

Anton von Trötsch (1829–1890) and his Otologic and Ophthalmic Education

Anton von Trötsch (1829.–1890.) i njegovo otološko i oftalmološko obrazovanje

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Abstract. Anton von Trötsch was well known German otologist and one of the pioneers of modern otology. The aim of this paper is to present his educational experiences in Continental Europe and the British Isles. This paper is based on an analysis of the data concerning this topic, from medico-historical books, scientific articles, and internet sources. Anton von Trötsch was trained as an ophthalmologist and otologist, but later devoted himself to otology only. His most famous teachers were the ophthalmologists Albrecht von Gräfe, in Berlin, and Ferdinand von Arlt, in Prague, the ophthalmologist and otologist William Wilde from Dublin and the otologist Joseph Toynbee from London. He popularized the 'reflecting aural mirror' and the speculum for usage in otoscopy. He was one of the founders of the first otological journal. In 1857 he opened an ear clinic in Würzburg. This paper describes his training and work in otology. Professor A. v. Trötsch made a great contribution to the development of modern otology thanks to his dedicated work and excellent training with eminent doctors of the time. He was especially impressed by British ear medicine, which led to his devotion to otology.

Keywords: education; history; ophthalmology; otolaryngology

Sažetak. Anton von Trötsch bio je glasoviti njemački otolog i jedan od pionira moderne otologije. Cilj je ovog rada prikazati njegovo iskustvo stečeno tijekom obrazovanja u kontinentalnoj Europi i na Britanskim otocima. Ovaj rad temelji se na analizi podataka o ovoj temi iz medicinsko-povijesnih knjiga, znanstvenih članaka i internetskih izvora. Anton von Trötsch školovao se za oftalmologa i otologa, ali se poslije posvetio samo otologiji. Njegovi najpoznatiji učitelji bili su oftalmolozi Albrecht von Gräfe u Berlinu i Ferdinand von Arlt u Pragu, oftalmolog i otolog William Wilde u Dublinu i otolog Joseph Toynbee u Londonu. Popularizirao je 'čeono zrcalo' i lijevak za upotrebu u otoskopiji. Bio je jedan od osnivača prvog otološkog časopisa. Godine 1857. otvorio je ušnu kliniku u Würzburgu. Ovaj rad opisuje njegovo obrazovanje i rad u otologiji. Profesor Trötsch dao je velik doprinos razvoju suvremene otologije zahvaljujući svom predanom radu i izvrsnoj obuci kod uglednih liječnika tog razdoblja. Posebno ga se dojmila britanska otologija, što je dovelo do njegovog usmjerenja prema otologiji.

Ključne riječi: obrazovanje; oftalmologija; otorinolaringologija; povijest

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INTRODUCTION

Anton Friedrich Freiherr von Trölsch (Schwabach, 1829–Würzburg, 1890) was one of the pioneers of modern otology and one of the founders of German otology (Figure 1). He came from an aristocratic family based in Franconia. He was the tenth child of the state judge Christian (1780–1851) and his wife Susanne born Haller von Hallerstein († 1840). In 1857, Trölsch married Auguste Julie Bauer (1833–1908). With her he had three daughters.

After school years in Bamberg and Augsburg, Trölsch attended high school in Nuremberg in 1847 and initially studied law in Erlangen. After completing two semesters of natural sciences in Munich in 1848, Trölsch studied human medicine at the University of Würzburg from 1849, where received his doctorate in 1853^{1,2}.

He reinvented and popularized the handheld ‘reflecting aural mirror’ for usage in otoscopy and presented it in Paris, in December 1855 (Figure 2). The concave mirror was described earlier, in 1841 by Dr. Friedrich Hofmann (1806–1886), but did not receive much attention. Von Trölsch mostly used daylight for otoscopy. He also used and popularized the funnel-shaped ear speculum for the examination of the external auditory canal and eardrum^{3,4}.

In 1862 he wrote a textbook “Die Krankheiten des Ohres–ihre Erkenntniss und Behandlung“ (The diseases of the ear–their diagnosis and treatment).

