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Martius, the Father of Palms

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Karl Friedrich Philipp von Martius was an intellectual giant, a type of Renaissance man, as it were, as much at home in the arts and letters as in the sciences. In addition to being a botanist, he was also zoologist, ethnologist, linguist (polyglot, actually), economist, geographer, pedagogue, philosopher, geologist, mineralogist, poet, traveller, and Latinist. He had a prodigious memory, wrote elegant Latin, and corresponded regularly with the great Goethe. The results of his trip to Brazil (1817-20) were so monumental and prodigious that the country claims him as one of its own to this day.

He produced some 150 publications in total and among them was his great work on palms, Historia naturalis palmarum (1823-1853), on which he labored some 30 years. It appeared in three folio volumes, with 245 colored plates. One of the three volumes describes the palms he himself had discovered in Brazil. The whole monograph was written in an elegant and faultless Latin and is said to be the work by which he is best known. It included the then-known palms of the world, even those found as fossils. It covered anatomy, physiology, morphology, classification, and characteristics of palms; descriptions of the genera and species; reports of various and extensive kinds about their commercial uses, as well as their technological and medicinal uses; profound dissertations about the role that these plants have played in the history of peoples and in the world; valuable teachings about the ethnography and geography for the regions studied:

and a truly universal treatment of palm geography; all edited with a solid erudition that characterized the genius of Martius. Another major work on palms was *Palmetum Orbignianum*, published as volume seven of Alcide d'Orbigny's *Voyage dans l'Amérique méridionale* (1847).

Martius is known as "the Father of Palms," a sobriguet he richly deserves. He was enamored of them and is described as admiring them like a tourist, sketching them like a landscape painter, and studying them like a botanist. He spoke of them with near solemnity, confessing that they fascinated him and that many times he had confided to them in his vouthful dreams. He wrote "In palmis semper parens juventus; in palmis resurgo" (literally, in palms ever appearing youthful; in palms I am revived), rendered by the Portuguese writer Dutra into "Nas palmeiras existe um viço imorredouro; entre elas, sinto novo alenta," or "In the palms exists an undying exuberance; among them I feel new strength." Medals struck in Martius' honor used the parts of palms for decoration and the request that in death he might find new strength among them. When his friends accompanied his body to the grave, they carried fresh, green palm fronds. Finally, his family* placed at his grave a tombstone whose only

^{*} The Martius family, many members of which had pursued learned professions, traced its lineage back to Galeottus Martius, who was a professor at Padua in 1450. In 1823 Martius married Franciska Freiin von Stengel; they had four children.

adornment was two palm fronds with the words "In palmis semper virens resurgo!" The emperor of Brazil, Dom Pedro II. knelt at his grave in 1871 in homage to this great friend and servant of Brazil. For Martius, palms were a part of nature, which formed the stairway to God. He gave us the names Acrocomia, Brahea, Copernicia, Desmoncus, Diplothemium, Guilielma, Hyospathe, Leopoldinia, Lepidocaryum, Maximiliana, Oenocarpus, Orbignya, Plectocomia, Syagrus, and Trithrinax, as well as Keppleria and Taliera, genera now known by other names. The material that follows is based on a translation of an article by E. Wünschmann in volume 20 (1882) of a German dictionary of national biography, the Allgemeine Deutsche Biographie, that appeared in 55 volumes over the period 1875 to 1912.

His Life

Karl Friedrich Philipp von Martius, botanist, was born April 17, 1794 in Erlangen, Germany and died December 13. 1868 in Munich. Destined for an academic career from the cradle through the gift of academic matriculation from his godfather, he grew up in his parents' home surrounded by love and care and early showed a talent and inclination for scientific study. The direction of this study was inherited from his father, the court apothecary and "professor honorarius" of pharmacy, and was encouraged by a predilection for the natural sciences. Martius also possessed a deep moral earnestness and a natural aspiration for a well-rounded, harmonious cultivation of the mind, and both were nourished by instruction at an excellent secondary school in his home town. To this school he was indebted for gaining a thorough knowledge of classical antiquity. The Latinity of his later writings was famous for its elegance and the reading of Greek and Roman poets and scholars formed his favorite pastime to the end of his days.

