

ANDERS ADOLF RETZIUS (1796-1860)*

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SWEDEN has produced many leaders in various branches of science. Chemistry and anatomy, botany and physics, anthropology and geography, as well as many other subdivisions of exact knowledge have been greatly enriched, and in some cases virtually established, by the labors of her sons. The lamp of learning has always burned bright in this

prizes of her secrets. It is to one possessing a happy blend of this sublimated Viking spirit and the explorer's zeal that we will turn our attention in this sketch.

Anders Adolf Retzius, anatomist and anthropologist, was born in Lund, October 13, 1796. He was the son of Anders Jahan Retzius, who from 1787 to 1812 was professor of natural history in the University of Lund. His mother was Ulrika Beata Prytz.

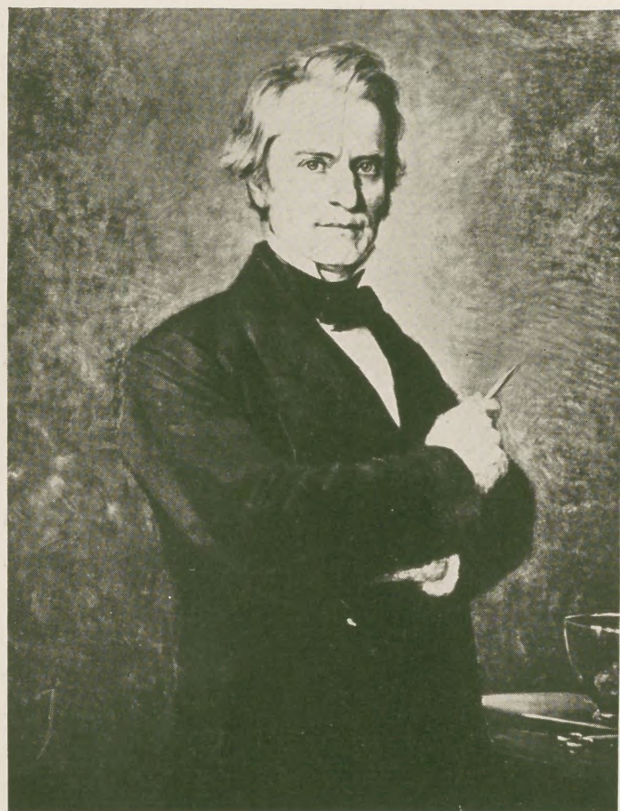
The University of Lund could not have had many students at that time. The city itself in 1805, nine years after Retzius was born, had only 3,224 people, and the entire population of Sweden in 1800 was but 2,347,343. The enrollment at the university in 1922 was something over 1,400, with the population of Lund more than 20,000, and of the entire country more than 6,000,000. On the basis of these comparisons the student body in the time of Retzius must have been relatively small, as universities are considered at the present time.

The father, Anders Jahan, apparently occupied what would now be considered an entire settee, for we learn that in addition to initiating his son into zoology, he also assembled a collection of minerals and rocks, and apparently taught mineralogy. This collection, which was donated to the university in 1815, is mentioned¹ in connection with a celebration of the institution in 1897.

We have little information concerning the boyhood of our subject. Evidently this period of his life was spent in Lund, in such studies and occupations as would ordinarily fall to the lot of a university professor's son. On completing his preparatory studies he entered the university.

Here under the tutelage of his father and of Arvid Henrik Florman, the professor of anatomy, the interest of the young student

¹ Fürst, Carl M. Lunds Universitets Årsskrift, N.F., II, vi, 5.



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northern country. The adventurous spirit of the Norseman must needs explore, even as did his ancestors a thousand years ago. With most of the earth itself well known, the adventurer now often turns to the undiscovered in the world of knowledge. Perhaps also something of the Viking strain, which sometimes found its ancient outlet in pillage, remains in those who today struggle, less tumultuously but just as vigorously, to wrest from Nature the

* Read before the University of Oregon Medical History Club, January 19, 1923.

was turned toward natural history and anatomy. Florman especially, who taught veterinary science in addition to his duties as professor of anatomy, exercised a strong influence in shaping the career of the young Retzius. It was Florman, apparently, who initiated him into the method of careful observation which was to mark his scientific work in later years.

