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# Carolus Linnaeus (Carl von Linné), 1707–1778

The Swede who named almost everything

Charles T. Ambrose, MD



Books and fish print in the library of  
Carl Linnaeus.

Mattias Klum/National Geographic/Getty Images.

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are representative of a million such names that owe their binomial formulation to Carolus Linnaeus, the Swedish botanist born in 1707.<sup>1</sup> He organized the living world on paper by promoting a system of official names for plants and animals that has been called “one of the triumphs of contemporary science.”<sup>2p259</sup>

**T**he bicentenary celebration in 2009 of Charles Darwin’s birth prompted a flood of papers on the theory of evolution and natural selection. Underlying this revolution in biology was the adoption by naturalists of universally recognized scientific names. *Escherichia coli*, *Canis familiaris*, and *Nessiteras rhombopteryx* (the Loch Ness monster)

Linnaeus was the elder son of a village Lutheran parson, Nils Ingemarsson, who during his theological studies paraded his Latin learning by adopting the surname Linnaeus, derived from a magnificent triple-trunked linden tree (*lind* in Swedish) he remembered from his childhood. Coining a human family name now seems prophetic for Nils’s senior son, who would later mint names for so many genera and species. All reports indicate that young Carl was an indifferent student who reluctantly learned schoolboy Latin but neglected most other subjects. His father reportedly gave him a copy of Aristotle’s *Historia animalium*. Outside of school, Carl was inspired by nature, notably plants, and hoped to pursue botany as a career, although this did not seem to offer a remunerative future. Instead, he studied to be a physician, since botany was part of the curriculum and plants were an important source of medicines. He attended the University of Uppsala, where in 1730 he attracted the attention of his

**COVER:**  
Statue of Carolus Linnaeus in front of Palm House in Sefton Park.

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Portrait medallion of Carl Linnaeus (1707–1778) by Josiah Wedgwood and Thomas Bentley. Etruria Factory, Staffordshire, England, 1777. Jasperware.

© British Museum/Art Resource, NY.

professors by writing a small essay on sex in plants titled, “Introduction to the Betrothal of Plants” (*Praeludia sponsaliorum plantarum*).

The notion that the stamens and pistils are generative organs of plants employed in their reproduction was only beginning to be suggested by a few botanists in the late seventeenth century: John Ray and Nehemiah Grew in England, R. J. Camerarius in Germany, and S. Vaillant in France. In his paper Linnaeus termed flower petals “bridal beds,” stamens “husbands,” pistils “wives,” and their sexual contacts as ranging from “monogamy” to “polygamy.”<sup>3</sup> The essay’s innocuous title did not keep Linnaeus from the condemnation of one sanctimonious critic, Johann Siegesbeck, who in 1737 wrote, “‘such loathsome harlotry’ as several males to one female would never have been permitted in the vegetable kingdom by the Creator.” Siegesbeck demanded to know “how anyone could teach without offence ‘so licentious a method’ to studious youth.”<sup>4p108</sup> But the little essay earned Linnaeus an appointment as curator of the university’s botanical garden and part-time lecturer.

### **Adventures afar in Lapland**

To support himself, Linnaeus tutored the children of Olof Rudbeck the Younger, the Uppsala University professor of medical botany, who in 1695 had traveled through Lapland at the command of the king merely to learn more about this isolated region. In 1732 Linnaeus decided to emulate Rudbeck with a comparable exploration. He obtained financial support from the Royal Society of Science of Uppsala to identify economic opportunities in the region. Lapland extends over the northern parts of Norway, Sweden, Finland, and Russia, occupying about one-third of Sweden. Since the region was rarely visited and relatively unknown, it was viewed then much as other countries regarded the West Indies—a place to be studied and exploited.

Linnaeus spent less than three weeks in Lapland itself, never went north of the Arctic Circle, searched for the sparse inhabitants, and described a great variety of flora and fauna (*Flora Lapponica*, 1732). In his reports he embellished his few contacts with Sami reindeer herders and other Laplanders. To dramatize this adventure when relating it during lectures or privately (including while courting his prospective wife), Linnaeus wore what he erroneously thought was native dress. He commissioned a painting of himself in a Lapp costume of reindeer hide heavily laden with rings, coins, and beads and which included a runic calendar, a shaman’s drum, a fur pouch, a Lapp woman’s summer beret, and colorful boots (actually made only for export)—none of which an ordinary Laplander ever wore. Like his bogus attire, in his final report to the Royal Society he falsified a circuitous route and exaggerated by twofold the distance he traveled.