When hardly 16 years old, he entered Erlangen University in 1810 to dedicate himself to the study of medicine. But among his academic teachers it was less the indeed learned, but narrow-minded, pedantic botanist Schreber who attracted him intellectually, despite Martius' devotion to botany, than it was the philologist Harless, the philosopher Vogel, the chemist Hildebrandt, the zoologist Goldfuss, and the clinical physician Wendt.

Martius was also indebted to the university gardener Rumelein for considerable instruction in the practical knowledge of plants. But above all, his association with the talented brothers Nees von Esenbeck contributed to his vouthful enthusiasm for a deepening absorption in the natural sciences. On March 30, 1814, Martius was conferred a degree of doctor of medicine on the basis of a rather comprehensive dissertation. "Plantarum horti academici Erlangensis enumeratio," which, prepared according to Linnaean methods, compared to a modern scientific garden catalog. But before the completion of this work. Martius had already changed over to being a botanist.

After Schreber's death in 1812, the Munich academicians Schrank and Spix came to Erlangen to buy the botanist's collections and there became acquainted with Martius, whom they inspired to join the then existing "Institut der Élèven der Akademie." This institute was a type of higher school that offered students many advantages in furthering their scientific studies. Martius agreed to go and, after taking the prescribed examinations, was accepted into the institute on May 13, 1814, and placed as an assistant for the administration of the newly-founded botanical garden under the direction of the aging Schrank. Two years later, he entered into actual state service as assistant to the academy. With joyous eagerness and abundant scientific success, Martius dedicated himself to the duties attendant upon this post, which consisted primarily of the orderly designation and grouping of the plants of the botanical garden. Likewise he strove to learn the indigenous flora through many extended trips beyond the borders of Bavaria to Salzburg and Carinthia.

A literary fruit of this activity was the *Flora cryptogamica Erlangensis* (1814), which contained Martius' first entirely independent research. He had worked on it while in Erlangen and because of its profundity and thoroughness, it earned him the recognition of his colleagues. He also won the benevolent kindness of the plant-loving king, Max Joseph I, who always specifically asked that Martius accompany him as he toured the botanical garden. This situation was of the most critical importance for Martius' future success in life.

The Expedition to Brazil

It was King Max Joseph on whose suggestion Bavarian scholars were also permitted to join the Austrian expedition which, in the spring of 1816, was to go to Brazil, accompanying the newly-married Archduchess Leopoldina of Austria who was to join her spouse, later Emperor Dom Pedro I. Besides Martius as botanist, the academician and zoologist Spix was also chosen. The two learned men left Trieste on April 2, 1817, on the Austrian frigate Austria, of necessity after only a short time for their provisioning and scientific preparations. They arrived in Rio de Janeiro on July 15 and remained in the capital city until December and then, separated from the scholars of the Austrian expedition, began to march through the immense land, sampling and searching, from the Tropic of Capricorn to the Equator.

They visited the provinces of São Paulo, Minas Gerais, Goiás, Bahia, Pernambuco, Piauí, and Maranhão, exploring from Pará at the mouth of the Amazon up the shores of this river to the Peruvian border, as well as its great tributaries, the Rio Negro and Rio Madeira, up to the Indian territories. Returning to Pará on April 16, 1820, they arrived back in Munich on December 8. 1820, after an absence of almost four years. The trip covered almost 1,400 geographical miles and, in spite of difficulties and even risks to life, was crowned by unusually good fortune. It remains first among all scientific expeditions to the South American continent, both as to geographical extent, as well as to the volume and importance of the results obtained. With the Brazilian trip, Martius' future was decided and a firm ground laid for his success. Soon after his return he was nominated by the Academy of Sciences as a regular member and was entrusted with the office of second conservator of the botanical garden.