At the age of nineteen years Retzius went to the University of Copenhagen and there spent the year 1816. While in Copenhagen he studied primarily under the direction of the Danish anatomist Ludwig Levin Jacobsson, but he also came under the influence of Ørsted, the chemist and physicist, and of J. H. Reinhardt in zoology. Retzius writes of the latter as a "true disciple of Cuvier, master both of anatomy and of zoology." Concerning Reinhardt's lectures in comparative anatomy he wrote nearly thirty years later that he vividly remembered the scholarly presentations, illustrated by many difficult preparations made by the lecturer's own hands. It was from Jacobsson, however, that the young naturalist received the chief stimulus to enter upon a scientific career.

After his return to Sweden Retzius continued the medical studies in which he had become interested and took the degree of Doctor of Medicine from Lund in 1819. The effect of Jacobsson's influence is already shown at this time in the title and dedication of his thesis for the doctorate, namely: "Observationes in anatomium chondropterygium praecipue squali et rajae generum." This was dedicated to *anatomo celeberrimo Ludovico Jacobsson*.

While pursuing the studies upon which this dissertation was based Retzius discovered the interrenal organ in Elasmobranchs. This organ has since been shown to be homologous with the cortex of the adrenal body of higher forms, and according to the indications of recent work is the active part of this gland in producing its characteristic secretion. The discovery of the interrenal organ was the first of many

new features in anatomical science to be credited to the young naturalist.

In 1818, a year before he received his medical degree, Retzius was appointed to the veterinary staff of the royal military academy at Carlberg and in 1821 was added to the staff of the veterinary institute of Stockholm. On December 27, 1823 he was appointed professor of veterinary science in this institution. By these appointments he was brought into the metropolis. Stockholm at that time must have numbered considerably less than 100,000 in population, for in 1805 its inhabitants numbered but 72,652. Here, nevertheless, he came into contact with the intellectual leaders of the country, a contact which must have been very stimulating to the quick intelligence of the young scientist.

An older brother of Retzius named Magnus Christian, had completed his medical work at Lund in 1815, and soon after this removed to Stockholm. Here he built up an extensive practice, and also in later life occupied positions of eminence on the medical staff of the army. The father was also brought to Stockholm from Lund in 1818. The occasion of this transplantation so late in life of the professor of natural history, was that in this year he suffered from a stroke which paralyzed the lower part of his body. The younger son, Anders Adolf, thereupon came to Lund and took his father to Stockholm, where he might be under the care of his sons.

The year following the appointment of young Retzius as professor of veterinary science there occurred an incident which was to change his career and bring him more directly into connection with medicine in its human aspects, at the same time allowing him to continue his work in comparative anatomy and morphology. He was engaged in debate with Nils Åkerman, then prosector and temporarily in charge of anatomy at the Caroline Institute of Medicine and Surgery, on the anatomy of the eye. Retzius showed such knowledge and training that at the close of the dis-

cussion, Jacob Berzelius, the chemist, who was at the time head of the Institute, came forward and said to the learned debater: "This is our man, just the one whom we seek; you, sir, shall become professor of anatomy at the Caroline Institute." The matter was so arranged that Retzius retained his connection with the veterinary school, because of the larger stipend paid there, but at the same time held the title of professor of anatomy at the Caroline Institute, and gave part time to the duties of this position. He was assisted at the medical school by his friend J. S. Billing. It was not until 1840 that he severed his connection with the veterinary school and gave all of his time to the Caroline Institute, although in 1830 he was appointed Inspector of the latter, in addition to retaining his original title as professor of anatomy.

The Caroline Institute had been founded in 1810, although the name by which it is now known was not adopted until 1822. At the period when Retzius was appointed to the staff there was still much to be done to establish the high standards which had been adopted at the reorganization of the school in 1822. Retzius was twenty-eight years of age at the time of his appointment, and at the beginning of his scientific career.

During these early years in Stockholm he had not allowed his new tasks to dim his love of investigation. From 1822 to 1824, in collaboration with G. J. Ekstrom, the newly appointed chief surgeon of the Seraaphim Hospital, he engaged in a series of experimental studies on ligaturing arteries and on the effect of vagotomy on the digestive processes. At the same time he was engaged in purely morphological work of fundamental importance on the structure of the hagfish, *Myxine glutinosa*. The foundations for a correct understanding of this primitive member of the vertebrate series were laid by Retzius in two brief but significant contributions, the first²

² Bidrag till ader-och nervsystemets anatomi hos *Myxine glutinosa* (contribution to the anatomy of the vascular and nervous systems of *Myxine glutinosa*).

published in 1822 and the second³ in 1824.

