FERDINAND VON ARLT AND ERNST FUCHS*

TWO REPRESENTATIVES OF THE VIENNA SCHOOL OF OPHTHALMOLOGY

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The second half of the 19th century and the beginning of the 20th were times of splendour and fame for the medical faculty of the University of Vienna. Many of its professors (Billroth, Brücke, Freud, Hebra, Hyrtl, Lorentz, Nothnagel, Politzer, Rokitansky, Schauta, Skoda, Wertheim and others) became world famous. This was no accident but was the result of the way in which the members of the medical faculty were chosen and the high standard that was deliberately kept up. The most important quality of a professor in Vienna was always considered to be his ability to do original research work. He had to be a pioneer in his branch of medical science, besides fulfilling the requirements necessary for a good teacher. He had to master his speciality in all its branches and ramifications, including laboratory techniques and accessory sciences. He had to be *the* expert, and it was expected of him to have absorbed all that was said and written in the past, and to keep himself informed about current research work done in the laboratories, clinics and hospitals throughout the world. He had to be a good speaker and to be able to lecture freely, without the help of a manuscript. Finally, only men of outstanding character were chosen, teachers who inspired the students not only through their teaching, but by their devotion to duty and their exemplary way of living. Nothnagel, in his inaugural lecture as professor of medicine in 1882 said these words: 'Knowledge gets its ethical value and its true significance only through the spirit in which it is used. Only a good man can be a good doctor.' In the choice

* A paper presented at the South African Medical Congress, Durban, September 1957.

of professors, national considerations were regarded as of secondary importance. If no suitable candidate for a vacant chair could be found in Vienna, a man from another Austrian province or another country was chosen. Professors in Vienna came from Germany, Switzerland, Holland, Italy. It hardly ever happened that a call from the Vienna University was refused. To become a member of this illustrious *collegium academicum* in Vienna was regarded as such an honour that anyone was proud to belong to it. Arlt and Fuchs might be regarded as typical representatives of the Vienna medical school of this period.

FERDINAND VON ARLT

Arlt, born in 1812, son of a poor blacksmith in a small village in northern Bohemia, suffered many hardships during his youth. In his autobiography he tells of the hard work he was put to as a child, of the poor food and the severe cold he suffered during the winter months. During his grammar-school days he lived in the house of his father's half-brothers, whose wife ill-treated him like the proverbial stepmother. His high-school days, in the small town of Leitmeritz, were not much better. He froze and he starved, and he succeeded in keeping body and soul together only with the help of meals to which he was invited by charitable people, and by helping younger pupils in their studies for a small fee.

His family wanted him to become a clergyman, but he decided in favour of medicine and studied at Prague, still not without hardship. After he qualified he became assistant (1840) and later successor (1847) to Johann Nepomuk Fischer, the professor of ophthalmology there. Ten years later (1856) he was called to Vienna, where for 27 years he occupied the chair of ophthalmology treating thousands of patients, operating, teaching and writing. In 1883 he retired from the clinic and in 1887 he died.

Arlt's fame as a scientist rested originally on his text-book, which appeared in 3 volumes between 1851 and 1856. Though more than a hundred years have passed since its first appearance and many changes have occurred in the conception of eye diseases and their treatment, it can be read with interest even today. For the first time clinical facts were strictly correlated with anatomical and physiological principles. What impresses one most are the numerous case histories which illustrate nearly all the diseases described. They bear witness to Arlt's excellent power of observation and his ability to describe what he had observed in clear, simple language. The main weight of the book rests on the presentation of the external eye diseases. The ophthalmoscope had just be invented (Helmholtz, 1851) and many findings made with its help could not then be properly interpreted.

Ferdinand von Arlt

Of Arlt's discoveries only two will be mentioned here: He was the first to show that in higher degrees of myopia the posterior segment of the eyeball was dilated and extended, while the front part was not altered in shape; and he explained correctly the nature of staphyloma as scar tissue formed from the prolapsed iris. He was the first to state in clear words that sight-testing and the determination of the refraction of the eye belongs to the ophthalmologist.

