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LINNÆUS—THE KING OF THE FLOWERS.*

BY LOUIS H. RODDIS.[1]

Karl von Linné, the greatest botanist of all time, and picturesquely called by Jacob Riis, the "King of the Flowers," was born in a little country parsonage, at

Fig. 1.—Karl von Linné.

Fig. 2.—Linné's Birthplace.

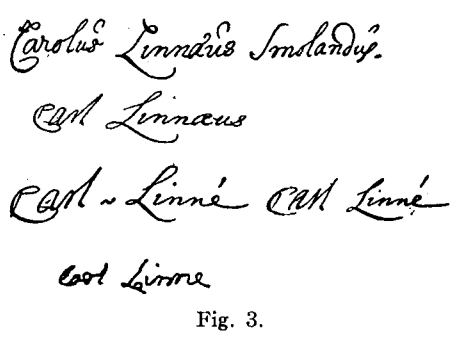

Fig. 3.

1. Carolus Linnæs Smolandus.
   (*a*) Signature on matriculation at Upsala, 23 Sept., 1728.
2. Carl Linnæus.
   (*b*) Signature in 1755.
3. Carl v. Linné.
   (*c*) Signatures in 1765.
4. Carol Linne.
   (*d*) The last signature known, 1777.

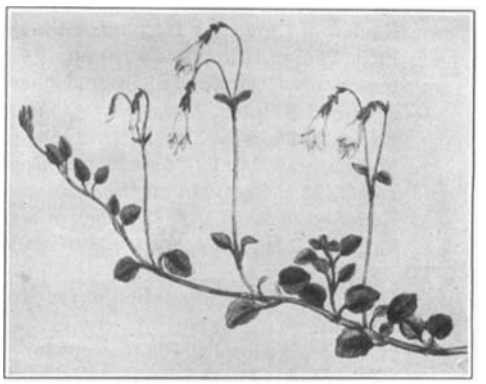

Fig. 4.—Linnea borealis.

Rashult in the province of Småland in southern Sweden, between the hours of midnight and one o'clock of May 13, 1707.

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The life and work of Linnæus is of interest to all pharmacists as the greatest contributor to one of the basic sciences of pharmacy.

The environment from which a great man comes is always interesting. Småland is an agricultural province, with little fields walled in by the stones taken from the land by generations of hardworking peasantry. The province has supplied more emigrants to the United States than any other part of Sweden. "America-fever" led many a young man and woman to leave "poor Småland," and numbers of their descendants are our neighbors here in Minnesota. Another emigrant that has carried the name of Sweden to the farthest corners of the land is the safety match, most of which are made at the great industrial city of Jonkoping. The province is dotted with shining lakes. Rashult stood on the shore of one of these and the ground in front of the old parsonage sloped down to the water's edge.

The name of the father of the little boy destined to be one of the world's greatest men, was Nils Linnæus. The name had originally been Lindelius and also Tiliander, taken from the great linden or basswood tree, which stood near the family homestead and now commemorated as the genus Tilia to which the basswood belongs. It seems fitting that a botanist should be named for a tree and so handsome a tree as the linden. Although his name was Linné and later when ennobled, the aristocratic "Von" was prefixed, the botanist is known to the world very largely by the Latinized form of Linnæus. The father was a poor country clergyman. It is a remarkable fact that more great men have come from the families of the ministry than those of any other profession. Even the log-cabin boys of America headed by Abraham Lincoln, are less numerous than the sons of the rectory and the manse.

The mother's name was Christina Brodersonia. She was the daughter of the previous minister at Rashult, so Linnæus had a double clerical descent. The father was thirty-three, the mother eighteen years of age. Carl was the eldest of the five children. The father was an ardent gardener and horticulturist, who supplemented the scanty income of a country pastor, with vegetables and fruits for the family table. Carl grew up in a garden and early showed his love and interest in plants. It is said that when a baby his mother would give him a flower to play with if he fretted.

