*migratoria migratorioides* phase *gregaria* Rch. and Frm.) in the campaigns, from May 9, 1932, to July 7, 1933, and the present, that the swarms and individuals have a definite course on motion.

As a general rule the path of flight of the whole swarm is in a counter-clockwise direction. In other words, if the swarm is heading north at one place a little distance farther north the swarm will have deflected and will be heading in a northwesterly course; and if the swarm has been noticed heading on southerly course it may be expected that the swarm will be heading on a southeasterly course a little distance farther south. This counter-clockwise course is maintained at normal atmospheric conditions and as long as no temporary impediment is encountered on its flight. With head or tail winds the insects seem to be blown off their course in all directions. Also where natural barriers occur, like mountain ranges that are quite high, the chances are that the swarms will have to deflect and find a path of least resistance until it shall have again gained an open course.

The writer also has noticed that the individual of a swarm flies in a general counter-clockwise circular course. That is, each individual, within the swarm on the wing, flies counter-clockwise and the whole swarm takes a counter-clockwise course.

Because of these facts the writer has been able to prognosticate locust movements to a fair degree.

These are observations that the writer has noted of this winged pest in the Philippines. It would be interesting to know if persons who have had anything to do with locusts have ever noticed or noted the paths of flight of this insect singly and in swarm.

The writer suspects that in the northern hemisphere the paths of flight of locust swarms and individuals within the swarm are counter-clockwise, while those of the southern hemisphere are clock-wise.

ALEXANDER GORDON

LA CARLOTA SUGAR CENTRAL
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## UPPER DEVONIAN SPONGES

THE Carnegie Museum has recently acquired a very large series of Upper Devonian sponges of the family Dictyospongidae. The collection, which contains over 5,000 specimens, including 85 types, was made in New York and in Pennsylvania by the late Edwin Bradford Hall, of Wellsville, N. Y. The types were described by Professor James Hall and Dr. John M. Clarke in Memoir II (1898) of the New York State Museum. However, a large part of the collection had never been cleaned or prepared for identification and this work was carried on during the past year. Due to the excellence of some of the cleaned material, it may prove advisable to revise several genera and species that have not been clearly understood. These sponges will no doubt prove to be good index fossils in determining the stratigraphy of the Upper Devonian in New York and in Pennsylvania.

The writer would very much like to hear of any other collections of Upper Devonian sponges of this family, especially of any collected since 1900, or of any new localities for them which have been discovered by contemporary collectors.

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## A CORRECTION

IN my review of Professor Pearse's book, "The Migrations of Animals from Sea to Land,"[1] I questioned the statement that "most species of salmon die after spawning." Such doubt, however, appears to be unjustified, for the adults of the five Pacific species of *Oncorhynchus* do not return to the ocean after their upstream reproductive migration. Only to the Atlantic salmon (*Salmo salar*), the two land-locked forms (*sebago* and *ouananiche*) and the steelhead salmon (*gairdnerii*) of the Columbia River, etc., would the objection apply.

ROBERT CUSHMAN MURPHY

# SCIENTIFIC BOOKS

## CRANIAL MUSCLES OF VERTEBRATES

*The Cranial Muscles of Vertebrates.* By F. H. EDGEWORTH. Cambridge: at the University Press. New York: The Macmillan Company. 1935. $30.00.

THERE is doubtless much to be said for the short article favored by editors of current journals, the short article which deals with some illustration of scientific thought torn from its context, or, more deplorably still, penned by an author whose thought has no context. But the day of the monograph will certainly return when donors of funds for research learn that no research is complete without adequate presentation. "Good form," wrote Gracian, "supplies everything, . . . sweetening the truth, . . . and a little manner is the thief of the heart."

This monograph by a veteran in comparative myology is gracious in form and sufficiently spacious in presentation to convey that feeling of confidence in the reader, lacking which no author can hope to make his contribution truly effective. Without prodigality

[1] SCIENCE, June 5, 1936, pp. 553–554.

of words Professor Edgeworth lays before us the investigations of a lifetime of study and experience, clearly, simply and modestly. "The theories here advanced," he writes, "may not be generally acceptable, but they are founded on evidence which has not hitherto been utilized in attempting to solve these difficult problems."