Later Pursuits

A change in his position occurred in the year 1826. After the enthronement of King Ludwig I, the University of Landshut was transferred to Munich and there Martius was appointed botany professor ordinarius in his 32nd year. Six years later, after the pensioning of the elderly Schrank, Martius received the latter's office of first conservator of the botanical institutes, the garden, and the botanical collections. Martius applied himself to his duties as an academic teacher with the same care and the same success as he did to his official affairs. The latter took a great deal of his time, especially after he was chosen secretary for the Mathematical-Physical-Science Class by the Academy of Science in 1840. As part of the duties of this position, he

had the honor to compose a farewell speech for every member of the class who died and the manner in which he did this is admirable. He wrote the most lofty, illuminating, and masterful characterizations of his colleagues, whether from the ranks of his own specialties or scholars from various other disciplines. Martius later gathered these addresses together and published them in 1866 under the title *Akademische Denkreden*. The later addresses he composed about Faraday, Brewster, Flourens, and others appeared in the proceedings of the Academy of Science in 1868.

Otherwise, the whole period of Martius' activity in office showed little change and no exceptional events. His work occupied him so completely that only seldom did he spare himself a break for the pleasure of a long trip to France, Belgium, Holland, England, or Switzerland. From an unexpected event commencing in 1854, Martius' official duties were brought to an untimely end. Even though a more useful alteration plan of the botanical garden had been made with the expenditure of a great amount of time and effort, higher authority approved the construction there of the palace for an industrial exhibition, despite Martius' most forceful remonstrances. Dejected and discouraged, Martius asked for dismissal as professor and garden conservator, which was then granted to him in the most honorable fashion.

But this 60-year-old, still completely vigorous in body and spirit, did not retire to idle ease. On the contrary, he dedicated himself with unbroken effort entirely to his duties for the academy and his own labors. With exceptional industry and considerable monetary expense, he was occupied to the end in enriching and classifying the botanical collections necessary for his work. Thus he had brought together in his home such resources of plants and botanical works as very seldom are found in private possession. His position of class secretary, his worldwide scientific communications, and his numerous personal acquaintances, combined to place upon him the need for an immense correspondence, to which he applied himself with an unusual punctuality. In this he was greatly assisted by his inherent ease and fluency of expression.

Martius' high scientific merits were fittingly recognized. Innumerable works were dedicated to him; many species of plants and animals, even a mountain-Mount Martius in New Zealand-were named after him. Almost every learned society honored him and itself through his enrollment in the count of its members. But the most eloquent expression of high honor from all sides was on the occasion of the celebration of the jubilee marking the 50th year of the granting of his doctorate on March 30, 1864. Fresh in body and spirit, he took part in this celebration. His ceaseless activity caused no noticeable decline in his physically as well as spiritually tough constitution even well into old age. In the autumn of 1868, four years after his jubilee, he visited his son and friends in Berlin and also brought his friend Ehrenberg the latter's honorary diploma from the Munich Academy for his 50th-year doctoral jubilee. However, soon after Martius' return, an illness overcame him and quickly developed into a dangerous pneumonia. After being confined only nine days in bed, he died at 75 years of age, having enjoyed unusually good fortune during his whole life.

His Personal Qualities

In conclusion it may also be mentioned that Martius was an ardent violin player in his earlier years, had written an essay on violin making, and had done research into the most useful form for the instrument and for the properties that the