He was intended for the ministry but showed such little aptitude in the preparatory studies for that profession, that he was considered something of a dunce by his teachers, and it was even recommended to the father that he be apprenticed to a shoemaker as he would never make his mark in a learned profession. Fortunately, the father did not heed their recommendation, and lived to see this backward boy rich and famous, covered with honors by his own and many foreign countries, and acclaimed throughout the world as one of the greatest men the human race has produced.

As a physician it is a pleasure to me to record that it was a medical man, Dr. Rothman, the town physician, who expressed the belief that the young Linnæus would distinguish himself in medicine and the natural sciences. He took the youngster into his home and became his medical and science preceptor. In 1727 his pupil entered the University of Lund, and in the following year went to Upsala, one of the oldest and most celebrated universities of Europe.

The young man was as poor as Job. It is said that, having no money to pay a cobbler, he reinforced the worn soles of his shoes with birch bark, a practical example of the use of economic botany by the future botanist. But, though poor in money, he was rich in other respects. He had a handsome person, an amiable disposition, and enthusiasm for the knowledge of nature that was unequalled, and a mind as clear and bright as a diamond. His shining talents attracted the attention

of two famous professors at Upsala; Celsius and the younger Rudbeck, the latter professor of botany. Rudbeck was then an old man and physically unequal to perform all his duties. Recognizing the abilities of Linnæus he employed him as his assistant. He also obtained a small state grant, 1530 copper dollars, about $125.00 of our money to-day, to send the young man on a botanical journey to Lapland. With this small sum Linnæus made one of the most famous of scientific expeditions, a one-man scientific mission in which he traveled 4600 miles, made many important scientific discoveries, and brought back a large collection of plants, animals and minerals. His account of the journey deserves a place beside Darwin's "Voyage of the Beagle," as a classic narrative of exploration in the cause of science. He omits nothing of interest, even not forgetting to mention that a minister with whom he stayed for a time had an extremely pretty daughter. Here is the way he describes the equipment of the expedition:

"I carried a small, leather bag * * * * * * furnished on one side with hooks and eyes, so that it could be opened and shut at pleasure. This bag contained one shirt, two pairs of false sleeves, two half-shirts (undershirts), an ink-stand, pencase, microscope and spy-glass; a gauze cap to protect me occasionally from the gnats, a comb, my journal, and a parcel of paper stitched together for drying plants, both in folio; my manuscripts, *Ornithology, Flora Uplandica* and *Characteres Generici*. I wore a hanger at my side and carried a small fowling piece, as well as an octagonal stick graduated for the purpose of measuring. My pocketbook contained a passport from the Governor of Upsala and a recommendation from the Academy."

The success of this journey led to an invitation from the Governor of Dalecarlia or Dalarne, as the Swedes often call this beautiful province, to travel there as he had done in Lapland. He made this journey also, and at Fahlun, the principal mining town of Sweden, lectured on metallurgy and assaying. He was advised by a chaplain at Tahlun to go abroad and take a medical degree. In 1733 he went to Holland for this purpose. On the way there he stopped for a time at Hamburg, where there was a municipal museum, boasting, among other wonders, a serpent with seven heads. Linnæus soon determined that the whole thing was a hoax and the heads had been made by skilfully placing the skin of serpents over the skulls of weasels. The curiosity, however, was worth money as an attraction to tourists. A fee was charged to see it and in fact it had been pledged by the Board of Elders of the city as security for a loan of 10,000 marks. What corresponded to the local Chamber of Commerce and Kiwanis Club did not view the young enthusiast's debunking of the pride of the museum with favor, and in fact he was advised by a friendly physician to leave town at the earliest opportunity, which he did.

