CARL LINNAEUS

a bibliographical measure of his scientific achievements

JERRY STANNARD

FRIENDS OF THE LIBRARY AT THE UNIVERSITY OF KANSAS

"WHAT'S IN A NAME?", was given a new and scientifically important answer beginning some 240 years ago.

Through a score of books, Linnaeus established a place for every living organism then known to science. His major writings, especially *Systema Naturae* and *Species Plantarum,* were nothing less than universal systems of classification with strict provision for the naming of every plant and animal. By the application of his taxonomic and nomenclatural proposals, natural history became amenable to the methods and objectives of the rapidly developing biological sciences. The conceptual simplicity, logical rigor and universal applicability of his methods were widely acclaimed and adopted by many of the leading European scientists. Although their initial reception was similar, however, the eventual fate of his methods of classification differed markedly from that of his nomenclatural methods. It is somewhat ironical in fact, but well in keeping with what we observe of the advancement of science, that the very methods which he devised became the instruments by which his botanical system of classification, the so-called sexual system, was later abandoned.

In addition to providing a niche for every plant and animal, Linnaeus also provided new names for them, ap-

plying consistently and universally a simple two-part Latin name. Such a binomial nomenclature—genus plus species—reflected Linnaeus' system of classification in that all plants and animals were neatly arranged in a vast yet orderly hierarchy that was synonymous with the world of living things. His choice of descriptive Latin adjective was often a clue to some noteworthy characteristic of the organism in question. Hence if one knew the Latin name of a plant or animal, its place in nature was also known. Unlike the *systema sexualis,* which was soon to be superseded, his nomenclatural innovations were immediately accepted. The advantages were obvious and many: every kind of plant and animal now possessed a unique, unambiguous, biverbal name. That name indicated its relations to others of the same or similar kind and marked it off from those that differed. Henceforth scientists could communicate without fear of being misunderstood, experiments could be conducted, and reported, with the assurance that the various investigators were examining, and writing about, the same organism, and finally, herbarium and museum specimens could be labeled and arranged systematically. A universal language for biologists was at least created! The physical sciences had long had their language, that of mathematics; now biology had its language and, as a result, entered the ranks of modern science.

The author of this scientific reformation was born 23 May 1707 in Råshult, the son of a Lutheran curate. As a child in rural southern Sweden, he grew up close to nature and, as befits the eldest son of a clergyman, he recognized that Nature was part of a larger design. Both observation and religious philosophy profoundly influenced his life

and works. To the end of his life, Linnaeus lost touch with neither, though it required much from him to bridge the widening gap between science and religion.

It is pleasant to imagine that the young Linnaeus did as many other children have done, and collected pebbles, shells, seed pods and the like; equally so, that he sought their names and perhaps pondered their meaning, if not their place in nature. These are matters that cannot now be easily ascertained, but it is a matter of record that Linnaeus' father was as proud of his garden as he was of his son, and that his mother often enjoyed sitting in the garden while awaiting the child's birth. To what extent Linnaeus' career was shaped by his father's instruction and botanical excursions is moot, yet Linnaeus fondly remembered his early days and commemorated them in *Adonis Stenbrohultensis* (written in 1732, but not published until 1920, in Stockholm).

After an inauspicious start at a nearby gymnasium—an academic high school—Linnaeus entered the University of Lund at the age of twenty. A year later, in 1728, he transferred to Uppsala, a university with which he was associated in one way or another for the remainder of his life. It was during his first years in Uppsala that his career took shape: several of his major botanical writings were begun; he made his famous research expedition to Lappland; on another trip to Dalarne he studied mineralogy and geology, and met his bride-to-be, he delivered his first lectures, in both botany and mineralogy, and he became a demonstrator at the University's botanic garden. This early success notwithstanding, his goal was to become *medicinae doctor*. In order to achieve that, he left for Holland where he received the M.D. degree in 1735 from

the University of Harderwijk. Until 1738, Linnaeus remained abroad, principally in Holland, but with occasional trips to England and France. His years of study were soon rewarded. Thanks to newly-acquired friends in Holland, Linnaeus saw within the space of three and a half years the publication of twelve of his books, including the first edition of *Systema Naturae* (Leyden, 1735). It is known that some of these books were begun in Uppsala, for example, *Fundamenta Botanica, Critica Botanica,* and *Classes Plantarum,* in each of which he advocated taxonomy as the basis of botany. Others, however, were the products of his years in Holland, for example, *Musa Cliffortiana* and *Hortus Cliffortianus.* But the publication of all of them was facilitated by liberal access to the collections of friends and patrons. His *Bibliotheca Botanica* (Amsterdam, 1736) is a good example, for it demonstrates what Linnaeus the scholar found in the writings of his predecessors. This analysis of several hundred herbals and floras was made possible by the magnificent private libraries placed at his disposal. The sumptuous *Hortus Cliffortianus* (Amsterdam, 1737 [1738]), by contrast, depended upon personal examination of living, tropical plants. They too were made accessible to Linnaeus who took advantage of the opportunity to describe them in accordance with his classification system and to coin new generic and specific names for plants he had previously known only through books.