The mind of the master is evident in a writer who can see beyond his own technique. The necessity of neurological investigations, especially by experiment, is stressed at once in the preface. The new attack on comparative myology by investigation of muscle action currents naturally enough finds no place in this volume, but its significant contribution is foreshadowed.

The nineteenth century was the heyday of comparative morphology, as study of the literature cited demonstrates. The twentieth century brought experimental method to bear on the theme and pure morphological studies have dwindled in number, but the author has kept adding, even in proof, references of significance.

Another important feature in the volume is the table of synonyms, for the nomenclature of structures "has been difficult though there is an abundance of names from which to choose."

The text is the more readable because it is not peppered with reference marks. This may be a drawback to those who desire, above all things, speed in identification of source. But the volume is written for the student who knows his literary material, not as a labor-saver for the beginner in his task of mastering literature.

There is a spaciousness of presentation which strides over points of detail, again assuming that the reader knows the field. For example, on page 151, absence of the spinal accessory nerve in a giraffe seems to be attributed to Lesbre and myself, whereas Lesbre never mentioned this form and I merely quoted Elliot Smith. The attack by Zuckerman and Kiss was indeed leveled at me, but, had they recalled the literature, they would have known they were assaulting their own chief. It is unfortunate for the discussion of the cucullaris that Professor Edgeworth did not add (even in proof) the significant paper by Howell and Straus which clears up all discrepancies. A related problem of laryngeal innervation in camel and llama finds isolated expression thirty pages later on.

One of the most stimulating and original sections of the book is that on the larynx. No student of laryngeal anatomy should fail to master this section which, by its breadth of treatment and its practical application, is a choice example of scientific presentation.

Other reviewers doubtless, in browsing through the pages of so compact and enthralling a dissertation, will light on other treasures. None will a[illegible]ult with the proofreading. Punctuation also is perfect. The hiccoughing comma does not affront one's propriety and full-stoppery is sparingly used. Nevertheless the implications of each sentence are clear, for he who is familiar with other languages can best handle his own.

The illustrations, so simple and effective in their line, so apt in their reinforcement of the text, should be singled out for special praise save that the singling out does violence to the symmetry of the whole.

This monograph is the record of an inspiration which has glowed through all the years of a busy life and quickens to a flame at last. "Now do's my Project gather to a head; my charmes cracke not; my Spirits obey and Time goes upright with his carriage."

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## STATISTICS AND NUMERICAL TABLES

*Elements of Statistics with Applications to Economic Data.* By HAROLD T. DAVIS and N. F. G. NELSON. The Principia Press, Inc., Bloomington, Indiana. 424 pp. Price, $4.00. 1935.

THIS book is copyrighted by the Cowles Commission for Research in Economics, of which the authors are respectively mathematician and economist. The purpose of the work may be inferred from the recommendation in 1932 of a committee of the Social Science Research Council to the effect that students of social science should be prepared for the study of statistics by a six to nine semester hour course in the mathematical essentials involved. The topics treated are largely those traditional in the statistics of economics, but there is a wealth of fresh economic data, a good choice of new "problems" (with solutions in the back of the book) and abundant enlightening notes of a critical, historical, biographical or bibliographical nature. Despite a first heavy impression created by its large format, thick paper, sober binding, extensive appendices, numerous footnotes and formula-strewn pages, the mathematical difficulties are reduced to a minimum and the work remains within the grasp of any serious and inquiring college student, while offering at the same time many fresh ideas to the veteran teacher.

*Tables of the Higher Mathematical Functions.* Computed and compiled under the direction of HAROLD T. DAVIS. The Principia Press, Bloomington, Indiana. Vol. I, 1933, 377 pages. Vol. II, 1935, 391 pages.

THIS work, of which the third volume is soon to appear, is obviously the most ambitious project at preparing numerical tables of special mathematical functions attempted in this country. To those interested in such tables this monumental enterprise needs no