

Sketches of Othistory

Part 6: Gustaf Retzius

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Students of the ear are forever indebted to Magnus Gustaf Retzius for his monograph *Das Gehörorgan der Wirbelthiere*. The Swedish anatomist and man of letters (fig. 1) was born in Stockholm in 1842, the son of the anatomist and anthropologist Anders Adolph Retzius and Emilia Sophia Wahlberg. He received his elementary education (1848–1857) in Latin, Greek, German, French, history, and catechism, to which were added English, Swedish literature, religion, and natural history, at Stockholm's grammar school (1857–1860). In 1860, the year of his father's death from iatrogenic poisoning by mercury used in treating his ileus, young Retzius passed his 'student examen' one year early and entered the university at Uppsala. Travels for scientific studies took him to England, Germany, Switzerland, Italy, Belgium, France, Finland and Russia. His medical education, however, was mainly at Stockholm, where he received the preliminary qualifying degrees of *med. kand.* (1866) and *med. lic.* (1869), and at Lund, where he received his *med. dr.* in 1871. In the same year he became a docent in anatomy at the Karolinska Institute (fig. 2). In the meantime he had already edited and published a collection of his father's ethnological papers (*Ethnologische Schriften von Anders Retzius*) in 1864 and had begun the publication, with Axel Key, of a series of papers on the membranes covering the brain and spinal cord.

In November 1876 Retzius married Anna Hierta, daughter of the founder and publisher of the Stockholm newspaper *Aftonbladet*. After their winter wedding trip to Italy he was appointed to a professorship in histology, especially created for him at the Karolinska. The war in

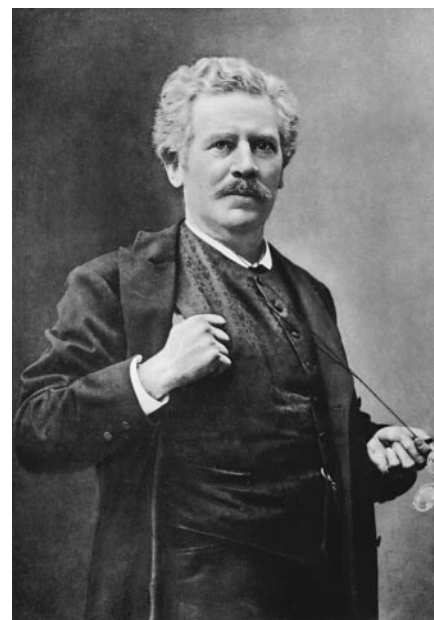


Fig. 1. Photo of Gustaf Retzius taken from Retzius G: *Biologische Untersuchungen*, vol. 19. Frontispiece.

the Balkans, which broke out in 1878, prevented his planned anthropological and archeological expedition to Asia Minor. Afterwards he regretted that the war had kept him from making the discoveries in Mycenae and Troy that were later claimed by Heinrich Schliemann and others.

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Fig. 2. Retzius's drawing of the Karolinska Institutet, taken from Retzius G: *Biografiska Anteckningar och Minnen*, vol. 1, p. 24.

