XIII. BOOK REVIEWS

(contd from p.924)

Archer, Mildred: Natural History drawings in the India Office Library. London. H.M. Stat.Office 1962. ix + 116 pp., 25 pl. Clothbound Sh. 27/6.

This is a catalogue of the c.5000 drawings still extant in the India Office Library of which only a few hundreds are of plants, the rest representing animals. There is an extensive introduction in which the activities of the persons involved in their donation are explained, which gives the book an interesting biographical and historical aspect. A beautifully executed work showing wide knowledge of its author. -- v.St.

Fleming, Charles A.: New Zealand Biogeography. Tuatara 10, 1962, 53-108, 15 fig.

An elaborate instructive study of the geological history and peopling by plants and animals of New Zealand, based largely on geological and palaeontological data. Almost all strata onwards of pre-Cambrian are present, showing that New Zealand has made part of a centre of land with adjacent geosynclines. In the Triassic a subcontinent "Tasmantis", stretching from the Campbell Islands towards and including New Caledonia, was a huge geanticline. Though simultaneous with the Tethyan, the West Antarctian and Andean, the Tasmantis syncline did not join the latter. The Kermadec-Tonga ridge system is attributed to later movements. Lower Permian was cool (but no Glossopteris), Upper Permian somewhat warmer according to corals. Triassic fossils and rocks similar to New Caledonia, but different from those of Australia. In Triassic to Middle Jurassic earliest Araucarians and Podocarps appeared in addition to extinct Mesozoic Equisetales, Cycadophytes and Ginkgoales; climate mesophytic. Until the end of the Cretaceous there was considerable land in the West of Tasmantis, with high mountains, but this land was not continuous to New Guinea or Asia, not then or later. In the Lower Cretaceous Angiosperms spread. In Upper Cretaceous the fossil fauna had relations with Chile and Seymour I. and Nothofagus appears with Proteaceae, Dacrydium, etc.; climate was moist-temperate, and warmer than at present. In the Tertiary the New Zealand area became more archipelagic; Casuarina appeared, Myrtaceae and Sapindaceae. Evidence of warmth and tropical incluence in Eocene seas were probably less than in Miocene. Loranthaceae, Meliaceae, Palms, etc.; in Oligocene with Winteraceae, Freycinetia, Astelia, Restionaceae, Cocos, Typha, Coprosma, Rapanea, Epilobium, and first Compositae. In Miocene the flora remained subtropical with Nothofagus brassii-group. In later Miocene rainfall increased, but many subtropical plants disappeared at the Miocene-Pliocene boundary. In Pliocene earth movements became intense and climate cooled, but even in late Pliocene the climate was warmer than at present with Nothofagus brassii-group, Agathis, Ephedra, Dysoxylum, Cupanieae. In Glacial Epoch few trees were present, pollens mostly of grasses and composites. Permanent snow level came down to 1000 m as compared with present. — v.St.

Forster, Georg: Reise um die Welt. Rütten & Loenig, East Berlin 1960. 667 pp. With an epilogue by G.Steiner.

There seems to be a growing interest in the remarkable Georg Forster, the son of Johann Reinhold (see p.915). From British ancestry but born near Danzig in 1754, he was largely educated by his father, had a quick mind for languages and a

deep interest in natural history. As a youth of 16 he accompanied his father on Cook's second voyage, at the last moment being called to replace Banks and Solander. He never lost sight of the human aspect of alien peoples, criticised colonialism, and displayed revolutionary activities at Paris where he died in 1794.

This book, written aboard the "Resolution", is a clear, well-balanced and pleasantly readable story which testifies to a keen intellect and a great maturity. Originally it appeared in two volumes at Berlin, the first in 1778, the second in 1780. The present edition has been finely executed, but we find reason for a serious objection in a note on p. 653, "except for a few repetitions only the purely scientific passages have been abbreviated." Actually, there is now almost nothing left that relates to natural history, a fact which definitely diminishes its value to any scientist. -- M.J.

Guinet, Ph.: Pollens d'Asie tropicale, fasc.1. Institut français de Pondichéry, Trav.Sect.Sci.Tech. 5, 1962, c. 100 pp.