He founded the first journal of otology – *Archiv für Ohrenheilkunde* (Archive of Otology), together with Adam Politzer from Vienna and Hermann Schwartze from Halle/Saale, in 1864⁵. This journal represented the establishment of the discipline of otology as a medical speciality, reflecting a higher level of otological knowledge and the need for a specialised journal (Figure 3)⁶.

Among medical professions, otology is perceived as a less important branch of surgery. During the 1850s and 1860s, an awakening of interest in ear diseases arose among a group of European physicians who became interested in medicine and surgery of the ear. Among them there was A. v. Trölsch. He is considered to be one of the most important otologists of the 19th century and one of the founders of modern otology in Germany.



Figure 1. Anton von Trölsch (1829–1890), c. 1864 (Photo by J. G. Gattineau and Sons, Würzburg)

Anton von Trölsch was well known German otologist and one of the pioneers of modern otology. He popularized the ‘reflecting aural mirror’ and the speculum for usage in otoscopy. He was one of the founders of the first otological journal.

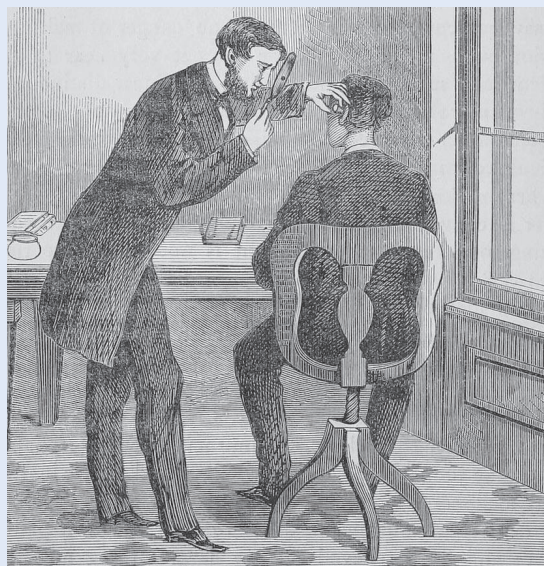


Figure 2. Examination of the ear with handheld reflecting mirror and speculum using daylight for illumination (From A. von Trölsch's *Treatise on the diseases of the ear*; translated and edited by D. B. St. John Roosa, 1869)

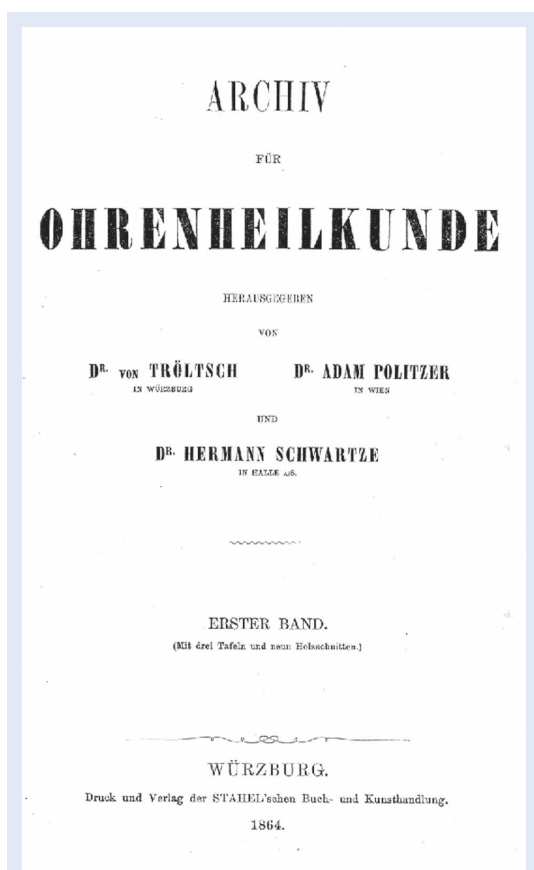


Figure 3. The first journal of otology—Archiv für Ohrenheilkunde was founded by Anton v. Trölsch, Adam Politzer and Hermann Schwartze in 1864 (The title page of the first volume)

