

REVIEWS

Gray's Manual of Botany, Eighth (Centennial) Edition—Illustrated.

A handbook of the flowering plants and ferns of the Central and North-eastern United States and adjacent Canada. Largely rewritten and expanded by MERRITT LYNDON FERNALD, with assistance of specialists in some groups. Pp. lxiv+1632, ff. 1806, pl. iii. New York: American Book Company, 1950; U.S. \$9.50.

The title of this book conceals its greatness and its importance for botanists in all North Temperate regions. Far from being merely a new edition of an old and honoured book, it is, in fact, a new flora and almost the perfect flora of the taxonomist's dream. This is because it is the work of the one man who was supremely competent to undertake it. Prof. Fernald, who died just after the book appeared, had been for many years the leading botanist in Eastern North America and combined, with tireless energy and equal distinction, the three rôles of herbarium systematist, field collector and plant geographer. This is a rare combination, and when its author enthusiastically devotes his time to assembling such vast knowledge in one great descriptive flora, the result is not merely a happy one, it is a unique masterpiece of its kind and a benefaction to the scientific world.

The area treated in the first edition of Asa Gray's *Manual* was altered from time to time by Gray and his successors until, in the seventh edition prepared in 1908 by Prof. Fernald himself in collaboration with Prof. B. L. Robinson, it extended from Prince Edward Island and northern New Brunswick to south-western Ontario in Canada, and covered the north-eastern States from New England to Virginia and Kentucky, the western limit following the western boundary of Minnesota and Iowa and thence southward along the 96th meridian so as to take in easternmost Nebraska and Kansas. For this centennial edition Prof. Fernald added Eastern Quebec Province and Newfoundland, because of their extraordinary phytogeographic interest and the many remarkable discoveries of relict species he had made there. It seems unfortunate that no map defining this area is to be found anywhere in the book.

That omission, however, is perhaps characteristic. True to its title, this book is unashamedly devoted to pure systematics, and, after 11 pages of preface, plunges straight into the synopsis of the orders and families of the vascular plants, without any phytogeographic survey or essays on geology and climate. The "new taxonomist", then, will not expect to find indications of life-forms or chromosome numbers of species, but he will get his "alpha taxonomy" in unsurpassed quality. The synopsis is followed by an artificial key to the families and a statistical summary of them, and then comes the descriptive flora in the order of Engler and Prantl's system. The book ends with a glossary and indices to Latin and colloquial names.

The exceptional merits of Prof. Fernald's work are to be found in his descriptions and keys, with their numerous italicised and contrast-

ing characters and the constant use of measurements. Surely there have never been, in any previous flora, such carefully considered descriptions and keys: they bear the marks of the finest monographic studies and could have been prepared only by a taxonomist of the highest order and the longest experience of such methods. In many instances keys are also given for infraspecific groups. There is nothing vague about these keys, and they will be just as helpful to students and amateurs as to professional botanists.

Other features of the work are the very numerous small text-figures, especially useful in the critical genera, the explanations of the meanings or sources of the generic names, the English equivalents of the Latin epithets, the accentuation of names as an aid to pronunciation, and the concise definitions of habitat, distribution and flowering period. Prof. Fernald's varieties occupy a somewhat segregated geographic area, while his forms correspond more nearly to the varieties of most British botanists. He also recognises certain geographic subspecies. No less than 8340 "taxa" are treated in the work, the total of the species being 5523. The six largest families are the *Compositae* (with 703 species), *Rosaceae* (551), *Gramineae* (487), *Cyperaceae* (473), *Leguminosae* (237) and *Scrophulariaceae* (152). Among the larger genera are *Carex* (with 267 species), *Rubus* (205), *Crataegus* (103), *Panicum* (76), *Solidago* (75), *Aster* (68), *Juncus* (56), *Salix* (54), *Viola* (51), *Polygonum* (46), *Eleocharis* and *Cyperus* (40 each), *Potamogeton* (37), *Ranunculus* (36) and *Antennaria* (32). In a few instances, e.g. *Crataegus*, the accounts were contributed by specialists. Prof. Fernald himself took a broad view of generic limits, while he has taken a firm line here with species in some large critical genera such as *Rosa*, *Rubus*, *Taraxacum* and *Hieracium*.

The Manual is important for British botanists and plant geographers, not only because so many of our species and critical allies of them occur as natives in the area covered by it, but also because nearly 1100 of the species described have been introduced into this area from Europe. We now have the advantage of seeing how the names and characters of many of our species and varieties have been reconsidered and weighed by this master mind across the Atlantic, and distilled into keys which we have not seen equalled in European books. Quite often Prof. Fernald's decisions run counter to the treatments to which we are accustomed here, and the rest of this notice may aptly be devoted to some examples of these and of other unusual statements with a bearing on British botany.

