

Petrus Artedi in his Swedish context

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Broberg, G. 1987. Petrus Artedi in his Swedish context. Proc. V Congr. europ. Ichthyol., Stockholm 1985, pp. 11–15. Petrus Artedi's life in Sweden is described. Little is known of his upbringing because of an almost total lack of biographical material. However, the background of early eighteenth century Sweden (a time when the country was facing considerable economic and social pressures), the complex parental atmosphere in which Artedi grew up, and the status of Uppsala University where he was educated, are all analysed with regard to the development of the gifted scientist.

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Petrus Artedi, generally considered as the founder of ichthyology, has always been a mystery figure to his biographers. His work is known from his publications but we know too little about him as a man. Without the biography Linnaeus wrote to Artedi's posthumous *Ichthyologia* (1738) the situation would have been almost hopeless, but this account is neither totally accurate nor comprehensive; it can only partly be relied on. There are a few documents but only one letter from Artedi, and, most importantly, no diary or any portrait. Therefore one needs a certain amount of imagination to reconstruct his short and tragic life.

Linnaeus did not need to say anything about Artedi's Swedish context. Sweden at his time was a nation declining in European importance. Artedi was born in 1705, some years after the glorious victory at Narva, when Charles XII defeated a much larger Russian army, although the decisive defeat at Poltava in 1708 lay in the immediate future. The early decades of the 18th century were overshadowed by the war and despite war propaganda a pessimistic mood was probably widespread. Even after the Swedes had been defeated, Russian pirates harassed the Swedish coast and Artedi may twice have suffered the harsh realities of war: once, when his parental home at Nordmaling was burnt down, and the other when Härnösand, where he went to school, was destroyed by the Russians.

Thus, Artedi's youth was passed in a dramatic period, with uncertainty as to events of the next day, or the prospect of peace after almost half a century of war. On the other hand, the political and religious organization of Sweden never really broke down. In general, civil servants were able and faithful to their tasks, while the clergy formed the backbone of the nation, ready to maintain its spiritual standing as well as continue their administrative work. There are many contemporary narratives about life in a clergyman's home, one of

the best known being Linnaeus's account of his youth, and his memories of his father, the devoted preacher and botanist, and mother with her keen interest in her son's future. In this case, as in many others, the clergy were the main recruiting base for potential scholars and civil servants as well as a new generation of ministers.

But Linnaeus had a better start than Artedi, and his home was a happy one. Artedi was brought up in a family tormented by problems about which documents give us some information (Nybelin 1955). His father was a minister, as also was his grandfather who, almost blind and very feeble, lived with the family. Artedi's father had, however, been admonished by the bishop on account of his connection with an adventuress, Maja Stina Fröling, who had acquired both the parish funds and the little money he had. There were also other scandals, which testify that something was wrong with the minister of Nordmaling. Petrus was the only son, thus he was bound to succeed his father by studying theology. His education commenced by being tutored by his father before he got the opportunity to attend the school at Härnösand.

One aspect of Artedi's youth which must have been a happy one was the natural surroundings of Nordmaling and Anundsjö and later of Härnösand. Nordmaling and Anundsjö are not situated at the coast, but they belong to what could be called the 'waterkingdom of Sweden', owing a lot to the glacial period. Fishing was an important activity for anyone living in this area. During summertime many people moved there from the south, even from as far away as Stockholm to live on what the sea could give. There is a beautifully painted chapel on one of the islands (Ulvöhamn) at the coast from about Artedi's time where you can see this trade going on – although the painting is meant to show the catch at Capernaum. The coat of arms of the province Ångermanland consists of three salmon arranged in a decorative way. Cer-

tainly, this was a suitable environment for the future founder of ichthyology.

Thus, the geographical and historical setting in some ways formed Artedi. He was destined to become a minister in some distant parish in Sweden, probably Nordmaling. At the primary school and gymnasium of Härnösand he was introduced to the necessary classical languages; Latin, Greek, Hebrew, and theology were the main subjects. It seems that he was a rather successful pupil but the gradings are very approximate. Otherwise we do not know much about his years in Härnösand except that during summertime he obviously devoted himself to natural history studies.

