

CARL PETER THUNBERG AND JAPANESE NATURAL HISTORY

Bertil Nordenstam

Department of Phanerogamic Botany, Swedish Museum of Natural History,
Box 50007, SE-10405 Stockholm, SWEDEN.

¹ Bertil.Nordenstam@nrm.se

ABSTRACT

*Carl Peter Thunberg (1743-1828) was the most famous of Linnaeus's pupils and became known as the 'Linnaeus of Japan'. However, he was a zoologist almost as much as a botanist and should be remembered also for his lasting contributions to zoology, especially entomology. He published about 160 zoological papers, 90 of which dealt with insects, and he described more than 1,500 new species of insects. One of his first scientific papers dealt with the new grasshopper genus *Pneumora* from South Africa. Thunberg's insect collections amount to 36,000 specimens and are largely intact as today. He was also the author of several mammals, such as the Brown Hyaena, and a number of reptiles and fishes, including several new species from Japan.*

Keywords: Thunberg, Japanese natural history, Entomology, Linnaean disciple, Taxonomy, History of science

INTRODUCTION

We tend to think of Linnaeus and many of his foremost pupils as botanists. Linnaeus has been famed as '*Princeps botanicorum*', and his perhaps most successful disciple, Carl Peter Thunberg (1743—1828; Fig. 1), has been named the 'Father of South African Botany' and also the 'Linnaeus of Japan'. However, most of the Linnaean apostles, like Linnaeus himself, were medical doctors and zoologists as well – in fact they are better labeled as naturalists, or natural history scientists. Their academic positions were not in botany, but rather in medicine and botany, and similar combinations. In 1812 a Swedish chair in botany in Sweden was created, when Thunberg's friend and contemporary colleague Anders Jahan Retzius (1742—1821) retired from his position at the University of Lund in south Sweden. This eminent scholar, sometimes referred to as a 'giant in learning' had occupied a professorship which included natural history, economy and also chemistry, in reality corresponding almost to a faculty of science. When he retired the chair was divided into three, one of which was botany and practical economy. The first holder of this botanical chair was Carl Adolph Agardh (1785—1859), who later became known as the 'Father of algology'.

Also the Professor Bergianus chair (in Stockholm, Sweden), created in 1791 through the will of the Bergius brothers, had a wider denomination although with a botanical touch, viz., "Natural history, especially botany". The first Professor Bergianus was Olof Swartz (1760—1818), who was indeed an excellent botanist, but following Linnaean tradition he also published on various aspects of natural history including economy and zoology especially insects (Nordenstam 1992).

Thunberg's Travels

Thunberg's unparalleled journey lasted nine years and was initially meant as a medical study tour to Paris, the capital city of medicine at the time. Thanks to Linnaeus's connections with Dutch colleagues, particularly the Burman family in Amsterdam, Thunberg's travels were

extended to include a three-year stay in South Africa and a voyage to the isolated and little known Japan.



Fig. 1. Thunberg in special dress for the visit to the shogun's court in Edo in 1776

Thunberg's travels and botanical works are well known (cf. Svedelius 1944, Nordenstam 1993, Hansen et al. 2012). However, in order to complete the picture of the naturalist Thunberg, here follow some comments mainly on his zoological contributions.

He arrived at the Cape in April 1772. In South Africa Thunberg made three major expeditions in the spring and summer months of the years 1772, 1773 and 1774. The original inhabitants, i.e. Bushmen and hottentots abounded in the Dutch Colony, and at the colony borders he met also with Bantu people and commented on their looks, life and manners.

The Father of South African Botany

At the Cape Thunberg collected an enormous amount of plants, including more than a thousand new species and dozens of new genera.

The South African flora is extremely rich. The small Cape Peninsula, dominated by Table Mountain, contains the highest density of plant species, endemic plant species and threatened species of any similarly sized area on earth. Many of them are endemic to this small area, and in spite of the large city at the very foot of the mountain only a handful of the rare species have gone extinct.

The Zoologist

Thunberg is no doubt the "Father of South African botany", but perhaps less known are his zoological discoveries and publications. One of his first scientific publications was the description of a grasshopper genus which he named *Pneumora*; with three species, illustrated by copper plate prints (Fig. 2, Thunberg 1775).