He created the foundations for the research of ear diseases using scientific methods and enabled ear medicine to be recognized as an independent specialty⁷. Some of the physicians in Germany who showed interest in otology before Trölsch's educational travels, were Wilhelm Kramer from Berlin, Eduard Schmalz from Dresden and Carl Gustav Lincke from Leipzig. They wrote many papers, books about ear diseases, measured hearing ability and studied vertigo and tinnitus and gave several devices in otology for diagnosis and therapy of eye diseases⁸. This paper describes Trölsch's education in ophthalmology and especially in otology, to which he dedicated his entire working life in Würzburg. At that time, it was common practice for physicians to specialize both ophthalmology and otology. Some of the more famous physicians include Ignaz Gulz in Vienna, Thomas Wharton Jones in London and Daniel Bennett St. John Roosa in New York.

For his work as a doctor during the cholera epidemic in Munich in 1854, von Trölsch received a grant from the Bavarian state government, which allowed him ophthalmic and otologic education abroad from 1854 to 1855⁹. A short biography of von Trölsch and his contributions to the otological profession are given.

RECEIVING AN EDUCATION IN CONTINENTAL EUROPE

Berlin

Von Trölsch studied medicine at the University of Würzburg from 1849 to 1853. In 1854 von Trölsch received a scholarship from the Bavarian state government, which enabled him to broaden his education. He first wanted to be an ophthalmologist, so he visited the famous ophthalmologist Albrecht von Gräfe (1828–1870) in Berlin. He spent five months in his private eye clinic at 46 Karlstrasse from November 1854 to the end of March 1855. In 1854, about 500 eye patients were hospitalized at the Gräfe clinic and 365 operations (cataracts, strabismus, iridectomies) were performed. 2700 patients were treated, and 350 were operated, on, on an outpatient basis¹⁰. In Berlin he also attended physics lectures with Heinrich Wilhelm Dove and Heinrich Gustav Magnus¹.

Prague

In April 1855 von Trölsch went to Prague, to the University eye clinic of Ferdinand von Arlt (1812–1887) at 499 Linden Gasse (today U Nemocnice 2) and remained there for three months. F. v. Arlt was an ophthalmologist, who also studied ear diseases, and was the first lecturer of otology in the Monarchy. Von Trölsch received his first lesson in otology from von Arlt, after meeting him during his lectures in ophthalmology. Arlt favored him greatly and gave him the opportunity to perform cataract surgery several times. Arlt also foresaw the development of possibilities for ear medicine and encouraged von Trölsch to pursue this field. Von Trölsch remained in a close and friendly relationship with him. Arlt gave him numerous tips for his later scientific work^{11, 12}.

EDUCATION IN THE BRITISH ISLES

Dublin

Von Trötsch became interested in otology during his studies due to some cases of hearing impairment in his family, and because, at that time, both in Germany and in the rest of the world, there was much more interest in other medical specialties than in otology. In the British Isles, scientific ear medicine began before the middle of the 19th century through the work of Toynbee and Wilde. In Germany, this development of otology was initiated by von Trötsch around 1860⁷. He met William Wilde in Dublin and Joseph Toynbee in London, considered to be, the greatest scientific representatives of otology, and resided in Great Britain and Ireland for nearly four months. Von Trötsch stayed with ophthalmologist and otologist William Wilde (1815–1876), father of the writer Oscar Wilde, in Dublin from July to the end of August 1855 in his St. Mark's Hospital for Diseases of the Eye and Ear, at 32 Lincoln Place. Wilde's hospital was founded in 1844, and was the first of its kind in Ireland. Wilde was the first to teach otology in the British Isles and his students came from Dublin and all over the world. He was a great clinician. The hospital had two wards with about 16 beds, an operating room, a room for lectures and an outpatient clinic. In the academic year 1853/54, 211 operations were performed and 2815 eye and 609 ear patients were treated in the outpatient clinic. There were 73 cataract operations. The most common ear diseases treated in the outpatient clinic were cerumen collections (158), inflammation of the external meatus (133), inflammation and thickening of the tympanic membrane (212)^{13,14}. In 1853, Wilde created a technique called Wilde's incision, which consisted of a retroauricular incision to drain purulent secretions in the treatment of mastoiditis. Von Trötsch had the opportunity to watch that operation twice, which ended with great success. Several times he watched surgery for ear polyp removal with an instrument called the Wilde snare. The snare was easy to attach to the root of the polyp, and then quickly cut the polyp with a steel wire, which proved a much better technique than pulling out or twisting the polyp.