Publications of diagnosis of pollen grains is undertaken by the French Institute, Pondicherry. This first issue includes chiefly South Indian species. Methods followed are the classical ones (G.Erdtman). Terminology followed is that of J.Troels-Smith (1950) and M.van Campo (1957-1959). Description of the pollen grains have been made in the same way as those of M.van Campo for Africa, in order to allow comparisons between tropical and sub-tropical floras. Emphasis has been laid on the study of the variation of single species which is both theoretically and practically important and seems wider in tropical areas than in temperate countries. In a great number of cases variations of polar axis lengths have been correlated with variations of endoaperture ("ora"). Taxonomical bearings have always been taken into consideration. The particular fold in the endoaperture described for the first time by M.van Campo and N.Hallé in Hippocrateaceae has been discovered in other families and seems to be of great value for the diagnosis of Celastrales. -- So far the summary, to which the following remarks may be added. Fifty-two species have been treated in this part. Each species has been numbered by its plate, which consists of a few drawings and/or photographs, accompanied by a descriptive text. Names have often been incorrectly applied (e.g. Capparis divaricata is of Lamarck, not of Hooker f. & Thomson; it is the correct name for C.stylosa DC. and not its synonym), or misspelt (e.g. Hiptage bengalensis for benghalensis), or author's names have been uncarefully cited (Forssk. for Forskal). It seems therefore necessary to judge the contents palynologi-

cally with greater keenness. Documentation, however, will satisfy the taxonomist perfectly, since the material of each species has been cited in full, with the herbaria where it is deposited. -- M.J.

Hegnauer, R.: Chemotaxonomie der Pflanzen, eine Uebersicht über die Verbreitung und die systematische Bedeutung der Pflanzenstoffe. Band 1: Thallophyten, Bryophyten, Pteridophyten, und Gymnospermen. Birkhaüser Verlag, Basel, 1962, 520 pp., 6 fig. Clothbound DM. 96.-.

This book has been written to give a critical survey of the phytochemical characters of plants and to make these available to plant taxonomists. It consists of three sections, the first dealing with the plan upon which the book is based. The second part contains several indices of literature, arranged according to subject. The last section is a systematic treatment of the families. The discussion of each family has been split into 4 sections. The first deals with the subdivision of the family, the second gives a short account of the anatomical characters, the third consists of a detailed discussion of the phytochemical constituents of the species, and the fourth gives a final consideration in which the author tries to evaluate the known chemical characters of the taxa from the taxonomical point of view. It is striking how little is known about the occurrence of chemical constituents and one cannot but realize how difficult this evaluation is. Intensive research has hitherto mostly been restricted to useful plants and to certain groups of chemical compounds. But the "Nachträge" show how much research is going on and we hope that in the future so much will be known on the subject that phytochemistry will turn out to be a very useful aid for solving taxonomical problems.

In spite of the incompleteness of the available data, this book will be of great value for taxonomists as well as for phytochemists because it is the first work that aims at the use of phytochemistry as an auxiliary branch of taxonomy and at the same time gives a full account of all the present day knowledge on the subject. The complete work is planned in 5 volumes, the second one, containing the Monocotyledones, being in press. -- H.P.Nooteboom.

Pendleton, R.L.: Thailand, aspects of landscape and life. Published by the American Geographical Society, New York 1962, xv + 321 pp., photogr., 26 fig. US $ 10.-.

R.L.Pendleton (1890-1957) is known to botanists for seeing vol.3 part 1 of the Florae Siamensis Enumeratio through the press in 1951. He spent many years in Siam after arriving there in 1935 as a soil scientist. The merits of the book are that it reflects the author's knowledge of soils, that it contains much post-war information and that the printing and

illustrations are of high quality. In the botanical chapter we notice a number of slips (on p.84 the evergreen rainforest is stated to have once covered all plains and mountains of the peninsula, while the origin of the other vegetation types is not revealed; on p.93 Sandoricum indicum is given for Santalum album, the sandalwood; many names are incorrectly spelled), and a certain amount of superficiality, which, however, is not surprising for a man who used to write ten to twenty letters a day and who "went to as many international conferences as it was possible for him to reach" (p.vii). Matters of ethnology, culture, science, and religion are hardly discussed. It is good to have a new book on Siam, but our hope for a counterpart equivalent in English of Wilhelm Credner's excellent book "Siam, das Land der Thai" (Stuttgart 1935) is still to be fulfilled. -- M.J.

Simmonds, N.W.: The evolution of the bananas. Tropical Science Series, Longmans. London 1962, xii + 170 pp., fig., distribution maps. Sh.42/-.

