Carl Peter Thunberg's Life, Travels and Scientific Contributions

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Linnaeus (1707–1778), the greatest Swedish scientist of all times, never travelled outside Europe, but he sent his disciples on long journeys of exploration to remote and sometimes unknown parts of the world. Many of these Linnaean apostles suffered from hardships of travels and tropical diseases and several of them died in foreign countries. Carl Peter Thunberg became the most successful of these apostles. He survived a nine-year journey to distant continents and after his return to Sweden held the Linnaean chair in Botany and Medicine at the University of Uppsala for 44 years.

Carl Peter Thunberg was born on Nov. 11, 1743, in the town of Jönköping in Southern Sweden, the son of a local tradesman and bookkeeper. He became fatherless at the age of seven, but his mother re-married another trader by name of Gabriel Forsberg and managed to provide a decent upbringing to her two sons. Carl Peter was meant to go into merchandise after a minimum of school attendance, but his talents for studies were soon discovered. He passed all grades of the local school and in 1761 he enrolled at the University of Uppsala. Having finished the compulsory courses in theology, philosophy and public law he specialized in chemistry, medicine and natural history. During his nine years of university studies he naturally came in contact with Linnaeus, who soon took notice of the talented young student with a special liking for natural history.

In 1767 Thunberg defended a medical thesis *pro exercitio* under Linnaeus and passed his academic degrees quickly. In 1770 he graduated as a licentiate and in the same year defended a doctoral dissertation under the medical professor Sidrén.

Linnaeus was instrumental in providing Thunberg with a small travel grant for studies abroad. The destination was Paris, the medical centre of the world. Thunberg travelled via Copenhagen by the sea to Amsterdam, where he visited Johannes and Nicolaas Laurens Burman, father and son, both friends and correspondents of Linnaeus.

The Burmans were impressed with Thunberg's knowledge in natural history and suggested that he should go with a Dutch East Indiaman to some exotic destination. Thunberg consented gladly, but had to go through with the planned studies in Paris, where he spent almost a year. In the meantime the destination had become defined to Japan, the plants of which were practically unknown in the Western World and believed to be suitable for European gardens.

Gardening was fashionable in Holland at the time, and exotic plants were much in demand. It was easy to find sponsors for the project, and three patrons were especially helpful. They were Jan van der Poll, Daniel ten Hove and Daniel Deutz, and all were later commemorated in genera described by Thunberg. *Pollia*, *Hovenia* and *Deutzia* are all known in horticulture, and especially the deutzias are garden favourites with a large number of species, hybrids and cultivars.

Since 1635 Japan was closed to the Western World

except Holland and China, and in Thunberg's days only Dutch ships were allowed to visit with two ships a year. Thunberg had to appear as a Dutchman, and for this purpose it was decided, that he should spend some years at the Dutch Colony at the Cape, to learn the language, but also to explore the flora of South Africa.

Around New Year 1772 Thunberg sailed from Holland as an extra surgeon on board the "Schoonzigt" in a convoy of four ships. The voyage lasted three and a half months, and 115 men died on Thunberg's ship on the way. This may seem a large figure, but it was quite normal to lose perhaps one third of the crew and soldiers, who were to a large extent recruited by obscure methods and often in a poor health condition.

Soon after embarkment Thunberg and the officers on board had the misfortune to be poisoned, when the cook by mistake mixed white lead in the pancakes. Nobody died from this mishap, but Thunberg was very sick, having eaten one of the last pancakes, rich in lead. Although Thunberg eventually recovered from the poisoning, he afterwards suffered from stomach troubles all his life. Characteristically, Thunberg recorded thoroughly the effects and after-effects of the poisoning in an article published in 1773 by the Swedish Academy of Sciences – his first scientific publication.

On April 16 1772 the ship anchored in Table Bay, and on the following day Thunberg could go ashore. By coincidence his compatriot and friend Anders Sparrman arrived simultaneously on board a Swedish East Indiaman. They spent some time together at the Cape, but they soon parted, Sparrman going with Captain Cook on his second voyage to the South Seas. When Sparrman returned three years later to explore the Cape, Thunberg had recently departed and was on his way to Java and Japan.

Thunberg spent the winter at the Cape, getting acquainted to Cape Town and its immediate surroundings. The settlement was still rather modest, the most conspicuous features being the citadel, the church, and the Company's garden, which supplied fruits and vegetables to the seafarers. The Cape of Good Hope was generally regarded as the southernmost point of Africa. The contemporary maps are deficient in this respect and generally poor. Sparrman's map, drawn in 1775–76 and published in his travelogue (1783), is more accurate and clearly shows Cape Agulhas as the southernmost point.