His life after his return to Sweden in September 1738 was no less eventful than his travels abroad. In quick succession he entered into private medical practice in Stockholm, served as the first president of the Swedish Royal Academy of Science, was appointed physician to

Frontispiece, *Vollständiges Natursystem* (Nürnberg, 1773), Erster Theil.

the Admiralty, married Sara Moraea, and finally, in 1741, obtained the professorship of medicine and botany at the University of Uppsala. Lectures and more books soon alternated with one another in a rhythm that was to characterize his life style. Academia provided him the means and the opportunity to extend his taxonomic methods and to apply his nomenclature to many hitherto undescribed species. The measure of his success was his masterwork, *Species Plantarum* (Stockholm, 1753) in which 5900 species are arranged under 1098 genera. In 1905 by international agreement, the "Sp. Pl." became the official starting point of modern botanical nomenclature, just as the tenth edition of *Systema Naturae,* which was published in 1758, became the basis of modern zoological nomenclature. The appearance of these two books, both classics of biological literature, did not end their author's activity. Until 1763, when failing health forced him to relinquish some of his duties, he maintained a steady pace of research, teaching, and writing. To say that his life was the typical pattern of academic routine is only partially true, for Linnaeus was all too often required to find time among his academic activities for appearances at court.

If we leave to one side his attendance at court, occasioned by his elevation to the nobility (whence the name Carolus von Linné) and his official duties as *archiater* or Royal Physician, his academic life can best be recaptured by considering another of his major works. Despite the complex textual tradition of the several editions of *Amoenitates Academicae,* authorized as well as pirated, two points stand out. The work is first of all, composed of 186 dissertations, written in Latin between the years 1743 and 1776, covering botany, zoology, min-

eralogy, and materia medica. Second, and more important, the dissertations were written by Linnaeus himself, either in part or wholly. Although the title page of each dissertation lists Linnaeus as *praeses,* his role was far more than what we associate with the supervision of a dissertation. Not only did he choose the subject, but he sometimes wrote or dictated the first draft and not infrequently edited the final version and polished the Latin syntax. A legacy of the Middle Ages, this procedure was continued in Sweden until 1852. Because it was ideally suited to his wide ranging interests, Linnaeus availed himself of the opportunity to select subjects which interested him at the time. The function of the candidate or respondent under this system was to pay the cost of printing and to defend orally his *thesis* at the formal, if not always solemn, *disputatio pro gradu doctoris.* As W. T. Stearn has noted, this procedure, "enabled the professor to publish quickly and free of charge any work of special interest to him." The *Amoenitates* cover such a wide range of subjects that even a summary is not feasible.

A record of the achievements of Linnaeus would be incomplete without at least a brief mention of two further areas in which he took special interest and which are reflected in the efforts of his students. The first is travel accounts, or what we might term agricultural and economic surveys of the natural products of a given region. His early trip to Lappland was followed by similar trips to other parts of Sweden, each of which resulted in at least one separate publication. Among them, *Öländska och Gothländska Resa* (Stockholm, 1745)—an account of travels on Öland and Gotland—deserves pride of place, for in its index the binomial nomenclature was first employed.

Moreover, his ethnological observations, if not the beginnings of the study of Swedish folklore, have greatly influenced its subsequent development. A second matter to which Linnaeus gave much thought, namely the role of the garden, museum, and herbarium, pertains to both his teaching and research. One of his first projects upon accepting the chair at Uppsala was the reorganization of the University Botanic Garden. This Linnaeus described in his *Hortus Upsaliensis* (Stockholm, 1748). He took an active interest in the garden's upkeep and strove to make its collections as representative as possible. As such, the Botanic Garden proved to be an important adjunct in the teaching of botany, a function, incidentally, which it still performs, though the research goals have changed considerably in the intervening two centuries. Linnaeus' beliefs concerning the value and arrangement of museums are set forth in *Museum Tessinianum* (Stockholm, 1753), a catalogue of the minerals and fossils in the private museum of his friend and patron, Count Carl Tessin. For his own private collections, including his herbarium, Linnaeus had a house built in 1762 at Hammarby, a few miles east of Uppsala. There he spent his summers and whatever free time he could find to relax with his family. Stimulated by a disastrous fire in Uppsala, Linnaeus later had a separate structure, his museum, built on his land at Hammarby. The value of his herbarium was beyond price; it required safeguarding because it contained the dried plants on the basis of which Linnaeus' taxonomy and nomenclature depend. Each plant, dried and affixed to a sheet of paper, is a "type specimen"—that specific example of a plant on the basis of which the name and

classification were established—and, unlike the books, unique and irreplaceable.

