Europe, Central Europe, Mediterranean Europe, and Eastern Europe, placing in the last of them only European Russia. Although in general Gottmann's subdivisions of the continent correspond quite closely to those of the masterful *Géographie Universelle* series, to which he recognizes his indebtedness, this reviewer sees little point in placing Rumania and Bulgaria in two separate regions, or in detaching the treatment of Finland completely from that of Scandinavia, with which it has so many obvious affinities. In view of the present availability of textbooks on the geography of the entire USSR, it appears rather unnecessary to perpetuate the fiction of a boundary at the Urals by including a treatment of European Russia.

The chapters on individual countries are well written, with a fine balance between physical considerations (landforms, climate, soil, etc.) and human factors such as population density, economic development, and political experience. France and Scandinavia are particularly well handled. There are occasional lapses into loose writing. Without defining terms it is confusing to write that "in Stockholm winter lasts 121 days, spring 57, summer 124, and autumn 63" (p. 122). It is incorrect to describe Luxembourg as being located "in the heart of the Ardennes Plateau" when only about one-third of the territory and probably not one-tenth of the population of the Grand Duchy live in the area of Paleozoic bedrock (p. 246). A few misprints were noted which can easily be corrected in later printings. The photographs are excellent, and good use has been made of numerous maps originally published in the *Geographical Review*.

RALPH E. OLSON

Department of Geography
University of Oklahoma

Gray's Manual of Botany: A Handbook of the Flowering Plants and Ferns of the Central and Northeastern United States and Adjacent Canada. 8th ed. Revised by Merritt Lyndon Fernald. New York: American Book, 1950. 1,632 pp. $9.50.

This new centennial edition follows the first after an interval of 102 years, and the preceding seventh edition after 42 years. The last edition actually prepared by Asa Gray was the fifth (1867). Since then the successive copyrights have been held by the president and fellows of Harvard College, and the revisions have been primarily the work of the staff of the Gray Herbarium. Needless to say, the changes have been so extensive that each of the last three editions has been essentially a new work, although retaining some features of its predecessor.

M. L. Fernald, who largely revised this edition, had already put the indelible mark of his personality into the seventh, which was the joint effort of himself and his colleague B. L. Robinson. It was Fernald who had the zeal and physical aptitude for field work which resulted in important botanical explorations of Quebec and Newfoundland and the extension of the range covered by the seventh edition of the *Manual* northward to cover the area below the Straits of Belle Isle and from Anticosti Island westward along the 49th parallel in Quebec to the northwestern corner of Minnesota. Southward from that point the "Gray's Manual region," unchanged since the former edition, follows the western boundaries of Minnesota and Iowa and then the 96th meridian. The southern boundary, likewise unchanged, follows the southern boundaries of Virginia, Kentucky, Missouri, and eastern Kansas. Nebraska and Kansas are thus the only states whose floras are but partially covered.

Although Fernald devoted almost all his energy to botanical exploration of the "Manual" area and revision of the *Manual* in the 42 years after the seventh edition, he had the help of some 400 collaborators, whose problems and questions all had to be to a high degree satisfied by his conclusions. Probably no botanical systematist has ever before gone so far in satisfying so many active finders of deficiencies and faults in a standard flora! Fernald has been an inspiring leader, and during four decades botanists of the "Manual" region have looked forward to "the new Gray" as though it would be oracular. There was a constant outpouring all this time of from one to several articles a month from Fernald's pen, mostly in *Rhodora*, the journal of the New England Botanical Club, of which he became the editor after Robinson's death, so that it came to be one of the most highly personalized of scientific journals, in an era in which most editors have deemed it scandalous to reveal any personality at all. *Rhodora* indicated, as the years went by, more and more of what would eventually be summarized in the *Manual*.

Fernald sought places for his own field work where there were the best chances of significant discoveries, and where workers were few. At first his efforts were devoted largely to Gaspé and Newfoundland. Having stimulated local zeal in further development of floristic knowledge of the northern border, he turned to the coastal plain of Virginia, and made a multitude of interesting discoveries. Moreover, he was ever ready for a trip to some neglected place within a short distance of Cambridge and even there he often found something that others had overlooked. When his eyes became impaired there was general lamentation, and fears were expressed that perhaps the *Manual* would become a casualty, but with the loyal aid of Bernice G. Schubert he valiantly pushed it along to a conclusion.

The *Manual* carries on the old tradition of recognizing many systematic entities as varieties and forms. Fernald did not follow the recent tendency either to consider everything as a species if it could be distinguished at all, or to require that every distinguished subspecific entity have a distinctive geographic range. Although he was ever a keen student of geographic distribution, he showed little regard for "life-zones," which in practice cannot be usefully defined or delimited.

