Translation by Simon Mayo, 15th June 1998

A. Engler in Bot. Zeitung (Leipzig) 37: 853-856 (1879).

Review of *Aroideae Maximilianae*.

Aroideae Maximilianae. Die auf der Reise Sr. Majestät des Kaisers Maximilian I nach Brasilien gesammelten Arongewächse nach handschriftlichen Aufzeichnungen von H. Schott, bescrieben von Dr J. Peyritsch. Mit einem Tafelbild und 42 Tafeln in Farbendruck. Gross Folio. Wien, Verlag von Gerold's Sohn. - Preis 40 Fl.Oe.W.

There are few families of Phanerogams which offer so many interesting facets as the Araceae. Apart from the extraordinary diversity of leaf shape, comparable in Monocotyledons at best only with the palms, there is an unusual diversity of shoot morphology, anatomy and floral structure. Apart from the modifications of the normal pentacyclic flower brought about by zygomorphy, there is scarcely any other alteration of this floral type which cannot be found in the Araceae. The placentation shows [all] the variations of which it is capable in a beautiful series within several associations and the reduction of the flower occurs in such an instructive and gradual way in certain alliances that we could well say that there could hardly be a better way to learn the whole subject of floral morphology than the study of the floral structure of the Araceae. In spite of the constant presence of the spadix and the almost universal transformation of the uppermost leaf, i.e. that immediately preceding the inflorescence, into a spathe, there is great diversity of floral arrangements and related characteristic forms of spathe and spadix, which can only be correctly understood if, by means of long term observation of fertilization processes, this diversity is recognized not merely as morphological variation, but also physiological adaptation.

It is thus understandable that this plant group could captivate and inspire a young botanist, and stimulate him to ever more profound studies and finally to lay claim to almost the entire scientific activity of a single industrious man. Even today, after the comprehensive and fundamental works of Schott, the task of attaining a full knowledge of this family is no small one, and the task of discerning the interconnections of the known facts will not be completed for a long time yet, in spite of the fact that the reviewer [Engler himself] strove to achieve, in his works on the family, more than just an expansion of knowledge of form. How did things stand, however, with this family when it first became Schott's favourite group?

Linnaeus distinguished only the genera *Arum, Dracontium, Calla, Acorus, and Pothos*. Schott, during his 40-year revision of this family, increased the number of genera to about 100, and these genera are with few exceptions natural, based on the most careful study of all the characters of leaves, flowers and fruits accessible to a botanist working only with the naked eye and a magnifying glass. Since, as everybody knows, Schott's view of the species concept is somewhat similar to that which today Jordan and others hold, the reviewer [i.e. Engler] had, when first starting his work on the Araceae, some misgivings in relation to Schott's genera. However, it became clear that they were for the most part well grounded, and that the few which had to be reduced at least corresponded to natural groups [?sections] or subgenera. The manner in which Schott studied the family is admirable and the materials he left behind are the most eloquent testimony of the love and devotion which the Araceae inspired in him. Through his numerous connections with the most important

systematists of his time, he was able to receive for study almost all the dried Araceae of the larger herbaria, and all that he received were drawn by skilled botanical artists such as Seboth, Oberer and Nickelli, in such a way that they appeared to have been prepared for publication, so that Schott could always consult them again, even after the plant specimens had been returned. This, however, is the smaller part of his achievements. Through his position as Director of the Imperial Gardens in Schoenbrunn, Schott was able to cultivate for many years all the living Araceae accessible to him, and eventually to observe their flower and fruit formation and their germination (most Araceae must be somewhat mature before they come into flower). These living Araceae, of which today 300 forms are still in cultivation at Schoenbrunn, were portrayed in colour, for the smaller individuals the whole plant, and for the larger the leaves and inflorescences, and for all, the individual flower parts in exemplary analyses of outstanding quality, particularly [those] by the Viennese artist Liepoldt. Schott utilized some of these illustrations in the publication of his larger illustrated works on the Araceae, but only a small part of the whole. The greater part could not be published because of the high cost of printing. After Schott's death this collection of illustrations was purchased for the Imperial Botanical Museum, of which it forms the most valuable material yet brought together for a single plant family. The Imperial Botanical Museum in Vienna thus possesses a treasure which will always cause botanists of other countries to come to Vienna to study the Araceae.