When O. Becker wrote in Arlt's obituary that, in a sense, all the ophthalmologists then living were his pupils, he referred to his *Ophthalmic Surgery*, which appeared in 1874, as a chapter in Graefe-Saemisch's *Handbook of Ophthalmology*. This made him famous throughout the world. For over 20 years most ophthalmologists, wherever they lived, studied it. The historian Hirschberg writes: 'Every one of us, whose duty it was to perform operations on the eye, studied this work with great diligence and consulted it again in every difficult case.' Every line in it is based on the personal experience of the author, collected during 25 years of intensive work. At that time it was the best book on ophthalmology and it remained so for many years.

Fuchs gave a graphic description of Arlt as an operator. Cocaine was then unknown and general anaesthesia was not used in Vienna for eye operations. In cataract operations the incision caused little pain but the iris, being very sensitive, could usually not be brought back to the right position and results without adhesions or prolapse were a rarity. At that time nothing was known about asepsis. Arlt advised putting Daviel's spoon into the mouth to moisten it with saliva before introducing it into the eye. The instruments were washed after each operation, not before. The post-operative treatment was cruel; for 6 days the patient had to lie motionless on his back. Men had often to be catheterized, and the pain and the pressing when trying to pass water often led to bursting of the wound, which of course was not stitched in those days. Hypostatic pneumonia was common, and so was sudden death from pulmonary embolism due to thromboses in the veins of the legs.

Arlt looked like a schoolmaster, and he was indeed an excellent teacher. He sat on a little three-legged stool, surrounded by his pupils. Every case was examined by one of them and was afterwards discussed. Arlt himself writes that he never saw the cases beforehand, and that his diagnosis was based on the observations he made while the student was examining. When teaching young doctors to operate, he assisted them himself; he did not criticize or interrupt them during the operation but after its conclusion discussed their mistakes and the way to avoid them. The teaching of certain branches of ophthalmology, such as ophthalmoscopy, perimetry and refraction was delegated to certain assistants who gave special courses on these subjects—a practice continued in Vienna up to the present day.

Arlt's private practice in Vienna was enormous and we have a good description of it from the pen of Dr. Hans Adler, who for some time was his private assistant. No fee was asked for; everybody gave what he wanted, many nothing at all, even for treatments lasting for weeks and months. His guiding principle was: '*Primum humanitas, alterum scientia*'. In his autobiography he enlarges upon this: 'The real disciples of our art', he writes, 'should not bother about income; this arrives in the course of their activities by itself. Their aim should be to help through science and ability and where these prove insufficient, through compassion and pity for the lot of the sufferer'.

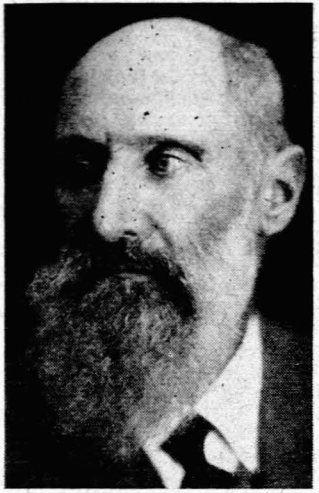
This life, entirely devoted to healing, learning, teaching and research, was not to end without great suffering. Though he was well off, he lived parsimoniously; he did not possess a carriage of his own, but used the horse-drawn trams which were the main means of communication in Vienna at that time. Jumping off from the running car, he one day fell and broke his left arm close to the shoulder. Thrombosis in his left foot supervened, causing severe pain, which did not leave him until his death nearly 9 months later. He suffered amputation of his foot, exarticulation of the fibula, amputation of the thigh, and finally resection of the sciatic nerve. Sedatives became useless to ease the pain and often he implored his doctors to let him die. On 9 March 1887 hypostatic pneumonia ended his sufferings.

ERNST FUCHS

The Fuchs family also came from Bohemia. They had been peasants in the Bohemian Forest, but Ernst Fuchs' grandfather migrated to Vienna and settled there. Ernst's father, a professor in a high-school in Vienna, though not well off, was able to give him an excellent education. As a result of this difference in early education, while Arlt, in spite of his achievements, remained in certain respects restricted in his general outlook, Fuchs had many varied interests and hobbies. He was typically Viennese. He spoke German, French, English and Italian equally well. He was a great reader, and fond of classical art; he loved walking, cycling and mountaineering, and became one of the greatest travellers of his time. Extracts from his travel diaries have been published by his son. He was asked to lecture in far-off countries, and his pupils all over the world often called him in for consultations and operations. He visited nearly all the European countries, Asia Minor, Ceylon, Thailand, Java, China and Japan. With Robert Koch he travelled in Central Africa, and on another occasion he

was invited to organize an eye clinic in Addis Ababa. Lecture tours took him through a great part of the American continent, both north and south.

