

BIBLIOGRAPHICAL AND MISCELLANEOUS NOTES.

C. G. G. J. VAN STEENIS, *Maleische Vegetatieschetsen — Toelichting bij de plantengeografische kaart van Nederlandsch Oost-Indië* (Sketches of Malaysian vegetations — Comments to the phytogeographical map of Netherlands East India) — Reprinted from the „Tijdschrift van het Koninklijk Nederlandsch Aardrijkskundig Genootschap”, Ser. II, Vol. 52, Jan.-March-May 1935, 112 pp. (repagination [Pages in the original: 25—67; 171—203, 363—398] with 46 photographs, 36 of which in the reprint only, and a phytogeographical map. The reprint preceded by a short preface, a (too) short index and a dedication to FRANZ JUNGHUHN „as a memory to his arrival in Java, one hundred years ago”.

It is a great pleasure to me indeed to announce here, more particularly on behalf of those readers who are not familiar with the Dutch language, this excellent work on the phytogeography of Malaysia, published in the Journal of the Royal Netherlands Geographical Society and therefore, moreover, likely less accessible to many botanists abroad. The author has, though only about 6 years engaged in botanical work in the tropics, gathered a remarkably thorough knowledge of the rich flora of this region, no doubt one of the most interesting ones, from a biogeographic standpoint, on earth. As the phytogeography of these parts has mostly, since JUNGHUHN's „Java” (1854), been only dealt with in scattered papers, VAN STEENIS has in the publication under reference, as well as in some others that preceded it¹⁾, done a pioneer work in his attempt to give a comprehensive and more or less complete survey of the current problems. Our gratitude and admiration is not in the least diminished by the fact that this work shows certain traces of cursorness and disequilibrium, as well as a certain want of continuity and well-ponderedness. These features are mostly inherent to all pioneer work and the author himself states in the preface, that this work is meant as a provisional publication; this is in accordance with the title, which, by the way, could have been more adequately chosen, e.g.: *Materials to Malaysian Phytogeography* („Maleische” is, in my opinion, in Dutch a less felicitous word). Indeed, this paper contains a great many informations and stimulating ideas, and moreover, an almost complete bibliography, also of many papers in Dutch. It may be supposed indeed that there is, at present, hardly any other botanist available who is more capable than VAN STEENIS to continue this work and to prepare, some time, a complete „Phytogeography of Malaysia”, to which we are looking forward with great interest.

¹⁾ More or less preliminary studies by the same author are to be found in: Bull. Jard. bot. Buitenz., Sér. III, 12, 1932, 151—211 (Anambas and Notoena Islands).

Ibid. 13, 1933, 1—56 (S. Sumatra).

Ibid. 13, 1934—'35, 135—262 and 289—417 (On the Origin of the Malaysian Mountain Flora; equally a publication of great importance and with numerous references).

We dispose now of a great number of data, though still more or less in the form of scattered annotations. Yet, VAN STEENIS has endeavoured to go farther and to give a frame work; how far he has succeeded therein, will be discussed below.

To begin with, these „sketches” are meant to elucidate the first detailed vegetation map of Malaysia ever made. This map is a reprint of sheet 7 (the first one to be issued) of the „Scientific Atlas of the Tropical Netherlands” in 31 sheets, prepared by the Royal Netherlands Geographical Society. This sheet, 37½ by 59 cm in size, contains a physiognomic vegetation map of Netherlands India 1: 10 000 000 and, besides 9 faunistic and 4 meteorologic cartoons, 3 cartoons with plant area's and 1 (of Java only), indicating the correlations of some plant area's (and also of tea plantations) and drought distribution in the year (severity of the dry season).

The text is divided into two parts, a general one and a special part. The general part contains 9 paragraphs, each with a bibliography (par. 6 even with 96 numbers). Their contents are not always very well coordinated and it is especially this part which, in spite of its remarkable fullness of data, leaves us somewhat unsatisfied by its want of surveyability. The paragraphs are respectively dealing with: 1. an introductory; 2. the origin of the map; 3. remarks on earlier vegetation maps of the region in question; however, only world maps are quoted, on which Malaysia forms only a small part, but — it must be admitted — having almost always been dealt with most inaccurately; 4. the fundamentals and sources to the map, taken from literature as well as from oral and written information from many sides, and particularly from information largely procured by the intensive cooperation of the Forestry Service. In this paragraph an introduction is given to 5. in which 175 vegetation-types have been enumerated, that have been dealt with more in detail in the special part (called „regional descriptions” by the author). As I have to put forward some objections to the arrangement of these vegetation-types at some length, I will postpone their discussion now; 6. general (better: miscellaneous) remarks on various subjects, such as local flora's and vegetations, many interesting informations on and a map of the forests in Netherlands India (forest-storeys, composition, elements), the influence of man (forest products, culling, cultivations, fires [also by lightning]), reforestation, altitudinal zones; 7. remarks to the map; 8. soil and flora, containing some data on the correlation of edaphic factors in general and plant distribution (lime, halophytes, soda, silica, clay, loam, etc.); 9. correlation of climate and flora in Java, text to elucidate the cartoon, mentioned above. The paper on this subject by the referent (Blumea I, 1934, 120—123), not mentioned by VAN STEENIS, has apparently been received too late to be dealt with. This paragraph contains a discussion on the distribution of some cultivated plants (sugar cane, tea) as well as some wild plants (*Andropogon contortus*; *Nepenthes gymnamphora*, with map).

