A Defining Career in Ophthalmology

Andreas Müller, PhD; Charles N. J. McGhee, PhD, FRCOphth

Although his name is commonly recognized in conjunction with various corneal and anterior segment disorders, Ernst Fuchs’ contribution to ophthalmology exceeds purely the delineation of ocular diseases and the detailed description of signs. Fuchs’ collection of microscopic samples laid the foundation for anatomical and pathological understanding of blood vessels, muscles, and most other tissues of the eye. Additionally, Fuchs was able to pass on his unique knowledge, educating ophthalmologists at an international level. His textbook was, for many decades, the most extensively used reference book in the field of ophthalmology worldwide.

In the same year that the ophthalmoscope was first described by Hermann von Helmholtz, Ernst Fuchs (Figure 1) was born in Vienna, Austria. His ancestors had lived for generations as poor farmers in Bohmerwald, a rural area not far from Bavaria. As a teenager, his grandfather was sent to Passau, Germany, to study theology.1 After a short time he abandoned theology, moved to Vienna, and eventually became a professor of history and teaching at the Academy of Engineering. Just like Fuchs’ grandfather, his father also underwent significant changes in his career. After studying medicine in Vienna and graduating with a PhD, his father, Adalbert Fuchs (born 1814), subsequently taught natural science in the small Austrian city of Tarnow and in 1848 moved to Innsbruck to become a professor of zoology.1 After only 2 years, he was summoned to Vienna to teach agriculture as a professor at the technical college, which he did until the end of his life.

Ernst Fuchs, born in 1851 in Vienna, was the eldest of 3 children.1 In 1860, Fuchs entered the Scott’s Gymnasium in Vienna, graduating in 1868 (Table). Fuchs is often described as having a very developed thirst for knowledge. He recounted a story from his days as a college student, when he heard about a whirlpool in the Donau River that apparently could pull even strong swimmers underwater. Desperate to discover the answer himself, he decided to jump into the river at exactly this spot. Fortunately for ophthalmology, he survived this rather dangerous early experiment.

Although his father wanted him to become an engineer, Fuchs’ interests were much more directed toward astronomy and physics. He finally decided to study medicine. Fuchs considered himself fortunate to have studied medicine in the heyday of the Vienna School, enjoying lectures by eminent teachers such as Joseph Hyrtl, Ernst Wilhelm von Brücke, Karl Rokitansky, Joseph Skoda, Christian Billroth, and Carl Ferdinand von Arlt.1 Of all his teachers, it was von Brücke who influenced him the most. von Brücke became aware of Fuchs’ keen interest in the field and soon offered him a post as assistant to the ophthalmologist Otto Becker in Heidelberg, Germany. However, Fuchs chose to accept a position for 1 year as an assistant at the Physiological Institute in Innsbruck instead. Here in the Austrian Alps, Fuchs developed his passion for mountaineering, which remained with him throughout his life. In the fall of 1873, he returned to Vienna and received his medical doctorate, with excellence, only 1 year later.

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In addition to the field of medicine, Fuchs had a keen interest in botany, literature, geography, and art history. As a member of the Wiener Geographische Gesellschaft, the geographical society of Vienna, he regularly presented talks to a wide audience on his many travels around the globe. Following a trip to Scandinavia in 1875, Fuchs brought back a pair of “snow-shoes,” as they were called at the time, thus introducing skiing to Vienna.¹

PHYSICIAN AND RESEARCHER

Besides von Brücke, the 2 other major influences in Fuchs’ professional life were von Arlt and Billroth. At the instigation of von Arlt, with whom Fuchs had already been working as an unpaid intern for several months, he started his formal training in surgery. Billroth, whose outstanding contributions as a surgeon were already recognized across Europe, became Fuchs’ teacher and mentor for the next 2 years. It was during this time that important changes in surgery took place, such as the introduction of antisepsis by Joseph Lister. However, the effects of cocaine were still unknown. Although Fuchs considered a career as a general surgeon during this period of his life, when his time with Billroth was over, von Arlt offered him a position as an assistant in his clinic. Apparently regretting his decision to decline the position with Becker the previous year, Fuchs now became von Arlt’s assistant and followed a route back toward ophthalmology.² It was the beginning of a scientific and clinical career that would make Fuchs an acknowledged worldwide authority in the newly defined specialist field of ophthalmology. At this time, 3 ophthalmic schools had been established in Vienna and were headed by von Arlt, Carl Stellwag, and Eduard von Jäger.

One should keep in mind that Fuchs’ career in ophthalmology started at a time when many surgeons still wet their cataract knife with their lips to keep it moist and able to slide. He was the first assistant in Vienna to give his medical lectures in both German and English. This jump-started his career.