It is of interest to note that this curious animal has been placed in widely different groups by various naturalists at different times. Linnaeus, who gave it the name by which it is still known, classified it with the worms. Others referred it to the group of the Mollusca, another included it with the fishes, and still another described it as an amphibian. The studies which determined its true structure, and thus its position in the animal series, were made by Anders Retzius and Johannes Müller. The latter has usually received the credit because of the series of papers dating from 1835 to 1845, published by him, which described *Myxine* quite completely. These papers were published in German, and received a much wider circulation among the scientific men of the world than did the earlier papers of Retzius, which also had the disadvantage of being published in a language which was read by a relatively small number outside his own country.

The interest of Retzius in this subject dated back to his naturalist father, Anders Jahan Retzius. According to Erik Müller, who now occupies the chair at the Caroline Institute to which Retzius was called one hundred years ago, and from whose interesting sketch⁴ of the history of the Anatomical Institute of the Stockholm institution much of our account is derived, the contributions of Retzius on the anatomy of *Myxine* may be summarized as follows: (1) He accounted for the first time for the intricate cartilaginous cranium; (2) he described the digestive system; (3) he discovered a new gland, which Johannes Müller later showed is homologous with the adrenal organ; (4) he accounted for the content of the slime glands; (5) he described for

³ Ytterligare bidrag till anatomien af *Myxine glutinosa* (further contributions to the anatomy of *Myxine glutinosa*).

⁴ Müller, Erik. Anatomiska Institutionen i Stockholm, 1756-1910. Karolinska Mediko-Kirurgiska Institutets Historia, Stockholm, 1910.

the first time the pronephric ducts, but not the pronephros itself, which was later discovered by Johannes Müller; (6) the small but complicated brain was so depicted and described that only details have remained to be added since; (7) of the cranial nerves he found the vagus, the trigeminus, the facialis and the acusticus, although he considered the last two as trigeminus; (8) he discovered the simply constructed auditory organ; and (9) he described the vascular system so completely there remained little for succeeding investigators to add.

These researches reveal a mastery of technique, especially on the vascular and nervous systems, that was to be used to good advantage in his later work on mammalian and human material.

After completing his work on Myxine, he and his friend Billing demonstrated the ciliary ganglion in the horse and also contributed an important account of the sphenopalatine ganglion in the same animal. He discovered that the rami communicantes between the cerebro-spinal nerves and the sympathetic trunk are connected, not alone with the dorsal nerve roots, but also with the ventral. By his injection methods he discovered the peripheral canal of the cornea, later named the canal of Schlemm. His methods of injection were also used to excellent advantage in the study of the circulatory system in various parts of the body, and a number of connections and anastomoses were demonstrated which previously had not been known.

An opportunity to dissect a python led to a comparison of the reptilian with the avian lung. He had already become interested in the respiratory system of birds in 1824, through a study of their skeletons and the peculiar connections of the central cavities of the long bones with the avian air-sacs. Various other studies and developments in anatomical technique also belong to this period, 1824 to 1835.

During these years he made several journeys for the purpose of study to the continent and to England. He states that

these journeys played a large rôle in his further development. In 1828 he attended the naturalists' meeting in Berlin. It is related that at this meeting the discovery by Von Baer earlier in the same year of the mammalian ovum was not attracting the attention which its importance entitled it to receive. One of Von Baer's biographers relates "Dass die alte Herren seine Schrift nicht lesen oder wenigstens in ihrer Ueberzeugung nicht stören lassen würden, konnte Baer sich wohl denken. Aber auch die Jungen schwiegen." Under these circumstances on the last day of the meetings, one of the youngest of the delegates, Anders Retzius, asked Von Baer to demonstrate his discovery. Von Baer was not slow to heed the request and on a hastily procured animal undertook the demonstration, which was successful. The official recognition of this important addition to embryological knowledge could therefore no longer be withheld. It is to the credit of Retzius that he called it forth.