Artedi matriculated at Uppsala University in 1724 at the age of nineteen, the usual age for the Faculty of Divinity. The students were organized into what were called 'nations', as prescribed by the academic rules (Lönnberg 1905). The *Ängermanländska nationen* was a second home for Artedi, or it was intended to be. He rose to the rank of senior and before his departure abroad he acted as curator of the nation (a position in which he was responsible for financial matters and, to some extent, the pastoral care of his fellow students). The minutes from this period are rare surviving writings in Artedi's hand. However, he does not seem to have taken very much interest in the activities of the nation. Obviously he was a loner. No applications for scholarships has come down to us. It is almost as if he wanted to hide from the authorities' attention.

After two years Artedi changed to the medical faculty. There his friendship with Linnaeus developed. Linnaeus tells us how they met; about their mutual interests, their competition, and how they decided to divide the study of natural history in such a way that he would take botany, except for the umbellifers, and also entomology and ornithology, while Artedi would concentrate on ichthyology and amphibiology. The mammals would be open to both, likewise mineralogy. Linnaeus explicitly states that when Artedi left botany to him the idea arose that he would cover the whole subject himself, a statement which if taken at face value must mean that Artedi inspired Linnaeus in his epochmaking undertaking.

In his biography of Artedi Linnaeus compares the two of them and describes himself as 'short, quick, easy to excite', while Artedi is characterized as 'tall and thin, with long black hair and similar looks as the English naturalist John Ray'. This comparison must also be interpreted at a deeper level: what Linnaeus and Artedi now had formed was a team which only could be compared to the team of Willoughby and Ray, and their objective

was to replace the works of the two famous Englishmen. The comparison had an element of tragic irony for Artedi like Willoughby died early, while Linnaeus lived his full life like Ray as an honoured member of the scientific community.

In unpublished notes Linnaeus described Artedi's way of working: sleeping all day and doing his research during the night – again in complete opposition to his friend (Thunberg, unpubl.).

Linnaeus has little positive to say about the general standard of medical education at Uppsala at the time (Linnaeus 1957, Lindroth 1978). Thus, biographers of Artedi have neglected other aspects of Uppsala of the 1720s and have, I think unjustly, concentrated on the relation between only these two men. True, the two professors of medicine were both old and odd. Rudbeck junior had been appointed professor in the 1680s, and Lars Roberg only a few years later. For many years Rudbeck had worked with an enormous philological manuscript, while Roberg despite great learning, simply did not have a good reputation. Perhaps it would have been better if the energetic Magnus von Bromell had stayed at the faculty. During his short period there he had introduced Tournefort's botany as well as Ray's zoology to the curriculum. But in the middle of the 1720s Rudbeck had been forced out from seclusion by the death of this assistant and son-in-law, Petrus Martin, who had undertaken the teaching of medicine. Now Rudbeck showed his great skill as a natural history artist, lecturing on his so-called 'Book on Birds', the marvellous illustrated manuscript he had made around the turn of the century (and which only recently has been published in full). Artedi was there to see these paintings. His annotations have survived as Linnaeus copied them. When Linnaeus saw the paintings for himself he exclaimed: 'This can not be the work of a human!' (Broberg 1985).

But it is especially Roberg who should have our attention. He is not easy to understand, being both cynic in the classical sense, convinced of the misery of man, and a philanthropist who in Uppsala started the first Swedish hospital. Quite against the general pattern he seems to have become more modern with growing age. He performed dissections, and urged his students to write good scientific dissertations. He was one of the first to adopt the Linnaean sexual system, but gained less recognition than the handsome Rudbeck who became royal physician (*arkiater*), as well as the father of twenty-four children. On the contrary, the badly dressed bachelor, Roberg, did not even choose to wear a wig. Artedi became Roberg's

protégé, while Linnaeus was supported by Rudbeck.

Linnaeus even lived at Rudbeck's house and acted as the tutor to some of his many small children. He went away on his Lapland tour, inspired and recommended by Rudbeck, who once had made the same journey. Linnaeus was able to use his library, lecture in the botanical garden which was supervised by Rudbeck. On one occasion at least he got his scholarship on Rudbeck's vote. Roberg and Rudbeck had been enemies for decades, and being affiliated with one of them it was natural to be opposed by the other.

