

Medicine in Stamps

Theodor Bilharz (1825–1862): discoverer of schistosomiasis

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Schistosomiasis is one of mankind's oldest and most pernicious parasitic infections, currently still afflicting more than 200 million people worldwide. Egyptian physicians of the XIIth Dynasty (1900 BC) recognised its cardinal symptom of haematuria, and ancient papyri portrayed men with enlarged abdomens and scrotal swelling – signs attributed to the complications of schistosomiasis. There are historical vignettes describing the “menstruating males of Egypt”, and both Egyptian and Chinese mummies are said to harbour *Schistosoma* eggs. Unfortunately, without an understanding of its aetiology, earlier efforts to treat the disease were in vain. For millennia, affected patients were cursed with lifelong haematuria and social ostracism.

In 1851, Theodor Maximilian Bilharz, while an assistant to the director of the Egyptian Department of Hygiene, identified the causative agent of “tropical hematuria”. During the course of autopsies on patients with haematuria, he noted consistent pathological changes in the mucous membranes of the intestines, seminal glands, ureters and bladder, and correctly attributed the abnormalities to a hitherto unknown worm-parasite, “...a white long helminth in the blood of the portal vein which I assumed to be a nematode but which I immediately recognized as something new.” He would subsequently link these new organisms (there was more than one species) to eggs found in the faeces. In a series of letters from 1851 to 1853, Bilharz eagerly explained his findings to his zoology teacher Carl Theodor von Siebold, believing them to be “...a few leaves of a saga as wonderful as the best of *Thousand and One Nights* – if I succeeded in putting it all together.”

UNIMPRESSIVE BEGINNINGS. If not for this discovery, Bilharz would have remained an obscure figure, for he was neither born into a prominent family nor particularly brilliant. Not much is known about his early childhood except that he was born in Sigmaringen,

Germany, on March 23, 1825, to Anton Bilharz, a counsellor of the treasury, and Elsa Fehr, a housewife. Bilharz apparently was fascinated with the natural sciences in school, and in 1843, he enrolled at Albert-Ludwigs-Universität in Freiburg im Breisgau. There, he met Professor Friedrich Arnold, a prominent anatomist, and through his guidance, gained an appreciation for anatomical dissections and medical research. After additional studies, including writing a thesis on the blood of invertebrates at the University of Tübingen, he received his Doctorate of Medicine in 1849.

ADVENTURE IN EGYPT. Bilharz's break came shortly thereafter when he accepted a job in Cairo with

Wilhelm Griesinger, the recently-appointed director of the Egyptian Department of Hygiene. This was an unusual opportunity, as much of Egyptian healthcare had been dominated by the French, there since Napoleonic days. Apparently, the new ruler of Egypt, Abbas I, was sympathetic to Germany and was eager to bring modern European medicine to Egypt. This would include requisite autopsies – taboo under traditional religious beliefs. One of Griesinger's stipulations was that he

could bring his 26-year-old assistant Bilharz with him to Egypt. Bilharz was excited at this possibility as his former mentor, Carl Theodor von Siebold, had encouraged him to investigate intestinal worms. In early 1851, he wrote to Siebold: “As helminths in general, and those who attack humans in particular are concerned, I think Egypt is the best country to study them.”

From careful observations of autopsy specimens, Bilharz was able to describe in detail the *Schistosoma* organism as well as the macro- and microscopical pathological changes they caused. He provided vivid diagrams of two copulating flatworms and their eggs, and named his discovery *Distomum haematobium*. His letters also contained drawings of *Schistosoma mansoni*, another organism which was later identified by Sir Patrick



Manson. His findings were subsequently published in a German zoology journal (*Zeitschrift für wissenschaftliche Zoologie*), and in his honour, the terms “bilharzia” and “bilharziasis” were named for the disease in 1856. In 1858, David F Weinand introduced the terms “schistosoma” and “schistosomiasis” as being synonymous with the disease, bilharzia.

Within a year after Bilharz discovered Schistosomiasis, he was promoted to chief physician of internal medicine. Three years later, he became chair of clinical medicine at Kasr-el Ain Medical School in Cairo, followed by chair of descriptive anatomy, a position he held until his death.

OTHER DISCOVERIES. His discovery of Schistosoma was just a part of his contribution to science. In 1857, Bilharz wrote a monograph covering his research on the electrical organ of the Egyptian electric eel or “thunderfish” – a common symbol seen in Egyptian hieroglyphics. This was an effort which Bilharz considered to be of much greater importance than his discovery of Schistosoma.

Much of his work for over a decade focused on the study of ethnology, geography and ecology. Compilation of materials and observations on these latter subjects can be found, but Bilharz did not personally publish much of his work, believing them to be of little significance. However, he was clearly an authority on Egyptian wildlife and culture. For example, he was the first to describe the Nile fish – *Alestes macrolepidotus* – a common inhabitant of the Nile river basin. Because of his dedication and scholarship, Bilharz was recognised as one of the foremost scientific authorities in Egypt. As a testament to the breadth of his contributions, his obituary was actually published in the German geography journal, *Petermann's Mittheilungen*.

DEATH AT 37. Bilharz never took a vacation except in 1858 when he returned briefly to Europe to present his discoveries. However, he could not resist the opportunity to accompany German explorer, Ernst von Coburg-Gotha, on an expedition to the Red Sea and Ethiopia. His official role on the journey was personal physician to the duchess. She returned home in good health, but Bilharz contracted typhoid fever. On May 9, 1862, shortly after his return, he died from complications of the disease at the young age of 37 years. He was buried in Cairo, ironically next to Hannes Eisele, a Nazi doctor convicted of war crimes for experiments on human test subjects.

While no monument stands to commemorate his contribution to medicine and science, Egypt erected in his honour the Theodor Bilharz Research Institute, one of its foremost centres for research. Perhaps his impact on Egyptian science is best reflected in the writings of Professor Olav Thulesius during his search for Bilharz' grave: “*When I was in Cairo searching for the grave of Bilharz I asked a taxi driver for help. When I mentioned the name of Theodor Bilharz he immediately knew who I was talking about and what disease I meant. For a whole day he helped me indefatigable (sic) to locate the small and forgotten churchyard in the old town where Bilharz was buried*”.

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