Thunberg was soon familiar with Table Mountain, which he climbed altogether 15 times. He also made a longer excursion in June to the wine districts of Paarl and French Hoek, where French Huguenots had planted vinyeards already in the 17th century. When springtime approached Thunberg prepared for his first long expedition in the Colony, by ox carts and on horseback. He travelled with three European companions (the Company's gardener J. A. Auge and two young officers) as well as two domesticated Hottentots. The party set out in the beginning of September when spring flowers abounded everywhere in the plains after rich winter rains.

The expedition, which lasted four months, first went north but soon southeastwards to Swellendam, from where they continued eastwards in the Colony. Travelling was dangerous in many areas; roads and tracks were bad, and wild life was abundant, in some areas including lions, leopards, buffaloes, rhinoes and elephants. In a wood near Knysna they were attacked by a buffalo bull killing two horses and chasing the men up the nearest trees. Eventually they reached the eastern border of the Colony at Gamtoos River, where hippos were frequent. Hottentots and Caffres lived there together, and beyond the river lay the unexplored Caffir country.

They turned back along partly new tracks, and after New Year 1773 they were back in Cape Town, where Thunberg remained until next spring. He was busy with his specimens and dispatched generous parcels of dried plants, bulbs and seeds to his friends and benefactors in Holland and Sweden, including

his mentor Linnaeus.

In September a new expedition was prepared, and as fellow traveller Thunberg now had the English gardener Francis Masson, who had a fine cart and a European coachman. They also took saddle-horses and four Hottentots along. Again they journeyed northwards and traversed rivers and mountains with difficulty. Following a similar route as on the first journey they arrived at Swellendam and from there proceeded eastwards. This time they crossed the Gamtoos River and reached as far as Sundays River, north of present-day Port Elizabeth. Among the abundant wild life there were also quaggas, now extinct. For safety reasons Thunberg enforced his party with a troop of Hottentots, and at times they were more than one hundred persons. European colonization was prohibited in this area, but Thunberg nevertheless found a farmer who had settled illegally in the area. They returned along a more northerly route than on the first journey, and from a mountain peak Thunberg could get a view of the wide and barren semidesert now called the Great Karoo. They returned to Cape Town in the end of January 1774, and Thunberg again became occupied with his collections.

The next winter was very cold, Table Mountain was white with snow and hail some days, and vegetables and grape-vines froze to death. Nevertheless, Thunberg kept his habit of making short excursions in the vicinity. He also started preparations for a third long expedition in the Cape Colony and persuaded Masson to join him once again. On the 29th of September they started on a northbound track, but this time they went much further than previously, to the Bokkeveld and Roggeveld mountainous areas, where they explored botanically unknown territory. The weather was rough, and they had frost and snow even in the summer month of December. There were only few settlers in this inhospitable area and they were partly nomadic, in summer growing wheat in the mountains, but in winter grazing their cattle in the lower karoo areas. Just before the New Year Thunberg and his party was back in Cape Town.