This book is complementary to "Bananas" by the same author in the same series (1959). It gives a wide systematic introduction, mainly based on Cheesman (1947), with keys and a survey of the 4 sections and c. 37 species of Musa. A scoring system to handle the characters on punching cards is also given. The distribution and ecology are discussed; the principal area of diversity is Assam-Thailand, followed by Borneo-Indonesia, M.acuminata s.l. being nearly coexistensive, geographically, with the genus as a whole, with the centre of its diversity in Malaya. Parthenocarpy, sterility factors, and other cytogenetical particulars are fully and clearly treated. It has been proved that edible bananas consist of diploid and triploid races derived from M.acuminata and from (often triploid) hybrids with M.balbisiana; edibility is the result of a combination of parthenocarpy and seed sterility. See p.136 "triploidy and hybridity were important events, to be sure, but they followed the evolution of edibility at the diploid level and were contingent upon it for their usefulness; without the edible diploids there would be no edible bananas."

According to Simmonds, West Malaysia is the centre of evolution of M.acuminata in its various subspecies; the same area is avoided by M.balbisiana (wild in India, the Philippines, and New Guinea), the parent material of what in Indonesia is known as "pisang batu" characters. He stresses the importance of field work, in West Malaysia and elsewhere. We agree with Simmonds that much work indeed is to be done and that the rewards will be considerable. On the one hand, we are not aware that banana experts ever have made an organized attempt to gather field information on a large scale about the numerous cultivars in Sumatra, Java, and Borneo. On the

other hand, Simmonds does nowhere mention the results that are available: the extensive studies by Quisumbing of cultivars in the Philippines (Philip.Agric.Rev. 12, 1919, 1-90), and the very careful taxonomic treatment of the Musaceae of Java by Backer (Handboek voor de Flora van Java 3, 1924, 130-141). Recently a thorough survey of the edible banana strains in Malaysia has been made by Paul Allan of the United Fruit Company (unpublished). The time seems ripe now for much more intensive exploration of wild bananas in Malaysia in order to get a complete picture of the genetic variability of Musa acuminata and for a breeding program conducted inside Malaysia. Simmonds argues that the potentialities of such breeding are considerable. Everybody who is familiar with the many local varieties of Indonesia will agree that the choice they offer in taste and quality far surpasses what is available in the West Indies. — W.Meijer & M.J.

Steenis, C.G.G.J.van: The land-bridge theory in botany. Blumea 11, 1963, 235-372, 24 maps.

This theory was first presented to the public in August 1961, at the 10th Pacific Science Congress, Honolulu. It embodies the idea that in the dim geological past the palaeotropics and the neotropics were connected by a tropical landbridge across the Pacific. This landbridge existed in the Mesozoic, and should be imagined as a more or less intermittently interrupted chain of islands, not unlike the Malaysian archipelago connects the Asian and Australian continents.

The method followed to work out this idea was developed by the author in his "Origin of the Malaysian mountain flora" of the mid-thirties. According to this method, the genus is the main working unit for statistics and comparisons. When the problem has been defined, notably that a number of genera occur within the tropics on both sides of the Pacific and nowhere else, all possible explanations are ruled out on careful consideration, and then the theory emerges as the only possibility to stand against all objections.

The special importance of the matter dealt with, lies in the fact that it holds the key to the main problem of historical plant geography: the problem how pantropical distribution evolved. Major general aspects of this problem are the relation between dispersal and distribution; the thermo-ecological properties of genera and families, which account for the fact that the latitudinal zonation of the plant kingdom is a taxonomic as well as an ecological one; palaeoclimatic and fossil evidence; the significance of land-bridges in general.

The importance of the thermo-ecological aspect is, that it permits the exclusion of temperate and subtropical genera from the truly tropical (= megatherm) ones; the former could have migrated through Beringia, the latter could not, and to

explain their amphi-transpacific distribution, an intratropical connection is therefore required.

Amphi-transpacific affinities within the tropics are not numerous; the author has listed 80 cases of the rank of section and higher. This is almost exactly the number found by Engler, who in 1905 worked out the tropical amphi-transatlantic connections. These affinities are to be regarded as parts of the major problem presented by the pantropical distribution of 28 strictly and 54 largely megatherm families. It is unimaginable that these families are of temperate ancestry, so that they must have spread by early large-scale connections between all continents. With this in view, the following possibilities are extensively discussed: a former tropical world, polyphyletic origin of transoceanic disjunct taxa, plant taxa as unreliable thermometers of the past, relict hypotheses, active transoceanic dispersal under the steady state, continental drift, polar shift. None of these appears satisfactory to cover the facts.