In Holland he took his medical degree at Harderwijk, his thesis being on intermittent fever. He then visited Leyden, where the great Dutch clinician, H. Boerhaave, was professor of medicine. Boerhaave's reputation was so great that a Chinese mandarin sent him a letter addressed simply "Dr. Boerhaave, Europe," which was promptly delivered. Linnæus spent the years 1735–1738 abroad visiting England and France, making many friends, particularly among botanists. In Holland a wealthy banker and ardent amateur horticulturist, G. Clifford, who had a magnificent garden near Haarlem, invited Linnæus to live with him, arrange his herbarium and garden and to publish an account of them. The description, published under the title "Hortus Cliffortiensis," is a botanical classic. In Holland, too, he began the publication of his really important works, such as "*Systemæ Naturæ*," "*Genera Plantarum*," "*Fundamenta Botanica*" and "*Critica Botanica*,"

books from which modern systematic botany may be said to have taken its departure.

Upon his return to Sweden in 1738 Linnæus began the practice of medicine in Stockholm. He was appointed a "resident physician" in the Navy, so that naval surgeons should be proud to own him along with Darwin, Huxley, Richardson and a host of others of their number, who have made great places for themselves in the annals of science. He was a most successful clinician, and came finally to number even the Queen among his patients. As was to be expected, his practice became very lucrative. He was unhappy, however, because he had no time for his beloved plants, and said to a friend, "Once I had plants and no money, but I was happy; now I have money but no plants, and I am unhappy." He wished to obtain an appointment to the chair of botany at Upsala. It was necessary for him, however, to accept instead the chair of medicine. He became professor of medicine there in 1741, but soon exchanged for the coveted professorship of botany. In this position his knowledge and love of natural history, his enthusiasm and his great gifts as a lecturer and teacher soon made him famous and attracted students from all over the world. The old Swedish university became the Mecca of naturalists. The ordinary enrollment at Upsala at that time was about 500, but it soon trebled. Linnæus built up a great botanic garden with special gardens for Scandinavian plants, Bible plants, economic plants, medicinal plants and greenhouses full of tropical and exotic species. In his *Hortus Upsaliensis* he described this garden and the 1100 additions to it he had made. He also made two journeys through Västergöthland and Skøne, similar to his Lapland and Dalecarlian expeditions, and published excellent and popular accounts of them. Other important works were a flora and a fauna of Sweden, for which he had made collections and observations for more than fifteen years. In 1750 appeared his *Philosophia Botanica*, in which he comments on the axioms of his early book on the fundamentals of botany. In 1753 appeared his most important published work, the *Species Plantarum*, in which the specific names and descriptions, most of them still in use, are set forth. His *Materia Medica*, considered by many of his contemporaries one of his most important works, was also printed about this time.

Honors, money and the friendship and patronage of kings and queens were almost forced upon him. The Swedish King, Frederick I, reëstablished the two famous Swedish orders of knighthood, the Order of the Seraphim, or the "Blue Ribbon," the Order of the Sund, or the "Yellow Ribbon," and founded the Order of the Polar Star or the "Black Ribbon." The latter was to be a special order for civil merit. Linnæus was made a knight of the Polar Star in 1753, the first man of science in Sweden to receive this honor. His patent of nobility was antedated to 1748. The badge of the order is a white cross with a five-pointed silver star on a blue medallion in the center, the whole suspended by a black ribbon of watered silk. Linnæus was extremely proud of this distinction and nearly all his later portraits showed him wearing the handsome insignia of the Order.

The arms chosen prominently displayed three crowns symbolic of the three realms of nature, the animal, vegetable and mineral kingdoms first clearly defined by Linnæus. The motto was "To extend fame by deeds."

The King also built a handsome house in the grounds of the botanic gardens as an official residence for the professor of botany, so that he might always be in

the midst of his beloved plants, that they might benefit from his care, and his knowledge be enriched by the greater opportunity for observation. Linnæus received so many gifts, prizes and fees, that combined with his salary and official emoluments, he became extremely well to do if not actually wealthy. He bought a country place at Hammarby close to Upsala, and built a fine home there for his family to inherit. The King gave him a pension, and two farms, and 500 pounds sterling was paid for the secret of making pearls which Linnæus had developed, and was similar to that used by the Japanese pearl fishers to-day. Both Linnæus and the Government believed this to be a discovery of great value. The King also appointed the eldest son of the great botanist to be Assistant in Botany at Upsala, with a promise that he would succeed to the professorship on the death of his father.