Fernald likewise had no use for spurious common names, made by translating scientific names into English, and had the courage of his convictions in refusing to use them. The furtherance of "standardized plant names" gets no encouragement from the new *Manual*. To be recognized, common names must somewhere belong to common language. Fernald was, however, a critical student of real vernacular names, as is evidenced in the

Manual by his careful introduction of Canadian-French popular names for species that range into the French-speaking part of Canada. The utterly absurd run-together names which certain pedants seek to force upon us (Fernald gives "treeofheaven" as an example) have no acceptance. Those who like such pedantry as "standardized common names" won't like the new *Manual* any better than the old.

Another adherence to good tradition that will irk the strictly up to date among us is the retention of capital letters in spelling the second word of certain binomials, as, for instance, for substantives in apposition. All in all, Fernald has set himself against thoughtless fads and innovations, which have been largely adopted in imitation of the zoologists, and has held fast that which is good. In matters of Latinity he has had the advice of an incomparable classicist and able botanist, A. S. Pease, of Harvard.

It is interesting to see what has been done with notoriously difficult groups. Fernald has replaced the treatment of grasses, contributed to the former edition by A. S. Hitchcock, by one of his own, more concordant with past *Manual* usage in the reduction to varietal status of many entities which Hitchcock would have maintained as species or neglected entirely. In spite of the application of this policy in the reduction of species to varieties in the difficult genus *Panicum*, new specific proposals and extensions of range increase the number of species from 73 in the seventh edition to 76 in the eighth, and many additional varieties are accounted for. This is just one example of the amazing expansion of the present work from the 4,885 named entities of its predecessor to 8,340.

It was, of course, C. S. Sargent at Harvard who initiated the vast increase in species of Crataegus. The Gray Herbarium, however, remained aloof while the stampede of naming went on at the Arnold Arboretum. When the genus had to be covered for the seventh edition, the job was done by an outsider, the late W. W. Eggleston, of the Bureau of Plant Industry. The disregard of Crataegus at the Gray Herbarium remained the same when the present edition was prepared, and, in Fernald's words, we are presented with "a treatment of the intricate genus Crataegus prepared by the only student who professes to understand it, Ernest Jesse Palmer," of the Arnold Arboretum. Crataegus has been increased from the 65 species recognized by Eggleston to 103 that are considered to be properly attested, together with a large group of others which are only tentatively admitted as "trees or shrubs of very limited occurrence or of suspected hybrid origin." The latter are interpolated where they appear to belong, systematically, but without numbers, and are not taken into account in the keys. Students of local floras wishing to contribute to a clarification of the systematics of Crataegus will do well to compare Palmer's *Manual* treatment with his "Synopsis" of North American Crataegi in Vol. VI of the *Journal of the Arnold Arboretum*. In view of the uncertainties regarding the true geographic ranges of the Crataegi, knowledge of the type localities, given in the "Synopsis" but not in the *Manual*, is very useful indeed.

Turning to Rubus, a prime puzzle to European systematists for generations, but only seriously engaging the attention of American botanists during the past 50 years, we find a vastly expanded revision, in which Fernald considers that he has been too liberal in acceptance of numerous propositions of L. H. Bailey. Here the admitted species are 119 as contrasted with 38, and still others are refused recognition which have as good claim to admission as some that have been accepted. It will be interesting to see how workable the new treatment will prove to be in years to come.

Many other "critical" genera have been interestingly dealt with, but lack of space forbids mention of them all. No one, however, will expect the present reviewer to fail to refer to the treatment of *Oenothera biennis* and its allies. Here Fernald frankly gave up the task of attempting to bring order out of chaos, and the trouble was not that too little was known of the group, but, rather, too much. The findings of geneticists have been largely disregarded by the systematists, and vice versa, although R. R. Gates and others have tried to make some application of genetic findings to classification. Efforts that have been made, however, have not been at all effective. To quote Fernald, we deal with "A hopelessly confused and freely hybridizing group, early introduced into Europe, and there cultivated, and, like other plants of the garden, intermixed; then spreading to waste or open ground. The types of several species, described from European material, not wholly clarified; and further confusion added by the publication of many scores of 'mutants' or 'elementary species' as true 'species.' . . . These, for the most part, not specially considered here."

Of course Oenothera is *not* apomictic, and is comparable in this respect to Taraxacum, as Fernald implied, but quite the contrary. The very large-flowered types of the subgenus Onaga freely hybridize. Fernald unites those of the East (excepting *Oe. argillicola*) as *Oe. biennis* var. *grandiflora*, disregarding the laborious experiments of B. M. Davis in which there was failure in the effort to simulate *Oe. Lamarckiana* closely by crosses into which *Oe. grandiflora* entered as a parent. Utter submergence of *Oe. Lamarckiana* as a synonym of what is conceived of as a variety is indeed a drastic and summary way to dispose of the experimental background of De Vries' mutation theory! It would have been more realistic and more in accord with the attitude adopted in dealing with Rubus, Antennaria, Crataegus, Panicum, Viola, and other difficult groups if a number of representative types which experimentation has shown to exist in nature had been recognized. The treatment in the new *Manual* is little changed from that of its predecessor. Perhaps Cleland's general review of Oenothera genetics, which is now being looked forward to, will present cytogenetic findings clearly enough so that systematists can profit by them. If so, Fernald's withdrawal from the problem may have been the wisest course.