In the Ferns, the name *Dryopteris disjuncta* (Ledeb.) Morton is accepted for the Oak Fern. In the Grasses, the genus *Helictotrichon* is not recognised (for *Avena pubescens*), and Dr. Philipson's paper on *Agrostis* has not been used. *Carex lepidocarpa* Tausch is strangely described as glaucous: is it, then, identical in North America with our plant? Of *C. microglochis* the author says, "A very primitive and ancient species, transitional to the subantarctic genus *Uncinia*." *Juncus conglomeratus* is treated as a variety of *J. effusus*, with the

remark, "With us the differential characters not so clear." *Betula alba* L. is adopted in the sense of *B. pubescens* Ehrh. *Polygonum lapathifolium* L. is given only pink or purplish spikes and its typical form is made to include *P. nodosum* Pers., while *P. dubium* Stein is used for our *P. mite* which is said not to be the plant of Persoon. The author's complete rejection of Aellen's work on *Chenopodium* will surprise European botanists, and he wrongly uses the name *C. graveolens* Lag. et Rodr. in the sense of *C. incisum* Poir. *Atriplex hastata* and *littoralis* are kept as varieties of *A. patula*, while *Salsola pestifera* returns to varietal status as *S. Kali* var. *tenuifolia* Tausch. In *Caryophyllaceae*, *Spergularia marina* (L.) Griseb. is used instead of *S. salina*, and *S. media* (L.) C. Presl instead of *S. marginata*; more interesting is the reduction, with an excellent description, of *Arenaria leptoclados* to varietal rank (as var. *tenuior* M. et K.) under *A. serpyllifolia*. In *Cruciferae*, *Brassica Rapa* and *B. Napus* are used in opposite senses to those current here; one wonders whether the author's application of the name var. *microphyllum* (Boenn.) Thell. of *Nasturtium officinale* is the same as ours, since he does not mention the seed character. *Potentilla anglica* Laicharding, an old name not yet listed in the *Index Kewensis*, antedates our *P. procumbens* Sibth. The nomenclature of some of the species of *Alchemilla* will be criticised here, as may the use of the name *Rosa Eglanteria* for *R. rubiginosa* and of *Dipsacus Fullonum* L. for the Fuller's Teazle. In *Leguminosae*, there is a good account of *Vicia* in which *V. villosa* and *V. dasycarpa* are kept distinct but *V. tenuifolia* is treated as a variety of *V. Cracca*; while, in *Medicago*, var. *glandulosa* Neilr. is adopted for the glandular form of *M. lupulina* instead of the familiar var. *Willdenowiana* Koch. The treatment of *Oxalis* must be examined here, since a polymorphic species *O. europaea* Jord. is admitted as well as the related *O. corniculata* and *O. stricta*. It is disappointing, if not surprising, to find *Euphorbia virgata* included without comment in *E. Esula*!

Rhamnus Frangula is "recently and very rapidly spreading; likely to become obnoxious." *Oenothera Lamarckiana* is included in *Oe. grandiflora* Ait. The tuberous-thickened rhizome is used to distinguish *Circaea alpina* from *C. canadensis* but will not, I suspect, prove a very reliable character. *Myriophyllum alterniflorum* var. *americanum* Pugsley is described as "the clones with smallest leaves." E. H. L. Krause, not Druce (as on p. 1157), was the first author of the combination *Centaureum pulchellum*. The varieties of *Calystegia sepium* are distinguished mainly by characters taken from the leaves. *Stachys palustris* is divided into two geographic (but unnamed) subspecies, each with several varieties; yet *Calamintha Nepeta* and *C. nepetoides*, which have a long European tradition as good species, are reduced to varieties of *Satureja Calamintha*. In *Veronica* somewhat heterodox sepal characters, which we must test, are used for distinguishing *V. agrestis* and *V. polita*; while others, equally unfamiliar to us, are seen in the key to *Rhinanthus*. It is strange to find that the common name for

Valeriana officinalis is "Garden Heliotrope." In the *Compositae*, *Carduus acanthoides* L. and *C. crispus* L. are carefully distinguished, and the varieties of *Cirsium arvense* are excellently described under their correct names, but Prof. Fernald's *Arctium nemorosum* Lej. et Court. is "a mixed series" covering *A. vulgare* Evans and probably including *A. pubens* Bab., and he has surely misinterpreted *Hieracium brunneocroceum* Pugsl. when he merges it in *H. aurantiacum* L. as "colonies with broadest [*sic!*] leaves, quite inseparable with us."

These examples will be enough, I think, to whet the appetite of British botanists and persuade them to purchase or at least borrow this wonderful book, which will broaden their outlook on their own flora by its revelation of parallel developments in the North Temperate regions of the American continent. N. Y. SANDWICH.