The special part is numbered par. 10 and contains more or less detailed descriptions, with eventual references, of the vegetation-types, enumerated in par. 5. I have now to discuss their arrangement and subdivision, which we may suppose to be meant as a tentative scheme or frame-work to serve as a basis for future work. The first subdivision is based upon whether the vegetation is natural or artificial:

1—101 „natural” vegetations (cultivated forests of teak, sagu etc. incl.).

2—15 grass, fern and shrub jungles

20 second growth forests

30—101 primaeval forest

150—175 artificial vegetations (cultivations).

The author means to leave open the possibility to intercalate thusfar unmentioned vegetations, having only enumerated a limited number in the scheme given. His subdivision runs therefore e. g.

1. „jungles” in general
2. jungles of shrubs, grasses or ferns
 3. litoral zone
 4. beach zone
 5. dunes (also inland dunes)
 6. freshwater vegetations
 - etc. as far as
 15. savannah-like vegetations
20. second growth forests (no subdivision)
30. other, mostly older forests
 31. palm forests
 32. Nipa
 33. sagu
 - etc. to
 39. Borassus
 - 39a. Corypha
 - 39b. Livistona
 - 39c. Pinanga
40. Casuarina
41. Coniferous forests
(subdivision 42—47).
48. Bamboo forests
49. Pandanus
50. Fern trees
55. Leafwood forests
 56. Forests of deciduous trees
 57. Heterogeneous
 58. Teak forests
 60. „Evergreen” forests
 61. Heterogeneous
 62. Tidal forests
(subdivision 63—66)
 70. Dipterocarpaceous forests
(subdivision 71—77)
 - 80—101. Several dominating trees
(genera or species)
150. Cultivated grounds
etc.

I have mentioned this statement at some length, because in my opinion it fails in the present state of plant physiognomy and sociology, to satisfy legitimate demands of logic and surveyability. In the above statement 1 stands opposite to 150. The latter number has apparently been chosen, since the next lower one was 101; had this been, say 95, then the second category would have probably started with 100. Now 2 is equivalent (or printed in such a way that it seems equivalent) with 20, 30, 40, 41 etc., however, 3—15 with 31, 56 and 60, 32—39c and 42—47 with 57, 58, 61, 62, 70.

80—101, and 63—66 finally with 71—77. I think, there is a lack of uniformity and adequate subordination in this system, which might have been avoided, if the decimal system had been used, which is sometimes used in bibliography. This system allows a more logical and equilibrated subdivision and can always be applied in such a way that intercalations are feasible without additions of *a*, *b*, *c* etc. (cf. 39). Of course, it is not necessary to go so far as to use such a decimal system in connection with that, proposed for libraries in which¹⁾:

- 5 = Science
 - 58 Botany
 - 58.1 Phytobiology (sic!)
 - 58.19 Phytogeography
- and e. g.
 - 9 = History and Geography
 - 91 Geography
 - 922 Java
 - 922.1 West Java
 - etc.

On the contrary, I think it is practically impossible to use more of this apparently not very successful scheme than the primary idea and the arrangement of the groups could then be based upon such factors as altitude, climate, soil, etc., etc. If we take VAN STEENIS's own paper on the mountain flora, quoted above (p. 327), as a basis, the number of zones indicated there being only 7, we need not commence with 0, thus using the numbers 1—7, e. g. in the following (or any other) way:

1. Marine Zone (alt. —5 to —0.25 m)
 11. alt. —5 to —1 m (*litoral zone*)
 111. Algae
 - 1111, 1112, etc. (various types)
 112. Phanerogams
 - 1121, 1122, etc. (various types)
 - 113.
 - etc.
 12. alt. —1 to —0.25 m (*mangrove*)
 121. Rhizophora
 122. Bruguiera
 123. Avicennia
 - etc.
2. Tropical zone (alt. 0.25—1000 m)
 21. alt. 0.25—1 m (*beach weed flora*)
 - 211, 212, etc. (various types)
 22. alt. 1—5 m (*beach forest and dunes*)
 211. beach forest
 - 2111, 2112, etc. (various types)
 212. dunes
 - 2121, 2122, etc. (various types)

¹⁾ cf. H. J. VAN LUMMEL en L. VAN VUUREN, Meded. Encyclop. Bur. N. I. 13, 1917, 169—314 and I—XVI (Literatuurstudie van Halmheira).

