



---

## Rafinesque's Publications from the Standpoint of World Botany

Author(s): E. D. Merrill

Source: *Proceedings of the American Philosophical Society*, Vol. 87, No. 1, The Early History of Science and Learning in America (Jul. 14, 1943), pp. 110-119

Published by: American Philosophical Society

Stable URL: <https://www.jstor.org/stable/985004>

Accessed: 02-01-2019 20:06 UTC

## REFERENCES

Linked references are available on JSTOR for this article:

[https://www.jstor.org/stable/985004?seq=1&cid=pdf-reference#references\\_tab\\_contents](https://www.jstor.org/stable/985004?seq=1&cid=pdf-reference#references_tab_contents)

You may need to log in to JSTOR to access the linked references.

---

JSTOR is a not-for-profit service that helps scholars, researchers, and students discover, use, and build upon a wide range of content in a trusted digital archive. We use information technology and tools to increase productivity and facilitate new forms of scholarship. For more information about JSTOR, please contact [support@jstor.org](mailto:support@jstor.org).

Your use of the JSTOR archive indicates your acceptance of the Terms & Conditions of Use, available at <https://about.jstor.org/terms>



*American Philosophical Society* is collaborating with JSTOR to digitize, preserve and extend access to *Proceedings of the American Philosophical Society*

## RAFINESQUE'S PUBLICATIONS FROM THE STANDPOINT OF WORLD BOTANY

E. D. MERRILL

Harvard University

(Read November 20, 1942)

IN undertaking work on a major task of actually preparing a comprehensive "Index Rafinesquianus," I recently had occasion to make a critical examination of all of that most erratic botanist's numerous botanical publications. At the same time I examined a great many papers by various authors commenting on diverse phases of Rafinesque's work. One statement by Professor M. L. Fernald<sup>1</sup> impressed me, and it was his comment that suggested to me the topic discussed in this paper. He had occasion to consider the status of certain eastern North American species named and described by Rafinesque, and states: "Constantine Samuel Rafinesque [Schmaltz], the most erratic student of the higher plants, has made unending trouble for American and (although they apparently do not realize it) European botanists." In another paper on Rafinesque<sup>2</sup> I mentioned Fernald's statement and amplified it by calling attention to the fact that, in his papers published while he was a resident of Palermo, between 1806 and 1815, and especially in his later publications, chiefly those issued in Philadelphia in the decade between 1830 and 1840, Rafinesque originated myriads of problems not only for the students of the flora of Europe to solve, but also for those concerned with a study of the floras of Mexico and Central America, the West Indies, South America, Japan, Siberia, China, India, Central Asia, Asia Minor, Malaysia, Australia, and North, Central, and South Africa. There is scarcely a major floristic area in the world that Rafinesque's work does not touch. His erratic work, in the past largely associated with North American botany, because much of his productive career was spent in the United States, and much of his work was published here, far from raising merely problems of concern to botanists working on the North American flora, actually impinges on world botany to a remarkable degree.

<sup>1</sup> Fernald, M. L. Some genera and species of Rafinesque. *Rhodora* 34: 21-28, 1932.

<sup>2</sup> Merrill, E. D. A generally overlooked Rafinesque paper. *Proc. Am. Philos. Soc.* 86 (1): 72-90, 1942.

This short paper is not intended to be a summary of Rafinesque's life and work. Briefly he was born in Galata, a suburb of Constantinople, in 1783 and passed his youth in Turkey, Livorno, Marseilles, Pisa, and Genoa. His father was a French merchant, and his mother, née Schmaltz, was of German parentage, born in Greece. He was largely self-educated, never having attended a university. From 1802 to 1805 he lived in Philadelphia, and from 1806 to 1815 in Palermo, Sicily. He returned to the United States in 1815, spending the remaining years of his life in this country. His second voyage to the United States ended in a catastrophe. After a long trip of 100 days, the ship, the *Union of Malta*, on which he was a passenger was wrecked on Race Rocks, near Fisher's Island in Long Island Sound, on November 2, 1815. In this shipwreck Rafinesque states that he lost his fortune, his share of the ship's cargo, all of his natural history collections assembled in the preceding twenty years, his library, unpublished manuscripts, drawings, and even his clothes. He remained in New York for several years and in 1818 made his first trip to Kentucky, returning to Philadelphia late in that year. In May, 1819, he left Philadelphia for Lexington, Kentucky, where from that year until 1826 he taught in Transylvania University. He returned to Philadelphia in September, 1826, and with the exception of various exploring expeditions to some of the Eastern States, he resided in that city until his death, September 18, 1840. At the time of his death he was in very straightened circumstances, and his body was buried by some of his friends in Ronaldson's cemetery in that city. The grave was not permanently marked until 1919. His effects were disposed of at auction to meet the demands of his creditors. When Ronaldson's cemetery was abandoned as a cemetery and turned into a city park, Rafinesque's remains were disinterred and removed to Transylvania College, Lexington, Kentucky, in March, 1924. The centenary of his death was celebrated by special ceremonies at Transylvania College in October, 1940.