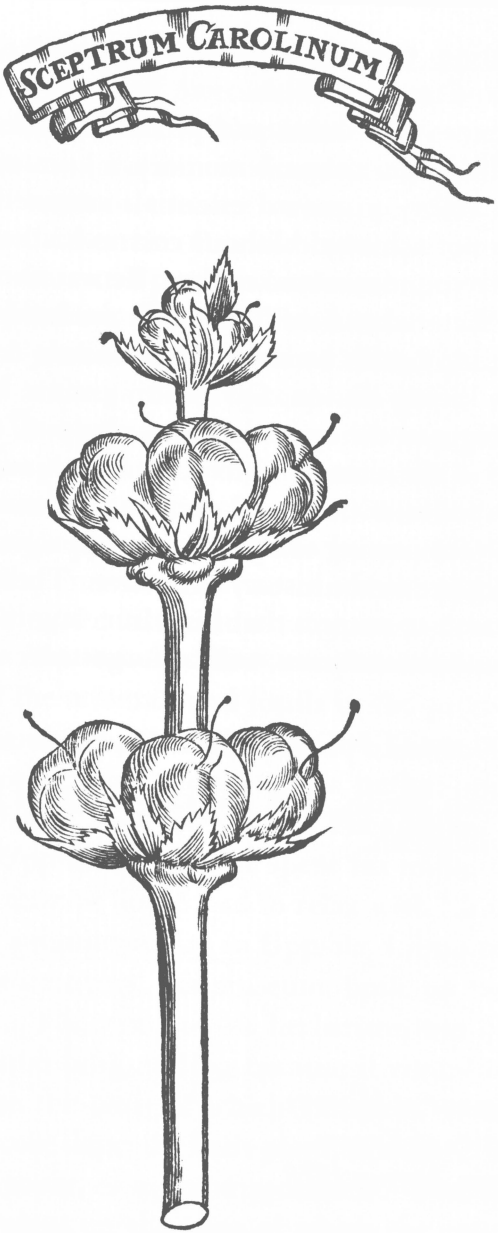
Linnaeus' successful and productive life was the result of diligence, a superb memory, a keen eye for detail, and the ability to record essentials succinctly. But success was not achieved without cost to his health. As his later correspondence makes clear, he was sometimes so ill that he dictated to a student while confined to bed. Despite failing health he continued to work, doubtless consoled by seeing his son, Carl *filius,* assume his professorship, safeguard the collections and above all continue the progress of the sciences which Linnaeus himself had done so much to foster. The end came on 10 January 1778.

With the passing of time, we can appreciate Linnaeus' rightful place in the history of science. There is, happily, little reason to suspect that his name, any more than the Linnaean nomenclature, will be forgotten.

Nomina si pereunt, perit et cognitio rerum.

If names perish, then the knowledge of things themselves will perish.

Department of History
University of Kansas
Lawrence, Spring 1978



Detail from plate in Linnaeus's *Dissertatio botanica de planta Sceptrum Carolinum,* his first printed work.

All the books cited in this essay are contained in the Linnaeana Collection in the Department of Special Collections, University of Kansas Libraries. Supplemented by several hundred works in the Ellis, O'Hegarty, Brodie, De Beer, and other collections, the holdings of the Department now exceed two thousand volumes by and about Linnaeus and his work. All the major titles are here, in many editions, but we are still actively adding to the collection. Other sources of Linnaeana at KU are the general collections of the University Libraries, and the history of medicine collections in the Clendening Medical Library at the University of Kansas College of Health Sciences.

