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THE BOTANICAL EXPLORATION OF AMBOINA BY THE BUREAU OF SCIENCE, MANILA

GEORGE EBERHARD RUMPF (Latin Rumphius) died in Amboina, Netherlands East Indies, in the year 1702, after a period of residence there of about thirty years. Some years after his death there was published in Amsterdam, under the editorship of J. Burmann, his great botanical work, the "Herbarium Amboinense." This monumental work consists of six folio volumes, comprising about 1,660 pages and 669 plates with approximately 960 figures, and with the accompanying "Actuarium" was published during the years 1741 to 1755. Linnæus did not receive a copy of the published parts until too late to incorporate the plants described in his "Species Plantarum." The work, then, as to nomenclature is pre-Linnæan, although binomial designations for the plants described are abundant in it.

The "Herbarium Amboinense" has at all times since its publication been a work of great botanical interest and is to-day one of the basic works for the student of the Malayan flora. For the proper interpretation of many species proposed by later authors, by citation of Rumpf, reference to the "Herbarium Amboinense" is absolutely essential.

In 1754 Olof Stickman, one of Linnæus's students, published his dissertation entitled "Herbarium Amboinense," a small pamphlet of 28 pages, which was reprinted by Linnæus in 1759 in his "Amœntates Academicæ," IV., pp. 112–143. In this work somewhat over 300 of the plants figured by Rumpf are reduced to species proposed by Linnæus in the first edition of his "Species Plantarum" (1753), or, by citation, are made the types of new ones. Constant references are made by Linnæus to the "Herbarium Amboinense" in his later works, so that very many of Rumpf's crude figures have become, by citation, the actual types of many Linnæan species. Later still other such species were proposed by Roxburgh, and by other authors, and Rumpf's plates are constantly being cited by modern authors in monographs and in papers on the Indo-Malayan flora.

Rumpf's plates, in many cases decidedly crude, being the only means by which a large number of proposed species can be interpreted, various attempts have been made more definitely to settle the status of the plants

figured and described by him. The first attempt comprehensively to treat Rumpf's plants was by A. W. E. T. Henschel, who published his "Clavis Rumphiana" in 1833, pages xiv + 215. In this work he attempted to reduce Rumpf's species, so far as possible, to modern binomial nomenclature. Thirty years later J. K. Hasskarl, a Dutch botanist having an extensive knowledge of the flora of the Malayan region, published his "Neuer Schlüssel zu Rumpf's Herbarium Amboinense," vi + 247 pages, originally printed in the *Abhandlung der naturforschenden Gesellschaft,* IX. (1866). Both of these works are unsatisfactory for the chief reason that a simple statement that a certain plate represents a certain species is frequently of little or no value, especially when the species is actually based on the plate, as is frequently the case.

In my work on the Philippine flora during the past ten years I have come very fully to realize that most of the species described by Blanco in his "Flora de Filipinas," none of which are represented by type material, can be accurately interpreted only by an intensive knowledge of the Philippine flora, as a whole, and a very special knowledge of the vegetation of those regions from which Blanco secured his botanical material, taking into consideration also habitats, dates of flowering and fruiting, economic uses and native names, in fact all data given by Blanco regarding each individual species. In many cases one must secure material from the actual localities cited by Blanco, and our recent collections must be compared with Blanco's descriptions not only as to the botanical characters given by him, but all other data. Similarly I have come to the conclusion that many of the species based on Rumpf's figures can be correctly interpreted and understood only by an intensive botanical exploration of the regions in which Rumpf collected his material, and a study of the specimens secured, taking into consideration all the data given by Rumpf and comparing it with data secured with botanical material from Amboina and neighboring islands.

Many of the species based wholly or in part on Rumpf's figures have been credited with a wide Indo-Malayan range, but in some cases, at least, the "species" are collective ones. Many others are not understood at all and appear in monographs as unrecognizable, doubtful or imperfectly known forms. We have in the Philippines many of the species proposed by the older authors which are typified by Rumpf's figures, and in critical genera, especially in those with numerous species, it is frequently quite impossible definitely to state which of our forms is the species based on Rumpf, and which is a distinct but closely allied one. The same principle holds true for the entire Malayan region.

In the case of many plants figured by Rumpf, there is absolutely no doubt as to the present status of such as the cocoanut, the papaya, the tamarind, the mango, the beetlenut palm, and other well-known forms in monotypic or small genera. The difficulties arise in such genera as *Calamus, Canarium, Gnetum, Mucuna, Pandanus,* etc., where specific differences are frequently not very great. It is frequently quite impossible absolutely to delimit the species from the figures and descriptions given by Rumpf, and apparently no serious attempt has ever been made to interpret the species from actual Amboina specimens.