23. alt. 5—500 m (*lowland zone*)
(many subdivisions possible)
24. alt. 500—1000 m (*colline zone*)
(many subdivisions possible)
3. Submontane zone (alt. 1000—1500 m)
etc. to
7. Nival zone (alt. 4600—5000 m)

It is not my intention to criticize here the above zonation; I would only suggest the author to consider the practical possibilities of this scheme, which is, I think, elastic and simple. I would add the suggestion that, as far as possible, sociological or ecological subdivisions should be given preference above floristic ones and that the final scheme be established in such a way that minor alterations may be made for many years to come without affecting the general principle and the main subdivision chosen.

I have little to add concerning the regional description of the second part. An astonishing great number of interesting and very different items has been gathered here. To some of the paragraphs some additional or correcting remarks could be made (and the author recommends himself to be presented with such informations), but here that would be throwing water into the Thames. Some paragraphs are more elaborate, others refer only to one dominating species or to literature, but together they form a wealth of information, on which both the author and the reader may be congratulated. The photographs are, with few exceptions, good and representative; eight of them are splendid large-size brown reproductions with a very minute lath.

The map and the cartoon are carefully prepared, drawn and printed. It is striking to observe how little forest is left in a part of N.E. Sumatra and W. Borneo, and especially in Java, Bali and Lombok. Large areas are covered with secondary forest in Sumatra, with teak in Central Java. Dominating species in primaeval forests (*Dipterocarpaceae*, *Agathis*, sagu, *Pinus*, *Melaleuca*) are indicated by various kinds of hatching. As to New Guinea, the map does not agree in some details with that, prepared by the referent some time ago (Blumea I, 116—117 and in „Nieuw-Guinee” I, 1935, 200—201), but it must be admitted that our knowledge of that immense island is still too scanty to attach much weight to such differences. It is, I think, to be regretted that the same (yellow) colour has been chosen for all open vegetations („shrub, grass and fern jungles”), whether in the lowland (except the savannah's, which are dotted) or in the subalpine zone.

As a matter of course, the area cartoons could only give an extremely scanty selection from the data available. Almost every individual writer would have made a different choice, and also that of VAN STEENIS has a personal character, but it gives several representative and remarkable examples.

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W. M. DOCTERS VAN LEEUWEN, *Krakatau 1883—1933*, A. Botany — Ann. du Jard. bot. de Buitenzorg 46 and 47, May 1st 1936 — XII + 506, with a frontispiece, 10 text figures, 60 photographs and a map.

Fifty years after the event that was almost as important and searching to

biologists as it was to volcanologists, we are glad to dispose of two authoritative and exhaustive publications on what happened with the flora of Krakatau, one by A. ERNST (Vierteljahrsch. Naturforsch. Ges. Zürich, Dec. 31st, 1934) and the other by W. M. DOCTERS VAN LEEUWEN. ERNST, the European University professor, transient visitor twice, unconcerned and mastering modern botany in its full extent; DOCTERS VAN LEEUWEN, with a long tropical career, experienced field botanist (and zoologist), retired director of the Botanic Gardens at Buitenzorg and investigator for many years and many a long day. These two men well complement each other and it may be accepted that, being published with an interval of little more than a year, their publications seclude a period of investigation, publication and contention. For many decades to come little is left to be said on the problem as it was; there only remains to tell how things will gradually change and develop. Every side of "The Problem of Krakatoa, as seen by a botanist" has been thrown light upon, more impartial and less one-sided than has been done by the third man who gave an extensive contribution, with the title just quoted, C. A. BACKER. If the contest has ended now, as may be hoped, both ERNST and DOCTERS VAN LEEUWEN have dignifiedly contributed to bring back the problem to its essential proportions. I reviewed ERNST's paper (Vakblad voor Biologen 16, 1935, 161—166) and I will therefore refrain from discussing in detail the work of DOCTERS VAN LEEUWEN, in order that I need not deal with the same questions twice. Yet, nobody who is interested in the problem, can venture to do without either of the two publications referred to. The fulness of personal impressions gives DOCTERS VAN LEEUWEN's work an attractiveness and a value that cannot be surpassed by anybody else. It deals with a subject, treated at length shortly before, but it is of a very personal nature, containing all known particulars of the volcano before and after the famous eruption, comparative studies on similar events, a complete history of the research, to which the frequent experiences of the author yield a very vivid character, interesting chapters on dispersal, on sociology and successions, and on the new-born „Anak Krakatau", and finally a complete and reasoned enumeration of all Zooecidia, Bryophytes (33 + 38), Pteridophytes (61) and Spermatophytes (263), some time collected or observed on one of the isles.