wood must have, etc. One can often read on Mittenwald violins his saying: "In silvis silui, nunc mortua cano." This versatility of talents that came to light in Martius made him important to more than his own time: his merits as a natural scientist reach into the present with their effects. Like a Cuvier, Jussieu, de Candolle, Robert Brown, and other exceptional minds, he understood how to unite harmoniously in himself the advantages of the learning of the past centuries with that of his own century. Besides classical and universal culture, which were peculiar to the great natural scientists of the former generation, Martius also possessed the more exact knowledge of those disciplines that his contemporaries created or developed further. Specifically, for botany his greatest merit lay in the fortunate bridging between the Linnaean period, in which the beginning of his life span lay, and the later years with their tremendous advances in botanical morphology, anatomy, and physiology, which also provided a deepened conception and a more comprehensive treatment of the vegetable kingdom for taxonomy. Martius contributed to the maintenance of descriptive botany as a viable botanical discipline. One must also give him credit for his fine understanding of how to track down able forces and put them to use in the service of science: A. Braun, H. von Mohl, K. Schimper, O. Sendtner, A. Eichler, and other authorities of botanical science sat at his feet. He possessed as well an eminent teaching ability, which not only made an impression from the lectern but also fascinated his listeners in private company. That beautiful relationship that prevailed between teacher and student came to the fore at the time of the then much-loved Linnaeus festivals. On Linnaeus' birthday, the 24th of May, Martius set out from Munich with his students by boat on the Isar River upstream to the little village of Ebenhausen where, at the Linnaeus oak, a simple meal was eaten, accompanied by speeches, toasts, and poetical outpourings. A friend of poetry. Martius had himself nurtured this facet of intellectual development. He had dedicated several songs to his palms and had published several songs from his larger poem Suitrams Fahrten (Suitram's Journeys) in Charitas, published by Schenk and Fernau. His spiritual life and his character were also as harmonious as his outward life. Of cheerful temperament, receptive to all that was good and beautiful, friendly and helpful to everyone, and a genuine, noble human being, he placed a living memorial in the hearts of all who knew him.

His Works

With the death of Martius, an outstanding representative of botanical science was gone. The crucial point of his scientific activity lay in his Brazilian trip. What he published before it has already been briefly pointed out. The trip itself opened to him an area of the most fruitful literary activity. Apart from the splendid impressions that the country made on the young, impressionable man, the following half century was not enough to work on the natural history materials that were brought back. Although Brazil had been explored several times before (never in its greater extent), it remained a little-known wonderland. Besides valuable fossils and rock specimens, the natural history specimens consisted of 85 species of mammals, 350 birds, 130 amphibians, 116 fishes, 2.700 insects, 80 each of the arachnids and crustaceans, and of plants about 6,500 kinds. Of the latter, usually several examples of each were carefully preserved and form the best part of the Munich herbarium. Also the botanical garden received a large part of the spoils, partly of the living plants brought back

and partly of the plants raised from the gathered seed.

The first great work that was published as a result of the trip was a description of the trip itself, written jointly with Spix, which appeared during the years 1823–30, under the title Reise in Brazilien auf Befehl S. M. Maximilian Joseph's I. von Baiern von 1817–1820 unternommen (Journey in Brazil on the order of His Majesty Maximilian Joseph I of Bavaria. undertaken in 1817-1820). Of its three volumes, the last two are almost solely Martius' work, since Spix died in 1826. For a knowledge of Brazil this work is of the same importance as Humboldt's works for the remaining countries of tropical America. Although the real story of the journey's progress is not interrupted by special scientific discussions, which are only added as supplements, the work is so full of geographical, ethnographical, statistical, and natural history materials, that it will be retained for all time as an original source. But it also belongs in the first rank for works on travel, both at home and abroad, because of the perfect style in which it is written, a style which even Goethe repeatedly praised highly. The special work on the Brazilian natural history collection was begun simultaneously with this travel account. From the botanical portions Martius next published an assortment: the phanerogams under the title Nova genera et species plantarum \dots in three volumes (1823–32) with 300 colored illustrations; the cryptogams in the Icones selectae plantarum cryptogamicarum . . . (1828-34). For the latter work, Hugo von Mohl supplied an excellent treatise about the stem structure of the tree ferns and for the first volume of Nova genera Martius had his colleague J. G. Zuccarini as collaborator; everything else is exclusively his own work. Both works contain thorough descriptions, accompanied by exemplary drawings of the whole plants in analytical detail. In part, single plants, characteristic of growth in Brazil, are covered as well as whole ranks and groups of related genera, by which the first ground was firmly laid for a more exact knowledge of the plants being treated. Also the shorter, but precise descriptions of the remaining plants, which total over 400 species in more than 70 genera, contain much important information about the hereditary, geographical, medicinal, and technical relationships. This information attests to a broad knowledge of the pertinent literature, but also to a gift for observation and critical discernment on the part of the author. The artistic handling of the illustrations stands forth as unique and peerless.