I cannot refrain from quoting a few passages from G. Browne Goode's<sup>3</sup> review of Richard E. Call's *Life and Writings of Constantine Samuel Rafinesque*. Goode states that Rafinesque was

a man whose brilliant intellect, eccentric character and unhappy fate will always cause his career to be looked upon with interest, and whose nervous and appalling industry has been the cause of a myriad of perplexities to students of the nomenclature of plants and animals in Europe as well as in America. . . . The roving habit of mind which soon became a part of his nature led him into a mental vagabondage that influenced his career even more than the lack of a permanent place of abode. . . . His precocious mind, unguided and undisciplined, wandered at will over the entire field of books and nature, and by the time he had reached the age of nineteen he had formed his own character and equipped himself for the career which lay before him. . . . Lacking . . . guidance, however, he was by no means fitted to enter upon a scientific career in a country like the United States, so when . . . he crossed the Atlantic [first in 1802, and again in 1815] he brought with him the germs of failure and bitter disappointment. . . . His fatal tendency to 'scatter' was already apparent, and in the work which he did for the 'Specchio' [during his residence in Palermo] all the weaknesses of his subsequent career were foreshadowed.

My adventures in Rafinesquiana commenced in the early part of 1942, when I discovered by chance that in a paper published by Rafinesque<sup>4</sup> in France in 1834 there were no less than 46 new generic names and binomials, for the most part validly published, that had entirely escaped the attention of the compilers of our standard indices. The oversight is scarcely surprising, for the reason that all of these new names are undifferentiated in the text covering **Rafinesque's cursory remarks regarding de Candolle's interpretations of certain North American genera and species**. Where he differed from de Candolle on problems of nomenclature, he proposed new names in a most casual manner, quite as he did in his earlier reviews of the work of his contemporaries who were then publishing on the flora of North America, including Michaux, Nuttall, Barton, Bigelow, Muhlenberg, Eaton, Torrey, Elliott, and Pursh, besides drawing certain conclusions as to the

work of Loudon, Lindley, Sowerby, Hooker, and others. It is fortunate, for those who must concern themselves with bibliographical matters in listing new names, that Rafinesque's innovation in publishing many scores of new generic and specific names in his reviews of the work of other authors was not followed by his successors. Perhaps influenced by Rafinesque's procedure, the unwritten law that reviews should not be made the media for publishing new names became universally established over a century ago. Rafinesque's overlooked paper of 1834 is listed in the Royal Society's *Catalogue of Scientific Papers* (5: 76, 1871), but I have elsewhere seen no references to it; it is not mentioned in Fitzpatrick's<sup>5</sup> comprehensive bibliography of Rafinesque, which contains 940 numbered items.

In the course of my examination of Rafinesque's publications it soon became manifest that various other important papers of this author had not been indexed. I was aware of the fact that this applied to the rather extensive and very rare *Autikon Botanikon* (1840), which was printed in Philadelphia in the year of Rafinesque's death. Here, because no copy was available, the new generic names were not listed in *Index Kewensis* until its seventh supplement appeared in 1929. The entries for 83 new generic names were made from Pennell's<sup>6</sup> paper; the several hundred new binomials that appear in the *Autikon Botanikon* are still unlisted. Incidentally, a modern lithoprint facsimile edition of this rare work has recently been issued under the auspices of the Arnold Arboretum, and it is now generally available for the first time, since most of the limited original edition was apparently destroyed in Philadelphia after Rafinesque's death. There is reason to believe, from Rafinesque's own statement regarding certain other volumes published shortly before 1840, that only 160 copies of this work were printed. At any rate, only about a dozen copies of the *Autikon Botanikon* are known to be extant, it apparently being much more rare in European libraries than it is in those of the United States. I was not fully prepared to discover that various other complete volumes and pamphlets published by Rafinesque had been overlooked by the compilers of our standard indices, and that overlooked, ob-

<sup>3</sup> *Science*, n.s., 1: 384-387, 1895.

<sup>4</sup> Rafinesque, C. S. *Remarques botaniques sur quelques plantes de l'Amérique Septentrionale, dans les quatre premiers volumes du Prodomus ou Synopsis plantarum de de Candolle*. *Act. Soc. Linn. Bordeaux* 6: 261-269, 1834. See Merrill, E. D., A generally overlooked Rafinesque paper. *Proc. Am. Philos. Soc.* 86 (1): 72-90, 1942.

<sup>5</sup> Fitzpatrick, T. J. *Rafinesque. A sketch of his life with bibliography*. Des Moines: 1-241, 32 pl., 1911.

<sup>6</sup> Pennell, F. W. "Unrecorded" genera of Rafinesque. *Bull. Torr. Bot. Club* 48 (3): 89-96, 1921.

scurely published new names in papers that had been indexed were fairly numerous.

Having direct access to all but very few of Rafinesque's known botanical papers and books, I completed the record by securing the essential data from other sources in the United States and England. With a complete set of published data available, as far as Rafinesque's actual publications are known, I then undertook the time-consuming task of indexing all of Rafinesque's new names in the botanical field. The normal procedure was to transfer to large index slips all that Rafinesque published about each entity, whether it were a new genus, subgenus, species, or variety, or merely a substitute name. The total number of these slips is between 10,000 and 12,000. While this study has not progressed to a point where I can make even an approximate estimate of the total number of new names proposed by Rafinesque in all categories, he did originate a total of about 3,000 new generic and subgeneric names. The expectation is that there are between 1,200 and 1,500 Rafinesque plant names, in all categories, that have been entirely overlooked by botanists in that they do not appear in any of our standard indices. After a lapse of a century it seems to be desirable that these generic and specific names (for the most part validly published) be at least listed.

When the slips were sorted by major groups, such as algae, fungi, lichens, mosses, pteridophytes, and phanerogams, it became possible to initiate preliminary work on the preparation of the actual lists. That for the pteridophytes has been completed and checked. Of the 62 new names published by Rafinesque in this group, it was found that most of them had been overlooked. Within the field covered by Christensen's *Index Filicum* and its three supplements, there are actually 54 Rafinesque names, but of these Christensen detected only 8, and the entries to half of these are not to the original places of publication. In the algae about 60 new generic names were proposed, in the fungi about 55, and in the lichens 3. Apparently most of the names in these last three major groups have been overlooked. The number of new generic and specific names for the phanerogams is very much larger.