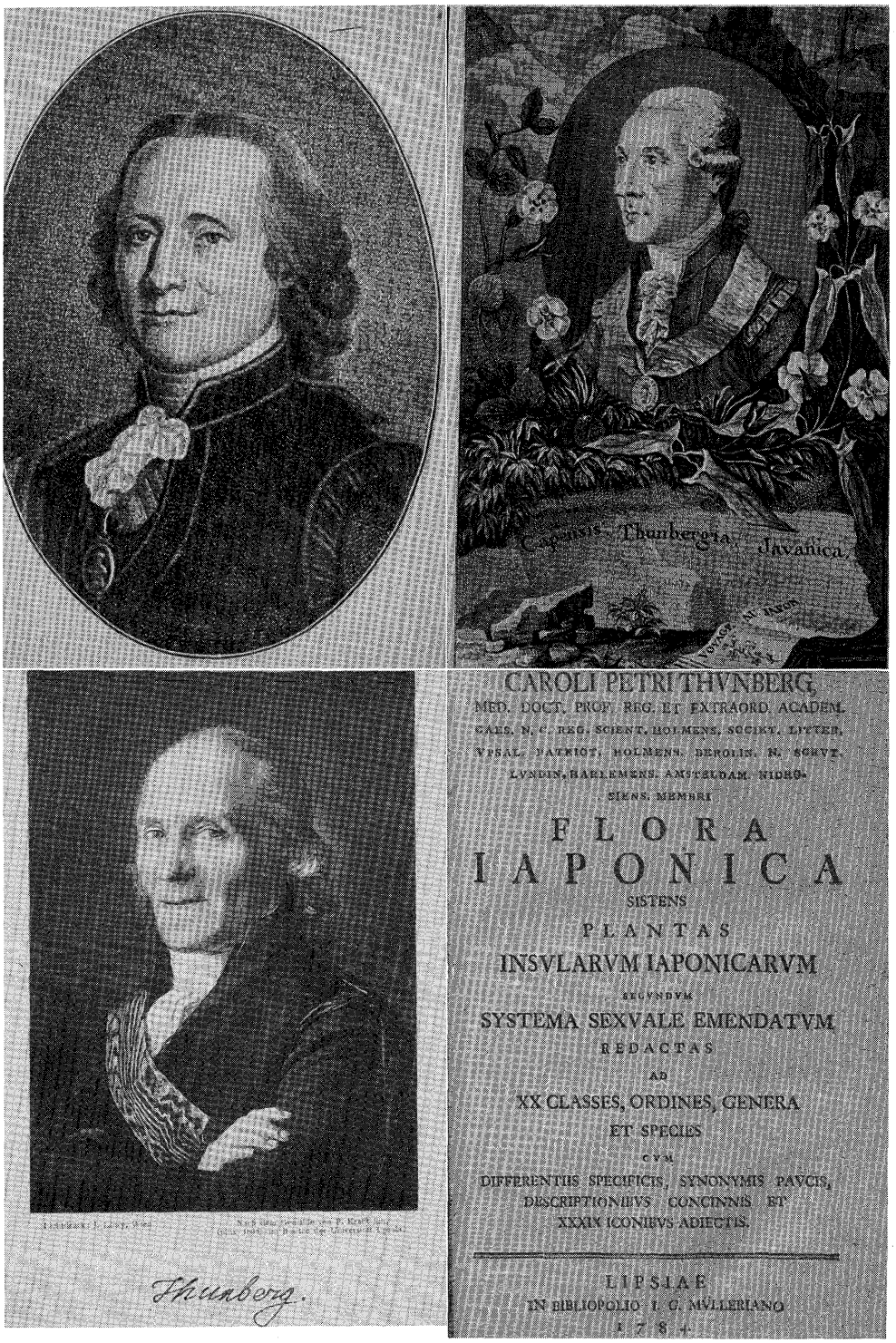
Thunberg's stay at the Cape came to an end, and in March 1775 he could continue towards his final destination, Japan. On the way he stayed one month in Java, where he mixed with the European colonists, made excursions, and bought unicorn (i.e., narwhal) horns, which could be sold with profit in Japan.

In August he arrived in the harbour of Nagasaki, where all foreign visitors were confined to the little islet called Deshima. His freedom of movement was very limited, and only after half a year he managed to get a temporary permit to make excursions in the surroundings of Nagasaki.

In 1776 Thunberg was allowed to join the Dutch legation on its annual visit to the shogun's court in Edo, which is now Tokyo. They travelled mainly by *norimon* (palanquin) along good main roads, and the journey lasted four months. Along the road Thunberg could make many collections and observations, e.g. at Hakone mountain. He was delighted and impressed by the Japanese culture and way of life, which he described as a well ordered society, which seemed to work smoothly and to everyone's satisfaction. He could not discern the ongoing political and economic decline, which was skilfully concealed by the government.

In Edo Thunberg met with many learned Japanese scholars, with whom he had daily conversations. Especially the medical doctors were interested to acquaint themselves with Western medicine and natural history. Thunberg held regular courses with some of these scholars and gave them diplomas before his departure. With some of them he kept a correspondence long after his return to Sweden.

In this way Thunberg may have exercised an influence on the Japanese society, more far-reaching than mere scientific knowledge. His Western ideas may have catalyzed the historical processes in Japan, which eventually led to the Meiji restoration and the



Portraits of Carl Peter Thunberg and title page of his *Flora japonica* (1784).

end of the long isolation of the country.

The audience for the shogun took place on the 18th of May 1776, but Thunberg was not allowed to be present. However, the shogun was apparently curious about the visitors and is said to have appeared incognito among them to watch them more closely.

