REVIEW

J. HUTCHINSON, Evolution and Phylogeny of Flowering Plants. Dicotyledons: Facts and Theory. — Academic Press Inc. July 11, 1969. XXV + 717 pp. 557 fig., 34 maps, sh. 170/-.

According to Hutchinson this is intended as a Companion or Supplement to the first volume of the 2nd ed. of his 'Families of Flowering Plants' (1959), which lacked room for notes on phylogeny or genera with outstanding characters. 'These are now provided with illustrations of many plants of special morphological interest and economic importance, and which sometimes may lead to their identification *(sic)*. Drawings of the type species of the type genus of most of the large families are also included. The illustrations are mostly my own work'. The illustrations, at once simple and carefully made, are a pleasure to the eye and interesting indeed as a large number either depict little known 'aberrant' genera or give in some families (*Cruciferae*, *Leguminosae*, *Umbelliferae*, etc.) an array of the perplexing variation in either habit or fruit type. There are no family diagnoses but in most families a short description is given of the type genus. The purpose of this is not clear as this need neither be characteristic of the family diagnostics, nor of value for phylogeny, being merely of value for nomenclatural typification. Also all family synonyms are given in footnotes. Their value seems doubtful in this type of book. The text amalgamating the figures contains some notes on phylogeny, but is largely devoted to particulars about the variation within the families, with notes on geography, on uses of particular plants, history of names of plants, ornamental and drug plants, contains not a few quotations and other anecdotical matter, several derived from the Botanical Magazine.

Obviously, the text serves for a large part to fill the space between the plates which Hutchinson wanted to have published.

The systematical text is rather uneven; e.g. for the *Helleboraceae* a complete survey-key is given down to the genera.

In essence, the system remains the same as in his former work, but there are some shifts; his well-known tendency to split larger families into so-called homogenous smaller ones is of course maintained, and there is a slight sprinkling of new family segregates.

Part of the text must have been written long ago; this appears from spots where it is not brought up to date. In 1959, Hutchinson had already correctly *Idenburgia* as a synonym of *Sphenostemon*, but here he has this inserted under *Trimeniaceae*, neither mentioning *Nouhuysia* as a synonym, nor adopting the proper generic name *Sphenostemon*. *Phelline* he mentions both under *Aquifoliaceae* and *Rutaceae*.

To make the book attractive by figures some maps are added, partly new, partly old ones, and Hutchinson stated to adhere to the theory of continental drift both in the text and in the captions of some maps, but under maps of ranges pleading against this he captioned sometimes saying 'A remarkable distribution' (as under *Lindenia*, map 27, a rubiaceous genus known from New Caledonia, Fiji, and Central Latin America; and *Embothrium*, map 12; *Eucryphia*, map 21; *Anaxagorea*, map 20; *Coriaria*, map 5; *Griselinia*, map 9; *Lardizabalaceae*, map 29; *Fuchsia*, map 31), avoiding the issue or not being aware that in accepting drift many other ranges become unexplainable. This appears also from his remark on *Chloranthaceae* (p. 504) which family 'probably originated in the Burma-Indochinese region *(Chloranthus)*, and spread eastwards through the Pacific *(Ascarina)*, culminating in *Hedyosmum* on the American continent which is inconsistent by Wegenerian drift; forgetting also that *Hedyosmum* occurs in Hainan, Sumatra, and Borneo; *Ascarinopsis* from Madagascar is omitted.

The book is heavily loaded with the magic of Phylogeny, measured by recent families without reference to fossils. Hutchinson is of course well aware of this, his hobby, quoting J. Parkin stating that 'Taxonomy without phylogeny may be likened to bones without flesh!' He even suggests that 'Bentham's classical memoir in *Mimosaceae* would have been of infinite value had he been of a more speculative mind'. Though he stated 'This book is brimful of Theory, which is of necessity founded on facts', this is contrasted with e.g. the phylogeny of *Fagales* which is derived from the *Magnoliaceae* via *Dilleniales*, *Rosales*, and *Hamamelidales*. This must have required some time, but in this respect I remind of the fossil *Fagales*, which are in both hemispheres already found in the Cretaceous, outdating all fossil records from the intermediate steps and challenging those of *Magnoliales*. If theory is founded on facts, there is here little theory, but an awful lot of speculation, thought-provoking and challenging, but no more. Many times, Hutchinson points to the fact that characters may be phylogenetic or parallel; this is indeed, of course of old, the crux. But his choice seems often to have been inspired by mere 'resemblance' as e.g. his remark under *Romanzoffia*

of the *Hydrophyllaceae* of which the leaves resemble some species of *Saxifragaceae*, leading to the remark that 'there is a strong possibility that a small part has come from the *Saxifragaceae*'. Such haphazard suggestions lack, I feel, all 'Theory'.