Trötsch saw an funnel-shaped ear speculum in Wilde's office. Its inventor Ignaz Gruber (1803–1872) demonstrated it to Wilde during his training in Vienna in 1840. Trötsch popularized it, so it was accepted on an international scale. A different type of speculum, bivalved shaped, was made by Wilhelm Kramer (1801–1876) in 1833^{13,15,16}.

Trötsch also visited Arthur Jacob (1790–1874) in Dublin, the first Irish eye pathologist, who worked at the City of Dublin Hospital and had two rooms with 12 beds for eye patients. The hospital was located at 9 Baggot Street Upper¹⁷.

In addition, Trötsch saw interesting ophthalmic cases in the operating rooms of Dublin hospitals and a series of eyelid surgeries. He received many encouragements and lessons from the physicians John Thomas Banks, Sir Dominic Corrigan, Sir Henry Marsh, Thomas Edward Beatty, and William Stokes.

Glasgow

In Glasgow, Trötsch visited the ophthalmologist William Mackenzie. He stayed at his villa in Oakfield terrace No. 1 at Hillhead. Mackenzie's Glasgow Eye Infirmary was located at 72 Charlotte Street. It had an operating room, two rooms with 12 beds, an infirmary, and a pharmacy. In 1854, 118 patients were hospitalized and 1692 patients were examined on an outpatient basis. Of the 96 surgeries, 42 were for cataracts. There were also 180 eye injuries. At that time Mackenzie had two junior assistants, Dr. Andrew Anderson and Dr. William Brown^{17,18}.

At Mackenzie's suggestion, Trötsch was eager to see the only otologist in Glasgow, Dr. David Patrick, but unfortunately Dr. Patrick was preparing for a long trip and wasn't able to receive him. Dr. Patrick worked as a surgeon and aurist in Glasgow from 1833 to 1869¹⁹.

Edinburgh

After Glasgow, von Trötsch turned to Edinburgh, where he did not stay long. He visited the large hospital—Royal Infirmary of Edinburgh, used by the old Scottish University for teaching purposes, where James Syme ran the surgical and John Hughes Bennett the medical clinic. At that time

two suitable rooms with about 20 beds were converted into an ophthalmic ward given to Dr. William Walker, an eye surgeon, who also took care of another eye institute—the Eye dispensary. He met William Walker, an eye surgeon at the Eye Dispensary on High Street. He also went to a small eye clinic—the Edinburgh Eye Infirmary at 140 George Street, but with a large outpatient facility, where he worked with Dr. Robert Hamilton and Dr. Benjamin Bell²⁰.

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London

Trötsch moved to London at the end of September 1855. In London, he visited 10 hospitals, 6 of which dealt with eye diseases and 4 with ear problems. It was quite tiring for him in London not only because of the large number of hospitals he visited, but also because of their locations in various parts of the city.

He visited eye hospitals in London because he primarily wanted to be an ophthalmologist. At the Royal London Ophthalmic Hospital (Moorfields), located in Blomfield Street on the corner of Eldon Street, he contacted William Bowman, George Critchett, Alfred Poland, Gilbert Mackmudro and James Dixon. This hospital had a number of rooms with about thirty beds for surgical cases, numerous dispensaries with rooms for ophthalmoscopy, an operating room and a pharmacy. In 1852 10,595 outpatients, and 344 hospitalized patients had been treated. 171 cataracts, 18 pupilloplasties, 40 entropions, and 57 patients with strabismus were operated on²¹.