The return journey to Nagasaki followed the same route, and after 16 months in Japan, Thunberg was ready to embark on his homeward voyage. He visited Java and Ceylon on his way and spent about half a year in each island. He also made a brief visit at the Cape and arrived in Holland after four and a half months. Having concluded the business with the Company and visited benefactors and friends, he went to London in December, where he was warmly received by Sir Joseph Banks and by his friend and compatriot Daniel Solander. Via Holland, Germany and a visit to the university of Greifswald, Thunberg came back to Sweden in March 1779, after nine years of travelling.

After his safe return home Thunberg became remarkably stationary. He had been appointed Demonstrator at the Botanical Garden in Uppsala under the younger Linnaeus, who held the chair after his father. When Linnaeus went to London in 1781 Thunberg was acting for him, and in the same year he was appointed associated Professor of Botany, with an increase in salary. After the death of the younger Linnaeus Thunberg was appointed to the chair which had been held by "four most celebrated men, two Rudbecks and two Linnaeus", using Thunberg's own words, and he kept this position until his death.

Thunberg continued to work on his collections and publish on many subjects during all his long life. His main interests were the floras of South Africa and Japan, but he also wrote of insects, birds, fishes, reptiles, mammals, minerals, Japanese coins, Swedish husbandry and so forth. He became popular with students and took part in academic life, e.g. as vice-chancellor of the university four times.

Thunberg was a member of the Royal Swedish Academy of Sciences for 56 years, but only reluctantly did he go to the meetings in Stockholm, and he was President of the Academy only once, in 1784.

The Swedish king Gustav III was benevolent to Thunberg and in 1784 set aside a piece of the royal garden in Uppsala for a new botanic garden and had a new museum erected on the site. This was inaugurated in 1807, and the building still houses the Thunberg Herbarium. The king also made Thunberg a Knight of the Order of Vasa, and thirty years later a Commander of the same order, a very rare honour not previously bestowed on any academic teacher.

Thunberg in 1785 donated his natural history collections to the University of Uppsala, where they were especially welcome, since the invaluable Linnaean collections had recently been sent to England.

Beside all his scientific publications Thunberg published a travel book on his journeys in four volumes. The Swedish original appeared between 1788 and 1793 and was soon translated into English, German and French.

On his way home from Japan Thunberg had declined an offer to marry a rich and beautiful girl, and he remained a bachelor until 1784. In that year he married the daughter of the university accountant Ruda, in whose house Thunberg had served as a private teacher during his university studies. The marriage was childless, but two young relatives were adopted, viz. a daughter Birgitta Elisabeth, and a son Per, who became a farmer. A third relative, Carl Peter Forsberg, lived as a son with the Thunbergs, but kept his family name. He became a favourite of Thunberg's, who helped him to a medical doctor's degree and a position as 'botanices demonstrator' at the Botanical Garden.

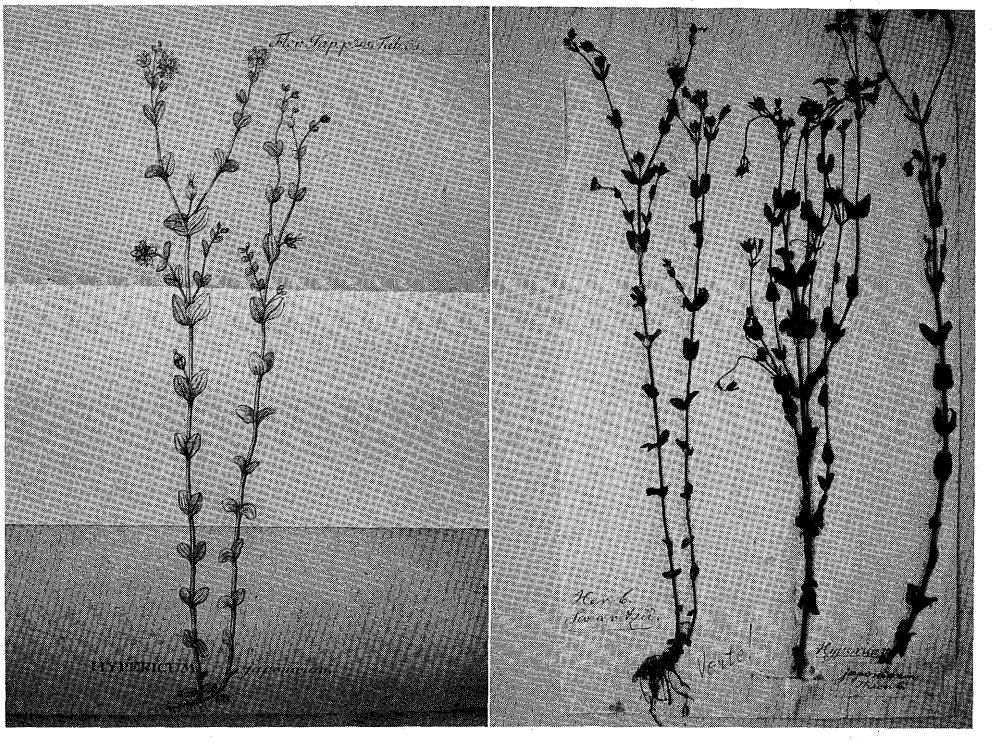
Thunberg was a generous, good-hearted person, who cared also for his servants, relatives and friends, especially when they were in economic trouble. His own financial circumstances were never bright, and at one stage he was compelled to sell his private library,