The King of Spain invited him to settle there, offering him a liberal salary, full exercise of religious liberty and a patent of nobility. He was to be the royal botanist and to make a survey of the plant resources of the great Spanish colonial empire in the New World. Had he accepted he might have anticipated much of the work of Humboldt. Linnæus, however, who was very patriotic, declined this offer, saying that any talent he possessed should be used for the benefit of Sweden. His favorite, and in his opinion most gifted pupil, Löfling, was sent in his place.

The influence of Linnæus was multiplied through his numerous pupils, who revered him as the king of their loved science. He not only made botany the favored science of the Swedish people, but through his pupils he gave direction to scientific research in it for a hundred years, not only in Sweden, but throughout the world. His pupils and numerous correspondents supplied him with specimens, drawings and descriptions. A Swedish sea captain brought him living specimens of the tea plant, which to the sorrow of Linnæus, could not be grown on a commercial scale in Europe. He received also a cactus covered with cochineal insects which were destroyed by a gardner who thought them harmful parasites. Among the most famous of his students were:

P. Löfling, whose name is connected with the Spanish flora; P. Kalm, the author of a celebrated account of his travels in North America before the American Revolution; Hasselquist, who described the flora of Asia Minor, Forskel, that of Arabia, Sparrman, that of South Africa, and accompanied Captain Cook on one of his Antarctic voyages; and Thunberg, who described the flora of Japan. These and many others carried the teachings of Linnæus and his love and enthusiasm for botany all over the world, and passed it on in their native land to such effect that it is safe to say that Sweden has produced more botanists in proportion to its population than any country in the world.

A striking instance of the fame of Linnæus at this time was the fact that the Pope, who had forbidden the use of his books seventeen years before, now issued a decree that no other texts on botany were to be used officially but those of the Swedish botanist. The Empress Marie Theresa of Austria congratulated the ambassador from Sweden that his country had such a luminary in the world of science as Linnæus, and Frederick the Great of Prussia is said to have addressed him as the "Prince of Botanists." The Russian Academy offered a prize for an essay on the utilization of the natural resources of the plant kingdom. This was a favorite subject with Linnæus, who was always particularly interested in economic botany. His essay won the prize and the pseudonym he used "*Illuminat*," "He illumines," was placed on the medal given him.

What did Linnæus do, we may ask, that he should receive all these honors? What were the achievements that place him in so high a position as a naturalist? They may be summed up as follows:

(1) Linnæus established the importance of the pistils and stamens not only as the sexual organs of plants, but as an important part in the orderly classification of plants. Caesalpino, the great Italian physician and botanist of the sixteenth century, the virtual founder of systematic botany and a forerunner of Harvey in the discovery of the circulation of the blood, had two centuries before stated the fundamental doctrine that—"in the fruit and seeds of plants we have the key to their affinities." This was forgotten by those who followed him, and the outer floral structure, the petals and sepals, were the principal things considered in the classification of plants. The important sexual parts of the flower, the stamens, the pistils, the stigmas and the ovary, were disregarded. Both the binominal nomenclature and the use of the pistils and stamens in classification seem simple things and it is difficult for a botanist to-day to realize what epoch-making innovations they were. Yet they created a new era in the science.