In 1833 he made a journey to England, France, Germany and Austria, and in the course of this trip attended the Congress of Naturalists at Breslau. Here he came into contact with Purkinje, who introduced him to the new realms just being opened up by the microscope. This meeting marked a turning point in Retzius' career, for on his return to Stockholm he began a series of microscopic researches. The first of these to be published was an important paper called "Mikroskopisc undersökningar öfver tändernas, särdeles tandbenets struktur," which appeared in 1836. In this contribution Retzius described many features of dental structure, and left a lasting contribution on the histology of the teeth. The brown striae, or contour lines of Retzius, in the enamel, still bear witness to his careful observations in this field.

To this period of his life belong also the studies on *Amphioxus*. We can best follow Erik Müller's account of this phase of the work of Retzius. According to Müller, the Swedish naturalists Lovén and Sundevall

found *Amphioxus* on the southwest coast of Sweden about the same time that Costa had described it from Naples (1834). Costa had included it among the fishes under the name *Branchiostoma lubrum*. It will be recalled that the animal had been discovered in 1774 by Pallas and described under the name *Limax lanceolatus*. Yarrell gave the first general description and grouped it with the Cyclostomes under the name *Amphioxus lanceolatus*. Müller⁵ states:

No animal form, with the exception of the *Selachii*, has had more importance in the development of the new morphology than this at first sight insignificant creature. Occupying the border zone between the vertebrate and the invertebrate organization, it is the only remaining relic of a group which was surely strongly represented in previous ages, and which probably is closely related to the transition forms between the above named large groups of the animal kingdom.

Retzius undertook the investigation of this form, as he had of that other form of uncertain position, *Myxine*. In a letter to Johannes Müller in 1839 he described several new discoveries on its structure which he had made. Because of trouble with his eyes, which was developing from excessive use of the microscope, he invited Müller to accompany him on a trip to Bohuslän, on the coast of Sweden, to investigate *Amphioxus* more completely. This Müller did in 1841 and in twelve days the two friends worked out the morphology of the little animal and many of the physiological problems connected with it.

The following and last period of Retzius' work, from about 1840 to his death, was of quite a different type than the preceding. His intensive microscopical work had brought on an affection of the eyes which forbade further work with the microscope. His researches were therefore turned to the skeletal, nervous and circulatory systems in their grosser structure and relation-

ships, and to topographical anatomy and anthropology.

The anatomy of the stomach occupied his attention for a time. As a result of his studies on this organ he sharply differentiated for the first time the two divisions of the pyloric stomach, namely, the pyloric antrum or vestibule and the pyloric canal. He further differentiated in the fundus of rodents as well as in the human stomach a gutter-like groove, the gastric canal, which is present along the inner surface of the lesser curvature. This trough affords a direct passageway for the stomach contents from the cardia to the pylorus. This discovery was forgotten and lost until 1907, when it was confirmed by Kaufman and it was further demonstrated by O. Cohnheim on experimental dogs that water or salt solution introduced by a tube into the full stomach, passes through this canal in the lesser curvature and presently emerges at the pylorus without mixing with the other stomach contents.

In the course of his studies on the brain Retzius found and described a group of gyri situated on the under side of the splenium, between the gyrus hippocampi and the gyrus dentatus. The group consists of small, rounded eminences, rudimentary in the human brain, but of importance in many mammals. Structurally they constitute a part of the hippocampal formation, and they are evidently associated with the olfactory system. Gustaf Retzius many years later named them the gyri *Andreae Retzii*, in filial honor of the discoverer.

In topographical anatomy Retzius is best known from his description of the extraperitoneal cavity in the ventral body wall, known as the prevesical cavity, or cave of Retzius. This space, which contains a loose mass of connective tissue, fat, and blood vessels, affords surgical access to the bladder without the necessity of entering the peritoneal cavity. This apparently accounts for the name which Retzius gave it, "*blåsporten*, door of the bladder." He also described the fundiform ligament of

⁵ *Vide* NOTE 4, p. 18.

Retzius, which lies in front of the ankle joint.