An extensive bibliography (12 pp.) and an index (18 pp.) precede a series of splendid photographs. The publication ends with a map in black without many particulars, perhaps the only disappointment in this important and well-edited work. I would have preferred to have inserted, in addition to a small-size general map, coloured vegetations maps of the separate islands with the indication of the altitudinal zones in various phases of development.

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Podostemonaceae in New-Guinea?

The Podostemonaceae are a plant family that has apparently originated in tropical America, as is well pointed out by F. A. F. C. WENT (1). Its generic and specific density diminishes towards the East and at the same time its differentiation (specialization, reduction) increases. Thus far, the eastern boundary of its area is found in S. Japan (Kyu-Syu), Indo-China, an island off the Siamese coast, a

doubtful habitat in the Philippines, and finally S. Celebes and E. Java (*Cladopus Nymanii* MÖLL.).

Now some time ago my attention was drawn by a passage in D'ALBERTIS's well-known narrative: „New Guinea: What I did and what I saw” (Vol. II, 1880, 93), on his exploration of the Fly River in S. New Guinea, running:

„Today (June 17, 1876) I met, for the first time, with a plant which I must „call extraordinary. It grows on the heaps of stones that abound in the river, and „seen from a certain distance, its dark colour, almost black, and its peculiar shape, „makes it resemble the scales of a serpent. Its branches lie flat, so as to offer as „little resistance as possible to the water. It owes to this curious conformation its „power of resisting the strength of the current”.

I wonder whether something else can be meant here than podostemonaceous plants. The author being a zoologist, his plant and vegetation descriptions are not always very elaborate and hard to interpret. But, if we remember, how long *Cladopus* has remained unknown in a relatively well-investigated country as Java (MÖLLER and NYMAN discovered it only in 1897 and it has even been detected near Buitenzorg in — I understand — 1929), and if we further bear in mind that still more eastern species may eventually be still more reduced in size, it seems not at all impossible that New Guinea rivers contain a representative of this remarkable plant family, the distribution of which is very important for historical phytogeographical problems, since it merely contains highly adapted freshwater plants. Let me make two quotations from WENT's paper (1):

„Even granting that the possibility exists of the discovery of one of these small species on New Guinea or on one of the islands of the Pacific, I rather think that this is not very probable” (p. 1906) and

„the flora of many islands in the Pacific is known only incompletely, so, it is possible, if indeed not probable, that Podostemonaceae may be detected there, especially because these small forms are easily overlooked, or taken for liverworts. Accordingly, I would urge those botanists, who study the flora of the Pacific Islands to keep a sharp lookout for Podostemonaceae, because their occurrence would compel us to alter our ideas as to the age of the Pacific Ocean.” (p. 1911).

May I, in addition, and particularly in view of D'ALBERTIS's observation mentioned, suggest that Australian or other explorers look out for these plants, as the opportunity occurs? I would also be obliged to learn additional informations, eventually known to other people.

The above had been set up in type, when a small paper by VAN STEENIS on “The Podostemonaceae of the Netherlands Indies” (Bull. du Jard. bot. de Buitenzorg, Sér. III, Vol. XIII, 530—534, July 1936) was received by me. The area of the order, mentioned there, agrees pretty well with that given above but for the remarkable habitat of *Torrenticola* DOMIN, an insufficiently known genus from Queensland¹⁾. DOMIN's description is not available to me, but A. LEMÉE writes (Dict. descr. et syn. VI, 1935, 625): “*T. queenslandia* (*sic*) Domin, d'Australie, forme sur les rochers de petits „thalles étroits entiers à aspect de *Fucus* qui sont abondamment couverts de courtes

¹⁾ ENGLER-DIELS, Syllabus der Pflanzenfamilien, 11th Ed. 1936, 185, mentions Australia also.

„pousses flottantes densément feuillées”. Could it be possible that D'ALBERTIS observed a representative of this genus in the Fly River region?

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References.

1. F. A. F. C. WENT — Proc. Third Pan-Pacific Science Congress 1926, II (1928), 1906—1911.
2. ——— Jaarversl. Prov. Utr. Gen. v. K. & W. 1929 (1930).
3. ——— De Trop. Nat. 19, 1930, 53—60, 5 figs.