Lest some reader of this statement be fearful that the mere listing of the Rafinesque names overlooked for more than a century will unduly upset nomenclature, let me hasten to record that for the pteridophytes as a group only one Rafinesque generic name and one binomial stand.

The former is *Pteretis* Raf. (1818), which should replace *Struthiopteris* Willd. (1809) (non Weis., 1770, nec Bernh., 1801), *Matteuccia* Todaro (1866), and *Pterinoides* O. Kuntze (1891), while the latter is *Equisetum praealtum* Raf.; and various botanists have long since accepted both. I do not think that many nomenclatural changes will result through listing the very much larger number of names for the phanerogams. Most of the necessary changes in reference to binomials will be through the application of the homonym rule, and the percentage here will be small.<sup>7</sup> Where Rafinesque's properly published generic names antedate those of other authors currently accepted for the same group (and there will be a number of these), it is always possible to invoke the principle of *nomina generica conservanda*.

The chief reason for listing the multitudinous overlooked Rafinesque names is, of course, the homonym rule. It is suspected that the majority of botanists would be perfectly willing to outlaw all of Rafinesque's publications were it possible to do so, but as a considerable number of his generic names and binomials have always been accepted, and many more should have been accepted, it is difficult to see how his papers could be outlawed without abandoning his universally accepted names. Throughout Rafinesque's publishing career he proposed and described genera and species that were not only acceptable to his contemporaries, but also to his successors, and these names are everywhere used. The following generic names proposed by Rafinesque illustrate this point: *Distichlis*, *Eatonia*, *Stenophyllus*, *Peltandra*, *Clintonia*, *Prostanthera*, *Hexalectris*, *Nestronia*, *Ofaiston*, *Phyllipedium*, *Adlumia*, *Polanisia*, *Nemopanthus*, *Cladrastis*, *Nirwamia*, *Pachystima*, *Didiplis*, *Osmorhiza*, *Spermolepis*, *Ptilimnium*, *Cymopterus*, *Meriolix*, *Oreoxis*, *Lomatium*, *Oxypolis*, *Steironema*, *Synallodia*, *Stylisma*, *Ilysanthes*, *Endopogon*, *Blephilia*, *Lepachys*, *Erechtites*, *Serenia*, and *Agoseris*.

<sup>7</sup> I realize very fully that some of the conservative botanists will echo "Why bring that up?" at the mere suggestion that Rafinesque's numerous names, overlooked for more than a century, be now listed. Yet a nice species of *Trillium* has been named in honor of one of these botanists, because in 1906, when *Trillium declinatum* (A. Gray) Gleason was published, its author did not know that in 1840 Rafinesque had described an entirely different *Trillium declinatum* Raf. from Alabama and Florida; Rafinesque's binomial is not listed in *Index Kewensis*. Thus we now have *Trillium Gleasonii* Fernald replacing *T. declinatum* Gleason 1906, non Rafinesque 1840. If an argument is needed to support the listing of Rafinesque's overlooked names, here it is.

As expressed by Fernald,<sup>8</sup> "The task of sifting the comparatively few perfectly sound grains from the chaff and the distorted or unrecognizable grains is a thankless one and, above all, it should be undertaken only by those with intimate knowledge of the floras concerned." What this sifting process means may be illustrated by the statement that, including the above Rafinesque generic names and about 75 others that have been eliminated through the application of the principle of *nomina generica conservanda*, the number that modern botanists might accept, *on the basis of strict priority, is actually less than five percent, of the total that Rafinesque proposed*. Contrast the work of Linnaeus, where about 99 percent of the names that he adopted are still accepted. The discrepancy here is not due to the "weight of authority" but is an excellent index to Linnaeus' good judgment as opposed to the erratic judgment of Rafinesque. Some idea of the percentage of Rafinesque's proposed generic names that can be definitely placed, either as valid entities or as synonyms, is indicated by the fact that De Dalle Torre and Harms (*Gen. Siphonogam.*: 583–586, 1906) listed only 11 of Rafinesque's genera under their heading *genera incertae sedis*; that is, those that have not been referred to their proper families. The actual number of Rafinesque's genera that cannot be definitely placed will probably prove to be considerably larger than this, but some of these 11 can probably be placed on the basis of future investigations. While Rafinesque's record of valid or possibly valid genera is exceedingly poor, the record of his attempts to delimit species on the basis of actual specimens is scarcely better. I cite three cases. In *Clintonia* he described 18 species, in *Dodecatheon* 15, and in *Trillium* 35. Modern botanists, working on the floras of the same geographical regions whence Rafinesque's specimens came, have been able to recognize but 2 species of *Clintonia*, 1 of *Dodecatheon*, and 20 of *Trillium*; and not a single Rafinesquian binomial in these three genera has been adopted by his successors.