Five years later, at only 30 years of age (Figure 2), Fuchs was appointed professor of ophthalmology in Lüttich, Belgium (which at that time was the youngest professorship appointment for a graduate from an Austrian university). Four years later he was appointed clinical director of the Second Vienna Eye Hospital. This was the same hospital that had progressed from being a department within the general hospital to an independent eye clinic during the management of Professor von Jäger. By this time and before his appointment to the hospital’s board of directors, Fuchs had already published his prize-winning book on the causes and prevention of blindness.³ However, his true scientific career and worldwide fame as a lecturer and physicien started with his appointment as clinical director in Vienna in 1885.

At the time, education in ophthalmology was still dictated by the “rigorous-order”³(p320) of providing knowledge about diseases of the outer eye and some standard surgical techniques. Although the anterior eye was also the main focus in Fuchs’ undergraduate teaching, he paid great attention to visual dysfunction and ophthalmoscopic studies in his clinic and private practice. His other areas of interest included dermatology, nervous diseases, and the sinuses. Fuchs considered attention to detail in making a diagnosis of the highest importance in teaching. Salzmann³ commented that it was entirely against Fuchs’ nature to tutor anything ex cathedra, without being entirely sure of its correctness.

Fuchs’ Textbook of Ophthalmology was first published in 1889. During the following 21 years, he edited 12 of the 18 German editions of the textbook himself. By comparison with other textbooks at this time, the scientific importance of his book is clearly shown. Fuchs emphasized that the publication of his textbook earned him more fame and respect than the combination of all his other published articles. The Textbook of Ophthalmology was translated into numerous languages (including Japanese, Chinese, Spanish, French, Russian, and Italian). Between 1892 and 1933, 10 British and American editions were published. Later versions were edited by Salzmann,³ his oldest pupil. In America as well as the Far East, the textbook was considered the bible of ophthalmology for approximately 50 years. The final edition was pub-

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**Chronology of the Life of Ernst Fuchs**

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1860-1868</td>
<td>Attends Scott’s Gymnasium in Vienna.</td>
</tr>
<tr>
<td>1868</td>
<td>Begins medical study in Vienna.</td>
</tr>
<tr>
<td>1868-1873</td>
<td>Assistant at the Physiological Institute in Innsbruck, Austria.</td>
</tr>
<tr>
<td>1874</td>
<td>Receives Doktor Universae Medicinae.</td>
</tr>
<tr>
<td>1875-1881</td>
<td>Assistant ophthalmologist in von Arlt’s clinic in Vienna.</td>
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<tr>
<td>1881-1885</td>
<td>Appointment as professor of ophthalmology in Lüttich, Belgium; publication of first textbook on the causes of blindness.</td>
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<tr>
<td>1885-1915</td>
<td>Return to Vienna and appointment as clinical director of the Second Vienna Eye Hospital.</td>
</tr>
<tr>
<td>1930</td>
<td>Dies on November 21 in Kritzendorf, Austria.</td>
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**Figure 1.** Portrait of Ernst Fuchs. Original etching by Emil Orlik, 1910. Reprinted with permission from the Institut für Geschichte der Medizin, Vienna, Austria, copyright 1910.

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**Figure 2.**
Ernst Fuchs became well-known for his ability to support the diseased eye.1 Especially fascinated by intraocular tumors, he published a major monograph on the topic at the beginning of his scientific career. The importance of Fuchs’ life achievement must surely be based on his discovery and description of numerous ocular diseases and abnormalities. As a result of more than 250 scientific publications, the name Ernst Fuchs became well known throughout the world, elevating his clinic into a meeting point for ophthalmologists worldwide. Many examples of the discovery of important ocular signs of new diseases and syndromes, or previously unknown sequelae, are based on Fuchs’ research. One particular example is a corneal abnormality called dystrophia epithelialis corneae (Fuchs epithelial dystrophy). Studying the inflamed cornea, Fuchs described keratitis disciformis (although the symptoms were already known, it was Fuchs who described the pathological features of the disease in detail), keratitis pustuliformis profunda, and keratitis punctata superficialis. Beyond corneal disease, Fuchs also described abnormalities affecting the lids, uvea, and retina; for example, blefarochalasis, ptosis myotropica, Fuchs heterochromic cyclitis (Fuchs uveitis syndrome), Fuchs coloboma, Fosterc-Fuchs spot in myopia, gyrate atrophy of the choroids, and retinitis circinata. For the first time, he differentiated clearly between endophthalmitis and ophthalmia sympathetic. Also for the first time, Fuchs reported choroidal detachment following cataract surgery.5 In one of his first works, Fuchs showed the possible resolution of the star-shaped traumatic posterior cortical cataract in episcleritis periodica fugax.