For the advancement of systematic botany in Austria, it has always been a great advantage that members of the Imperial family had a taste for judicious involvement in the world of plants. The noble and finally unlucky Emperor of Mexico, Maximilian, had a great inclination for nature and especially for the plant world, and demonstrated this often by supporting botanical studies. As Archduke Maximilian, he undertook his journey to Brazil in the years 1859-1860, accompanied by Dr Wawra and Royal Gardener Maly. The latter had already sharpened his eye for Araceae in Schoenbrunn under Schott's tutelage, and proved himself in that expedition an outstanding collector of these plants, which for the most part reached Schoenbrunn in the living state, where they were cultivated. At the instigation of Archduke Maximilian, the botanical results of that expedition were published in a richly produced work by Wawra in 1866. However, the Araceae were to be prepared by Schott, the most eminent specialist of the family. He was able to bring the work so near to completion that under his supervision, illustrations of the collected Araceae were made ready in the manner described earlier, by Liepoldt, and he also published preliminary diagnoses for the species he recognized as new. More detailed manuscript notes were destined for the more comprehensive publication. Unfortunately neither the patron who provided the considerable funds needed for the work, nor the scholar entrusted with its publication were able to see the ripened fruits of their labours. After Schott's death, Kotschy, Reissek and Fenzl were in succession entrusted with the honourable task of publishing the work, already so near to readiness for publication, but again and again obstacles impeded its final conclusion. The chromolithographic printing of the 42 plates, undertaken by the Viennese firms of Hartinger und Sohn and Reiffenstein und Rösch, alone necessitated a long period of time. These plates, together with the frontispiece drawn by von Selleny representing a landscape from the Brazilian primary forest in which the Araceae predominate, are the most magnificent which have yet been published in botanical works. [It should be emphasized that] this work is nothing like those botanical

picture books which in former times were sometimes produced at great cost but which had rather little scientific value. The wealth of detail in the analyses makes it a source for scientific study. After Fenzl's retirement from the Directorship of the Imperial Botanical Museum, Peyritsch was permitted to bring the publication to completion; he completed the diagnoses of the illustrated species and made reference to other treatments of the Araceae which had been published in the meantime. Of the 38 described species, two, *Anthurium Maximiliani* and *Xanthosoma Maximiliani* Schott remind us by their names of the founder of this work. When the reviewer [i.e. Engler] was permitted to utilize Schott's legacy of materials for the preparation of the treatment of the Araceae for the Flora brasiliensis, these newly published plates were not accessible to him. However, he saw most of those species as dried specimens or as living plants in the Imperial Garden of Schoenbrunn, and also the diagnoses, though short, were already published by Schott. Although Schott's collection of illustrations is exquisite, it would nevertheless be wrong to evaluate the species [limits] of Araceae on them alone. Everyone who has concerned themselves with the Araceae knows that new generations of plants are often very different from one another and that form and size relations of the inflorescences of different generations can be different. The plates represent mostly a single generation and it is still essential to diligently observe cultivated plants to verify the change from one condition to another. Thus we know from the diversity of variations in our own *Arum vulgare*, in Caladiums, in Dieffenbachias, in *Anthurium harrisii* and in other species widely grown in glasshouses, that often small variations bestow on plants a somewhat different appearance, and that these small differences may remain constant for a long time because of the almost universal method of propagation by stem cuttings. Because of this, the reviewer's interpretations of species are often different from those of Schott; Peyritsch, as is only just, has kept the work as far as possible according to Schott's concepts and has referred to the Flora brasiliensis where necessary.

It may be permitted to draw attention to other matters which should be heeded when using the rest of Schott's illustrations. As is easily understandable, Schott was not agreeable to the publication of new Araceae by other authors often unfortunately based on the most inadequate material; he was thereby often hindered in his striving to get to know the species as completely as possible before their publication, and was also forced to publish quickly the diagnoses of many species. Apart from his narrow style of species concept, Schott also went too far in describing dried material and very often based new species on incomplete dried specimens, in many cases also on very incomplete illustrations of older botanists, which the reviewer found it necessary to suppress in his monographic treatment of the Araceae, while others, somewhat better distinguished, were listed as varieties and forms. Thus it resulted that the number of species listed in the reviewer's recently published monograph of Araceae is considerably fewer than in Schott's Prodromus. Schott's great service, however, remains uncontested, i.e. to have firmly established most of the genera of Araceae, and for this, the work in question is a further proof. Even from regions which in Schott's time were little investigated, new genera are only seldom recognized. Thus the rich Araceae collection which Beccari made in the Sunda islands and in New Guinea yielded to the reviewer over 40 species, but only one new genus.

Kiel, 10 Nov. 1879
A. Engler.

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