There are numerous cases where Rafinesque's proposed and validly published generic names actually antedate those in current use, but many of these have been included in the list of rejected names, for other names published later by various authors have been included in the list of *nomina generica conservanda* approved by the Interna-

tional Botanical Congresses. Examples of these are: *Bulbilis* Raf. (1819), replaced by *Buchloe* Engelm. (1859); *Diarina* Raf. (1808), replaced by *Diarrhena* Beauv. (1812); *Spathyema* Raf. (1808), replaced by *Symplocarpus* Salisb. (1818); *Megotigea* Raf. (1836) [1837], replaced by *Halicodicerus* Schott (1853); *Hexalepis* Raf. (1836) [1838], replaced by *Vriesea* Lindl. (1843); *Pogomesia* Raf. (1836) [1837], replaced by *Tinantia* Scheidw. (1839); *Piaropus* Raf. (1836) [1837], replaced by *Eichhornia* Kunth (1843); *Chrosperma* Raf. (1825), replaced by *Amianthium* A. Gray (1837); *Pubilaria* Raf. (1836) [1837], replaced by *Simethis* Kunth (1843); *Amblostima* Raf. and *Oxytria* Raf. (1836) [1837], replaced by *Schoenolirion* Durand (1855); *Laoethoe* Raf. (1836) [1837], replaced by *Chlorogalum* Kunth (1843); *Geboscon* Raf. (1824) and *Periloba* Raf. (1836) [1837], replaced by *Nothoscordium* Kunth (1843); *Quamasia* Raf. (1818) and *Cyanotris* Raf. (1818), replaced by *Camassia* Lindl. (1832); *Diphryllum* Raf. (1808), replaced by *Listera* R. Br. (1813); and *Cordula* Raf. (1836) [1838], replaced by *Paphiopedilum* Pfitz. (1886). I have here covered only the monocotyledonous families, but there are approximately 55 additional cases in the dicotyledonous groups or a total of about 75 cases where earlier and validly published Rafinesque generic names have been officially eliminated in favor of later ones published by other authors. The list must eventually be considerably increased if we are to avoid nomenclatural changes due to the discovery of still other generic names published by Rafinesque at dates earlier than those of other authors now currently accepted.

This is a rather deplorable record in view of the generally accepted principle of priority in taxonomy. While our rules of nomenclature are impersonal, yet it seems to be evident that modern botanists are just as unimpressed with the character of Rafinesque's work as were his contemporaries; and his contemporaries merely ignored much of his work under the assumption that it was not necessary to consider his findings. After all, the blame rests very largely with Rafinesque because of his usually inadequate methods of presentation, brief and sketchy descriptions, and his habit of publishing in out-of-the-way places. Numerous shorter papers were published in some ten different American magazines, twelve European and British ones, and in no less than seven "personal" periodicals that he hopefully initiated from time to time, but most of

<sup>8</sup> *Rhodora* 34: 21, 1932.

which never attained more than volume one, number one, and few saw the completion of more than one, or at most two volumes. Rafinesque's tendency to scatter his shorter papers in strange places is discussed somewhat in detail in a previous paper,<sup>9</sup> where the titles of ten American serials and twelve European ones, that he favored by submission of manuscripts to their editors, are listed. Most of these are not in any sense of the word botanical periodicals. The period covered is from 1803 to 1841. Most of these periodicals are not normally found in the libraries of even the largest botanical institutions in this country or abroad.

This problem of inaccessibility applies not only to the types of periodicals in which Rafinesque published numerous technical papers, but also to his small, independently published pamphlets and to his larger books. In two cases I have been able to locate only single copies in all of our libraries, and curiously, although one of them, the *Herbarium Rafinesquianum*, was actually published in Philadelphia in 1833, there seems to be no copy of it in any of the Philadelphia libraries. The *Western Minerva* was published in Lexington, Kentucky, in 1821, and of this only a single copy, in the library of the Academy of Natural Sciences of Philadelphia, is known to exist. Regarding it Rafinesque states that he was able to save but three copies, as the irate printer destroyed the entire stock. In his *Life of Travels* (p. 66, 1836), Rafinesque states that this action was due to his secret enemies, but the probability is that he was unable to pay the printing bill. Yet it is understandable that some of his associates in Lexington, Kentucky, might have been disturbed by some of the articles included in this, the rarest of his publications. He wrote a letter to Bory St. Vincent which he actually published in his *Western Minerva* (1: 71-74, 1821), printed in the town where he was then residing and which was then known as "The Athens of the West." He refers to certain of his fellow townsmen as follows:

A set of unfortunate individuals, who have two eyes; but cannot see: their minds are deprived of the sense of perception: they are astonished and amazed at my discoveries, are inclined to put them in doubt and even to scoff at them. . . . Our cat-fishes, eels, shads, sturgeons, &c. are for them mere fish to fill their stomach! and moreover they are all of European breed, and were carried here by Noah's flood direct from the Thames, the Seine and the Rhine!—I let

them rail to their heart's content, and I laugh at them. . . . It is only in Europe that my labors and discoveries may be fully appreciated: here I am like *Bacon* and *Galileo*, somewhat ahead of my age and my neighbors. . . . The Western Minerva has been threatened before her birth.

All of which may well have had at least a shadow of truth, but which, nevertheless, was an evidence of lack of tact on the part of Rafinesque, considering the time and place.

Throughout Rafinesque's copious writings one notes this tendency to criticism, and the reiteration of claims that he (Rafinesque) was always right and that those who differed from him were wrong. This attitude, combined with his strange ideas regarding classification and nomenclature, and his unorthodox methods of publication, went far in alienating his contemporaries who were working in similar fields. He was obsessed with the idea of discovering new genera and new species, and the establishment of these actually became a monomania. This, however, is no place in which to discuss the idiosyncracies of such a remarkable character as Rafinesque.