It is as an anthropologist, however, that Retzius is probably best known. The difficult task of classifying the races of mankind engaged his attention. The familiar subdivisions of the human race, namely, Caucasian, Mongolian, Ethiopian, American and Malay, which Blumenbach (1752-1840) has given us are based primarily on color of skin and geographical habitat, rather than on anatomical features. Anders Retzius introduced an entirely new point of view to this phase of anthropology. He based his classification on the physical characteristics of the various races. The feature which he most emphasized and which he established as the fundamental basis of his classification is the cranial or cephalic index. He showed that there is a quite constant ratio between the breadth of the cranium and its length, in the various races of mankind. This ratio is usually expressed at present in terms of per cent, thus when the ratio of head breadth to length is as 3 to 4, the cranial index is said to be 75, when breadth is to length as 4 is to 5 the cranial index is 80. On this basis Retzius classified crania in two groups: Those having an index of 75 or less he called dolichocephalic or long-headed, those whose index is above 75 he considered brachycephalic or round-headed. At the present time a mesocephalic group is usually recognized by anthropologists, comprising crania with indices between 75 and 80, so that the brachycephalic group would include those having above 80 as a cranial index. This, however, is but a modification of the grouping established by Retzius.

Craniometry had been practiced long before the time of Retzius, both by artists and anatomists. In 1680 Tyson described the dissection of a chimpanzee, and included measurements of the skull. He states that these measurements were taken with a view to showing the difference between this skull and that of the human. It appears

that even before Tyson's time anatomists had compared by measurement the skulls of apes and of humans in the dispute over the anatomical material of Galen, whether it had been human or simian.

Whether or not Retzius was familiar with the work of Tyson and of the disputants concerning Galen, the credit is properly his of turning this valuable method to the comparison of human races. These researches began in 1840. The impulse to undertake them, according to his own statement, he received from perusing a monograph by Sven Nilsson on the ancient inhabitants of the Scandinavian North. In 1842 at the meeting of the Scandinavian Natural History Society in Stockholm, Retzius presented an epoch-making paper on the form of the skull in what is now designated as the Nordic race. The principal points in this paper, according to Erik Müller⁶ are as follows: The dolichocephalic cranium, as found among the Swedes, is oval, one-fourth longer than broad. The neck is elongated, as determined by passing a straight line through the auditory openings, which thus bisects the longitudinal cranial axis in the middle. The height of the arc which is formed by the rounding of the neck, with this line as its cord, is equal to the cord. The surface upon which the cerebellum rests is nearly horizontal. The tuber occipitale, which corresponds to the posterior points of the cerebral hemispheres, lies behind this. The brachycephalic cranium, which is typical of the Slavic race, is short and rounded. The length is greater than the breadth by only one-seventh or one-eighth, and in form it approaches a square with rounded corners. The neck is as if chopped off directly across, and forms by its continuation with the back of the head a large, low vault or flattened surface. The rounding of the neck forms an arc whose height corresponds to only one-half the cord between the auditory openings. The latter also lie posterior to the middle of the longitudinal axis of the head. The bony

⁶ Vide NOTE 4, p. 18.

surface on which the cerebellum rests is rounded, and rises with the posterior wall of the skull so that it becomes continuous with the posterior surface of the neck.

In addition to these cranial measurements there are certain characteristics based upon the facial bones. Here also are found two types, namely, the orthognathic and the prognathic. In the orthognathic type the cheek bones do not project beyond the front surface of the cranial vault, and the facial profile is accordingly perpendicular. The prognathic type, on the other hand, has projecting cheek bones and a much less perpendicular profile.

On the basis of these characteristics Anders Retzius built a simple classification of the subdivisions of the human races then known. Each head type, dolichocephalic and brachycephalic, is subdivided into orthognathic and prognathic, with the result indicated below:

Dolichocephalic: Orthognathic; Gauls, Celts, Britons, Scots, Germans, and Scandinavians; Prognathic; Greenlanders, many North and South American races, such as Caribs, Botocuders, etc., Negroes, and Maoris.

Brachycephalic: Orthognathic; Slavs, Finns and Tschudic tribes, Afghans, Turks, Lapps, Jacuts, etc.; Prognathic; Tartars, Kalmucks, Mongols, Malays, many North and South American tribes, as Incas, Harruas, etc., and Papuans.

