrbücher* 6: 77–90 (1928).
5. Kousis, A., Manuscripts. The Apotherapeutic of Theophilos According to the Laurentian Codex, plut. 75, 19. *Proceedings of the Academy of Athens* 19: 35–45 (1944).
6. Kousis, A., Manuscripts. Les Oeuvres médicales de Nicéphore Blémmydès celon les manuscrits existants. *Proceedings of the Academy of Athens* 19: 56–75 (1944).
7. Kousis, A., Medical Manuscripts. The Medical Work of Romanos according to the Vatican Greek Codex 280. *Proceedings of the Academy of Athens* 19: 162–170 (1944).
8. Kousis, A., Medical Manuscripts. The Written Tradition of the Works of Leo the Iatrosophist. *Proceedings of the Academy of Athens* 19: 170–171 (1944).
9. Lascaratos, J., *Ophthalmology in the Works of Byzantine Doctors. Byzantine Studies* (Athens) Vol. 1: 317–326 (1989).
10. Lascaratos, J., Marketos, S., The Surgery of the Cataract in Ancient Peoples. *Ophthalmological Annals* 19: 121–147 (1982).
11. Lascaratos, J., Matsagas, A., Marketos, S., Therapy in Byzantine hospitals. New Information for the Cure of Ophthalmological Diseases. Bulletin of the Hellenic Ophthalmological Society 56: 162–166 (1987).
12. Lascaratos, J., Tsirou, M. (1990) Ophthalmological Ideas of the Byzantine Author Meletius. *Documenta Ophthalmologica* 74: 31–35 (1990).
13. Lascaratos, J., Tsirou, M., Fronimopoulos, J., Ophthalmology according to Aetius Amidenus. *Documenta Ophthalmologica* 74: 37–48 (1990).
14. Leon, The Philosopher and Physician. Synopsis of Medicine. Anecdota Medica Graeca. Lugduni Bavatorum: F.Z. Ermerins, 1840.

[4] They were called *anargyroi* because they did not accept payment for their cures. In Greek, the word *anargyros* refers to a person extending a service free of charge, etymologically.

15. Magoulias, H.J., The Lives of the Saints as Sources of Data for the History of Byzantine Medicine in the Sixth and Seventh Centuries. *Byzantinische Zeitschrift* 57: 127–150 (1964).
16. Miller, T.S., *Byzantine Hospitals*. Dumbarton Oaks. Symposium (Byzantine Medicine), 1983: 53–63.
17. Miller, T.S., *The Birth of the Hospital in the Byzantine Empire*. Baltimore/London: John Hopkins University Press, 1985.
18. Orlandos, A., The Reconstruction of the Xenon of the Monastery of the Pantocrator in Constantinople. *Epetiris of the Society of Byzantine Studies*. 17: 198–207 (1941).
19. Papadopoulos-Kérameus, A., *The Miracles of the Glorious Miracle Worker and Saint, the Grand Martyr, Artemios*. (Miracula S. Artemii). Varia Graeca Sacra (St. Petersburg) 1909: 1–79.
20. Toole, H., The Miracles of the Physician-Saints Cosmas and Damian (Anargyroi). *Epetiris of the Society of Byzantine Studies*. 42: 253–297 (1975–76).

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