pended upon to enhance the value of the factor of equipment undertaken by any certain laboratory.

A definite statement of the objects to be sought as well as regulation of the various activities would, of course, be necessary, as well as the establishment of a basis of values and rules governing exchanges of materials which might or might not be for monetary considerations. The establishment of such regulations could well be placed in the hands of a secretary or committee of the parties to the agreement.

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SCIENTIFIC BOOKS

A Revision of the Cestode Family Proteocephalidæ. By George Roger LaRue. (Contributions from the Zoological Laboratory of Illinois, No. 33.)

The graduate school of the University of Illinois is to be congratulated on the publication of this monograph, which, we are informed, is a "Thesis submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy."

Dr. LaRue has, in this thesis, made a contribution to the literature of helminthology of a kind that is much needed. He has performed the drudgery of examining the literature of his subject with skill and patience and at the same time has achieved noteworthy success in bringing order out of confusion. The labor of identifying species by future investigators should be much lightened on account of this contribution.

The monograph is a large volume of 350 pages and 16 plates containing 199 figures. The figures are simple line drawings, largely diagrammatic, but, so far as the writer has tested them, clear in diagnostic features and free from confusing or unnecessary details. Methods of technic are incorporated in the introduction, which should be of value to prospective workers on the anatomy of the cestodes. Hematoxylin mixtures are found to yield more satisfactory results than carmine. "It is noteworthy that the carmine stains give beautiful preparations of trematodes in toto, but fail almost entirely for cestodes. For the cestodes these stains fail because they do not sharply and clearly outline the sexual organs as they do in the trematodes, though not better than do the hematoxylins. In the judgment of the writer the use of carmine stains in cestode material has been responsible for many errors in the interpretation of cestode structures." An important introductory section deals with the anatomy and histology of the Proteocephalids. In this section the literature of this phase is reviewed critically. It is interesting to note that while insisting that the anatomy and finer structure of the internal organs furnish the most valuable characters for diagnostic purposes, the author remarks that more value should be given than is given to data as regards the host, the locality and habitat of the host, which data are always of value.

The insertion of a key to the better known genera and species of Proteocephalidæ is to be highly commended. The literature of the Cestoda is much scattered and there is need of synopses and keys if acquaintance with the distribution of species with all that goes along with that knowledge is to be extended and made accurate.

The bulk of the monograph is made up of the description of species of Proteocephalids, of which there are 33 from fishes and 18 from amphibians and reptiles. These descriptions are, from the nature of the case, of unequal proportions. For example, *Proteocephalus filicollis* (Rudolphi) and *P. torulosus* (Bartsch), neither found in this country, are given about eleven pages each. Extracts are made from French and German authorities and from the Latin of Rudolphi. There is perhaps justification in these instances for inserting descriptions in the languages in which they were originally written, although as a general practise the reviewer would advise against it. LaRue has not been content with simply reviewing the literature of such species as those just mentioned, but has studied material obtained from European helminthologists, and, having had the use of Dr. Ward's extensive collection, has been able to review the literature with an intelligence and authority that inspires confi-

dence in the reader. Other species, as, for example, *P. cyclops* (von Linstow), *P. nemetosoma* (Leidy) and *P. salvelina* (Linton), are given less space, such being, as a rule, records of material that either did not admit of certain identification, or at least were inadequately described. Such species as *P. ambloplites* (Leidy) and *P. perplexus* (LaRue), which are American species and have been studied by the author, are described in detail, and with such discrimination that there should not be any confusion in future identifications of these forms. Comparative tables of selected characters of Proteocephalid species are given. Such tables are of peculiar value in the identification of such soft-bodied forms as cestodes and trematodes, whose superficial appearance is affected diversely by preserving fluids. Under distribution it is of interest to note that amphibian Proteocephalids are known only from the two continents, North America and Australia, while those of reptiles and fish are known from all the continents.

The following conclusions are of general interest:

1. A species of *Proteocephalus* may occur in different host species of the same genus. Five species are limited exclusively to various species within the same host genus.

2. A species may occur in the different genera of the same family.

3. A species may occur in the members of closely allied genera, *i. e.*, of the same order. Four cases are known.

4. A species may occur in families of very wide relationship, *i. e.*, of different orders. There are two cases, of which one is doubtful.

A further general statement is: The parasitic infestation of the host is determined by the food eaten.

A suggestive fact, pointing to a wide and fruitful field of investigation, is indicated when it is noted that in this monograph of 350 pages less than 2 are devoted to the life histories of the Proteocephalidæ, and these pages are largely taken up with a discussion of probable life histories.

As to the relationship of the Proteocephalids to other cestodes, the author finds that structurally they are to be considered as being closely allied to the Tetraphyllidæ, while their relationship to the Cyclophyllidæ is distant. The inclusion and long retention of the Proteocephalids in the great genus *Tænia* was due to external features alone.

The origin of the Proteocephalids is discussed and the suggestion made that it may have been some member of the family Lepisosteidæ that is responsible for the introduction of these cestodes into the fresh-water environment.

A bibliography of 78 authors and 144 titles is appended. These range in time from 1766 to 1912.

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January 22, 1916

SCIENTIFIC JOURNALS AND ARTICLES

THE opening (January) number of Vol. 17 of the *Transactions of the American Mathematical Society* contains the following papers:

W. F. Osgood: "On functions of several complex variables."

E. B. Van Vleck and F. H'Doubler: "A study of certain functional equations for the θ-functions."

B. A. Bernstein: "A set of four independent postulates for Boolean algebras."

L. P. Eisenhart: "Transformations of surfaces Ω (second memoir)."

E. J. Moulton: "On figures of equilibrium of a rotating compressible fluid mass; certain negative results."

THE February number (Vol. 22, No. 5) of the *Bulletin of the American Mathematical Society* contains: Report of the ninth regular meeting of the Southwestern Section, by O. D. Kellogg; "A note on the problem of Lagrange in the calculus of variations," by G. A. Bliss; "Concerning a non-metrical pseudo-archimedean axiom," by R. L. Moore; "A type of singular points for a transformation of three variables," by W. V. Lovitt; Review of Goldenring's Die elementargeometrischen Konstruktionen des regelmässigen Siebzehnecks, by R. C. Archibald; "Shorter Notices;" Wentworth and Smith's Plane Trigonometry and Tables