Le Valois: Phytosociologie et Phytogéographie. Paul Jovet. 8vo, pp. 389, with 66 figures, 79 tables, 28 maps and 20 photographs. Paris: Société d'Édition d'Enseignement Supérieur, 1949; francs 1,500.

British field botanists have so long been familiar with accounts of their local floras based on the traditional systematic treatment that there is a danger that they may overlook alternative methods of presentation. The works of Crampton, 1911, *The Vegetation of Caithness . . .*, and Moss, 1913, *The Vegetation of the Peak District*, were valuable in introducing the ecological approach, but they made no attempt to include material of the kind associated with our conventional local floras—and there has been no attempt to combine the two methods in this country since. To a considerable extent this has been achieved by M. Jovet for the part of France selected for his book. While his approach is ecological, he has incorporated a history of botanical research in his area, and he shows that he is well acquainted with past records, distribution and taxonomy. It cannot be claimed that the result supersedes our own method for all purposes, but it does merit close examination by workers producing local floras in this country and it affords an excellent opportunity of comparing our own flora with that of an area just across the English Channel.

Le Valois is an ancient jurisdiction of France, well known as having given its name to a line of French kings, and now divided between the *départements* of Oise and Aisne. As defined by M. Jovet for the purposes of his book, it is bounded approximately by the R. Oise and its tributaries and by tributaries of the R. Marne. Although only 34 km. N.E. of Paris at its nearest point, it is little known to English tourists. Including a wide range of habitats on acid and basic soils, it presents fascinating opportunities for comparative studies, of which the author has taken full advantage.

The classification of the vegetation is based on the Braun-Blanquet system but with considerable modification. Whereas the use of this system in several continental countries has been far too rigid to reflect the facts observed in the field, M. Jovet's classification is more closely

based on nature. As a result he recognises various small well-defined communities which will be familiar to field botanists in this country but which I do not remember seeing mentioned in other works on ecology. An example of this is the account of his *Caricetum strigosae* (pp. 158-164) which so strongly recalls the flora of parts of Kentish and Surrey woods below the North Downs. Other communities will be of particular interest to botanists familiar with Breckland, which offers interesting comparisons with the siliceous-calcareous areas of Le Valois.

Features of the ecological treatment are the excellent transects, which include drawings of the underground systems of the plants, and the tables showing the range of *pH* tolerance for a large number of species. The latter show surprisingly low limits for some species regarded as calcicoles in this country—for example, *Potentilla verna*, *Veronica spicata* and *Euphorbia Cyparissias* as all given (on p. 123) with about *pH* 5.5 as a lower limit.

The classification of vegetation is carried to its logical conclusion with a long chapter on "*Vegetation anthropique*" and here there is much to interest English workers. The weeds of flax fields (p. 239), the flora of railways (p. 246), and the plants of walls (p. 246 *seq.*), are examples of the thoroughness with which the flora has been accounted for. Elsewhere in the book the associates of *Euphorbia Cyparissias* may help to throw light on its status in Britain, while our alien *Festuca heterophylla* is characteristic of one type of Beech-Hornbeam-Oakwood (p. 196), *Senecio viscosus*, as with us, spreads along railways (p. 337), *Juncus tenuis* is associated with *Cicendia filiformis* and *Radiola linoides* (p. 92)—the pages are crowded with similar ecological observations.

Over a quarter of the book is devoted to a study of the present distribution of the flora, and an attempt to explain it by comparison with adjacent areas and from geological and recent history. The occurrences of about 120 species are plotted on maps. There is an interesting discussion of the causes which lead to plants becoming extinct or reduced in quantity—collectors are blamed for the reduction of *Ranunculus Questieri* which is known only from Le Valois. The records of earlier workers, and especially those in the 118 notebooks of the Abbé Questier, compiled from 1843 to 1877, are cited to indicate increases and decreases in frequencies. Contrary to our experience in Britain, *Cynoglossum montanum* is now more frequent than it was about a century ago (p. 337). *Erigeron canadensis* was recorded in 1655, and *Elodea canadensis* in 1868, while *Matricaria matricarioides* tends to replace other *Matricarias*, as with us (p. 339) [the names quoted are those in current use in Britain]. The map showing the distribution of *Coronilla varia* (p. 338) indicates that this, with some other species, is confined to the vicinity of railways.

The book concludes with an excellent bibliography and detailed lists of illustrations and contents, and it is to be regretted that there is no index. *Le Valois* may be strongly recommended to English botanists as a volume packed with information and ideas; one cannot help wishing that we had accounts of a few British areas on similar lines.

J. E. LOUSLEY.