On the other hand, Linnaeus and Artedi were friends. Linnaeus tells us that he bequeathed his scientific papers to Artedi in case he should perish during his Lapland journey – though it would later be he who would act as the executor of his friend's last will. But they were also competitors, and probably the competition was fiercer than Linnaeus admitted in his later writings. In my view the situation was more complicated than has been generally acknowledged, because when the two friends decided to divide between them the world of natural history they did so with a quite normal consideration of the prospect of succeeding Rudbeck and Roberg respectively. For this reason Linnaeus choose botany, ornithology and entomology, three fields in which Rudbeck excelled, while Artedi choose Roberg's subjects. However, in time Linnaeus was to succeed Roberg.

This is, of course, a rather unglamorous interpretation of the history of science, but is also a pragmatic one, especially as there really were no other competitors. It must also be remembered that both Rudbeck and Roberg were old and overdue for replacement.

Before I return to Roberg's influence I must briefly analyse the motivation of scientific studies in Sweden at this period. Sweden was politically defeated and badly needed economic recovery. This does not mean that high hopes of nationalistic importance were forgotten. Olof Rudbeck Senior, at the end of the 17th century, wrote his remarkable *Atlantica*, in which he claimed Sweden to be the cradle of all culture, once the sunken Atlantis, which he had rediscovered. However improbable that may sound, the idea lingered on of something very special with the Swedish or 'Gothic' history. This resulted in a number of inventory works showing the splendour of Sweden's history as well as its natural history, including several local floras, and monographs on different provinces, for example Ångermannia where Artedi was born. He himself wrote in 1729 a flora of the plants of Nordmaling, a rather

strange piece, combining rural knowledge and Tournefortian botany (Lönnberg 1905). The fact that it was written in Swedish could, I think, be associated with the Gothic ideology in a general way. Also, this flora pays much attention to economic value of the plants which at the time was dominant in botany. Such inventories would also deal with fisheries and mineralogy, Artedi's main interests, as well as Sweden's most important natural resources. Thus, a modern utilitarian (or *utilistisk*) aspect and old gothicism came together in the same works. I do not claim that Artedi was directly influenced by Rudbeck Senior and Gothic ideology, nor do I say that he chose to deal with applied science, which he obviously did not. What I want to stress is that there was an atmosphere of general support for scientific undertakings at his period, and also a climate of opinion in favour of a nation rebuilt with the help of science and technology.

This, again, to some extent contradicts Linnaeus, who lays too much stress on the poor shape of Uppsala University at the time of his glorious advent. In evidence, let me draw attention to some forgotten ichthyological research.

In 1710 a scientific society in Uppsala, *Vetenskaps societeten*, was founded. It is still thriving (Hildebrand 1939). With both Rudbeck and Roberg as members there were some contributions in natural history in the proceedings of the society. Rudbeck's son-in-law, Petrus Martin, was the society's censor in ichthyological matters. He corrected the writings on fishes of the extremely versatile minister of Hudiksvall, Olof Broman, as well as the works on Lake Vättern by Daniel Tiselius, and he himself planned to specialize on ichthyological matters. However, Martin died in 1726, which I think is important for Artedi taking up ichthyology.

Also there was the activity of Roberg. A vignette has reached posterity showing Roberg on his way through the city carrying a burbot (*Lota lota*), a very un-manly thing to do, usually something left to the kitchen maid, but the bachelor Roberg had no maid, and his purpose was probably not to cook a dinner of stewed burbot but to bring scientific material to the dissection table (Dintler 1959). Some of his students wrote ichthyological dissertations; there is also a quantity of manuscript material dealing with ichthyology now in Uppsala University Library. According to a note in this collection he commissioned Artedi to be the opponent to the well-illustrated dissertation *De piscibus* from 1727, in which, among other things, there are the first Swedish illustrations of microscopically magnified fish-scales. For some reason

Artedi did not fulfil his task, but to me it seems quite clear that the year 1727 marks the starting-point of his career as a serious ichthyologist. After Martin's death there was room for somebody else. Thus, Roberg should be honoured as Artedi's mentor.