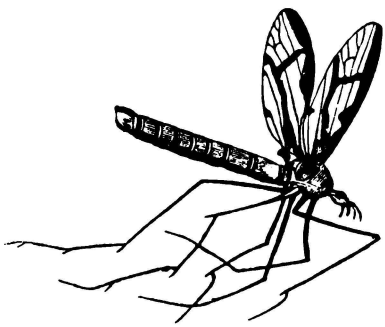
The natural sciences have always been of importance in the Department of Special Collections. The bequest of the Ralph N. Ellis collection to the University in 1945 brought us twenty-five thousand books on ornithology, natural history, and scientific voyages and travels. With the acquisition in 1953 of the Thomas Jefferson Fitzpatrick collection of eight thousand items in botany and early American science, the history of botany came into primary focus. Besides Linnaeana, significant parts of the Department's botanical holdings, with emphasis on medical botany, are the 16th century herbals, the printed works of John Ray and other 17th century botanists, various editions of Mattioli's commentaries on Dioscorides, and early American botany, including an outstanding assembly of the books and manuscripts of Rafinesque. Supporting these holdings is substantial material on 18th and early 19th century agriculture and economic botany.

The Ellis collection brought to the Department what was reputed to be the largest collection of Linnaeana in private hands in this country. With the addition of an almost equal number

of works from the Fitzpatrick collection, and active building over the last two decades, it may be assumed that the Linnaean holdings at the University of Kansas are now among the largest in the United States.

The present publication commemorates the bicentennial of the death of Linnaeus, and accompanies a major exhibit in the Kenneth Spencer Research Library which offers a view of one part of our outstandingly important resources for the study of botany and the part it plays in the history of science.

Sarah Hocker



Linnaeus's drawing of a cranefly, made at Umeå. From *Lachesis Lapponica* (London, 1811), volume I.

On back cover: Cancelled page from *Species plantarum* (Holmiae, 1753), Tomus I.

Gramen murorum, ſpica longiſſima. *Raj. angl.* 3. *p.* 415. *hiſt.* 286. *Moriſ. hiſt.* 3. *p.* 215. *ſ.* 7 *t.* 43.
Habitat in Anglia, Italia.

6. FESTUCA, panicula ſubnutante ſecunda, pedunculis incraſſatis, ariſtis calycinis longitudine floſculorum. *incraſſata.*
Gramen feſtuceum myurum elatius, ſpica heteromalla, gracili. *Barr. ic. t.* 99. *f.* 2. *Scheuch. gram.* 293?
Habitat in Hiſpania.
Singulare quod pedunculi membranacei floribus fere craſſiores. Calycinae ariſtæ non breviores ariſtis floſculorum.

7. FESTUCA panicula ſecunda: ſpiculis erectis: calycis altera valvula integra; altera acuminata. *bromoides.*
Feſtuca ſpicis erectis ad unum latus, palea altera calycina minima, altera acuminata. *Roy. lugdb.* 68.
Gramen paniculatum bromoides minus, paniculis ariſtatis unam partem ſpectantibus. *Raj. angl.* 3. *p.* 415. *hiſt.* 1287. *Pluk. alm.* 174. *t.* 33. *f.* 10. *Scheuch. gram.* 297.
Habitat in Anglia, Gallia.

* *Panicula æquali.*

8. FESTUCA panicula erecta, ſpiculis ſubovatis muticis, calyce floſculis majore, caule decumbente. *Fl.* 92. *It. ſcan.* 226. *decumbens.*
Gramen montanum avenaceum, locuſtis muticis tumentibus, piloſum. *Scheuch. gram.* 170.
Gramen avenaceum parvum procumbens, paniculis non ariſtatis. *Raj. angl.* 3. *p.* 408. *hiſt.* 1288. *Pluk. alm.* 174. *t.* 34. *f.* 1. *Mont. prödr.* 53. *t.* 2. *f.* 1.
Habitat in Europæ *paſcuis ſiccis ſterilibus.*

9. FESTUCA panicula ſecunda erecta, ſpiculis ſubariſtatis exterioribus teretibus. *Fl. ſuec.* 91. *elatior.*
Feſtuca panicula ſpicata, ſpiculis uno verſu inclinatis ſubmuticis. *Roy. lugdb.* 68.
Gramen pratenſe majus, locuſtis tumidis. *Buxb. cent.* 5. *p.* 41. *t.* 16.
Habitat in Europæ *pratis fertiliſſimis.*

10. FESTUCA panicula ramoſa erecta, ſpiculis ſubſeſſilibus teretibus muticis. *Fl. ſuec.* 90. *fluitans.*
Poa ſpiculis oblongis erectis. *Hort. cliff.* 28. *Roy. lugdb.* 62.
Gramen aquaticum fluitans, multiplici ſpica. *Bauh. pin.* 2. *theatr.* 41. *Scheuch. gram.* 199.
Habitat in Europæ *foſſis & paludibus.*

11. FE-