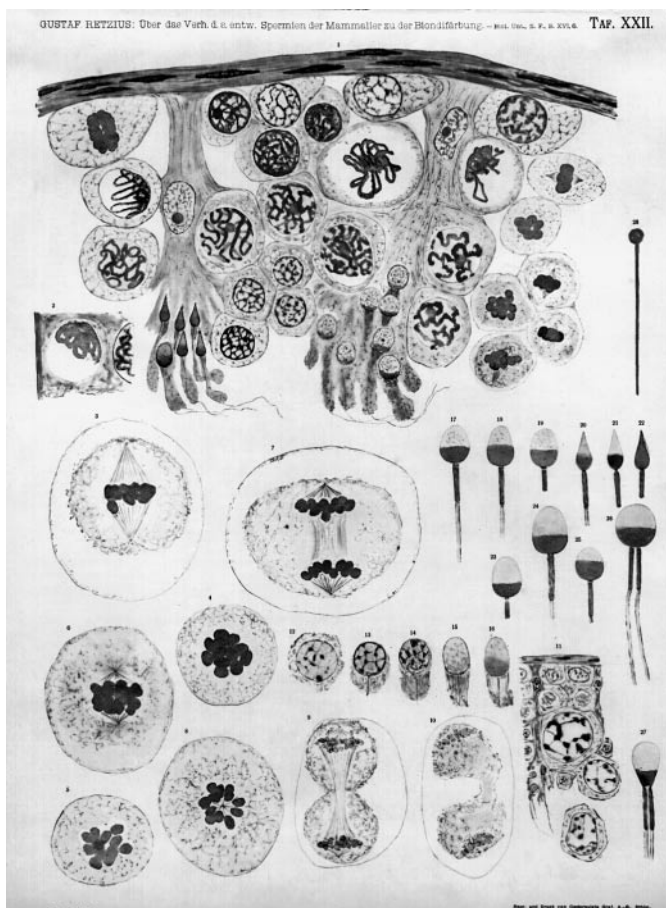


Fig. 3. Blondi staining of spermatozoa, taken from Retzius G: *Biologische Untersuchungen, Neue Folge*, vol. 16, plate XXII. The original plate is in color.

Retzius published *Das Gehörorgan der Wirbelthiere* in two folio volumes, dated 1881 and 1884. For the next three years, he and his wife, having purchased the *Aftonbladet*, her father's newspaper, became its joint editors and publishers. In 1889 he was appointed to his father's old position as professor of anatomy at the Karolinska but resigned his post the following year over an academic row over the institution's failure to grant his favored candidate the professorship of ophthalmology. Retzius continued his anatomical studies in his own private research laboratory, set up, presumably, with financial support from his wife. The results of most of his subsequent investigations, including further work on the organ of Corti, as well as his contributions to neuroanatomy, histology, anthropology and the comparative anatomy of spermatozoa (fig. 3), appeared in the 19 folio volumes of his privately printed and personally distributed journal *Biologische Untersuchungen, Neue Folge*, in the years 1890–1921.

Fortunately for both scholars of science and scholars of otohistory, Retzius reflected on his work in his autobiography *Biografiska Anteckningar och Minnen* ('Biographical Notes and Memories'), from which the quotations cited in this article were translated. In reading his recollections, one cannot help but admire the thoroughness and quality of his investigations (fig. 4, 5) given the rather primitive methodology available to him at the time.

In 1872 Retzius published his first treatise on the auditory organ in bony fishes (*Das Gehörorgan der Knochenfische*). He recalls the event that finally prompted him to turn a long-standing interest into experimental studies:

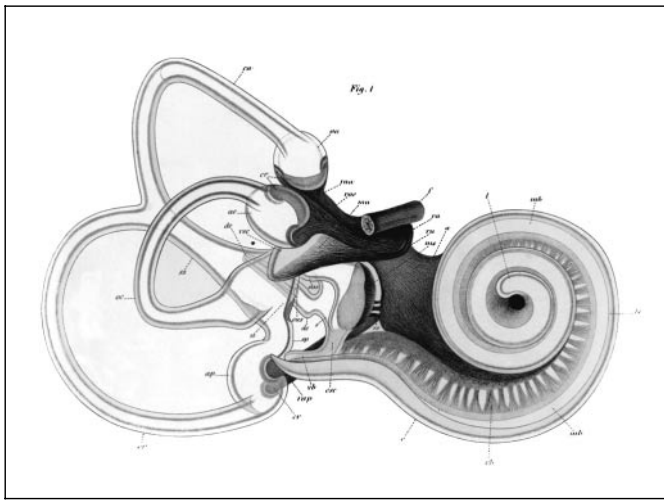


Fig. 4. Drawing of the human inner ear, taken from Retzius G: *Biologische Untersuchungen*, vol. 2, plate II.

