

deals fully with the celebrated Hantzsch-Bamberger controversy, which was maintained for several years. The author has himself formulated a theory of the constitution of diazonium salts which, with a modification suggested by the reviewer, is sufficiently elastic to account for the properties of aromatic diazo-compounds and also for the existence of a rapidly increasing group of heterocyclic and non-aromatic diazo-derivatives. A new chapter on the latter group has been added to this second edition of a unique monograph.

G. T. M.

Ancestral Studies of Compositæ.

The Origin and Development of the Compositæ: Thesis approved for the Degree of Doctor of Science in the University of London. By Dr. James Small. (*New Phytologist* Reprint, No. 11.) Pp. xi+334+6 plates. (London: William Wesley and Son, 1919.) Price 15s. net.

THERE is perhaps a tendency among systematic botanists to fight shy of the Compositæ, on account largely of the enormous size of the family and the difficulties of properly classifying its members. Those, however, who once succeed in passing these lions in the path soon become enthusiastic students of the group, and Dr. Small is no exception to this rule. His contribution to the investigation of the origin and development of the family is by far the most important that has appeared for many years.

After a general discussion of previous literature, in which the most important names are those of Cassini and Bentham, the author goes on to deal with the various morphological and ecological features of the family one by one, considering, for example, the pollen-presentation mechanism, the corolla, the pappus, the involucre, the receptacle, the phyllotaxis, and the fruit dispersal. From all of these, similar general conclusions are drawn, to the effect that the Senecioneæ are the most primitive type of the family, and that from them, directly or indirectly, and ultimately from Senecio itself, as the basal genus from which the Senecioneæ arose, there sprang all the other tribes and genera of the family. This is then very strikingly confirmed by a study of the geographical distribution, which shows what would be expected upon this theory of mutational origin, and upon the hypothesis of age and area, which is likewise adopted. It is shown that the distribution of Senecio (the oldest genus) is the widest of all, and that of other tribes and genera less and less in proportion to their lesser age.

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Senecio is supposed (and the evidence is fairly clear) to have arisen from the Siphocampylus group of Lobelioideæ, and probably in the Bolivian highlands after the upheaval in the Cretaceous period had provided available land above the limit of trees. Once formed, its pappus fruit and the great area of open land available in the mountain chains which with few breaks run all round the world enabled it to spread rapidly over America, Asia, Africa, and Europe.

In the final chapter an interesting sketch is given of an hypothetical evolution of the Compositæ from Senecio, based upon the various conclusions drawn in the course of the work, summed up largely in a diagram on p. 297, which illustrates this evolution in time and space. The second great genus to evolve is supposed to have been Gnaphalium (from which the Inuleæ are descended), then Spilanthes (Heliantheæ), Solidago (Eupatorieæ and Astereæ), and so on. The whole is a striking and interesting illustration of the way in which our whole outlook upon phylogeny has been altered by the acceptance of the modern theories of evolution and geographical distribution.

In the course of the work many minor points are further elucidated, such as irritability in the pollen-presentation mechanism. Good reasons are brought forward for supposing the pappus to be of trichome nature, and by an ingenious mechanism the dispersal of the seed was studied, and it was shown that a very slight wind was sufficient to keep the seeds aloft in sufficiently dry air, so that there is no need for land bridges to explain the distribution. Many other points are also dealt with, for which reference must be made to the original.

Our Bookshelf.

Monarch: The Big Bear of Tallac. By Ernest Thompson Seton. Pp. 215. (London: Constable and Co., Ltd., 1920.) Price 7s. 6d. net.

THIS is a composite picture of a grizzly bear, or, more exactly, the personality of one remarkable bear still living in prison has been credited with the adventures of several of his kind. Beginning with the growth and education of the cub, the book tells the story of many ups and downs, such as the first sheep-stealing, the escape from the forest fire, the circumvention of the hunters; the affair of the ten-gallon empty sugar-keg with the delicious smell, into which the bear thrust his head; and the final capture (by means of drugged honey) of an adventurer with many aliases. Mr. Thompson Seton is a fine raconteur, but we wish he had put a little more stuffing into the book; and his literary facility sometimes gets