of the book. To give an example, in the chapter on evolution, which occupies twenty-nine pages, the following topics are considered: meaning of the term evolution, morphological resemblances among animals, homologous organs, analogous organs, vestigial organs, physiological resemblances among organisms, chemical resemblances, use of precipitins in determining relationship, similar parasites on similar hosts, embryological resemblances, fossils, methods of determining geological time, the eras of geological time, the formative era of the earth, life in the Archeozoic, Proterozoic, Paleozoic, Mesozoic and Cenozoic times, geographical distribution of organisms, Lamarck and the inheritance of acquired characters, Darwin and natural selection, artificial selection, types of genic and chromosomal mutations, the role of mutation in species formation, role of isolation in speciation, induction of mutations with radiations, a summary of the factors in evolution, the origin of living matter, the organization of living matter into cells, the direction of evolution and the place of evolution in modern thought. With reference to the latter it is asserted that the concept of evolution and the law of gravitation are "probably the loftiest conceptions of which the human mind is capable."

The treatment of physiology seems wholly inadequate for a biology course given to-day. The use of a seed plant to introduce organisms might be questioned. With this as a basis it seems doubtful that the full value of the chapters following, which discuss digestion and metabolism, would be gained.

The illustrations are excellent.

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FLORA OF ILLINOIS

Flora of Illinois, containing keys for the identification of the following plants and ferns. By GEORGE NEVILLE JONES. 317 pp. 2 maps. Notre Dame, Ind.: (Am. Midl. Nat. Monogr. No. 2). 1945. $4.00.

THIS book, second of a series edited by Theodor Just, is an annotated key to the higher plants of Illinois. We may hope it is the precursor of a detailed manual such as that for Indiana by C. C. Deam. Meanwhile, it is a most useful working guide to plants of a state which has never had a plant list both comprehensive and generally accessible. The present enumeration comprises 2,124 species in 716 genera and 152 families.

The introduction includes a description of flora and vegetation, with short lists of plants characteristic of the eight geographic divisions recognized. Boundaries of these divisions are superposed on the map showing forest and prairie (the former shaded), prepared by C. J. Telford in 1926. The second map locates and identifies counties. Pages 8–31 are occupied by the keys to families, arranged according to growth-form in 19 sections. The body of the book (to p. 272) is the annotated key to genera and species. A ten-page glossary, a selected bibliography of 51 titles on botany of Illinois, a detailed bibliography of over 400 taxonomic monographs and revisions of particular families and genera, an author index to these works and an index of plant names complete the book.

In addition to the taxonomic characters, items of information of other kinds are inserted in the key. These items include for every species its distribution and its habitats in Illinois; there is usually also some statement of its degree of abundance. Synonyms are given where they may be useful to non-systematist users of the book, *e.g.,* for a species long known under a recently rejected name. Common names are given for those species that really have them. The months of flowering are given for most plants; and for any species not native, its source. For those rare species whose present or past occurrence in Illinois could be questioned, locality and collector of one or more authentic specimens are cited, often with year or collection number. This plan of inserting other information in the key itself makes possible a compact arrangement which keeps down the size of the book. As a possibly extreme example, the family *Lobeliaceae* is treated in three inches of type: 7 species in 1 genus in less than half a page.

The reviewer is not qualified to pronounce upon accuracy of taxonomic judgments made nor validity of names used. He has some reason to believe that in these respects the work is of the same high quality that marks the rest of it, and that the keys are workable.

The extreme brevity of treatment is attained at a cost: many of the annotations are not sufficiently explicit or definite. This lack seems most serious in designating habitats. To illustrate, habitat notes are quoted for a few particular species, followed in each instance by a substitute note as it might appear in a revised edition. *Bouteloua curtipendula,* "prairie soil"—hill prairies and sandstone cliff-tops; *Populus grandidentata,* "river banks"—forested bluffs and ravine-slopes; *Psoralea tenuiflora,* "dry soil"—drier western prairies, especially of loess bluffs; *Taenidia integerrima,* "woods and thickets"—uually eroding clay bluffs or bare soil. Some of the habitat designations may be expanded by inference; thus "roadsides" may be taken to mean surviving remnants of less-disturbed vegetation: prairie or herbaceous

ground-cover of open forest lands. But it may instead mean weedy vegetation of trampled roadsides, as it does with *Aristida dichotoma*. Field experience usually enables the user to decide which meaning to read into a statement.