Even Rafinesque's larger publications, such as his *Medical Flora* (1828-1830), *New Flora and Botany of North America*, four volumes (1836-1838), *Flora Telluriana*, four volumes (1836-1838), *Sylva Telluriana* (1838), the *Good Book or Amenities of Nature* (1840), and the *Autikon Botanikon* (1840), are exceedingly rare, and copies are unobtainable today. The reasons for their scarcity are the time and place of publication (Philadelphia, 1828-1840); the fact that they were for the most part privately published by Rafinesque; their very limited sale; the limited editions (apparently about 160 copies only, this being definitely the case with the *Flora Telluriana*); and the fact that when Rafinesque died in 1840 his effects were sold at auction to satisfy the demands of his creditors. Apparently the unsold stock of his numerous publications was disposed of as waste paper.

Attention should be called to the fact that the various volumes mentioned above were essentially media in which Rafinesque published his findings in reference to the classification and nomenclature of plants. Thus his *New Flora and Botany of North America* is not a descriptive flora in any sense of the word, but consists largely of additions that Rafinesque made to the subject, most of the items included being proposals of new genera and new species. The same is true regarding his *Flora Telluriana* and his *Sylva Telluri-*

<sup>9</sup> *Proc. Am. Philos. Soc.* 86 (1): 78, 1942.

*ana*—neither in any sense treats the genera and species of the world, but chiefly those forms that Rafinesque considered to represent new genera and new species. The same statement applies to his *Alsographia Americana*, the *Good Book or Amenities of Nature*, and the *Autikon Botanikon*. As four of these works apply to the world at large, rather than merely to the flora of the Eastern United States, they should have a place in every large botanical library, particularly libraries of institutions wherein systematic work is an important activity.

The net result of Rafinesque's long-continued publication methods is that even in most of our larger botanical libraries many of his publications are missing; and as this is true of the specialized American libraries, it is even more so in regard to those of Europe. With us there are excellent collections of Rafinesquiana at the Gray Herbarium, the Arnold Arboretum, the New York Botanical Garden, the Academy of Natural Sciences of Philadelphia, the Smithsonian Institution, and the Library of Congress. I judge that from a botanical standpoint the magnificent assemblage at the Arnold Arboretum is by far the most complete; and yet this lacks several Rafinesque items. It is suspected that the paucity of Rafinesque publications in European libraries is reflected by the fact that in the second edition of his *Thesaurus* (1872) Pritzl listed only four Rafinesque titles, although in the first edition (1851) he included sixteen, most of which he apparently never saw.

Naturally, with his fixed ideas that species and genera were constantly being formed, and that both genera and species should be established on the basis of very slight differences, Rafinesque proposed and named very numerous entities as genera, subgenera, species, and varieties. That more of his generic and specific concepts have not been accepted is more a reflection on his judgment than on the judgment of his contemporaries and successors. As noted above, the total number of new generic and subgeneric names actually published by Rafinesque approximates 3,000, thus placing him in a category by himself in the number of these units that he thought should be recognized. I know of no author who proposed so many generic names, for even Linnaeus, taking up numerous names originated by his predecessors, recognized less than 1,600. The very fact that among these 3,000 Rafinesquian generic names only about 25 are currently accepted as valid, while about 75 others have been placed in

the list of *nomina generica rejicienda* is in itself another reflection on Rafinesque's judgment; for in segregating genera good judgment is basically most important. Probably Adanson (*Familles des plantes* 2: 1–640, 1763) originated more new generic names than any single botanist since Linnaeus, with the exception of Rafinesque; or at least he is credited with having originated them. As a matter of fact, the total that he recognized is approximately the same number that Linnaeus recognized, somewhere in the neighborhood of 1,600. Most of these were adopted from such pre-Linnaean authors as Hippocrates, Theophrastus, Pliny, Dioscorides, Avicennia, Ponteder, Dillenius, Vaillant, Tournefort, Heister, Fuchs, Loeffling, Ray, Plukenet, Plumier, Lobelius, Micheli, Dodoens, Camerarius, Gronovius, Hermann, Gesner, Ruppius, Celsius, Brunfels, Buxbaum, Cordus, Ammann, P. Browne, Houstoun, Kaempfer, Rheede, and Rumphius, together with a certain number that Linnaeus originated. In the index to his work Adanson actually credits to himself the authorship of less than 200 of the names he published, although currently his name is cited as the authority for many more than 200, because he first assigned to many earlier names an approximation of generic form. Rafinesque occupies the unique position of having originated infinitely more new generic names than any other botanist in the entire history of the science, and yet at the same time one whose proposals have met with the smallest percentage of acceptance, for the possible acceptance of less than five percent of approximately 3,000 new names speaks for itself; and yet uninformed individuals have, at times, spoken of Rafinesque as a "great" botanist. Clearly it takes more than the mere publication of many hundreds of papers and many thousands of new generic names and binomials to deserve the characterization "great." The average botanist's work is not judged so much by his immediate associates and co-workers as it is by posterity; and posterity has been particularly hard, although scarcely unfair, in its judgment of the nature of Rafinesque's work. Rafinesque's confidence in his own judgment was no less than superb, and he claims, in various of his writings, that posterity would justify his attempts at clarification of classification of both plants and animals. Unfortunately for Rafinesque, posterity was and still is as unimpressed as were his contemporaries.

While Rafinesque described a great many new genera and new species *de novo* on the basis of

actual specimens, he based an extraordinarily large number of his "new" entities on the published work of other authors. It is apparent that if, in scanning a published description or illustration, he noted the slightest discrepancy between the characters as given by this or that author, and his or other botanists' concept of the same genus or species, he proposed a new generic or specific name (or both) on the basis of the description before him; and the noted "differences" might well be due to the personal equation, rather than any actual differences. He apparently disbelieved in the unusually wide geographical distribution of individual species, and I judge that many of his units were proposed, named, and described because he could not accept, in general, the idea that any species could be of very wide geographical range.