For a long time, I had wanted to work with the organ of hearing, primarily from the comparative anatomical point of view. I had known of the work of the Danish anatomist Jakob Ibsen in that area, which was broken off while still in its initial stage and was never published during his lifetime, except in the form of figures and their description. Now I was seeing one paper after another published by Carl Hasse, who was still a prosector in Würzburg. However, I was bound by my agreement with Key about our joint studies of the nervous system and other topics. But in the late summer of 1871 he gave me a paper to referee from Edv. Clason in Uppsala, who at that time was working with Hasse on the labyrinth of the lizard. With that I could no longer resist my steadily growing urge to have a look into the wonderful world of the auditory organ, and even in my first attempt at the readily accessible labyrinth of the teleost fishes I found structural arrangements that were beyond imagination. I discovered, first in the cod and then in a series of other bony fishes, an unknown end-organ I named the *macula acustica neglecta*, in which a special branch of the auditory nerve has its ending. From Breschet's time until then, the labyrinth in the fishes had not been the object of a thorough investigation of its structure and composition, and when I came into the field I found much that was worth studying.

Like other anatomists of his time, Retzius had to struggle with inadequate methods of tissue preservation and sectioning, aggravated by the difficulty of accessing the labyrinth. Some thirty years later he reminisced about these difficulties:

Present-day researchers who have it in mind to produce and publish a work of that kind can scarcely imagine the difficulties that stood in the way of such a project then. It was not enough that the very task of dissecting the labyrinth with that era's simple tools was extremely difficult, and through a single mistake or slip of the knife, etc., could easily come to grief, but above all that the work of dissect-

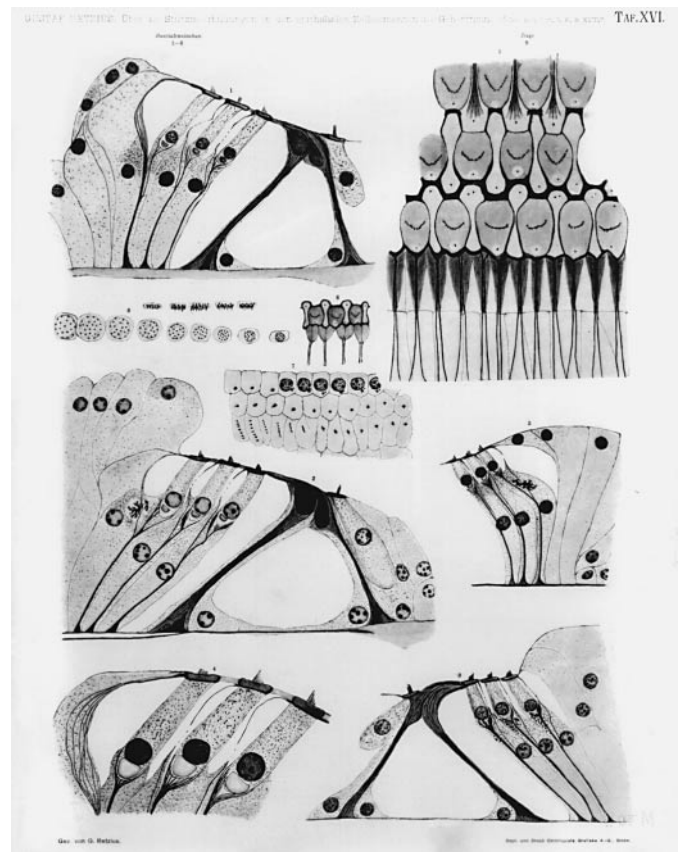


Fig. 5. Organ of Corti of the guinea pig (No. 1–8) and goat (No. 9, upper right), taken from Retzius G: *Biologische Untersuchungen*, Neue Folge, vol. 18, plate XVI.

ing the labyrinth under the simple, hardly suitable magnifiers was terribly tricky and had to be done with the greatest care. By turns, the preparation was immersed in the 0.5–1% osmic acid solution that I used, taken out again to be worked on by me, bit by bit, with scalpel and scissors, and to be transferred as soon as possible to a suitable, not-too-strong solution of Beale's carmine, the ammonia in which should prevent excessive darkening of the specimen. With long practice, however, I was able to improve the method of preparation so that the specimen generally remained undamaged, intact, properly stained, keeping its natural shape and translucency, and could be kept afterward in a weakish solution of alcohol in water for study and sketching.