Another aspect of Artedi's studies which has been completely neglected, is his interest in alchemy. Again, there is a connection with Roberg. Linnaeus, in his biography, hints at his friend's predilection and some further information is provided by Roberg, though in his almost unintelligible handwriting. Artedi was said to be living outside Uppsala at a place called Brunby as the tutor to the children of a potter. Here he was able to use the oven for his alchemical experiments (Roberg, unpubl.). A notebook with excerpts from alchemists' books was found some years ago in the Royal Library of Stockholm, and there one can see how he delved deeply into the subject (Walde 1951). Nothing from these experiments has been preserved, or published, but Linnaeus, in the *Hortus Cliffortianus* (1737) (his botanical description of Clifford's garden in Holland) mentions Artedi as the foremost of Swedish chemists (Linnaeus 1737). Such a distinction would have been an exaggeration as chemistry was *the* Swedish science. Note here that Linnaeus calls Artedi 'chemist', which shows that there was no clear-cut demarcation between alchemy and chemistry at that time.

This is an important point: one should not expect science to follow direct route towards truth. In studying alchemy Artedi could not be called ill-advised just because we find it a waste of time.

However, attempting to transmute base metal into gold was simply not the right thing to do at this time. There were other writers on alchemy, among them Roberg, who published a small pamphlet with alchemical rules in 1732, but who, despite his standing as an academic professor, was admonished and forced to withdraw the booklet. The reasons for this attitude may throw some light on Artedi's situation. As alchemy was not considered as nonsense at this period I suggest that the censorship was motivated by political or religious bias. Around 1710 there had been an extensive legal action against the adventurer Otto Arnold Pajkull, who had failed to fulfil his promises to Charles XII to make gold and who had been decapitated for this and other acts of treason. Thus, alchemy still contained an element of danger. Furthermore, towards the end of the 1720s there was a religious adventurer – or so he was regarded by the authorities – named Johan Conrad Dippel, living in Stockholm (Pleijel 1935). He was a

radical pietist, rejecting many of the religious dogmas dealing with the Trinity and Baptism, substituting for them the inner light of every individual. And Dippel advocated alchemy as a sort of spiritual art to refine man as well as nature.

Is it possible to connect Artedi with Dippel? Was he a religious heterodox? Considering his father's problematic relations with his superiors it would be possible to argue that he might have been so. That Artedi was unconventional in his religious outlooks seems clear. He never mentions God in his works, nor was there any religious work among the books he left at his death (Engel 1951). From what Linnaeus wrote of him he was obviously strongly introverted, always dressed in black, and living isolated. However, we do not know if, like some other students of his day, he was a real heterodox, a heretic Dippelian. Perhaps science simply was his true religion.

Artedi necessarily became separated from his Swedish context when he set out from Sweden for further studies abroad. (Of course, 'context' should not be interpreted as something absolutely determining but rather as an open framework of prevailing ambitions and possibilities.) At that time he abandoned the use of the name 'Arctædius', meaning 'from Nordmaling', his birthplace, for 'Artedi'. Perhaps this was a symbolic gesture, a farewell to his problem-ridden youth, perhaps there was other significance. With him he brought his manuscript fish fauna on the Baltic, the manuscripts which later became the *Ichthyologia*, the *Trichozoologia* or classification of 'hairy animals', and also some notebooks on chemistry. (Artedi 1934, Engel 1951, Nybelin 1966). He went to London to visit Hans Sloane, later crossed the English channel and arrived at Amsterdam, where he met Linnaeus. He worked for the rich pharmacist Albertus Seba, describing his fish collection. But only a few days after they met Linnaeus had to write in his almanac that Artedi had drowned in Amsterdam during the night between September 27 and 28, 1735. Two and a half years later he had edited the ichthyological manuscripts to which he added the life of Artedi. Obviously Linnaeus had access to some letters from Artedi's relatives, which makes his version especially important, but also he used his own memories and judgement.

However, as I stated at the beginning, to understand Artedi one must go beyond the biography by Linnaeus. I have tried to do this, stressing the importance of the geographical, social and economic features of his life. The general impression you get of his life is not a very happy one, indeed it was toilsome and, in the end, tragic. I have also tried to 'normalize' the work of these two

extremely gifted friends by stressing Uppsala as a more fruitful place for natural history studies than has often been suggested. I have also tried to stress the elusiveness, the almost mystical character of Petrus Artedi, which makes him even more memorable.

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