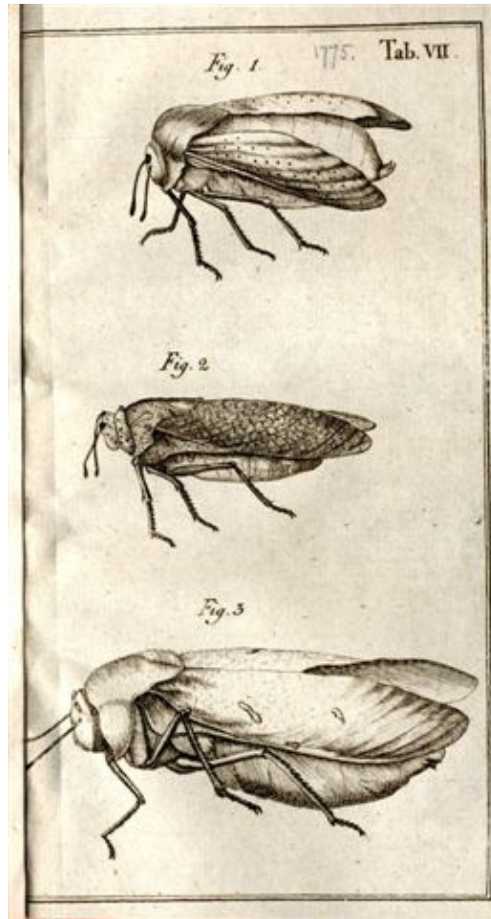


Fig. 2. *Pneumora*, a grasshopper genus from the Cape, described and illustrated by Thunberg (1775).

These insects are locally known as ‘Opblasers’ or ‘Blaasops’ because of their inflated body – and the generic name is still valid. The inflated body of these creatures serves as a musical instrument and the insects make a wonderful concert at night. This was well understood by Thunberg and noted in his travelogue (Thunberg 1795, 2008): “The oppblasers (*Pneumora*) a kind of grasshopper were caught in the evening. After sunset they begin to make a singular noise, rubbing their barbed hind-legs against their empty and transparent stomach...this sound was heard at a great distance. Their whole body is, as it was, a bladder, and so empty, that these creatures cannot be carried about stuck through with a pin, like other insects.”

Thunberg also described various larger animals including mammals. In his travelogue Thunberg relates many encounters with animals, some quite dramatic involving lions or buffaloes. He depicted an animal called *Marmota Africana*, which can be identified as *Bathyergus suillus*, the Cape sand mole, or Cape Dune Molerat. He is also the author of the Brown Hyaena, which has the scientific name *Hyaena brunnea* Thunb. He probably never saw a Brown Hyaena alive during his South African travels in the 1770’s, and the animal only got its scientific name almost 50 years later, in 1820 (Rookmaaker 1989).

Out of the total of 584 publications by Thunberg (Rookmaaker & Svanberg 1994) no less than 159 can be classified as purely zoological, and some more with mixed contents may be added. About 90 of Thunberg’s publications are devoted to entomology (Wallin 1994). Altogether he described 1513 new species of insects, and more than half of these names are still valid and used today. These figures are comparable to his botanical achievements, since

he described ca. 1900 new plant species, about 60% of which are valid names today (Juel 1918, Nordenstam 1993).

Some Details Of His Entomological Contributions Are Discussed Below.

Thunberg's insect collection in Uppsala amounts to more than 36,000 specimens, and they are largely intact today. Less than 100 specimens have been destroyed or are missing for some reason (Wallin 1994).

After his return to Sweden Thunberg published a series of entomological dissertations mostly based on his own discoveries during the long journey, He described some 160 new insects from South Africa and about 40 from East Asia and Japan. His main contributions to entomology are the works on parasitic wasps, especially in two major works from 1822 and 1824, when he was 80 years old! The major genus of this large group of insects was named *Ichneumon*, a Linnaean name, and Thunberg described around 250 new species of this genus alone. Imagine his problem to find new specific epithets for each of them! He chose to name many of them after human occupations or titles, such as *ensor*, *creditor*, *curator*, *debitor*, *dictator*, *director*, *laborator*, *rector* etc.

He also named many new species of '*Microlepidoptera*', i.e. small butterflies, after persons including friends and colleagues, such as Acharius, Montin and Osbeck, here likewise following a Linnaean tradition.

Japanese Natural History

Thunberg's contributions to the zoology of Japan are likewise significant and important. In addition to numerous insects he described new lizards, turtles and several fishes.

The turtle *Testudo japonica* was described by him in 1787 (Thunberg 1787b; Fig. 3). It is now regarded as a subspecies of the Green Turtle, *Chelonia mydas japonica* (Thunb.).