The drawings accompanying the anatomical texts of the early anatomists were often not the work of the anatomists themselves but of draftsmen who specialized in these skills. Retzius initially followed this custom of engaging an artist but – fortunately, as we may say in retrospect – became rather frustrated and took the pencil in his own hand.

Fortunately, from childhood on, I had learned something of the art of drawing, partly on my own account, and partly from my sister. Later, first at the gymnasium [grammar school] and afterward as a medical student, I had improved my skill by attending the preparatory classes at the Fine Arts Academy, where I learned how to draw and shade-in. (...) For the work in collaboration with Key, as related above, an elderly draftsman, Mr. N.O. Björkman, had been hired, who was admittedly quite able but a bit too slow, and a peculiar type as well, not easy to deal with. Since he had no knowledge of anatomy, each time there was something new to draw one had to try to explain to him the significance of the preparation. Stubborn as he was, and also more than a little vain, he could not always manage to produce images in perspective, such as one often requires for the ear. For my work on the inner ears of fishes, therefore, I resolved simply to do the drawing myself.

The final step of the long process of producing an anatomical text, namely the preparation of the plates, had to remain in the hands of specialists. Retzius was fortunate to have some of the finest lithographers to work with him.

During the years 1878, 1879, and 1880 the work with all of that collected material had progressed so far, and the original figures for so many of the plates for the work in progress had been satisfactorily drawn by myself and had been engraved and printed by the master lithographer Mr. Wilhelm Schlachter – who at the time still worked at the Central Press in Stockholm – and his apprentices, equally remarkably clever, Miss Aspeqvist, Mr. Tholander and others, in part also by the famous copper engravers, Magnus Petersen and Lövendal in Copenhagen and W. Grohmann in Germany. Thus I found that I could publish the first volume of that work in the year 1881, with the text and 35 plates in folio format, containing the auditory labyrinths of the fishes from *Myxine* up to and including *Protopterus*, plus the amphibia, from *Proteus anguinus* up to and including *Rana esculenta*. Meanwhile, there remained the auditory organs of reptiles, birds, and mammals to be dealt with in the second volume of the treatise.

Although he may be best known for his anatomical contributions, the titles of Retzius's numerous other publications illustrate his many-sided interests. With Axel Key, Retzius initiated a popular scientific series in 1872,

Ur vår tids forskning ('Research in our time'), and continued as its sole editor from 1880 to 1889. His travel memoirs told of journeys to Egypt (1891), Sicily (1892), and North America (1893–1894), and he contributed numerous biographical accounts of prominent Swedish scientists and physicians, including Sven Nilsson (1901), A.E. Nordenskiöld (1902), Emanuel Swedenborg (1903) and Carl von Linné (1907).

As editor of his newspaper *Aftonbladet* Retzius seemed rather liberal and, on one occasion, defended the Swedish playwright and novelist August Strindberg against accusations of indecency. After his election in 1901 to the Swedish Academy, however, he apparently shunned modern literary trends and threatened to resign over the election of the poet Heidenstamm and the nomination of the author Selma Lagerlöf for membership. Evidently in a happier, musical mood, he wrote cantatas at the request of the Academy of Science for services commemorating Berzelius (1898) and Linné (1907). He also published two volumes of collections of poetry, *Söderifrån* ('From the South') and *Dikter* ('Poems'), the latter in 1911. Although the former was awarded the Swedish Academy Prize in 1871, others view the quality of his poetry as rather dubious [Nordlander, 1999]. His anatomical contributions, however, were unanimously esteemed and praised by his contemporaries although the ultimate recognition eluded him: he was nominated twelve times for the Nobel Prize but never received it.

Distressed by the outbreak of the First World War, Retzius became ill, but did not fail to write his memoirs before dying on the 29th of July, 1919. This autobiography, *Biografiska Anteckningar och Minnen* was edited by O. Walde and eventually published in two volumes in 1933 and 1948. An obituary by Waldeyer-Hartz [1919] eulogized Retzius as '*einen unserer besten, auch als Menschen und Kollegen*' ('one of our best, also as a person and colleague').

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