Historia Naturalis Palmarum

Martius began yet a third work simultaneously with his travel account. It is the work that can be called in every respect his "magnum opus," since it brought him renown all over the world. It is the three-volume *Historia naturalis palmarum* (1823–53), which was accompanied early on by a slim volume entitled *Palmarum familia ejusque genera denuo illustrata* (1824).

It appears that Martius' long sojourn in a land of palms awakened in him the desire to make the natural history of this noble model of the plant kingdom the subject of his special scientific endeavors. For this purpose he studied on the one hand the many living kinds of palms during his trip and collected a rich harvest of specimens for further research. On the other hand, he searched on his return for the palms from other parts of the world, even the prehistoric fossils, so as to bring together the groups in their entirety, as far as possible, for the purpose of studying them in exacting detail. His persistent effort produced a mono-



ASTROCARYUM Iauari.

LEOPOLDINIA pulchra.

1. Plate 52 from the second volume of *Historia naturalis palmarum* showing the habit of *Astrocaryum jauari* and *Leopoldinia pulchra*.

graph of epoch-making importance. Its worth was such that it extended beyond the subject treated into other areas of botany, in teaching, in stimulating, and in enlightening. Alexander von Humboldt was right in saying "So lange man Palmen nennt und Palmen kennt, wird auch der Name Martius mit Ruhm ge-



2. Plate 53 from the second volume of *Historia naturalis palmarum* with details of leaf, inflorescence, flowers, and fruit of *Leopoldinia pulchra*.

nannt werden." ("As long as man mentions palms and knows palms, the name of Martius will be quoted with glory.") In the first volume, which appeared after the second, Martius was assisted in those areas less familiar to him, namely the anatomical and paleontological aspects. Hugo von Mohl furnished the anatomy in a highly important chapter while Franz Unger undertook the treatment of fossil palms and A. Braun and O. Sendtner contributed a part of the morphology. But by far the most methodical and comprehensive work is Martius' own, which comprises a monograph on the Brazilian palms in the second volume and the taxonomy of the whole palm family in the third. Herein are contained the results of the differentiations based on morphological research, the classification analyses, as well as the special descriptions of the genera and species along with numerous basic discussions about history and distribution, as well as technical, medicinal, and cultural-historical references for the palms covered. But on the other hand, the chapter by Martius covering the geographical relationships for the entire palm family in the first part is of special importance because here the author's universal ideas on palm geography are laid down. Concerning the artistic merit of the drawings. Goethe passed gracious judgment. which he bestowed in a review in his Bildung und Umbildung organischer Naturen.

Flora Brasiliensis

Even while the works referred to were originating and going forward, Martius had taken up yet another, an immense work that occupied him to the end of his days and aimed at nothing less than the systematic enumeration and description of the entire flora of Brazil. At the beginning of his 30th year, in collaboration with Chr. G. Nees von Esenbeck, he had already started on this in a smaller way by publishing Flora Brasiliensis seu enumeratio plantarum in Brasilia . . . provenientium. . . . Of the two volumes, the first one, covering algae, lichens, and liverworts, was authored jointly by Martius. Eschweiler, and Nees von Esenbeck, the second one covering the Brazilian grasses, by C. G. Nees von Esenbeck alone. But this form of treatment was abandoned by Martius as inadequate. At the initiative of Prince Metternich and in alliance with Stephan Endlicher, a by far more grandiose plan was drawn up which also enjoyed the active support of Kaiser Ferdinand I of Austria and King Ludwig I of Bavaria. The Flora Brasiliensis undertook the challenge to describe in detail and illustrate the entire flora of that land based on all plants collected from Brazil and available to scientists. The one exception was to be the lower cryptogams.