While this classification would be greatly modified by anthropologists at the present time, it is of interest to note the result of the first attempt at classification based upon physical criteria. The cephalic index is now used by most anthropologists as the measurement of perhaps the greatest significance in determining racial relationship. In one of the most recent contributions⁷ of inclusive type on the analysis of the races of man and their origins, cranial index, height of skull and nasal index, all physical characteristics of the same category

⁷ Dixon, Roland B. *The racial history of man*, N. Y. and Lond., 1923.

as that which Retzius introduced, serve as the basis. Retzius is the founder of craniometry, and may be justly regarded as one of the founders of physical anthropology.

Anders Retzius died on April 18, 1860, after a brief illness, at the age of sixty-three years. His life had been full of scholarly activities, not all to be measured by his published scientific work. During his several trips to the continent and to England he visited especially the museums and laboratories of anatomy. He formed friendships with many of the leading scientific men of his day. Johannes Müller calls Retzius his best friend, and the names of Bischoff, Liebig, Rudolph Wagner, Ernst Weber, Von Baer, and others are numbered among the circle of his close acquaintances. Correspondence with these and others, with interchange of scientific ideas had its part in his busy life.

Retzius was interested not only in anatomy, but in all living nature. Among his writings one finds, in addition to the strictly scientific papers, articles on other topics in various fields. A history of the development of anatomy in the Scandinavian North⁸ served as the subject of his presidential address before the Royal Academy of Science in 1845. Biographical sketches,⁹ particularly of Swedish scientific men, writings on sanitation and on the water supply of Stockholm and contributions to horticulture, as well as other topics, indicate the range of his interests. A quotation from a letter¹⁰ written by his son, Gustaf Retzius, in 1892, will serve to illuminate the breadth of interest and particularly the enthusiasm for biological science, which Anders Retzius always showed. Gustaf Retzius writes:

⁸ Retzius, Anders Adolf. *Anatomiens uppkomst och utveckling i den Skandinaviska Norden*. Skrifter i skilda ämnen, m.m., Stockholm, 1902.

⁹ Retzius, Adolf Anders. *Skrifter i skilda ämnen jämte några bref af Anders Retzius*. Samlade och utgivade of Gustaf Retzius, Stockholm, 1902.

¹⁰ Retzius, Gustaf. *Själlfbiografisk skizz. Autografin och porträter af framstående personer*. Ser. 3, vol. ix b, Stockholm, 1892.

I remember even yet so well how a large human skeleton stood beside my bed, and how in the window were placed aquaria and jars with lizards and tree-frogs, indeed one of the bellowing giant frogs of Brazil, which when it got loose made room-high jumps. There were casks with young salmon-fry, whose further development my father studied. And each Spring when the ice broke up, he took me with him to Kungsholmbrunn, where we clattered down on the stone piers to the water's edge and gathered small water animals, infusoria, bryozoans, and worms, which we took home to the aquaria. I shall never forget my father's enthusiasm when he observed under the microscope the wonderful life which was unfolded in the water of these aquaria, and of which he with his spirited descriptive art tried to give me an inkling. I shall never forget his burning interest, his love of truth and the alert, keen look, concerning which a foreigner one time said that in case there was any proof needed for immortality, Anders Retzius' glance was such a proof.

Retzius was concerned not only with the problems of morphology and kindred purely scientific subjects, but as may be inferred from his contributions to topographical anatomy, he had an interest also in the practical applications of anatomical knowledge. His practical bent is further indicated by his horticultural experiments in introducing many new plants into Sweden. At about the same time as his contribution to the histology of the teeth was published there also appeared from his pen an essay on the castration of cattle. He describes the operation which he performed with his own hands on two young bulls, and closes the account with a plea "to our enlightened farmers to undertake experiments and make the results known." No doubt his early connection with the veterinary school gave direction to a part of the practical side of his nature.

Erik Müller, to whom we are indebted for much that precedes, and who has had intimate access to the papers and writings of Retzius, says:¹¹

¹¹ *Vide* NOTE 4, p. 18.

Naturally the scientific work of Anders Retzius, as of all, has its weak points which furnish material for the critical and carping judgment. It may be noted and even has been noted that his work is not sufficiently consecutive, inclusive or thoroughly done. In part such a statement is justified. His notes show the quick understanding by short-cuts in his scientific works which is a result of his mind's activity, which could degenerate into a sort of uneasiness that made it difficult for him to longer sit still engaged in one task. He himself acknowledges in the most good-natured fashion that he lacks much as a writer. He writes in 1827 to Florman: "It comes to this, that I am a poor scribe, it costs me much trouble to write, for I received less foundation in language than I could have wished." And in another place: "I am a poor grammarian and must therefor let my essays lie long on the digestion-shelf before I let them leave me."