Back in Uppsala, Linnaeus resumed his medical training. Due to professional disagreement between university

professors and Stockholm doctors, medical degrees were not being granted in Sweden just then. But a diploma could be easily obtained from the Dutch medical diploma mill at the University of Harderwijk. So in the spring of 1735 Linnaeus sailed to Holland with a thirteen-page dissertation he had already written: “On the Cause of Intermittent Fever,” i.e., Uppsala fever, or malaria, which was then endemic in the Baltic region. Within eight days at Harderwijk he was examined for his medical knowledge, defended his thesis, had it printed, and received a diploma.

While in Holland he met with numerous naturalists and was befriended by renowned physician Hermann Boerhaave (1668–1739), who was called *Hippocrates Redivivus* (“Hippocrates who lives again”). Linnaeus’s Dutch acquaintances were so impressed by his knowledge of botany that he was soon recommended to a wealthy merchant-banker to organize the banker’s large botanical and zoological garden near Leyden. Linnaeus remained at this task in Holland for three years, all the while developing ideas about codifying the natural world and writing fourteen works, including *Hortus Cliffortianus* (*The Clifford Garden*), *Fundamenta botanica*, and *Systema naturae*—the first of twelve editions of this work published during his lifetime. He visited England, Brabant (later part of Belgium), and France, and began a correspondence with other European naturalists.

### **Back in Sweden, and opportunity**

Upon returning to Sweden in 1738, Linnaeus found that news of his many publications had not yet reached home and that there was little immediate prospect for him of a university appointment. To make a living, he began practicing medicine in Stockholm, but competition from barber-surgeons and various quacks was fierce. So he began frequenting popular restaurants and befriending young soldiers “wounded *in castris Veneris*” (“in the camps of Venus”).<sup>4p35</sup> His treatment of their gonorrhoea, which he had learned in Holland, was so successful that his medical practice attracted civilians—politicians and nobility—and soon involved regimens for syphilis, scurvy, and smallpox. Through his new patients he gained access to the upper classes, and in a short time he was appointed a medical officer at the Stockholm naval base. The steady salary provided the means to marry his betrothed and the time to further his botanical researches and writings. In 1739, with five local friends, he founded the Swedish Academy of Sciences in Stockholm and at age thirty-two was chosen by lot as its first president.

Linnaeus’s new local prominence, the death of Rudbeck

The China limodoron, *Limodoron tankervilleae*. From *New Illustration of the Sexual System of Carolus von Linnaeus, or The Temple of Flora*, 1807. Dr. Robert John Thornton. Hand-colored mezzotint.

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*Handwritten signature or name in the bottom left corner.*

*Handwritten signature or name in the bottom right corner.*

*The China Limodorum*

*From the collection of the Hon. Mr. ...*

in 1740, and the retirement of another university professor opened the way for him to be appointed professor of Medicine at Uppsala. Although his appointment was approved by the king, Linnaeus exchanged the position for one that he coveted more, professor of Botany. Over the ensuing decades he enlarged the university's botanical garden, gave yearly courses and lectures in botany, and attracted hundreds of students into the subject of botany. Some 187 young men graduated under his training. Each defended a doctoral dissertation, most of which was, as was customary then, written by the professor himself. Linnaeus also enthusiastically arranged voyages of discovery for nearly a score of his "apostles" to remote parts of the world, where they were expected to gather new specimens of plants and animals for his examination and classification.<sup>5p149</sup> The success of these expedition was disappointing: four of his graduates died en route, others returned ill or insane, and no substantial collections were ever sent back for study.

After returning from Holland, Linnaeus never again traveled outside Sweden but did visit several local provinces to identify exploitable natural resources. All during his later adult career Linnaeus sought ways for his country to become economically independent through mining and expanded agriculture. He repeatedly tried to adapt useful flora from abroad to the cold Swedish climate. He introduced rhubarb from the Orient but failed to acclimatize tea bushes and mulberry trees. He advocated growing rice, cinnamon, ginger, and trees bearing bananas and coconuts, but success with these plants was never realized\*