He proposed his own laws of nomenclature,<sup>10</sup> and many of the changes in both generic and specific names were made because of his confidence in his own rules—rules that other botanists never accepted. If a generic name was too short, he lengthened it, as *Leea* Linn. = *Leeania* Raf., *Inga* Willd. = *Ingaria* Raf., *Cola* Schott = *Colaria* Raf., *Neea* Ruiz and Pav. = *Neeania* Raf., *Rhus* Linn. = *Sumachium* Raf., *Zea* Linn. = *Mayzea* Raf., *Poa* Linn. = *Poagris* Raf., *Chloris* Sw. = *Chlorostis* Raf., *Donia* R. Br. = *Doniana* Raf., and *Crypta* Nutt. = *Cryptina* Raf., *Cryptella* Raf., and *Cryptaria* Raf. (these three new names actually published in a single line!). If names were too long, or as he said, uncouth in sound, these were also changed, such as *Tabernaemontana* Linn. = *Tabernaria* Raf., *Lightfootia* L'Hér. = *Lifutia* Raf., *Calamagrostis* Roth. = *Amagris* Raf., *Stachytarpheta* Vahl = *Tarpheta* Raf., *Carludovica* Ruiz and Pav. = *Ludovica* Raf., and *Krasheninnikofia* Gueldst. = *Kranikofa* Raf. (1814), *Kranikovia* Raf. (1837), and *Krasnikovia* Raf. (1837). Names that he designated as "mongrel," part Latin and part Greek, he changed at will, for this reason abandoning *Vincetoxicum* Linn. in favor of *Gonolobus* Michx., and changing *Scyphofilix* Thouars to *Scyphopteris* Raf., while for such a name as *Pteris* Linn., which he correctly says merely means fern, he at various times proposed no less than five substitutes—*Peripteris* Raf., *Pterilis* Raf., *Lemapteris* Raf.,

*Phyllitis* Raf., and *Pteridium* Raf. He was just as casual in his treatment of specific names proposed by other authors when, for any reason, he considered that they did not apply, and he changed a great many of them at will. A good illustration is his treatment of *Floerkea proserpinacoides* Willd. (*Am. Jour. Sci.* 1: 373–376, 1819): "a long and uncouth specific name which has been changed by every subsequent author." He then proceeded to list *F. uliginosa* Muhl., *F. lacustris* Pers., and *Nectris pinnata* Pursh as representing the same species, and although expressing a preference for Muhlenberg's name, he most casually proposed three others: "Did I think myself permitted to coin a new name, while so many have been proposed already, I should have called it either *F. tenella*, or *F. flaccida*, or *F. olitoria*." Regarding names, he states (*Fl. Tellur.* 1: 16–17, 1836 [1837]): "I am never at a loss for names, as Linnaeus was when he framed *Quisqualis*; I could readily supply 20,000, *all good*"; he literally spawned new names! As an extreme example of the most casual manner in which Rafinesque proposed new names, I cite the following case from his *Sylva Telluriana* (p. 85, 1838):

500 CARPUPICA Raf. probably another distinct G. Type *C. odorata* Raf. Piper carpupija R. P. tree of Peru with fragrant leaves—Piper methysticum and Churumaya are also probably types of other Genera ? to be called *Methysticum esculentum* Raf. and *Churumaya arborea* Raf. Is not Piper betel another ? to be called *Betela mastica* Raf.?

All these new names are readily placeable in synonymy, for Rafinesque actually designated the type of his genus *Carpupica*, and lists the binomials on which *Methysticum*, *Churumaya*, and *Betela* are based; none of these can be considered as validly published.

While I have above indicated that Rafinesque's very numerous nomenclatural innovations have received short shrift at the hands of his contemporaries and successors, in that only about 25 of his new genera have been more or less generally accepted, and that about 75 of his names that were actually earlier than currently used ones published by other botanists have been placed in the list of *nomina generica rejicienda*, still there are a number of additional cases that need to be treated on their merits. I cite only a very few to illustrate this point. *Shortia* Raf. was published in 1840, and *Shortia* Torr. and Gray was published in 1842. Technically the latter should

<sup>10</sup> Rafinesque, C. S. Principes fondamentaux de somnologie ou les lois de la nomenclature et de la classification de l'empire organique ou des animaux et des végétaux. Palerme: 1–51, 1814. Also *Flora Telluriana* 1: 81–90, 1836 [1837] (Philadelphia).

be replaced by *Schizocodon* Sieb. and Zucc. (1843) or *Sherwoodia* House (1907). It is suspected that when this case is brought before a properly constituted international body, *Shortia* Torr. and Gray (1842) will be retained, because *S. galacifolia* Torr. and Gray is a name now rather widely used in horticulture; *Shortia* Raf. (1840) is a synonym of *Arabis* Linn. The case of *Delonix* Raf. is in a different category. Under all rules this is the proper generic designation for the now universally distributed tropical tree known as the flamboyant, flame tree, fire tree, or royal Poinciana. While *Delonix* Raf. has been adopted by a considerable number of botanists, it is curious to note how consistently the conservative botanists still continue to designate the species as *Poinciana regia* Bojer, the binomial under which it was originally described; but the type of the genus *Poinciana* is *P. pulcherrima* Linn. = *Caesalpinia pulcherrima* (Linn.) Sw.; Bojer did not describe his entity as a new genus, but erroneously placed it in the Linnaean genus where it does not belong. This very characteristic and striking species should be known as *Delonix regia* (Boj.) Raf. *Hebokia* Raf. (*Alsogr. Am.*: 147, 1838) is an older name than *Euscaphis* Sieb. and Zucc. (1840) and is validly published; it was based wholly on *Sambucus japonica* Thunb. = *Euscaphis japonica* (Thunb.) Kanitz. To avoid a change in the generally accepted name for this particular genus, it will be necessary to conserve the later name by appropriate action, but as yet no one has proposed such action.

