were known in North Africa, Asia Minor, India and perhaps America at a very early period but that the Eumusae were unknown in these regions until a much later date than we had supposed. I should appreciate any references that I have missed and especially any pre-Christian records from the Malay Peninsula, Siam, Cochin China or the East Indies.

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THE COLOR-BLINDNESS OF INDIANS

THE department of psychology of the University of Denver has begun a preliminary study of color-blindness of Indians. In the spring of last year (1929) we tested 390 Indians of the southwest with the Ishihara test for color-blindness, and found seven red-green blind, but none definitely totally color-blind. This is an incidence of not more than 2 per cent. Only one was a female. It is planned to visit numerous Indians of the central far-west and administer the same test with the Nela test from the Johns Hopkins University during the spring and fall of this year so as to determine if the incidence of color-blindness among Indians is greater or less than it is among whites.

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THE PRESIDENCY OF THE BRITISH ASSOCIATION

IN the extract on the British Association from the London *Times*, reprinted in SCIENCE of April 4 (p. 354), it is stated "if General Smuts becomes president of the London meeting (in 1931) he will be the first president elected from one of the Dominions." It may be noted Sir William Dawson, of Montreal, was president at the 1886 meeting held at Birmingham.

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SCIENTIFIC BOOKS

Methodik der wissenschaftlichen Biologie. Edited by TIBOR PETERFI. Vol. 1, Allgemeine Morphologie, xiv + 1425 pp., 1 col. pl., 493 figs. in text. Vol. 2, Allgemeine Physiologie, x + 1219 pp., 358 figs. in text. Berlin, Verlag von Julius Springer. 1928. Price (bound), 198 marks.

A PARTICULARLY illuminating insight into the rate of progress in the biological sciences, a layout of their diversification and ramifications and a display of the dominant directions of biological developments can be observed in a comparison of the contents of Peterfi's recent monographic encyclopedia of methods of scientific biology with any book in the fields of methods, say of fifty years ago. The very word biology in the last half century has itself acquired new and wider meanings and has established itself beyond displacement by the quibbles of botanists and zoologists, followers of disciplines diverted from their common interests by the artificial jurisdictions of herbarium and museum. There is really only one biological science, though many avenues approach it. Both the diversity and divergences of these avenues as well as the unity of the science of biology are revealed in this encyclopedia of biological methods.

As an index of the shift in emphasis and selection in biological work now current, possibly some what distorted by editorial guidance, one notes that the entire subjects of botanical and zoological collecting and of museum and herbarium technique are restricted to 148 pages of the total of 2,644, which is less than the space devoted to the care of living plants and animals. There is less occasion for the inclusion of these subjects under "Allgemeine Physiologie."

No one person could possibly function as an expert, and scarcely even as a critical compiler of methods in so diversified a field. Hence Dr. Peterfi has associated with himself in this enterprise no less than forty-two other biological specialists, each of whom is responsible for one or more chapters in this work.

The first volume deals with general morphology, but in a more restricted sense than the extremely comprehensive "Handbuch" of Aberhalden which covers the entire field of the natural sciences. The aim has been rather to restrict the subject to, and to intensify the treatment of, those fields of the natural sciences which are more or less distinctly morphological or which impinge thereon. The first volume is therefore written for morphologists, botanical and zoological alike. It includes the basic methods of morphology, microscopy, the study of cells, tissues and of development.

The volume opens with a 200-page introduction to the mathematical treatment of biological problems by Professor A. Walther, with abundant illustrations of the applications of formulas and graphs to specific biological data. Professor A. Köhler discusses the optics of the microscope and Dr. H. Zocher the ultramicroscope.

The subject of general microtechnique is introduced by Fr. P. Vonwiller with articles on the use of direct illumination and on vital staining, by Dr. R. Keller on electrohistological staining reactions and by Professor G. Levi on tissue culture, while Professor T. Peterfi writes of micrurgie, or the study of cells with the micromanipulator; Professor G. C. Heringa writes

on the making of permanent microscopical preparations, and Dr. K. Belar on descriptive cytology.