Botanical theories on tropical transoceanic land-bridges are scanty, except Engler's for the Atlantic. Factual geological data available appear insufficient to explain past and present plant distribution, but are not inconsistent with the land-bridge theory. Amongst the arguments adduced in favour of a tropical land-bridge across the Pacific, two axiomas have been accepted, i) the steady state principle which means that warmer and colder zones have always existed, and that after the Palaeozoic there has been no continental drift and no polar shift, ii) those taxa which have been unable to produce both cold-adapted and warmth-adapted plants, are considered unable to change their thermo-ecological potentiality and are therefore regarded as reliable ecological thermometers of the past.

Among the positive evidence we find the following arguments: the amphi-Pacific floristic relationships form essentially a well-balanced whole; there is a marked symmetry in floristic composition of all latitudinal zones, and in migration tracks of microtherm genera; in all zones plants which one might fairly expect to find in view of a former land connection are really present; preponderance of Indo-Malaysian flora in the western half of the Pacific; submerged land-ridges in the East Pacific.

Possible age of the land-bridges projected to account for the present situation on both sides of the Pacific are: 1) Behring bridge - Upper Cretaceous and Tertiary, 2) Marianas bridge to eastern Malaysia - Early Tertiary, 3) Tropical transpacific bridge - Jurassic or early Cretaceous, and largely South of the equator. It is supposed to have broken down first in the East Pacific and gradually to have crumbled away towards the West, 4) Subantarctic bridge - Cretaceous

and Early Tertiary. A great role is attributed to mid-oceanic ridges, which seem to be regular phenomena and might have provided the land for these connections.

As for the zoogeographical evidence, mostly based on P.J. Darlington's book on the zoogeography of the Vertebrates of 1957, the fossil record of the Mesozoic, the age of both these land-bridges and the large Reptiles, is very meagre. Caution is expressed with regard to the assumption that fossils of large Reptiles must indicate a tropical climate. Six points are discussed on which Darlington's conclusions are concurrent with the author's, versus one minor point of difference.

The paper is, of course, fully documented with briefly annotated lists of genera of all categories, a bibliography of over 150 numbers, indexes to plants, persons, and subjects, and a short list of terms. -- M.J.

Tomlinson, P.B.: Anatomy of the Monocotyledons II. Palmae. Oxford, Clarendon Press 1961, xv + 453 pp., 9 pl., 45 fig.

This is the fourth volume in the series edited by Metcalfe at Kew (1 & 2 Dicots, 3 Grasses), which deals with the "big game of the plant world", a sentence which, first uttered by L.H.Bailey, we find repeated both in Metcalfe's and in Tomlinson's preface. But otherwise the book has been made up of an unusual amount of new matter, tenaciously collected in 6 years' time on several travels by the author, who found his field largely blank and who by now has examined 250 species of the 2500, having personally examined all 129 Palm genera except 4.

In a table the systems of Martius (1850), Bentham & Hooker (1883), Drude (1889), Burret (1953), Beccari & Pichi-Sermolli (1956) and the author's suggestions can be compared at a glance. Germination and seedling morphology, morphology and anatomy of the stem, leaf, and root are deeply discussed in a general chapter. The taxonomic conclusions from the anatomical evidence largely corroborate the previous picture, but in the author's opinion, the 12 not equally related groups recognized by him probably deserve the rank of subfamily, and the genera Ceroxylon, Leopoldina, Orania, Pelagodoxa, Pseudophoenix, and Sclerosperma are "anatomical misfits" within their tribe. Rather than the old subdivision fan-palms vs. feather-palms, which fails in several groups, the fundamental character for subdivision is the induplicate vs. reduplicate folding of the young leaf segments, more or less correlated to the vascular structure of the leaf rib.

Within each of the larger subfamilies it is possible to recognize groups of anatomically closely related genera. Anatomical differences on specific level seem negligable. Microscopical examination now reveals the tribe and often the

genus. The distribution of the important diagnostic characters over the genera is given in an appendix.

It is remarkable that the reproductive parts in this book have completely been left out of consideration. It is regretted that no indication has been given to geographic distribution of the genera, except the mentioning of the botanic garden where the material was taken. It is also regretted that no collector's numbers or garden numbers have been given, which might have helped to overcome the difficulty that "no great reliance has been placed on specific identification, and that the present account will be found to emphasize only generic differences". Such a statement does not make the taxonomist very happy, whose difficulties in typification of this big game are already extraordinary.

