opment, or as authorizing the board to exercise any supervisory direction or power of regulation over such functions or activities in any manner. Funds allocated by the board to other governmental agencies shall be utilized for projects designated by the board and undertaken on its behalf, and shall be in addition to, and not in lieu of, funds regularly appropriated to the agency concerned.

(2) Wherever practicable the board shall make use of the facilities and services of governmental agencies legally available for scientific research or development work, and wherever practicable it shall conduct research or development projects related to the legally authorized functions or activities of any governmental agency through or in cooperation with such agency. The said agencies are hereby authorized to make such facilities and services available to the Board and to participate in the conduct of its projects, on terms mutually agreeable to the Board and to the agency concerned. The board shall not operate laboratories under its own auspices.

V. To implement the foregoing opinions, the following motions were passed unanimously by the councils:

(1) That proposed legislation should be amended to include statements to the effect that autonomy in the development and conduct of their research programs should be maintained by those governmental agencies now engaged in such activities.

(2) That there should be governmental representation on such boards and advisory committees as may be set up in connection with the proposed National Research Foundation.

(3) That the joint report and recommendations of the councils be brought to the attention of other scientific groups, both public and private, now considering the proposals for a National Research Foundation.

SCIENTIFIC BOOKS

BIOLOGY

General Biology. By LESLIE A. KENOYER and HENRY N. GODDARD. 653 pp. Revised edition. Harper and Brothers. 1945. $4.50.

THE second edition of Kenoyer and Goddard's book joins the ranks of elementary biology text-books. Professor Kenoyer is head of the Department of Biology of the Western Michigan College and his interests are primarily in plant ecology. Professor Goddard retired from the same institution some years ago. His interests are in nature study and elementary science teaching.

The authors have attempted "(1) to introduce much material illustrative of the outstanding biological principles; (2) to place a satisfactory emphasis on both the animal and the plant kingdoms; (3) to steer a median course between the type study method and the method that emphasizes principles; and (4) to introduce wherever possible biological facts of general interest and practical or economic importance."

Chapters 1 and 2 deal with the scope and history of biology and include a brief survey of the plant and animal kingdoms. The next chapter is concerned with structure and function in the seed plants. This consideration of the seed plant as a typical organism is followed by chapters on cellular structure and the nature of protoplasm. Discussion of the latter topic consists primarily of elementary inorganic chemistry. Chapters 6 and 7 discuss food and digestion and metabolism. The process of digestion is treated with such brevity that it nearly missed inclusion in the book. The chapter on "metabolism" emphasizes diffusion, osmosis and photosynthesis.

Following these seven introductory chapters, fourteen chapters are devoted to the lower plants and to the animal kingdom. The usual organisms included in an elementary course are described. The description of individual organisms is brief, but an attempt is made to indicate their importance to more general problems. Thus, in the discussion of Amoeba we find a paragraph, on the role of the nucleus in the cell, based on experiments performed on that animal. In the chapter on bacteria we find mention of viruses, the electron microscope, spontaneous generation, carbon and nitrogen cycles, the sulfonamides and penicillin. A single chapter is devoted to chordate morphology and physiology. The frog is taken as a type and the emphasis is morphological. A chapter on the classes of vertebrates concludes the survey of the animal kingdom.

Genetics and embryology are covered in few pages but with an attempt to include as many aspects of these fields as is possible. The remaining plant groups (Bryophytes, Pteridophytes and Spermatophytes) are treated next, and then the authors turn to more general topics such as evolution, man's place in nature, ecology and conservation.

This résumé will give an indication of the material covered by the authors. Nearly everything that could conceivably be studied in any elementary biology course is mentioned. This extensive coverage of topics, which apparently is a trend in current biology text-books, is probably made with the hope of increasing adoptions. In the present instance this results in more superficiality than broadness of view. This, in the reviewer's opinion, is the chief weakness

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