(2) The binominal method of naming plants and animals was one of the greatest advances in biology and brought order out of chaos in the classification of plant and animal life. Each species was given two names, a generic and a specific name, thus: *Primus virginiana*, the chokercherry. The meaning of the binominal method of naming plants and animals is best understood by an example from the names of people. If there were only given or Christian names, the world would be full of Johns, Georges and Williams, and Sarahs and Marys, and no designation to show which were brothers or sisters. By the use of two names, that is by adding surnames such as Smith, Jones or Johnson, the Johns and Sarahs become grouped in their proper family relationship. This is what occurred with the use of the binominal method; related species of plants or animals were quickly classified. It was all the more needed on the tremendous additions to the known flora and fauna of the world from the discoveries of the New World and the Exploration of the Asiatic African and Australian continents.

(3) The division of all natural objects into the three kingdoms, animal, vegetable and mineral.

(4) His enthusiasm for botany and natural history created world-wide interest on that subject so that, in the words of another great Swedish botanist—"Natural science, formerly a neglected child, who seldom came into view, soon became a cherished possession of high and low, old and young."

(5) He elevated science to where it attracted the attention of people both in the highest and lowest walks of life. He was the greatest propagandist for science of all the followers of science.

(6) He made many important contributions to economic botany, and was a pioneer in ecology and plant geography.

(7) He was one of the founders of geology. He began the comparison of strata of one locality with those of another, and propounded the theory of a fixed sequence of strata over the whole earth, a fundamental idea in paleontology.

(8) As a mineralogist he drew attention to crystallization forms as a basis of classification.

(9) As a medical man he described aphasia and re-awakened interest in dietetics and dietetic therapeutics. His use of strawberries in arthritis and gout is of interest in the light of recent research. Linnæus drew attention to parasitic "small animals," as causes of certain skin disease. He opposed the excessive blood-letting so universally practiced in his day, mentions the value of electricity in the treatment of disease, and generally showed in medicine, as in natural history, that he was in many respects, in advance of his time.

Linnæus married, in 1739, Sarah Elizabeth Moraea, the handsome daughter of the town physician of Tahlun. He had been betrothed to her before going abroad, but marriage had been opposed by her parents until Linnæus had completed his studies in Holland, taken his medical degree and become able to support a wife and family, not an unusual demand to be made by parents. His wife turned out to be something of a Tartar. She was so thorough a housekeeper and she kept the house in such a state of disorder from cleaning that it was little of a home. She

kept her husband "under the slipper," as the Swedish call petticoat government, and more serious still she had an unusual dislike of her eldest son. With all her faults, however, she was loved by Linnæus, and though some have declared his domestic life unhappy, it is doubtful if Linnæus was dissatisfied with it, and in expressing thankfulness to his Creator for certain benefits, he mentions among others that: "God gave him the wife he most desired, who kept house for him while he worked."

Linnæus was apparently extremely fond of his wife and children. He had two sons and three daughters. The youngest daughter was probably his favorite child. She was still-born, but was brought to life by insufflation, Linnæus applying his lips to hers and gently blowing air into her lungs. He was very religious and among a number of autobiographic notes which he made are the following memoranda in which he set down his feelings of respect and thankfulness to God for benefits received. They constitute in a sense a sort of biography and estimate of his life, character and achievements. He uses the third person in referring to himself:

God has conducted him with his own Almighty hand;

God has let him grow up from a trunk without root, planted him on a distant, splendid spot, let him grow into a considerable tree;

God has given him so ardent a mind for science, that it became the most desirable aim in life;

God ordained that all suitable means should be available in his time to aid his progress;

God so directed him that his failure to win what he wanted became his greatest advantage; caused him to be taken up by patrons of Science, even by the highest in the King's Palace;

God gave him the best and most honorable duty; precisely what he most desired in the world;

God gave him the wife he most desired; who kept house while he worked;

God gave him children who were good and virtuous;

God gave him a son as successor;

God provided him with the greatest herbarium in the world, his greatest delight;

God bestowed goods and other possessions, so that there was nothing superfluous, nothing wanting;

God honored him with a title of honor, knight and nobleman, and made him a great name in the learned world;

God preserved him from fire;

God preserved his life beyond sixty years;

God let him see more of his created world than any mortal before him;

God bestowed upon him the greatest insight into the knowledge of Nature, more than anyone had hitherto enjoyed.