Trötsch was taught by Haynes Walton, Robert Taylor and Alfred Smee from the Central London Ophthalmic Hospital.

At the Royal Westminster Ophthalmic Hospital (Guthrie Hospital) at 19 King William Street,

Charing Cross, Trötsch worked with the hospital founder George James Guthrie and his son Charles Gardiner and Henry Hancock. Trötsch had many objections to the way the hospital worked, and he particularly disliked Dr. Hancock's surgical techniques.

He also visited the Royal Infirmary for eye diseases in Cork Street and spent time with Henry Alexander and his son Charles Reeves.

Trötsch also visited the North London Infirmary for diseases of the eye, and spent time with eye surgeon William White Cooper, who also treated eye diseases at St. Mary's Hospital.

Professor of ophthalmology, Thomas Wharton Jones, received him at University College Hospital in Gower Street. Von Trötsch praised his work, especially his thorough anatomical concept of disease entities and his superb capacity of determining differential diagnoses. He was less satisfied with his cumbersome and radical treatments²².

In London, he finally visited the otologist Joseph Toynbee (1815–1866) at St. Mary's Hospital in Paddington, a very famous and important person in the English scientific world. This was attested to by his title "Fellow of the Royal Society" (F. R. S.), which in Continental Europe is equivalent to a "Member of the Academy". He dealt with anatomical abnormalities of the ear and dissected about 2000 preparations of the temporal bone (ear), giving otology scientific significance. By the time von Trötsch arrived, he had prepared over 1000 of them. They were nicely arranged so that they could be studied with great ease, and Toynbee himself allowed everyone to see them, with great enthusiasm. He was the first to describe otosclerosis and demonstrated ankylosis of the stapes of the fenestra ovalis in 160 temporal bones and he recommended an early incision of the tympanic membrane in acute otitis media²³. He made and introduced an artificial eardrum in 1853 in the cases of loss or perforation of the natural eardrum. Von Trötsch witnessed several times the introduction of such a rubber plate, attached to a silver wire, with more or less immediate hearing improvement. To examine the external auditory canal and eardrum, Toynbee used a speculum in four different sizes, oval cylinder, with an outer funnel-shaped opening. In addition to

daylight, Toynbee also used concentrated artificial lighting. He used a concave mirror with gas lighting (Segalas's lamp) or with a wax candle (Miller's lamp). He rarely used a catheter to examine the condition of the Eustachian tube. He would rather put an 'otoscope' or auscultation tube into the patient's and his own ear, and the patient would close his nose and mouth and swallow or make a forcible attempt at expiration. During this procedure he would listen to the resulting tones and diagnose if air reached the middle ear.

His overall work was briefly described by W. Wilde: "The labor and investigations of Mr. Toynbee have affected more for aural pathology than those of all his predecessors either in England or on the continent." Toynbee and Wilde were the two greatest otologists in the English-speaking world at the time. Von Trölsch was impressed so much by British ear medicine that he turned to otology as a profession^{13, 24, 25}.

He also visited the English ear surgeon George Pilcher (1801–1855), who taught at St. George's School of Medicine, and was a consulting surgeon at the Surrey Dispensary and worked privately at his home at 2 Harley Street. Pilcher was awarded for his work in anatomy, physiology and pathology of the ear. As a professional, he fought charlatany in his profession, as much as Toynbee and Yearsley.

In London, Trölsch visited two more ear surgeons James Yearsley and William Harvey. James Yearsley (1805–1869), was an ear surgeon who founded and worked at the Metropolitan Ear Nose & Throat Hospital – the first hospital of its kind in the world. He was the first doctor to recognize the connection between the ear, nose and throat. Yearsley deserves recognition as the one who assisted in bringing aural surgery out of the degraded position it held at the beginning of the 19th century. William Harvey (1806–1876), was an ear surgeon who worked at the Royal Dispensary for Diseases of the Ear²⁶.