### **Cultivating pearls turns a profit**

During 1752 through 1754, Linnaeus stayed several months in Ulriksdal Castle to arrange and catalogue the Swedish king's natural science collection and later spent time in Drottningholm Castle to document the queen's museum. He entertained the Swedish court and impressed the parliament with his schemes to improve the country's economy with weather-tamed cash crops. During this period he attempted to cultivate pearls in fresh water mussels. After a decade or so he was finally able to exhibit nine small pearls to government officials, to whom he turned over his secret technique. In 1762 the government licensed it to a Gothenburg merchant, who in turn paid Linnaeus 6,000 silver thalers. As a further reward, the officials authorized Linnaeus to name the successor to his university chair, and they ratified the king's recommendation for his title of rank. That year he was ennobled as Carl von Linné. His coat of arms included the plant from which Lapp tea was brewed, a member of the honeysuckle family, now officially named *Linnaea borealis*.

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\* Two centuries later, Trofim D. Lysenko would falsely claim to have "vernalized" various crop species so that they thrived in Russian weather.

At the university, his prodigious output of books continued. For his students, Linnaeus wrote *Hortus Upsaliensis* (*The Garden of Uppsala*), *Flora Suecia* (*Flora of Sweden*), *Fauna Suecia*, and successive editions of *Systema naturae*, which listed all species recognized to date. Here and in other later works he promoted binomial names for plants and animals. Genus-species names followed by the letter "L" indicate that Linnaeus himself first reported the species, e.g., *Viola pedata L.* Linnaeus coined the terms "fauna" and "mammalia" and introduced into biology the astrological symbols for sex: iron/Mars for males and copper/Venus for females. He also discovered dendronology, which involves determining the age of trees and assessing weather patterns based on tree rings.

### **Botany made easy and fun by day tours**

Linnaeus sought to popularize botany by writing short readable books on the subject. Several were inexpensive pocket-size guides in simple Latin with the minimum of rhetoric and Latin terms. They listed basic botanical words, illustrated essential parts of plants, and provided simple aphorisms to aid memory (as in an almanac). They were intended to entice intelligent people with little schooling to botanize in the countryside. For a small fee Linnaeus led day-long nature hikes around Uppsala, often with groups of several hundred—the men wearing uniforms of his design, carrying banners, and sounding horns and drums. They sometimes moved along in lines as they searched the fields, and at intervals reported their findings to Linnaeus, who would then expound before the group. But in 1748 these botanical excursions were terminated by the rector of the university, who frowned on their military tone and intensity, which turned "youths' minds from all other duties and tasks."<sup>6p43</sup>

Linnaeus had initially elaborated on his sexual taxonomy in the first edition of *Systema naturae* in 1735. Classifying flowering plants by their stamens and pistils offered students and others much amusement and titillation at the varieties of sexual combinations in the botanical world as he noted the number, size, and placement of the generative organs: hermaphroditic—one bed, most plants; unisexual—two beds, sexes in separate plants (e.g., date palms); flowerless—no bed, cryptogams. An indirect consequence of such avid interest was that Linnaeus's sexual system served "as a recruiting tool to engage the public"<sup>7p268</sup> at large in botany and led to the discovery of new plants being relayed to him in letters from all over the world.

### **On classification**

Linnaeus sought to classify the entire natural world—plants, animals, and minerals. His classification of the inorganic world was dated and ignored. His great success rests in the binomial names he coined for 7700 species of plants and 4400 species of animals, about one thousandth of the



Illustration from *Hortus Cliffortianus*, by Carl Linnaeus (1707–78) published Amsterdam 1737–38. European School/The Bridgeman Art Library/Getty Images.

suspected earth-borne species.\* His Latin-based nomenclature was first developed in 1753 and after much tinkering in his early works was finally formally presented in 1771 in *Nomenclator botanicus*. It remains a seminal contribution to biology because of its simplicity and universal adoption. His efforts at classification need to be judged in light of previous attempts to organize the world on paper.

Long before Linnaeus, Plato conceived the notion of species (*eidos*) and family (*genos*), but the classification of things on earth really began with Aristotle's *Scala naturae* (*Ladder of*

*Nature*), a triadic division into minerals, plants, and animals. Aristotle's pupil, Theophrastus grouped 500 known plants into herbs, bushes, and trees and then listed them according to their dietary and medical uses. Dioscorides and Scribonius Largus, first-century herbalists, likewise described plants according to their medicinal value. In the sixteenth century, Charles de L'Escluse arranged flora by their place of origin, while Andrea Cesalpino classified 1500 plants based on their fruits and seeds.