Naturally the solution to this task could only be possible by the union of a great number of scholars. These men had the task of preparing, in Latin, separate monographs on the families of plants chosen and based on certain common criteria for the handling of the plant material. These monographs were then to be bound into volumes in the order of natural, taxonomical classification. Martius had the luck to acquire a group of the most outstanding botanists, both from home and abroad, to take part in the work, of which just a few such as Hornschuch, Nees von Esenbeck, Grisebach, Hanstein, Miguel, and Tulasne will be named here. So under the nevertiring, energetic direction of its editor, the work grew, under the title Flora Brasiliensis, sive enumeratio plantarum in Brasilia hactenus detectarum. . . ., into a magnificent production, one that in range and thoroughness finds no peer in the botanical literature of any nation.

From 1840 on, the first issues followed

one after the other with comparative rapidity and when in 1852 Emperor Dom Pedro II of Brazil turned his liberal support to the undertaking, it took on an even stronger upswing. The retirement of Martius soon thereafter made it possible for him to dedicate all his efforts to the work. In 1848, after the death of the first co-editor, Endlicher, Eduard Fenzl took his predecessor's place and in 1861 A. W. Eichler was called upon as assistant in editing and as permanent collaborator with Martius. The monographs, for which at first only the resources of the Vienna and Munich state herbaria and the private collection of Martius were available, were enlarged as little by little greater resources were The collections of the Berlin added. herbarium, the St. Petersburg botanical garden, and the great private herbaria of Alphonse de Candolle, Count Franqueville, Boissier, as well as many smaller herbaria, became available. In individual cases the museums at Kew and Paris could also be used, so that, in time, everything in the way of plants that had been brought from Brazil to Europe was worked into Flora Brasiliensis. Because of this it was often necessary for later workers to step over the political boundaries of Brazil and include plants from neighboring regions into the framework of the literary undertaking; in this way the importance of the work for a knowledge of the South American plant world was considerably raised.

The systematic arrangement and description in the *Flora Brasiliensis* is the usual one for larger, descriptive works. Throughout the descriptive parts is a chapter on geographical distribution, and where appropriate, a chapter on the medicinal, technical, commercial, and economic uses of the plants is added. In this regard, Martius himself had prepared many contributions, which were interpolated into the monographs. The Anonaceae and Agavaceae families he treated himself. Also a special supplement volume of "tabulae physiognomicae," a group of original landscapes with characteristic vegetation, sketched at the original locations, was included, with a descriptive text in the most elegant Latin. Finally the work contains two maps, of which the first shows the most important botanical journeys in Brazil and neighboring countries and the second the different geobotanical regions, which, according to Martius, can be distinguished in Brazil. So up to 1869, in 46 parts of Flora Brasiliensis, more than 8.000 species in almost 850 genera were treated. of which about 1,400 species were pictured on 1,071 lithographic plates. Of the "tabulae physiognomicae," 55 appeared.

Then Martius died. It had been one of his last concerns that the uninterrupted progress of the monumental undertaking be provided for. His successor in the editorship was A. W. Eichler, professor of botany and director of the botanical garden in Berlin. And so the work went on. By 1882, 109 families, which represent over 10,000 species, had been treated in 91 fascicles, and the final work of 15 volumes (in 40) in 130 fascicles was completed in 1906. To the earlier materials at the disposal of the workers, others were added by botanists Hooker, Oliver, and Warming, and many of the best known representatives of botanical science, such as Baker, Bennett, Warming, Eichler, Engler, Rohrbach, Kanitz, Solms-Laubach, Peyritsch, and others joined the circle of workers.

An eternal monument to the name Martius is erected in the *Flora Brasiliensis.* The fundamental importance of the work lies essentially in the following: all at once it opened up a knowledge of the plant world of nearly all of tropical America. This was done by the range of the geobotanical regions covered as well as by the completeness of the exhaustive treatment and the great number of drawings, which are without parallel. Also, there is a treasure in the masterful monographs that, in morphological and phytographical hindsight, was epoch-making for plant taxonomy in other areas of botanical science. Indeed, the monographs were written by men who dedicated their whole lives to the study of the family groups.