I hold no brief for the acceptance of *Ryttilix* Raf. for the characteristic grass genus currently known as *Hackelochloa* O. Kuntze; all that Rafinesque says (*Seringe, Bull. Bot.*: 219, 1830) is: "III. *Ryttilix* (Rafin. in litt.) *Manisuris granularis* et *myurus* auct. 1. *R. glandulosa* (Rafin. mss.)". *Manisuris granularis* Linn. f. and *M. myurus* Linn. are not congeneric, the former being a species of *Hackelochloa* and the latter a species of *Rottboellia*. Had O. Kuntze known of this most sketchy "publication" of *Ryttilix* Raf., he might have accepted it instead of proposing the new name *Hackelochloa* in 1891; and yet there is no way of determining on which of the two cited synonyms *Ryttilix glandulosa* Raf. was based except by arbitrary selection. *Cenchrus granularis* Linn. = *Manisuris granularis* Linn. f. = *Ryttilix granularis* Skeels = *Hackelochloa granularis* O. Kuntze; *M. myurus* Linn. = *Peltophorus myurus* Beauv. = *Rottboellia myurus* Benth. I personally consider that Rafinesque's publication

is invalid, in that he gave no generic description and based his new generic name on binomials only. Clearly in this case the action of the International Congress in conserving *Hackelochloa* O. Kuntze (1891) over *Ryttilix* Raf. (1830) was correct.

It is not anticipated that any botanist will agree with Rafinesque in his extreme views as to the limits of genera and species, although some of our modern botanists both in Europe and in America seem to approximate his viewpoint, if we may judge by the very tenuous characters by which some specialists now differentiate both genera and species. It seems to be evident that the present tendency in systematics is to subdivide the larger and more or less complex genera, although it is inconceivable that any individual will go to the extremes that characterized Rafinesque's work. This point is brought up merely to emphasize the fact that if a modern botanist decides to subdivide a large and complex genus, it may not be necessary for him to originate new generic names for certain segregated groups. In many cases it is evident that some of Rafinesque's published names will serve, for whatever else he did, he usually indicated the type. It is thus usually possible to interpret his proposed genera and subgenera, especially when his new names were based on bibliographical references. As these numerous Rafinesque names were for the most part validly published, no reason exists for not accepting those that can definitely be placed.

I list here a part of the genera that Rafinesque subdivided, in order to bring to the attention of those botanists, who may be inclined to subdivide these groups, the fact that in some cases Rafinesque may have forestalled them and that he may have proposed a name, or names, for a group or groups, that they now feel to be worthy of generic status. Among the genera that Rafinesque subdivided are: *Acacia*, *Acer*, *Achyr-anthes*, *Aesculus*, *Agrostis*, *Albizzia*, *Allium*, *Amaryllis*, *Andropogon*, *Ardisia*, *Aristida*, *Aristolochia*, *Arum*, *Aspalathus*, *Aster*, *Atropa*, *Avena*, *Baeckea*, *Bauhinia*, *Bignonia*, *Bumelia*, *Camellia*, *Campanula*, *Capparis*, *Carex*, *Casearia*, *Cassia*, *Cissus*, *Cistus*, *Cleome*, *Commelina*, *Convolvulus*, *Conyza*, *Cordia*, *Cornus*, *Crotalaria*, *Croton*, *Cuphea*, *Cuscuta*, *Cyperus*, *Cypripedium*, *Cytisus*, *Daphne*, *Dendrobium*, *Dianthera*, *Drosera*, *Echium*, *Ehretia*, *Elaeocarpus*, *Epidendrum*, *Eugenia*, *Euphorbia*, *Festuca*, *Ficus*, *Fraxinus*, *Gentiana*, *Gerardia*, *Geum*, *Gossypium*, *Gypsophila*, *Habenaria*, *Helianthemum*, *Helicteres*, *Heliotropium*, *Hicoria*, *Hy-*

*pericum*, *Ilex*, *Inula*, *Ipomoea*, *Jussiaea*, *Justicia*, *Lantana*, *Laurus*, *Leersia*, *Leucas*, *Litsea*, *Loranthus*, *Lycium*, *Lythrum*, *Melastoma* (including *Miconia* and other genera), *Mimosa*, *Myrica*, *Myrtus*, *Neottia*, *Nicotiana*, *Origanum*, *Ornithogalum*, *Osbeckia*, *Pancratium*, *Panicum*, *Passiflora*, *Peperomia*, *Phyllanthus*, *Phlomis*, *Physalis*, *Piper*, *Poa*, *Polygala*, *Polygonum*, *Pontederia*, *Populus*, *Quercus*, *Reseda*, *Rhamnus*, *Rhexia*, *Rhus*, *Rubus*, *Ruellia*, *Salix*, *Salvia*, *Sambucus*, *Saxifraga*, *Scabiosa*, *Scilla*, *Scirpus*, *Scleria*, *Sideroxylon*, *Smilax*, *Solidago*, *Spiraea*, *Sterculia*, *Stipa*, *Teucrium*, *Tilia*, *Tradescantia*, *Uniola*, *Urtica*, *Utricularia*, *Veronica*, *Viburnum*, *Vitis*, and *Xyris*.