His originality, his keen insight into morphological problems, his ability as an explorer in the unknown regions of knowledge, must to the thoughtful mind more than compensate for the fact that he did not always map out in detail the discovered regions. The details, to his mind, could be left to others, even though another thereby might receive the credit which he himself justly deserved. His chief concern was the advancement of science by the widening of its boundaries.

Retzius' influence on anatomy and medical science in general in his own country was even more strongly marked by the effect of his character and his knowledge on his students and contemporaries. Through his personality and his methods of teaching Retzius drew students from the University of Upsala and from Lund for his courses in anatomy, in spite of the fact that at that time the Caroline Institute did not have the power of conferring degrees, and these students must therefore return to their universities for examination. Many of the students so attracted had already completed the prescribed courses and came to Retzius, not to prepare for an

examination, but from a desire to study under the stimulus of his spirit.

Retzius introduced the teaching of histology and comparative anatomy into the medical curriculum in Sweden. He writes: "In the Autumn of 1824 I began a course in microscopic and general anatomy for about twenty auditors, and continued in the Spring months with comparative anatomy, while in the meantime presenting the descriptive anatomy on the human cadaver." In all his teaching it was his effort to train his students to see and to think for themselves.

At the beginning of his connection with the Caroline Institute he had very little in the way of museum or demonstration material. He writes¹² that in moving the anatomical collections from the old site of the institution on Riddarholmen to the new location, which it was necessary to do by boat between the two islands, the greater part of the collection fell into the sea. The small part that was recovered was so damaged by water as to be useless. Through the interest of the crown prince, supplemented by the efforts of Retzius himself, a museum was again gradually established.

The picture of Anders Retzius as the anatomist, teacher and public-spirited citizen is incomplete without a further glimpse of his personality, which we may get in part by quoting again from the letter already cited,¹³ written by his son Gustaf Retzius:

Only a single time was I permitted to hear my father lecture in his auditorium. . . . He lectured on the trachea, its structure and function. With a vivacity which for a man of sixty years must be thought phenomenal, with a youthful verve and enthusiasm, of which few teachers even in their prime are in possession, he gave an illustrated picture of this organ's wonderfully simple, yet so ingenious structure, and its great importance for mankind. He entered with all his might into his subject. His mobile features made clear the shades of meaning with a clever mimicry. His hearers followed with intense attention the by no means arranged,

¹² *Vide* NOTE 8, p. 22.

¹³ *Vide* NOTE 10, p. 22.

but all through, spirited exposition. One immediately caught the contagion of zeal and laughed heartily at the original fancies which spiced the lesson, which had quite a different form from that of the ordinary dry lecture. I have often since reflected over it and seen that in such manner lectures may have much greater influence than as ordinarily given.

Another setting is given us by Erik Müller. This pictures Retzius in his orchard, from which he appears to have found his chief recreation. We see a man small of stature and slight of frame, in simple working clothes, but with the distinguished mien of the patrician, who with mattock and spade labored diligently in his orchard. "It was the Institute's Inspector, who between making preparations and giving his lectures, in this manner sought outlet for his love of activity."

The Caroline Institute of Medicine and Surgery, in whose service Retzius spent the greater part of his life, and with whose history his name is inseparably bound up, had been in existence but fourteen years when his connection with it was established. It was therefore still in its infancy and Retzius had largely to make his own place and conditions of work. It was in some measure due to his energy and his excellent example, as well as to his administrative ability, that this institution whose faculty now has the honor of awarding the Nobel prize in medicine, has come to occupy the position of distinction which it now enjoys. Retzius was the pioneer in the northern countries in teaching the new spirit and methods of anatomy, which have borne so rich a heritage of knowledge, not only in his own country, but throughout the world.

He was the founder of craniology as a distinct branch of anatomical science, and he was a pioneer in the new morphology, as well as in histology. Because of his contributions to these branches, as well as to other fields of anatomical science, Anders Retzius earned for himself a place among the foremost of the anatomists and anthropologists of the nineteenth century.