In close connection with the main work just covered, Martius published yet one more: Herbarium florae Brasiliensis. In the specially printed supplements to the Regensburger Flora (1837), there appeared in 1837–40 a catalog to an herbarium collection brought together in Brazil. It was a critical work, with numerous diagnoses and literary references, and was prefaced by an excellent review of all the organized botanical explorations to Brazil up to that time and the nature of the distinguishable geobotanical regions there. In addition, Systema materiae medicae vegetabilis Brasiliensis appeared in 1843, a systematic enumeration of the plants that the people of Brazil use for medicinal purposes, with reference to their preparation, application, and results. Of similar content was Specimen materiae medicae Brasiliensis, appearing in 1824 in the ninth volume of the memoirs of the Munich Academy, as well as a number of essays in Buchner's Repertorium der *Pharmacie*. There was also a special offprint, appearing in 1831, of Die Pflanzen und Thiere des tropischen Amerika's (The Plants and Animals of Tropical America). The fine address Die Physiognomie des Pflanzenreiches in Brazilien (The Physiognomy of the Vegetable Kingdom in Brazil), (Records of the Bavarian Academy of Sciences, 1824) is of exclusive botanical nature. But Martius pursued more than natural history interests in Brazil. Being a naturalist in

the broadest sense, wherever he ran across new and important phenomena in the diverse provinces, he had studied them with zeal and so he made many valuable contributions to the geography, ethnography, and linguistic understanding of Brazil. The most important evidence is a two-volume work completed in the last year of his life: Beiträge zur Ethnographie und Sprachenkunde Amerika's (Contributions to the Ethnography and Linguistics of America). He treated similar areas in gifted fashion in the writings Abhundlungen über den Rechtszustand der Ureinwohner Brasiliens (Essays on the Civil Condition of the Natives of Brazil); Über Pflanzen- und Thiernamen der Tupisprache (On Plant and Animal Names in the Tupi Language); Über das Naturell, die Krankheiten, das Arzthum und die heilmittel der Ureinwohner Brasiliens (The Disposition, Diseases, Medical Practice and Remedies of the Natives of Brazil); Über Vergangenheit und Zukunft der amerikanischen Menschheit (Of the Past and the Future of American Mankind). Finally, Versuch eines Commentars über die Pflanzen in den Werken von Marcgrav und Piso (Attempt at a Commentary on the Plants in the Works of Marcgrav and Piso) in Proceedings of the Bavarian Academy of Sciences, volume 7, 1853, belongs in this category. Marcgrav and Piso had published in 1648 a "historia naturalis Brasiliae," of special accuracy and truth, whose numerous wood engravings, as well as the original oils on paper, painted by Marcgrav, had passed into the possession of the Berlin royal library. Through the latter, Martius obtained a collection of copies of these pictures, which he used as a basis for the named work.

Other Botanical Writings

If Brazil was the land in which the roots of his literary power lay, Martius also produced a large number of works that do not especially relate to that country. Of the great number of other works of botanical content, the following monographs may be mentioned: Beitrag zur Kenntniss der natürlichen Familie der Amarantaceae (Contribution to a Knowledge of the Amaranthaceae Family). (Proceedings of the Academy Leop. Carol., Vol. XIV, 1825); Die Eriocauleen als selbständige Pflanzenfamilie aufgestellt und erläutert (The Pipeworts Proposed and Explained as an Independent Family), (ibid., Vol. XVII, 1833.); Beiträge zur Kenntniss der Gattung *Erythroxylon* (Contributions to a Knowledge of the Genus Erythroxylon), (Proceedings of the Bavarian Academy of Sciences, Vol. III, 1840.). The short essay Conspectus regni vegetabilis, which Martius used as a textbook for his lectures and in which he developed a new plant taxonomy based mainly on structure and growth relationships of the seed buds (ovaries), appeared in 1835 and merits special mention. It was meant to blend the organic classification of natural taxonomy together with the keenness and certainty of the artificial. But the system did not spread later on. A Syllabus praelectionum de botanica pharmaceutico-medica, appearing in 1852, also served didactic purposes.