As an extreme case in generic segregations, Rafinesque's treatment of the large genus *Carex* may be cited. In his paper, published in 1840,<sup>11</sup> he recognized 22 genera as segregates from *Carex*, of which 19 were briefly defined as new, and under these 22 generic names he published about 130 new binomials. Few of these generic and specific names, to my knowledge, have ever been cited in botanical literature since they were published, and none of them, or the numerous other new names that appear in the *Good Book*, are listed in *Index Kewensis*. Apparently even modern facsimile reprinting of rare publications is no guarantee that the often numerous new names that appeared in the original will thus be included in current indices. Clearly, if one were tempted to follow Rafinesque's example and segregate various genera from *Carex* Linnaeus, as currently understood, one would here find names already published for at least certain groups.

As one scans monographic treatises issued within the past century, wherein some of these numerous genera are considered, one rarely notes a Rafinesque name that has been accepted, even for minor categories such as subgenera or sections. The usual procedure in such groups as *Quercus*, *Aristolochia*, *Carex*, *Croton*, *Gentiana*, *Melastoma*, *Polygonum*, *Ficus*, *Piper*, *Phyllanthus*, and other large genera has been to propose names for secondary groups *de novo*, when, in some cases, it would have been perfectly feasible to have ac-

cepted names previously proposed by Rafinesque (as genera), utilizing these as designations of minor categories. As Rafinesque's publications frequently antedate those of certain monographers, this would have been a perfectly logical course to pursue. It is refreshing to note that within the past decade at least one botanist has had the courage of his convictions and has utilized certain Rafinesquian generic names, such as *Pythiusa* Raf., *Tulocarpa* Raf., and *Murtekias* Raf., as the designations of sections and subgenera.<sup>12</sup>

In spite of Rafinesque's often erratic work, I am inclined to dissent from the type of "argument" discussed below. In the long article on "Conservation of Later Homonyms" (*Kew Bull.* 409, 1935, sub *Claderia* Hook. f.), this name (1890) is retained in preference to the much earlier *Claderia* Raf. (1838), on this basis: "Rafinesque's genus, though technically published, must apparently be synonymous with *Melia* L., *Azadirachta* Juss. (1830) or *Murraya* L.; and it represents a kind of pseudo-scientific work, the nomenclatural results of which may well be legislated out of existence." The general approval of such a principle would open a veritable Pandora's box, for in systematic botany who shall define the limits of "pseudo-scientific" work? Very little reason exists for retaining *Claderia* Hook. f. if a better argument than the above cannot be devised; it was Hooker's error in selecting a generic name that had already been used for an entirely different group, and in retaining it we merely condone his error. Here is a case where the weight of authority intervenes, for Hooker's botanical work was on a plane so infinitely higher than was that of Rafinesque that the two can scarcely be compared; were the situation reversed, there is no chance that Rafinesque would have received corresponding consideration.

While in no respect should this contribution be considered as an argument in support of Rafinesque's general type of work, it is hoped that its publication will bring to the attention of other than American botanists the desirability of at least considering Rafinesque's generic entities when monographic work is undertaken, or when local floras are under consideration. Had the botanists of the world in the past had the opportunity of becoming acquainted with the scope of Rafinesque's publications, I might not have had

<sup>11</sup> Rafinesque, C. S. The natural family of Carexides. *Good Book*: 23-28, 1840. A facsimile reproduction of this paper was issued under the auspices of the *American Midland Naturalist* in 1913. At the same time another overlooked paper that was published in the *Good Book* was reissued, this being Rafinesque's "Scadiography of 100 Genera of Umbelliferous Plants, chiefly New, with their Types &c." (*Good Book*: 49-61, 1840, facsimile reprint 1913).

<sup>12</sup> Prokhanov, J. *Conspectus systematicus Tithymalorum Asiae Mediae*. (Trans. Rubber and Guttapercha Institute.) Moscow: 1-241, 70 fig., 46 maps, 1933.

to cite the rather unflattering figure of 75 of his generic names that have been officially placed in the limbo of *nomina generica rejicienda*, largely because his contemporaries and successors in Europe were unfamiliar with what Rafinesque had already proposed, and thus redescribed the same groups under different names at later dates. This is, in a way, a reflection on the bibliographical researches of various botanists whose later generic names have been officially accepted in order to avoid undue changes in currently accepted binomials through a strict application of the rule of priority. It is clear that the vast majority of Rafinesque's published generic names can be definitely placed, but to do this individual authors need to have access to his publications. When one of his names is found to be valid, there is really little excuse for coining a new one to designate the same natural group; one that in order to stand the test of time must, perhaps, be approved at some future session of the International Botanical Congress. From a purely bibliographical standpoint Rafinesque's botanical publications are distinctly worthy of careful con-

sideration, no matter how much his work may be criticized; and his work is, on the whole, eminently worthy of severe criticism. It is to be regretted, in justice to him, that the necessity of considering what he proposed was not realized at an earlier date. Asa Gray<sup>13</sup> recognized this in the year following Rafinesque's death, for in 1841 he stated: "Many of Rafinesque's names should have been adopted; some as a matter of courtesy, and others in accordance with strict rule." A century later about the best we can do, when it is discovered that a Rafinesque generic name antedates a currently accepted one proposed by some other author, in ignorance of what Rafinesque published, is promptly to add the Rafinesque name to the already over-long list of *nomina generica rejicienda*. This, in Asa Gray's words, is neither courteous nor in accord with strict rule. We who follow the cult of Flora, in times of old worshipped by the Romans, might at least recall the words of Ovid: "Pascitur in vivis livor. Post fata quiescit, cum suus ex merito quemque tuetur honos."

<sup>13</sup> *Am. Jour. Sci.* 40: 234, 1841.