Other special interests included congenital abnormalities in movements of the eyelids as well as insertion of the extraocular muscles. Numerous publications were dedicated to the assessment of the blood and lymphatic vessels of the eyelids, iris, and lamina cribrosa. Subjects of other publications included the study of chalazion, pinguecula, pterygium, retinal degeneration, “ulcers” of the pars ciliaris retinae, and many more. By making use of his large collection of histologic specimens (more than 40000), Fuchs became particularly well known for his ability to support any clinical work with pathological-anatomical findings. During his years as assistant, the precocious Fuchs wrote an extensive monograph on the “sarcoma” of the uveal tract.6 He discovered the diffuse form of the sarcoma, studied the necrosis of the ulcer and its symptoms, and identified its unusual form of sympathetic inflammation. Particular attention leading to voluminous publications was focused on inflammation of the uveal tract and its different forms. There is a long list of special interests that became a lifelong focus for Fuchs’ scientific work, including several neuro-ophthalmological conditions.

Even if Fuchs’ surgical innovations did not reach the same degree of importance as his clinical research, his studied attention to detail in this field was certainly groundbreaking for its time. As a teacher, he was aware of the fact that surgery can be taught only as a hands-on experience rather than solely through textbooks. Two important works that evolved from Fuchs’ school of surgical technique were Die Augenärztlichen Operationen by Czermak7 and Ophthalmic Surgery by Mellor.8

In 1915, at age 64 years, Fuchs resigned as clinical director of the Second Vienna Eye Hospital. Apparently, the main motive for his relatively early retirement was escape from the time-consuming obligations of teaching and examining. Nevertheless, following his retirement as a physician and lecturer, he published a further 99 articles, most of them based on his unique collection of pathological-histological specimens.

INTERNATIONAL RECOGNITION

Ernst Fuchs was an honorary member in 39 scientific societies, was President of Honor of the Ophthalmological Society of Madrid (Madrid, Spain), and held numerous honorary doctorates.3 In 1902 he delivered the Bowman Lecture in London, England, at the Ophthalmological Society of the United Kingdom. In 1911, during the first of Fuchs’ journeys to the United States, he gave the Lane Lectures in San Francisco, Calif, and read a paper there to the American Ophthalmological Society. On his second journey, from 1921 to 1922, he completed a coast-to-coast lecture tour on the pathological characteristics of the eye (see Figure 3).9

**Figure 2.** Portrait of the younger Ernst Fuchs. Photograph by J. Löwy, circa 1885. Reprinted with permission from the Institut für Geschichte der Medizin, Vienna, Austria, copyright circa 1885.
Thanks to numerous invitations by international colleagues, scientific societies, and governments, Fuchs was able to escape the Austrian winters (of which he had a growing dislike with age) by speaking in countries as far away as Indonesia and East Africa. Remarkably, besides some knowledge of Latin and Greek, Fuchs was fluent in English, French, and Italian. To present his work in Spain and South America, he also began to learn Spanish at age 70 years and subsequently produced several publications in that language.

Fuchs’ worldwide reputation was particularly recognized when a special banquet was held in his honor by the American delegation at the Amsterdam International Ophthalmological Congress (Amsterdam, the Netherlands) in 1929. At the close of the congress, the International Association for the Prevention of Blindness was established, to which Fuchs was elected the first honorary member. He was also honored with the Leslie Dana Medal of the Missouri Association for the Blind, the first time this medal was awarded outside the United States. From the Netherlands, he traveled to Canada and then to Baltimore, Md, where he was invited as guest speaker for the opening of the Wilmer Ophthalmic Institute. During this journey, his third to the United States, he was made an honorary member of the New York Academy of Medicine (New York, NY). Fuchs continued his journey through Mexico and Central America. Only a few months after his return to Vienna and following an outstanding, dynamic career, Ernst Fuchs died on November 21, 1930, at age 79 years. He was buried in Kritzendorf, a small Austrian village on the Donau River.

During the funeral obsequies held by the Austrian Ophthalmological Society (Vienna), of which he had been President of Honor, Fuchs was described as a serious teacher and physician but never dogmatic. He was also described as being aware of the relativity and limits of scientific knowledge, especially in medicine. As part of the introduction of the 10th edition of his textbook, Fuchs wrote,

[N]othing shows me the speed of scientific progress better than to leaf through the first editions of my book. I come across opinions that I shared with other experts and that now seem to have aged half a century. I would prefer not to admit to these opinions, would the proof not lie in front of me.\(^\text{3(p320)}\)

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