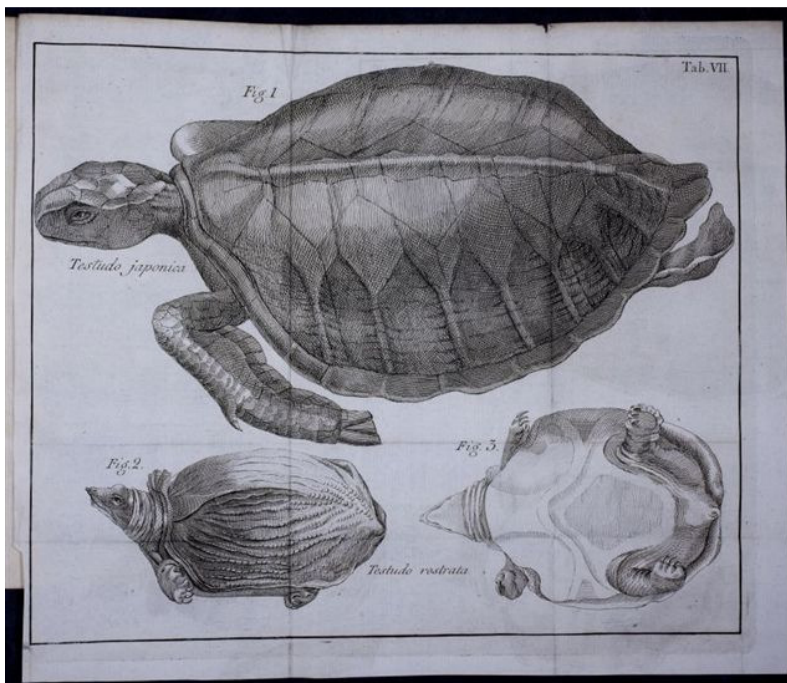


Fig. 3. Turtles described by Thunberg (1787b). On top is *Testudo japonica* (Thunb.), now regarded a subspecies of the Green Turtle.

Several of his animals were nicely illustrated by copper-plate engravings. Among them are these two Japanese fishes, *Ostracion hexagonus*, now *Kentrocapros aculeatus* (Houttuyn) and *Sciaena cataphracta*, now *Monocentris japonica* (Houttuyn) (Fig. 4, Thunberg 1790).

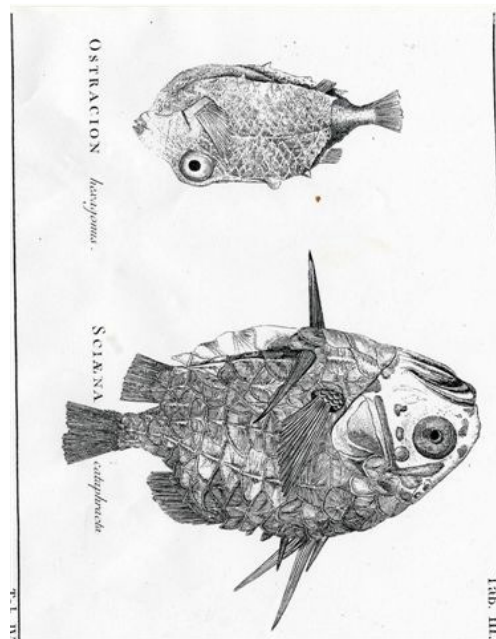


Fig. 4. Two Japanese fishes described by Thunberg (1790) as *Ostracion hexagonus*, now *Kentrocapros aculeatus* (Houttuyn) and *Sciaena cataphracta*, now *Monocentris japonica* (Houttuyn). Thunberg also found, described and illustrated (Fig. 5) the nowadays rare and near-endemic lizard called Japanese Clawed Salamander (*Onychodactylus japonicus*) at Hakone, where it still exists as a red-listed (endangered) species. At the time of Thunberg's visit this animal was more abundant.

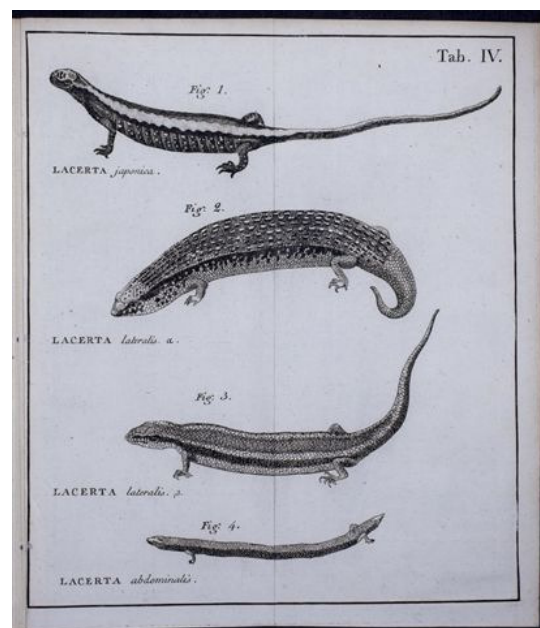


Fig. 5. The Japanese Clawed Salamander, *Onychodactylus japonicus*, by Thunberg (1787a) named *Lacerta japonica*.