Very few species known to occur in Illinois have failed to be included. Dr. Jones's criterion for admission was his own examination of a valid specimen. In a nearly complete scrutiny, the reviewer found only 4 or 5 typographical errors or inadvertent slips, none of which is likely to mislead; possibly worth mentioning—on page 203, *Dodecatheon amethystinum*, for "Mo." read *Iowa*.

Numerous distributional problems remain to be solved, and additional species to be found, even in so thoroughly cultivated an area as Illinois. Such notes as "woods, local" for witch-hazel and for twinleaf (*Jeffersonia*), raise questions: are they restricted to few stations because of an undiscovered environmental requirement; are there unknown hazards in dispersal or establishment; or are they limited in their abilities to compete? When two entities are recognized where formerly one served, as in the trifoliolate sumacs, *Rhus aromatica* Ait. and *R. arenaria* (Greene) G. N. Jones, one asks whether it is only the latter that forms thickets over the extensive dune areas of the larger valleys or both species. Such problems may be solved by further field study; the new Flora should stimulate interest and activity in them.

A most appropriate feature of the book is the already-mentioned citation of collectors of rare or little-known species. The old-time collectors, too little known to present-day botanists, did much to preserve data now unobtainable. The earliest record noted is 1829, when S. B. Mead collected *Ceratophyllum echinatum*. Mead was perhaps the earliest resident collector. He prepared the first general list for the state, now practically unknown.

S. B. Mead. *Catalogue of plants growing spontaneously in the state of Illinois, the principal part near Augusta, Hancock County.* The Prairie Farmer, 6: 35–36, 60, 93, 119–122. 1846.—A manuscript version of this list was prepared in 1942 by Dorothy May Croker (Mrs. Frank Newton Gillette), and may be consulted at the Natural History Library, University of Illinois. Its title: *Mead's 1846 Illinois flora, with present-day names.* In it Mead's notes on locality and habitat are more conveniently arranged. The number of species is 895.

It is presumed that Mead's list, rather casually mentioned in I. A. Lapham's catalogue of Illinois plants (1857) was a major basis for it. Other early collectors were C. A. Geyer, M. S. Bebb, Elihu Hall, John Wolf, George Engelmann, Frederick Brendel, Jacob Schneck, T. J. Burrill, George Vasey, H. H. Babcock and G. H. French. Somewhat later were W. K. Higley, E. J. Hill, H. N. Patterson, W. E. Andrews, Robert Ridgway, H. Shearer, G. P. Clinton, A. B. Seymour, M. B. Waite, W. S. Moffatt, W. A. Nason, F. E. McDonald, L. M. Umbach and H. S. Pepoon. To mention living botanists, the collections of Agnes Chase, V. H. Chase, Gleason, Gates, George D. Fuller and E. J. Palmer are important. G. N. Jones has collected extensively within the past few years. In this work, as in herbarium studies and preparation of manuscript, he has had the able assistance of Florence Freeman Jones.

Botanists of Illinois and elsewhere have waited long for some one with the energy and ability of Dr. Jones to prepare a usable and modern guide to the flora of the state. Progress in systematic and other phases of botany will be accelerated by it.

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MINERALS

Minerals of Might. By WILLIAM O. HOTCHKISS. vii + 206 pp. 14 graphs and maps. Lancaster, Pa.: The Jaques Cattell Press. 1945. $2.50.

"I AM afraid the nations of the world have neither the intelligence nor the character to postpone forever World War III." So states Mr. Lawyer, a fictitious character in "Minerals of Might," a thought-stimulating book by William O. Hotchkiss, president emeritus of Rensselaer Polytechnic Institute. That is a stern indictment of the peoples of the world but one which seems justified after an unemotional analysis of recent world news.

"Minerals of Might" is a book which every American citizen should read even if he has to forego his daily game of bridge to do it. There is information in it which should cause him to ponder well before he casts his next votes for those who will formulate and execute our foreign and domestic policies. The book explains clearly the differences between the "have" and the "have not" nations and sheds considerable light on the economic pressures which lead to war, cleverly concealed as they are under ideological cloaks. It shows, too, that rich as America is, she is not self-sufficient in many of the minerals most necessary to our welfare, happiness and defense. The statement "Of most of our resources we have used more in the last thirty years than we had used before in all history—more in 30 years than in the preceding 30 centuries" may be prophetic of future accelerated use.

Although the book contains a great many statistics it is not stuffy. The data are given in such a way that reading is easy and the few charts shown may be omitted if the reader so desires. It is evident from the treatment that Dr. Hotchkiss is an educator. He