Fuchs' parents lived in a four-roomed flat in one of those gloomy middle-class apartment houses of Vienna. He went to a gymnasium which had been founded by clergymen from Scotland, one of the best in Vienna. The main subjects of instruction were Latin and Greek. Pupils were expected to work hard, and Fuchs recalls how for many months he started at 4 a.m. In 1868 he entered the medical faculty of the Vienna University. His teachers included Hyrtl, Brücke, Rokitansky, Hebra, Billroth and Arlt. While still a student he showed his ability for research in the physiological institutes both in Vienna and in Innsbruck. In 1874 he took his degree in Vienna. Arlt advised him to get a working knowledge of general surgery before devoting himself to ophthalmology, and consequently he worked for 2 years under Billroth, during which time antisepsis was introduced and Lister himself visited Vienna. From 1876 to 1881 Fuchs was assistant at Arlt's clinic, which laid the basis of his encyclopaedic knowledge of everything pertaining to ophthalmology. During this period he wrote his first large scientific work, about sarcoma of the uvea—a masterly treatise which should be studied by everybody who wants to do research work in the ophthalmological field.



Ernst Fuchs

This work, undertaken to qualify as a *Docent* of the Vienna University, made Fuchs world-famous, and at the age of 30 he was called to the newly created chair of ophthalmology at the University of Liège. He stayed for 4 years and, amongst other scientific publications, he wrote another book which carried his name all over the world. This was a work on the prevention of blindness which, as shown by the table of contents, dealt with eye diseases on a hereditary basis, in childhood, in school age (dealing with the aetiology and prophylaxis of myopia), and as a result of general illness, and contagious eye diseases (particularly blennorhoea and trachoma). It then dealt with the influence of occupation, social environment including illumination, food and cleanliness), and climate. Finally it described the organization of treatment and prophylaxis.

This classic work paved the way for his return to Vienna in 1885, when he became professor there at the age of 34. For nearly 30 years, until 1914, when he retired voluntarily, he remained professor of ophthalmology in Vienna. His influence can hardly be over-estimated. He was generally regarded as the greatest ophthalmologist of his time, and patients came to see him from all over the world. He reformed the teaching in ophthalmology. Every one of his own lectures was a masterpiece, and his school included demonstrations and special courses by his assistants. Foreign doctors flocked to the Vienna clinic, and Fuchs himself gave courses for them in their own language, mostly in English. He had the final say in ophthalmological appointments in Austria and hardly anybody became a lecturer, a professor, or head of an eye hospital, who had not studied under him and had been recommended by him.

During all these activities, Fuchs continued with his scientific work. The number of his publications exceeds 250. Many eye conditions were described by him for the first time, some of which are the following: Blepharochalasis and ptosis myotrophica of the lids; herpes iris of the conjunctiva; episcleritis periodica fugax; heterochromia of the iris; the so-called 'Fuchs coloboma'; retinitis circinata; the black spot in the macula; gyrate atrophy of the choroid; detachment of the choroid after cataract extractions; the diffuse form of choroid sarcoma; and sympathetic ophthalmia following a necrotic sarcoma in the other eye.

No publication, however, contributed so much to the fame of Fuchs as his text-book, first published in 1889. In the introduction he says he wrote this book because he resented it if students took notes during his lectures instead of paying attention to his words. He therefore wanted to provide them with a book where they could find the essence of what he had to tell them and to which they could refer later in life. This book has been called the bible of the ophthalmologist. It has been translated into many languages, amongst them into Chinese and Japanese. Twelve editions came from Fuchs own hand, and altogether 18 editions were published, the last in 1945, 46 years after the first edition and 15 years after Fuchs' death, which took place suddenly from coronary thrombosis at the age of nearly 80, shortly after his return from one of his journeys. His wish for a quick end had been granted.