Thunberg writes in his travelogue, “A long and slender lizard (*Lacerta Japonica*) was very commonly seen running in the tracts of the Fakonie mountains. I afterwards saw the same animal hanging out for sale and dried, in almost every shop in this part of the island; several of them were spitted together on a wooden skewer, that was run thro’ their heads. It was used in powder as a strengthening remedy; it was also exhibited in consumptions; and to children that were infested with worms” (Thunberg 1795, 2008). These are interesting remarks, and they are typical of the style and contents of Thunberg’s travelogue – he purposely excludes scientific descriptions (because they are published separately and elsewhere), but includes general observations and notes on usefulness of animals as well as plants.

The Complete Naturalist

These remarks may remind us of Thunberg as a faithful Linnaean disciple and a complete naturalist. His contributions to zoology equal his botanical achievements in quantity and in scientific impact. We should also remember that Thunberg, like Linnaeus, Sparrman and many of the other Linnaeans, were also medical doctors, although only at times practicing physicians. In Thunberg’s case he only practiced temporarily during his stay at the Cape, mainly for the purpose of raising money. Like most Linnaean apostles, Thunberg was a monetary poor but intellectually rich traveler and observer. He became an unusually ardent and long-lived worker in the Linnaean scientific vineyard of descriptive natural history.

In Japan, Thunberg is maybe better known than in Sweden, and he is familiar to many, from school children to the Imperial Family in three generations. The late Emperor Hirohito, now known as Emperor Showa, was a keen marine biologist, also botanically interested. On the bicentenary jubilee in 1976 of Thunberg’s visit to Japan I was invited to the Imperial Palace in Tokyo for a long conversation with the Emperor on biology in general and Thunberg in particular.

REFERENCES

- Hansen, V., Nordenstam, B. & Hansen, L. (2012). Biographies with maps. Pp. 13-77 in: Hansen, L. (ed.), *The Linnaeus Apostles*. 8, Encyclopaedia. IK Foundation & Co., London.
- Juel, H. O. (1918). *Plantae Thunbergianae*. Akademiska bokhandeln, Uppsala; O. Harrassowitz, Leipzig.
- Nordenstam, B. (1992). Olof Swartz. Pp. 23-43 in: Jonsell, B. (ed.), *Bergianska botanister*. Atlantis, Stockholm.
- Nordenstam, B. (1993)(ed.). *Carl Peter Thunberg. Linnean, resenär, naturforskare*. Atlantis, Stockholm.
- Rookmaaker, L. C. (1989). *The zoological exploration of Southern Africa 1650-1790*. A.A. Balkema, Rotterdam, Brookfield.
- Rookmaaker, L. C. & Svanberg, I. (1994). *Bibliography of Carl Peter Thunberg (1743-1828)*. Svenska Linnésällskapets Årsskrift 1992-1993: 7-71.
- Svedelius, N. (1944). *Carl Peter Thunberg 1743-1828. Ett tvåhundraårsminne*. Svenska Linnésällskapets Årsskrift 27: 29-64.
- Thunberg, C. P. (1775). *Pneumora, et nytt genus ibland insecterne, upptäckt och beskrifvit*. Kgl. Vetenskaps Academiens Handlingar, Stockholm, 36: 254-260.
- Thunberg, C. P. (1788—1793). *Resa uti Europa, Africa, Asia, förrättad Åren 1770-1779*, vol. 1-4. Joh. Edman, Upsala.
- Thunberg, C. P. (1787a). *Beskrifning på några sällsynte och okände Ödlor*. Kgl. Vetenskaps Academiens Nya Handlingar 8:123-128, Tab. IV.
- Thunberg, C. P. (1787b). *Beskrifning på Trenne Sköld-Paddor*. Kgl. Vetenskaps Academiens Nya Handlingar, Stockholm, 8: 178-180.
- Thunberg, C. P. (1790). *Beskrifning på tvänne Fiskar ifrån Japan*. Kgl. Vetenskaps Academiens Nya Handlingar, Stockholm, 11: 106-110.
- Thunberg, C. P. (1793--1795). *Travels in Europe, Africa and Asia, performed between the years 1770 and 1779*. W. Richardson & J. Egerton (vol. 1-3, 1793), F. & C. Rivington (vol. 4, 1795), London.
- Thunberg, C. P. (2008). *Travels in Europe, Africa, and Asia*. In: Hansen, L. (ed.), the *Linnaeus Apostles*, 6. IK Foundation & Co., London.
- Wallin, L. (1994). *Carl Peter Thunbergs insektsamling*. Svenska Linnésällskapets Årsskrift 1992-1993: 73-84.