As for the anatomical substance of the book, which we feel incompetent to judge, we refer to the penetrating reviews by K.R.Sporne, New Phytologist 61, 1962, 230-231, and by A.J. Eames, Bull.Torrey Bot.Club 89, 1962, 122-123. -- M.J.

Visser, W.A. & J.J. Hermes: Geological results of the exploration for oil in Netherlands New Guinea. 1962, 265 pp. + 18 enclosures. State Printing Office of the Netherlands. + £ 25.

The explorations for oil in the former Netherlands New Guinea, carried out for 25 years by 200 scientists and technicians altogether at a cost of 160 million dollars, were largely futile, but the report of this failure seems anyway a splendid achievement and obviously of a scientific value far beyond the limits of geology. The text shows impressive outcrops of information on the history and technique of the explorations, biostratigraphy, rock stratigraphy, tectonics, and petroleum, natural gas, water. Two sections (p.124 and 194) summarize the geological history and development. The enclosures, which mainly account for the total thickness of 8 cm, contain a geological map in 4 sheets, scale 1:500,000, and one, scale 1:1,500,000, palaeontological maps, palaeosections giving configurations of land and sea, a structural map of the Moluccas, New Guinea, and North Australia, and stereo-photographs of Carstensz Peaks. The execution is magnificent.

Particularly relevant to important plant-geographic problems are the hypotheses on the development of the Moluccas and western New Guinea. It is held that New Guinea with Halmahera structurally belong to the Australian continent. During the Juro-Cretaceous, New Guinea was mostly under sea, except for the present Vogelkop area, where there seem to have been landmasses throughout. West of this, there was in the Old Palaeozoic a gap, much wider than nowadays, the Moluccan geosyncline, which extended roughly North-South, and was bordered in the West by the Asian shelf, the margin of

which was formed by the present Celebes arms, Ceram, and Timor. During the Mesozoic, the intercontinental Moluccan geosyncline together with the structures on its Asian side, was bulged eastwards in the direction of the Arafura Sea, making the gap between the two continental shelves considerably narrower, and finally in the early Tertiary, encroaching onto the New Guinea shelf. In the mid-Tertiary, then, the central New Guinean geosyncline, which had gradually been filled up with sediments that came probably from Australian mountains, was lifted to form the present Central Range.

Unable to judge its probability as a whole, we can only say that we find it hard to see how this theory (which practically rules out the possibility of a former land connection between New Guinea and the rest of Malaysia) can contribute to an explanation of the fact that the New Guinea lowland flora is Malaysian and not Australian in affinity. -- M.J.

Willis, J.H.: A Handbook to plants in Victoria. Vol.1. Melbourne University Press 1962, xv + 448 pp., small 8vo.Sh.45/-.

This work treats Pteridophytes and Monocots, 949 species, native and naturalized, in the form of a system of keys in which the text of the forks seems very clear, unambiguous and rather full; this is also necessary as descriptions are only given by exception; it is no 'Handbook' as said in the title. Of each name a reference is cited to the first description and if necessary a basionym and sometimes a reference to the name in Ewart's Flora. This is followed by a list of works with illustrations of the species; vernaculars and distribution; and sometimes a diagnosis. Occasional introductions and other notes may follow in square brackets. The work looks very critical and stuffed with concise information, as could be expected from the author. Personally I do not like the keys to the species woven into the text and would have preferred to have these apart. I have also an aversion against the following of certain rules for citing titles in which the latter are not all abbreviations with capitals and have to read on page v 'Flora Australiensis' but elsewhere 'Benth. Flor.aust.' and 'Hook.f. Flor.Tasm.' and 'Black, Flor.S.Aust.' but again 'Icon.Flor.germ.' and 'Flor.japon.'. Also 'Obsns.' for Observ. seems strange and what to think of 'A.Gray, Manual Bot.nth.U.S.' in which 'nth.' seems to be the official abbreviation of 'northern' (p.226). Distributional data are rather well up to date but note: Thysanotus tuberosus also in S.New Guinea, Geitonoplesium also throughout SE.Malaysia, Astelia alpina also in New Guinea. This welcome, important acquisition is well printed and easy to handle. The author deserves our congratulations with this result. -- v.St.