Von Trölsch remained in London for one month, i.e., until the end of November, 1855, and then he went to Paris. There he demonstrated the usage of the concave mirror to examine the external ear canal and eardrum at a meeting of the Society of German Physicians²⁷.

WORK IN WÜRZBURG

In February 1856 he settled in Würzburg, and in 1857 he opened a private eye and ear clinic. Initially, he practiced ophthalmology, but due to his competition with ophthalmologist Robert von Welz (1814–1878) and the growing number of patients with ear problems, he devoted himself only to otology. Robert von Welz was a student of the famous ophthalmologist Albrecht von Gräfe (1828–1870), who occasionally assisted Welz in counseling and in complicated eye surgeries. Trölsch's private clinic was in the 3rd district 46 Domer Pfaffengasse (now Bibrastrasse) (Figure 4).

After 1870 he had a private clinic in the 4th district at the address vor dem Göbelslehen No. 2/1 (later Friedenstrasse)²⁸.

At first, he spent nearly a year studying the anatomy of the ear under Albert Kölliker (1817–1905), Heinrich Müller (1820–1864) and Rudolf Virchow (1821–1902). Trölsch treated a lot of patients with otitis media and claimed that it was responsible for numerous hearing impairments. He proved that middle ear infections in children were far more common than previously thought. He made a detailed study of the Eustachian tube, which was one of the first reports on this kind.



Figure 4. Von Trölsch private clinic in Würzburg in the 3rd district at 46 Domer Pfaffengasse (arrow) (The map of the district capital Würzburg, 1856)

He also described the anatomical differences between a child and an adult Eustachian tube^{29,30}. Von Trötsch performed deep incisions and dissected the bone for mastoiditis in 1861. He is credited with arousing interest in mastoidectomy among German ear surgeons³¹.

The 1860s was a particularly active period for von Trötsch. He taught many physicians who later became university lecturers and founders of university ear clinics³². He was habilitated in 1861 and became a lecturer at the Julius-Maximilians University as a private assistant professor³³. The mentors for his habilitation thesis were Albert Kölliker and Heinrich Müller. He became associate professor of otology in Würzburg in 1864⁷.

In 1867 he was elected a member of the Leopoldina-German National Academy of Sciences³². During the Franco-Prussian war in 1870, Trötsch volunteered as a medical companion for the transport of the wounded⁹.

In 1879, although already handicapped by illness, he founded the University Ear Polyclinic. Thus, together with his assistants, he was able to treat patients in hospital rooms and use them regularly for teaching students³.

Trötsch's work and publication activity had a great influence on the development of otology, in particular his textbook of ear diseases. Between 1853 and 1883 he wrote 36 scientific works²⁷.

Von Trötsch was aware of his qualities and the importance of his work in otology but he was not boastful. He was really loved and respected by his colleagues³⁴.

END OF A CAREER

From 1877 Trötsch suffered from multiple sclerosis or Parkinson's disease. Since 1883, his ear polyclinic had been run by his assistant Wilhelm Kirchner (1849–1937). Trötsch closed his private practice in 1886. He died of influenza in 1890, and was buried in the honorary grave of the University of Würzburg, on the north side of the main cemetery³⁵.

CONCLUSION

Professor A. v. Trötsch made a significant contribution to the development of modern otology thanks to his dedicated work and intense collabora-

tion with eminent doctors of the time. The use of a perforated concave mirror with a speculum and illumination helped diagnostics and ear surgery and led to the enormous development of otology in the second half of the 19th century. The reflecting mirror has been used as a symbol of the otorhinolaryngology profession for over a hundred years. Trötsch's otological practice was and remains an example to all otologists. In his honour, the German Society of Otorhinolaryngology, Head and Neck Surgery has been awarding an annual "Anton v. Trötsch prize" for outstanding scientific achievements in the field of ear, nose and throat medicine, since 1962.

Conflicts of interest: Authors declare no conflicts of interest.

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