Being well aware of this he repeatedly states that 'this will sound heresy to others', for instance p. 573 where he denies affinity of *Araliaceae* with *Umbelliferae*, the first being woody, relating it to *Cunoniales*, the latter herbaceous, relating to Saxifragaceous stock. Likewise he maintains the idea of splitting *Oxalidaceae* into two families of which *Averrhoaceae* belong to *Lignosae*. In *Bignoniaceae*, of the *Lignosae*, he admits some herbaceous genera, which resemble a Gesneriaceous or Scrophulariaceous habit (p. 455), but explains that this apparent similarity is, 'to use an oft repeated hackneyed phrase in this book, due to parallelism or convergent evolution. That is my interpretation of it and the system more or less stands of falls by it throughout'. This is indeed the kernel of systematics, but in my opinion convergence should be sustained by facts, and the facts are against the explanation of relationships like *Araliaceae-Apiaceae*, *Oxalidaceae-Averrhoaceae*, *Ehretiaceae-Boraginaceae*, and *Capparidaceae-Cleomaceae* as convergent features. And, for example, to place *Cuscutaceae* in *Polemoniales* instead of *Solanales* with the *Convolvulaceae*, and to accept that *Myrsinaceae* and *Primulaceae* are not related. I do not believe that his division in *Herbacae* and *Lignosae* is tenable; families containing both woody and herbaceous plants are either diversified in this respect from their matrix, or in many cases the herbaceous groups are derived specialisations from the tropical woody stock. In passing it may be remarked that he does not split *Rubiaceae* (of the *Lignosae*) of which he simply says 'The habit is chiefly woody'; I have not counted them but there are really many herbaceous genera. Being so homogenous in characters he is, of course, incapable to make any reasonable splitting in this family.

The whether-or-not splitting of families is performed in a very personal way: *Helleboraceae* are distinguished next to *Ranunculaceae*, *Capparidaceae* are split into three, one of them new *(Oxystylideaceae)*, herbaceous *Saxifragaceae* are split into 6 small families, *Loganiaceae* also in 6, *Lecythidaceae* into 3, but nothing is said of *Rhizophoraceae*, the tribes of which are as distinct as in *Lecythidaceae*. He comments on this subject as follows (p. 565) 'This treatment may be regarded by some as splitting unduly, though it is often necessary that if a single tribe is removed from a large family, the other tribes may be just as distinct. Examples are *Rosaceae*, from which the tribe *Chrysobalanaceae* is treated by some as a separate family, though the other tribes are equally entitled to a similar status. The same may be said of the large family *Euphorbiaceae*, which could be split up into at least 12—15 families. I am not in favour of either of these families being so divided.'

This seems to me as a statement, not an argument. One argues: why is it necessary to remove one tribe if the others are equally distinct? It seems merely a very personal upgrading.

The background of this way of thinking is partly a confusion Hutchinson makes with the concept 'natural', as e.g. shown on p. 575, speaking on the family *Umbelliferae* which 'vies with *Gramineae*, *Compositae* and *Rubiaceae* being the most natural (homogeneous)', in which the concepts homogenous and natural are put as equivalent. This is a thinking error, as in any hierarchic system the higher echelons are by definition less homogeneous than the lower ones, but both may be equally natural in a taxonomic or phylogenetical sense. In passing it may be remarked that whereas *Compositae* are praised as belonging to the most natural, on p. 586 it is said that 'they may be in small part polyphyletic.'

Of course, Hutchinson is not much an admirer of the last edition of Engler's Syllabus, though in my opinion this provides a more generally acceptable system than his own. He does not conceal his feelings and produces sometimes lengthy citations and discussions, e.g. on p. 571 in casu *Sarraceniales*, p. 591 on the affinity of *Sphenoclea* — where Wagenitz is indeed incorrect — in an unnecessarily lengthy, blown-up comment, and pointed remarks on the position of *Ancistrocladaceae* and *Cucurbitaceae*, commenting that 'If the late Sir Winston Churchill had been a botanist instead of a world famous statesman he would surely have termed this and other groups in the Englerian system "taxonomic inexactitudes".' Such an inexactitude is surely made by Hutchinson in his incredible account of *Scyphostegia*, which he places next to *Celastraceae*, still maintaining that the ♀ flower is multicarpellate, although Van Heel has shown definitely that Hutchinson mistakes ovules for carpels (cf. Blumea 15, 1967, 107—125), a Donquichotian tenacity of clinging to an opinion based on an erronenous early observation.