Like every great naturalist, Linnæus had a remarkable memory. It is said that at one time he could name and describe over 7000 plants. This memory began to fail in old age and in the last two years of his life he could not even remember his own name. It is safe to say that he assigned the aptly descriptive scientific names now in use to nearly 10,000 species of plants and many animal species as well. One has only to glance through a descriptive botany and note the "L" after the specific name, indicating that it was given by Linnæus, to realize that nearly every important scientific name for plant species originated with the great Swedish naturalist.

In his home, in his garden, his herbarium, and with his insect and mineral collections, Linnæus was very happy. In his study he had on the wall the pictures

of famous botanists and naturalists. Here in this beautiful home, with his wife and children, engaged with his studies and his pupils, honored by high and low both in his own country and abroad, Linnæus was very happy.

He had suffered a stroke of apoplexy in May 1774, and the increasing infirmities of old age finally brought him to his grave. In 1776 there was the following pathetic entry in one of his diaries:

"Linnæus limps, can hardly walk, talks confusedly, can scarcely write." He died on the 10th of January 1778, at eight o'clock in the morning. He was buried in the cathedral at Upsala. Many memorials have been raised to him, including the handsome statue in Stockholm, but none are more beautiful or more appropriate than a little lowly flower he himself discovered on his Lapland journey and named for him the "*Linnea borealis.*" The most fitting memorial for a botanist is a flower, and this little evergreen plant of the north, creeping on the ground, and blossoming almost from the snow, typifies at once the great botanist's modest origin, early struggles against adversity and his later flowering in a bloom that commanded the attention and admiration of the whole world. The *Linnea borealis*, as its specific name implies, is a native of the northern latitudes. The flower is beautiful, a snowy white bell streaked with purplish pink. The plant was an especial favorite of Linnæus. There is an American variety, "americana," considered by many identical with the "borealis."

In appearance Linnæus was of rather short and stocky build. His countenance, as may be seen from the portraits, was pleasing. His eyes were brown and his hair, in youth, flaxen. As a young man he was erect and active but by the time he was fifty he had become somewhat bent and his gait was shuffling in character. When talking or when lecturing to classes on botany his face fairly beamed with enthusiasm and interest for his darling science. He seemed to radiate this interest to his listeners and it was this quality as much as his marvelous knowledge that captivated his students and made him so great a teacher.

BIBLIOGRAPHICAL NOTES.

The most important and definitive biography of Linnæus is in Swedish and was written by the veteran botanist, T. M. Fries. In 1923 this was translated in a much abridged form by B. D. Jackson. This translation is published by H. F. and G. Witherby, London. It is well illustrated and gives the important facts about Linnæus and is the only modern work on him in English book form.

Stoever, D. H., "Life of Linnæus," in German, was published at Hamburg in 1792 and was translated by J. Trapp, London, in 1794. An old volume long out of print, it is a very interesting biography. Stoever was almost a contemporary and knew many of the pupils of Linnæus. Some of his material is, therefore, of particular value and his is a source book for many later biographies.

A charming book in English is Mrs. Florence Caddy's "Through the Fields with Linnæus." This is not so much an ordered biography as a trip through Sweden, describing the country and giving a running account of the naturalist's life with the description of travel. It is delightfully written, freely illustrated and reading it is a most agreeable way to become acquainted with Linnæus.

E. L. Green wrote a brief account entitled "Carolous Linnæus," published in Philadelphia in 1912. Two other accounts, D. C. Carr's "Life of Linnæus" written in 1837 and a "Life of Linnæus" by Miss G. L. Brightwell written in 1858, I have been unable to procure and have not seen.

Richard Pulteney, the author of a biographical history of English botany, published in 1781 "A General View of the Writings of Linnæus" which was probably the first account in English.