The field of special microtechnique is somewhat unevenly broken up and developed under the headings of Protozoa by Dr. K. Belar, vital staining in plants by Professor E. Küster, permanent botanical preparations by Dr. H. Schneider, animal tissues and histochemical methods by Professor B. Romeis, cell pigments and lipoids by Dr. M. Schmidtmann and general and special methods in histochemistry by Professor G. Klein.

Methods in descriptive embryology, including collection, fixation, preservation and sectioning of embryos and the demonstration cavities and of vessels by injection and corrosion methods, are described by Professor E. Pernkopf. There is no treatment of the preparation of models from sections.

The final section deals with microscopical methods as applied to the skin, nervous system and sense organs of invertebrates and to several of the principal invertebrate phyla by Dr. J. v. Gelei.

The outstanding chapters in this comprehensive volume are those of Dr. Köhler on the theory and construction of the optical parts of the microscope, Dr. Peterfi's account of microdissection apparatus and Dr. Belar's discussion of the technique of cytology.

The second volume is assigned by title to "Allgemeine Physiologie." Possibly, since systematics are at present under the tabu of orthodox biology, the editor has conceded a place in the kindly shade of physiology [*sensu latu!*] to "Zoologische Musealtechnik" by Professor C. Zimmer and to "Botanische Museumskunde" by Professor J. Schiller, with "Herbarpflanzen" by Konservator Dörfler slipped in as an "Anhang," while the article by Professor P. Schulze on the collection of zoological material for investigation is permitted to devote all of two pages to vertebrates.

Continuing in the field of physiology, we find sections devoted to the maintenance and rearing of animals and plants, with chapters on fresh-water aquaria and terraria by Professor L. Müller, on sea-water aquaria by W. B. Sachs, on insects and insectaries by Professor A. Hase and on mammals by Professor H. Nachtsheim, while Professor E. Küster and Professor F. Oehlkers treat respectively the lower and higher plants.

The following section treats of photography, microphotography, cinematography, microcinematography and the technique of drawing. The last named, by Dr. K. Belar, is very helpful, though he omits mention of the exceedingly useful Wolff carbon pencils.

Methods in the study of heredity by Professor G. Just include the mathematical treatment of variation, a brief discussion of the analysis of individual characters and a very full account of methods in genetics in *Drosophila* and in man.

Developmental mechanics in plants is treated by Dr. A. T. Czaja and in animals by Dr. O. Mangold, including a most welcome account of the methods used in the study of external and internal factors, such as gradients, isolations, defects, combinations and transplantations, to which appendices on artificial parthenogenesis and cell stimulation are added.

A nearer approach to physiology is attained in the chapter on methods in aseptic operation by Professor H. F. O. Haberland, in the physiology of stimulation by Professor O. Koehler and of protoplasm by Professor J. Spek, on plant physiology by Professor E. G. Pringsheim, on electrometry by Dr. G. Ettisch, on the metabolism of cells and tissues by Dr. H. A. Krebs, on metabolism in plants by Dr. O. Arnbeck and on substance and energy changes in plants by Dr. J. Hirsch.

In face of the difficulties which arise from the dimensions of the fields covered, the inevitable omissions of desirable portions of the many fields and the obvious inequalities in the treatment of different subjects, the editor has succeeded admirably in producing a most useful encyclopedia of modern biological methods which every biologist will find exceedingly useful as a work of reference for methods in a wide range of biological investigations.

The current methods in German laboratories are to be found here with a moderate but by no means adequate account of those from other sources. There is a glossary of equivalent technical terms in German, English, French and Italian. The different subjects are extensively documented, but citations are largely drawn from German sources; for example, the closing chapter cites exclusively from such sources.

In these days of increasing specialization and of new developments a synthetic work such as this is both an aid to progress and a stimulus and a guide to endeavor.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

AN ELECTROMAGNETIC PUMP

DURING the course of some investigations in this laboratory, it became necessary to devise a pump which could be used to circulate sterile fluid in a system free from any rubber, metal, oil, grease or cement. To fulfil these requirements, a pump has