and he also considered selling his insect collection to St. Petersburg. He has been described as a happy, lively and friendly person with a genuinely honest character. In his older days he became stone-deaf and was sometimes smiled at, when he appeared in an old-fashioned outfit in his antiquated horse-cart nicknamed "Skallerormen" (the rattle-snake). When he died in 1828 at the age of 85, he was sincerely mourned and solemnly honoured.

Most of Thunberg's publications deal with botany, particularly the flora of South Africa and Japan, in a seemingly unending row of publications. Thunberg followed closely the method of Linnaeus, although he ventured to introduce a change in the sexual system. Instead of the 24 classes of Linnaeus, Thunberg recognized only 20, but this innovation was adopted by very few botanists and soon forgotten.

Thunberg's scientific strength was his discerning eye and descriptive capacity. 'God created, Linnaeus ordered, Thunberg described' – to paraphrase a sentence of Linnaeus. Thunberg contributed substantially to the younger Linnaeus' work *Supplementum plantarum*, which was based on his father's unfinished *Mantissa tertia*. During the summer 1779 Thunberg worked intensely with the younger Linnaeus to complete the work, which was published in 1782 (1781 according to the title-page). Thunberg contributed almost 500 new species from the Cape as well as several from the East Indies and Japan. However, he never got the credit for describing these scientific novelties, since they are all cited with Linné filius as author.

Thunberg then concentrated on Japanese plants and in 1784 published his *Flora japonica*, a funda-



Hypericum japonicum Thunb., illustration in *Flora japonica* (left) and original specimen in the Swedish Museum of Natural History, Stockholm.

mental work which soon became an indispensable classic. It was a critical and comprehensive flora, summarizing the knowledge of the vascular plants of Japan, and containing much new information. The work was preceded by a critical examination and analysis of Engelbert Kaempfer's Japanese plants, collected in 1690–92 and which Thunberg had studied in London on his way home from the long voyage.

Flora japonica contained 39 copper engravings of plants, and Thunberg aimed at publishing a lot more illustrations. His *Icones plantarum japonicarum*, which appeared in five fascicles between 1794 and 1805, contained 50 plates, mainly copper engravings, but some were produced in the newer technique of aquatint. Thunberg had many hundreds more drawings which remained unpublished.

Altogether Thunberg described 74 new genera, and about 40 of these are still valid. Some are South African genera with such an isolated taxonomic position to merit their treatment as separate families: Achariaceae, Hydnoraceae, Montiniaceae, Oliniaceae, Retziaceae and Vahliaceae.

New species described by Thunberg amount to about 1880, plus the ca. 500 which he contributed to the *Supplementum plantarum* (Linné fil. 1782). Thunberg was also an eminent zoologist, particularly entomologist, and his name as original author is attached to mammals, birds, reptiles, fishes, and insects, mainly from South Africa.

Thunberg became the most well-known Swedish scientist of his time. He was a member of 65 academies and learned societies and he kept an extensive correspondence with colleagues in many countries, including Japan. Thunberg laid the solid foundation for taxonomic botany in South Africa and Japan, and he is sometimes called 'The Father of South African botany', or the 'Linnaeus of Japan'. Today the importance of taxonomy is more widely understood than perhaps one or a few decades ago. The need for basic knowledge of the biodiversity and its components is emphasized in many disciplines of biological science, and is a prerequisite in conservation. We owe much to Thunberg, and we have to continue in his footsteps. Let me conclude with the often cited words by the South African botanist Peter MacOwan, formulated more than a century ago: "Nevertheless, as long as in our paradise of flowers there wanders a single botanist, so long will the name of Thunberg be held in honoured remembrance".

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