It is not to be expected of such a vast labor of revision as the total *Manual* that in each detail it will satisfy everyone. On the whole, however, it is a highly satisfactory and noble achievement, the culmination of a lifetime devoted to the reinterpretation of our flora, as largely on the basis of zealous personal field work as half

a century would permit. We are entering a period in which the experimental investigations of geneticists, cytologists, and biochemists are coming to have more and more bearing upon classification, and it will soon be impossible for one botanist to have critical firsthand knowledge of so large a flora as Fernald had. His book will be a lasting landmark in the botanical history of our region, and it is a source of deep satisfaction to his devoted botanical following that he lived to see it in print.

H. H. BARTLETT

Botanical Gardens
University of Michigan

Biological Actions of Sex Hormones. Rev. 2nd ed. Harold Burrows. New York: Cambridge Univ. Press, 1949. 615 pp. $8.50.

The rapid and continuous progress made by investigators in endocrinology has caused many books in this field to become out-of-date shortly after publication. Consequently, prompt revision is not only an ideal goal but a definite necessity. The second edition of *Biological Actions of Sex Hormones* has been revised and enlarged by approximately 100 pages since it first appeared in 1945. Thus, within a matter of four years the advances in our knowledge of sex hormones has led Burrows to expand his book by approximately 20 per cent.

As with the first edition, this volume includes an excellent bibliography, which has been enlarged to 3,000 references. This alone would make the book a "must" for students of the sex hormones. Dr. Burrows has retained the general form and organization of the first volume. The book is divided into six parts, each part containing one to ten chapters. In Part I the author discusses the gonadotrophins, their action, factors influencing their release, etc. In Part II a general consideration of the gonadal hormones is given as an introduction to the main portion of the text. The remaining sections are devoted to consideration of the sex steroids and their actions. The book is well written, reads smoothly, and the text is generously interspersed with tables, which add greatly to its value. There is, however, little attempt at interpretation and correlation of the facts, and a critical evaluation of the reported data would greatly enhance the book's value.

Reference to relaxin is included for the first time, but it is to be regretted that its role as a possible hormone of pregnancy (at least in some species, such as the guinea pig and mouse) was not stressed. Nomenclature is always a sensitive item with scientists, and the coining of new words is to be lamented when others are in universal usage. The use of FRH for FSH merely clutters up the field. A number of minor errors of commission and omission are to be found, but they are amazingly few. For example, the author fails to point out that adrenal hypertrophy does not always occur after estrogen treatment but seems to be dependent on the age of the animal. More space could be given to vitamin-hormone relationship, especially the role of folic acid.

A major criticism of this volume is the failure of the author to summarize the available data into working hypotheses for such phenomena as menstruation, estrous cycle, ovulation, pregnancy, lactation, etc. Thus, the subject of the interaction of all the hormones in the physiology of reproduction is not treated as such. In spite of this major criticism the second edition of *Biological Actions of Sex Hormones* is well on its way to becoming a standard reference book for students and investigators of the physiology of the sex hormones. It contains a wealth of well-annotated experimental data and it should be of great value to all students beginning their investigations on the sex steroids. It is to be hoped that the author will see fit to revise his book often. Failure to revise Allen's *Sex and Internal Secretions* since 1939 has made Burrows' book one of the major up-to-date works in this field.

M. X. ZARROW

Division of Zoology
Purdue University

Scientific Book Register

Researches on Fungi: The Sexual Process in the Uredinales, Vol. VII. A. H. Reginald Buller. Toronto, Canada: Univ. Toronto Press; London, Engl.: Geoffrey Cumberlege, Oxford Univ. Press, 1950. 458 pp. $13.50.

Renal Function. Transactions of the First Conference, October 20–21, 1949. Stanley E. Bradley, Ed. New York: Josiah Macy, Jr. Foundation, 1950. 172 pp. $2.50.

Wave Theory of Aberrations. H. H. Hopkins. New York: Oxford Univ. Press, 1950. 169 pp. $3.00.

Emotions and Clinical Medicine. Stanley Cobb. New York: Norton, 1950. 243 pp. $3.00.

Photons and Electrons. K. H. Spring. London: Methuen; New York: Wiley, 1950. 108 pp. $1.75.

Experiments in Physical Chemistry. Otto F. Steinbach and Cecil V. King. New York: American Book, 1950. 250 pp. $3.50.

Encyclopédie Entomologique: La Biologie des Diptères, Vol. XXVI. E. Séguy. Paris, France: Paul Lechevalier, 1950. 609 pp. 4,000 fr.

Unit Operations. George Granger Brown, *et al.* New York: Wiley; London: Chapman & Hall, 1950. 611 pp. $7.50.

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Some Applications of Statistics to Archaeology. Service des Antiquités de l'Egypte. Oliver H. Myers. Cairo, Egypt: Government Press, 1950. 37 pp. and 19 figs. Under 25/–.

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