Martius' everyday activity as director of the botanical garden produced several noteworthy essays. In the Hortus botanicus Regiae Academicae Monacensis (1825), apart from an explanation of the climatological and geological relationships of the Munich area, there appeared a history of the garden, an enumeration of the plants outdoors and those in the conservatories, and in conclusion, a description of the profitable uses of the plants. A Wegweiser für die Besucher des Königlichen botanischen Gartens in München (A Guide for Visitors of the Royal Botanical Garden in Munich) appeared first in 1852, two years before his resignation. At any rate, Martius gave great care to the botanical garden. It was kept in excellent condition in spite of a very small yearly budget and contained a collection of living plants from almost all families of the plant kingdom. It was hardly surpassed by any similar establishment. The new plant species, raised from seed sent in, were described and these accounts published either in *Amoenitates botanicae Monacenses* (1829–31), or together with P. von Schranck in *Hortus regius Monacensis* (1829).

His interest in horticulture and efficient agriculture was documented by his activity in the horticultural society in Munich, for which he served as chairman until his death. Several of his lectures appeared in the annual reports of this organization, of which the Vorträge über die Florenreiche (Lectures on the Vegetable Kingdom) are particularly noteworthy. Also the potato disease occupied him thoroughly. He published an essay about it in 1842 in the Proceedings of the Bavarian Academy of Sciences: Die Kartoffel-Epidemie der letzten Jahre, oder die Stockfäule und Räude der Kartoffeln (The Potato Epidemic of Recent Years, or the Vine Stock Blight and Scab of the Potato) and in 1845 in the bulletin of the farmer's association in Bavaria: Sendschreiben über die Kartoffelkrankheit (Open Letter about the Potato Disease). Martius was the first one who observed a microscopic fungus in the sick tubers, which he called *Fusisporium* solani; he derived the epidemic-like spread of the disease by the transmission of the spores of this fungus to healthy plants.

Finally, it has already been stressed that Martius cultivated philological studies as one favorite and in his writings was a master of discourse, in German as well as Latin. In the historical-philological area there is a small essay Quaedam de priscorum epistolis in Bibliotheca Universitatis Erlangensis asservatis, that appeared in 1845 on the occasion of the jubilee of David Heinrich Hoppe.

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PALM RESEARCH

CLAUDE I. BARRANT, Research Dept., Coconut Industry Board, Kingston, Jamaica, is carrying out long-term research on nutritional requirements, spacing, weed control and intercropping of *Cocos nucifera*. Main varieties are 'Malayan Dwarf' and a locally developed hybrid 'Maypan.'

BASIL O. BEEN, Research Dept., Coconut Industry Board, Kingston, Jamaica, is testing imported and local varieties of *Cocos nucifera* for lethal-yellowing resistance, and developing hybrids with lethal-yellow resistance, large nuts and good yields. Methods of pollen collection, storage and application are also being investigated.

ANDREW J. DABEK, U.K. Overseas Development Ministry, Coconut Industry Board, Kingston, Jamaica, is currently engaged in attempts to identify insect vector(s) of coconut lethal-yellowing disease.

SIMON J. EDEN-GREEN, U.K. Overseas Development Ministry, Coconut Industry Board, Kingston, Jamaica, is attempting to isolate mycoplasmalike organisms from lethal-yellowing-diseased

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coconut palms and transmit them to healthy palms.

AUDLEY L. GOWDIE, Coconut Industry Board, Kingston, Jamaica, heads a coconut advisory division with links with several thousand farmers.

DAVID H. ROMNEY, Research Dept., Coconut Industry Board, Kingston, Jamaica, is operating a foliar analysis laboratory for deficiency diagnosis in *Cocos nucifera*: he is also comparing varieties and hybrids in terms of copra out-turn and oil content.

HENRY WATERS, U.K. Overseas Development Ministry, Coconut Industry Board, Kingston, Jamaica, operates an electron microscope laboratory in the study of the cause and transmission of coconut lethal yellowing. He is mapping the frequency distribution of mycoplasmalike organisms in the palm and studying the three-dimensional shape of the MLO.

TOM WILSON, Coconut Industry Board, Kingston, Jamaica, supervises coconut seed and seedling production in Jamaica, comprising some 150,000 'Maypan' hybrid seed and 800,000 selected 'Malayan Dwarf' seed per annum.