A similar rather erratic or incoherent opinion is emerging on the status of genera. Commenting on *Mitella*, p. 568—569, he agrees with Rosendahl in rejecting Rydberg's splitting of it, but on the other hand suggests on p. 367 that the genus *Loranthus* must be retained with 500 spp. in the Old World tropics and subtropics. Being familiar with *Loranthoideae*, this is a remark reflecting complete ignorance of this group. It is quite true that Van Tieghem was a notorious splitter in this group, but Danser has brought excellent order; the genera he distinguished can meet any criticism and are sustained by both anatomy and embryology. The ignorance is shown furthermore by Hutchinson's remark that 'it is significant that the flowers of *Nuytsia* are bisexual', as if not almost all *Loranthoideae* possess bisexual flowers.

Hutchinson introduces in his explanation of taxonomic affinity a distinct tendency of explaining supposed evolution of families by rather anthropocentric concepts of usefulness, not seldom referring to ecological behaviour as the explanation. What does he mean when saying (p. 511) '*Fumariaceae* is a considerable

advancement on the *Papaveraceae*'? I find this a tendential way of declaring that in a comparative-morphological sense *Fumariaceae* are specialized in flower structure as compared with *Papaveraceae*. Of *Cruciferae* it is said (p. 521) that in *Cruciferae*, representing the final stage of reduction, 'the 4-dynamous stamens have become a fixed and apparently very efficient contrivance for successful pollination'. Is pollination in *Cleomaceae* than not successful? 'Progressive economy with nectar concealment and special dispersal-mechanism is very early evident in the family *Valerianaceae*'. Is 'economy' a concept and a way of thinking to fathom the way of evolution? The fallacy of incorporating so light-heartedly human concepts, no doubt as a consequence of exaggerating Darwinian ideas, led to errors. '*Casuarinaceae* is here regarded as an extreme reduction adapted mostly to dry climatic conditions' (p. 154). As derived from Dr Johnson's c.s. excellent research, primitive *Casuarina* is a constituent of the tropical rainforest, the development in Australia being distinctly secondary. Pitchers of *Marcgravia* are said (p. 288) to be transformed bracts 'which serve as landing places for humming birds. . .'. As far as I know humming birds need and use no landing places. It seems incredible to derive *Nepenthes* from the highly specialized *Cytinaceae* (p. 511). A mysterious tenacity to colour is claimed in *Compositae* to have prevailed from *Ranunculaceae* onwards (p. 611, 615) 'Most of the flowers in this tribe *(Verbesineae)* are yellow, a primitive colour (cf. *Ranunculus*), being little removed from green.' 'In considering the evolution of *Asteraceae* the colour of the flowers may be of considerable significance. Yellow is the basic colour of the *Heliantheae*, being little removed from green. Petals were first of all green or partly so and derived from green leaves in the most primitive flowering plants'.

Use of vegetative characters is not the strongest point in the book. In fig. 287 (p. 335) a picture is given of *Ceriops* and *Aegiceras*, according to the caption as an example that 'Some species of plants are so much alike in their habit and foliage that one may be easily be mistaken for the other when not in flower or fruit'. This may be true for a complete ignoramibus but not for a botanist, even a student: *Ceriops* has decussate leaves with large caducous stipules leaving large scars, *Aegiceras* having spirally arranged exstipular leaves; *Casearia* and *Glochidion* might have been a better example. To argue that *Hypericaceae* are better kept separate from *Guttiferae sens. str.* because the first have translucent dots and the latter have such characteristically 'worm-like secretory canals' is not in agreement with the facts; *Kayea*, *Mammea*, etc. of *Guttiferae* possess only pellucid dots, precisely as in *Hypericaceae*. His warning to beginners fresh from college not to accept authority or immature judgement to accept *Guttiferae sens. lat.* gave me a good laugh. There is no urgent reason to separate these families. *Afrostyrax* is still maintained (p. 118) in *Styracaceae* instead of affiliating this with *Malvales*, probably *Sterculiaceae*; its stipules make inclusion in *Styracaceae* impossible.

In conclusion, I must state unfortunately that with due respect for the enormous production of works of Hutchinson, I am neither much impressed with the text, and still less so with the 'theory'. The publication of the plates of a large number of unusual plants (*Canacomyrica* and *Oceanopapaver* are unfortunately ignored), the chief purpose of the book, is its chief merit; the extraordinary variation in the fruit of *Cruciferae*, *Leguminosae*, and *Umbelliferae* is extremely instructive, possibly not of evolution but of form explosion 'working in a mysterious way' (p. 525) on a simple theme.

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