The world of animals was divided broadly by Aristotle into sanguineous, bloodless, viviparous, oviparous, quadrupeds, etc. In the sixteenth century, Conrad Gesner, a Swiss biologist, compiled a 3500-page encyclopedia of animals with separate volumes for quadrupeds, birds, fishes, and reptiles/insects (*Historia animalium*, 1551–1558), with closely related animals grouped alphabetically. Linnaeus divided the animal kingdom

\* Ernst Myer stated that the "highest estimates of the number of living animals and plants is about 10 million species,"<sup>8p139</sup> and that "at the present time about 10,000 new species of animals are described annually."<sup>8p246</sup>



into six classes: quadrupeds, birds, amphibians, fishes, insects, and worms (including animalcules, or microorganisms). Buffon, Linnaeus's French contemporary and rival, grouped animals first according to their continent of origin.

### **Classification of disease**

Being a physician, Linnaeus lectured on dietetics, the equivalent of hygiene today. His medical books included *Materia medica* and *Clavis medicinae duplex* (*The Double Key to Medicine*, 31 pages). In *Genera Morborum* (*Classes of Diseases*, 1763) Linnaeus divided diseases into eleven classes, thirty-seven orders, and 325 species based largely on symptoms. The first three classes involved types of fever; the other eight entailed diseases characterized by pain, mental or sensory disturbances, motor dysfunction, respiratory difficulties, fluid discharges, deformations (phthisis, rachitism, etc.) and a miscellaneous grouping (emphysema, edema, inflammation, gangrene, etc.). Other physicians before Linnaeus (Felix Platter in the seventeenth century) and afterwards (Phillipe Pinel, F. B. de Sauvages, and others of the eighteenth century) composed nosologies, always beginning with fevers (the easiest conditions to classify) and following with other disease states organized according to their symptoms and signs, organ system/location, apparent cause, or pathogenesis. Like fevers, mental illnesses invited a detailed classification, notably by Platter (*Praxeos medicae*, 1602) and Pinel (*Nosographie philosophique*, 1798).<sup>9</sup>

### **Later years—writing and suffering much**

Linnaeus's binomial nomenclature and system of classification represent his enduring dual legacy, but his mania for organization extended to contemporary naturalists, to whom he assigned pseudo-military titles, ranging from a low rank for those he disliked up to himself as general.<sup>10p212</sup>

In his later academic years Linnaeus corresponded with a Baron von Münchhausen. Readers familiar with Münchhausen syndrome, an eponym given to spurious illnesses feigned by some patients, should not assume this baron was Karl Friederick von Münchhausen (1720–1797), renowned for telling incredible tall tales. In 1754 Linnaeus was invited to the chair of Botany at Göttingen University by Gerlach Adolf Baron von Münchhausen, who had founded that university in 1737. The chair had been relinquished by Albrecht von Haller (1708–1777), the famous physiologist and botanist with whom Linnaeus had long exchanged botanical ideas. The offer was very tempting to Linnaeus, but was declined, probably because the Swedish king would never have sanctioned his leaving the country.

Linnaeus's marriage produced four daughters and several sons, one of whom inherited his professorial chair in Botany but never lived up to his father's renown. Linnaeus wrote seventy-two books and several autobiographies, some of which he anonymously (and favorably) reviewed in Stockholm newspapers.<sup>4p65</sup> He was a complex person—alternately rude

and charming, ambitious, self promoting, opinionated, vain, and covetous of honors and respect. Few of his many students liked him, and most shunned him once free of his influence. In his old age he often appeared unshaven and dirty, possibly because he believed that epilepsy was caused by washing one's hair. He suffered from carious teeth, gout, migraine, and rheumatism. He experienced several debilitating strokes during 1774 through 1776 and died two years later. Sweden's Prince of Botany was buried in the cathedral at Uppsala in a solemn evening service.

Linnaeus's renown faded in his homeland within several decades after his death, when his sexual classification system was criticized as narrow and pedantic and his efforts at acclimatizing foreign plants were ridiculed. But in time he regained regional prominence when a romantic nationalism identified him as the Flower King. He also became an iconic figure "who recaptured in his science the military victories won by Sweden's famous warrior kings."<sup>6p8</sup> His public recognition waned again during the 1930s, when a social democratic government came to power in Sweden and apparently shunned such a martially tainted national image. But through all the vicissitudes of his reputation, his lasting legacy remains the binomial system of taxonomy.

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