To illustrate this matter *Mucuna pruriens* DC. is based on *Dolichos pruriens* L. The original publication of *Dolichos pruriens* L. is in Stickman's "Herbarium Amboinense" (1754), 23, and is based absolutely and only on *Cacara pruiens* Rumpf Herb. Amboin., V., 393, *t. 142;* the question of specific identity of *Mucuna pruriens* is not complicated by any additional synonyms in the original publication of *Dolichos pruriens.* Most botanists assign to the species a pantropical distribution, as did Linnæus in his later publications; yet a simple examination of the material in any large herbarium will at once show that *Mucuna pruriens* is a "collective species," and that specimens so named really represent several more or less distinct species. No botanist can definitely state that he actually

knows just what *Mucuna pruriens* is, yet the species undoubtedly still grows in Amboina, and specimens from there which agree with Rumpf's figure and description will closely typify the Linnæan species. I assign to *Mucuna pruriens* a form that is not uncommon at low altitudes in the Philippines because, so far as I can determine, it agrees absolutely with Rumpf's figure; moreover the Philippine flora is very similar to that of the Moluccas. Yet other botanists refer to *Mucuna pruriens* quite different plants, and specimens that much less resemble Rumpf's figure than does the Philippine material. Now a prominent botanist has proposed to describe this Philippine form, my idea of *Mucuna pruriens,* as a new species, yet neither he nor I can definitely state whether it is or is not the form figured by Rumpf. I assume that it is, he assumes that it is not *Carcara pruriens* of Rumpf.

In 1788 Lamarck described a certain Rutaceous plant as *Fagara triphylla,* basing his description on a single Philippine specimen collected by Perrottet, and adding a reference to *Ampacus angustifolius* Rumpf Herb. Amboin., II., 188, *t. 62,* as illustrating the same species. In 1824 DeCandolle transferred Lamarck's species to *Evodia,* as *E. triphylla,* and until recently the species has been retained in that genus. An examination of Lamarck's actual type in the Muséum d'Historie Naturelle, Paris, shows it to be not an *Evodia* at all, but a *Melicope,* and a species known only from the Philippines. All botanists, however, have interpreted *Evodia triphylla* from Rumpf's figure, not from the actual type, and it has been given a range of from Tenasserim and Burma to Japan, China and Malaya. *Evodia triphylla* of modern authors contained at least three distinct species in two genera, and the number of synonyms is quite appalling.[1] Whether or not the Amboina *Ampacus angustifolius* is the same as the Philippine *Melicope triphylla* Merr. (*Fagara triphylla* Lam., *Evodia triphylla* DC.), it is impossible to determine at present, but the case illustrates remarkably well the errors in interpretation made by eminent botanists in attempting the identification of extra-Moluccan specimens with Rumpf's figures.

Recently Dr. O. Becarri has published his great monograph of the genus *Calamus,*[2] having access to most of the large European, Indian and Malayan collections. Rumpf figures eleven forms, on which ten species of *Calamus* have been based by later authors; yet Dr. Beccari, in spite of his great knowledge of the group, a personal knowledge of the Malayan species based on his own extensive Malayan collections, and in spite of the vast amount of material examined by him, was able definitely to recognize but four of these ten species. He states, *l. c.,* 90:

> The others represent, I believe, very well-marked species which will be recognized at some future time, because considering the period at which they were made, Rumpf's figures are very good and the descriptions, if properly understood, are quite reliable. I have therefore no doubt that these species will be found again in the Moluccas when these islands are better explored.

Some months ago I conceived the plan for a botanical exploration of Amboina, with the primary object of collecting in the original localities cited by Rumpf, actual botanical material that might represent the species, often so crudely figured by him, the actual field work to be done with a consideration of all the data given by Rumpf, localities, habitats, native names, uses, time of flowering and fruiting, etc. The plan as developed by the Bureau of Science was approved by the authorities in the Philippines, and has received the cooperation and support of the Dutch botanists at Buitenzorg, Java. The problem was assigned to Dr. C. B. Robinson, of the botanical staff of the Bureau of Science. Plans were perfected and he left Manila in June for Java and is now in Amboina, where he will prosecute botanical exploration for some months.

It is the ultimate plan to distribute the bo-

[1] Merrill, E. D., "On the Identity of *Evodia triphylla* DC.," *Philp. Journ. Sci.,* VII., 1912, *Bot.,* 373–378.

[2] *Ann. Bot. Gard. Calcutta,* XI., 1908.

tanical material thus secured to various institutions, authentically named with reference to modern nomenclature, and at the same time correlated, whenever possible, with Rumpf's figures and descriptions. It is felt that this particular piece of taxonomic research is one of the very greatest importance and the material we hope to secure should enable botanists generally very definitely to interpret and delimit many of the now doubtful species that have been proposed by citation of Rumpf's figures.

It is hoped that in case we succeed in solving some of the taxonomic problems which are dependent on a correct interpretation of species based on Rumpf's work, that our success may stimulate some other botanist to do for Rheede what we hope to do for Rumpf; that is, to collect and distribute a set of plants from the Malabar coast in India that shall represent those species figured by Rheede tot Draakenstein in his "Hortus Malabaricus," I.–XII., 1678–1703, a work of as great or greater importance than that of Rumpf in interpreting various Linnæan and other species.

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