vaginal fluid. In 1943 Papanicolaou and Traut published a monograph on *Diagnosis of uterine cancer by the vaginal smear*, based on the study of over 3,000 women.

The present monograph, written with Traut and Marchetti and published with the aid of the Commonwealth Fund, chronologically really should antedate the others, as it represents the fundamental cytology of the epithelia of the female generative tract with particular attention to the cyclical changes produced by the ovarian cycle. The text is largely a commentary on the 22 admirable colored plates which show the follicle, corpus luteum, tubal, endometrial, endocervical, and vaginal epithelia.

It is rather confusing that in Chapter III, day one for the human menstrual cycle corresponds to the day of ovulation, while on the final colored plate it is assigned to the first day of menstruation. Based on cytologic criteria, the corpus luteum begins to regress by the 9th–11th day and corpus luteum of pregnancy, by the 120th day: The maxima of development of tubal, endometrial, and vaginal epithelia are described.

This monograph is an atlas and source book which should prove of utmost help to gynecological pathologists. It contains material which previously had to be searched for in the widely scattered literature.

ROBERT T. FRANK

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The brain of the tiger salamander (Ambystoma tigrinum). C. Judson Herrick. Chicago: Univ. Chicago Press, 1948. Pp. vi + 409. (Illustrated.) $5.00.

This monumental work represents the culmination of 50 years of labor on the nervous systems of vertebrates. The author has not only amassed an enormous amount of data on the details of neurological structure in the salamander, but he has also laid a broad foundation for the comprehensive understanding of all vertebrate brains, with special emphasis on the origins of structural features and functional capacities of the human brain, and the general principles of their evolutionary development.

Because of its typical generalized, primitive, vertebrate brain, the salamander has lent itself admirably to this study, and the fruitfulness of Herrick's concentration on this form, as testified by the present volume, is ample evidence of the wisdom of his choice.

The book has 300 pages of description and discussion and is divided into two parts which can be read independently of each other. Part I (120 pp.) is devoted to a general description of the brain of the salamander, together with several chapters on physiological analyses and interpretations, and a final chapter on general principles of embryologic and phylogenetic morphogenesis. This section is designed to give biologists, clinicians, and psychologists an outline of the plan of organization of a generalized vertebrate brain and some insight into the physiological principles exemplified in its action.

The second section (180 pp.) deals with the intricate structure of the salamander brain and presents the detailed evidence upon which the first part is based. It is drawn from the author's many previous papers as well as from considerable new material. Altogether, it is an invaluable reference for specialists interested in either comparative neurology or experimental neurophysiology.

The descriptive material is followed by 11 pages of bibliography and 70 pages of illustrations, the latter consisting of surface views and diagrams showing the internal architecture of the salamander brain, together with complete explanatory notes.

Dr. Herrick's lucid style, obvious enthusiasm, and broad perception give this specialized text, particularly Part I, the rare quality of being both interesting and intriguing reading. The author has performed a signal service in so ably presenting the results of his life-long quest.

WALTER A. STULTZ

University of Vermont College of Medicine

The neocortex of Macaca mulatta. Gerhardt von Bonin and Percival Bailey. (Illinois Monographs in the Medical Sciences, Vol. V, No. 4.) Urbana: Univ. Illinois Press, 1947. Pp. xi + 163. (Illustrated.) $3.00.

This monograph presents a greatly needed study of the cytoarchitectonic structure of the neocortex of *Macaca mulatta*. The authors describe the fissural pattern of the brain, the cortical architectural types, and their surface distribution; they survey the fields by serial sections and discuss the interrelations of cortical areas. Von Economo and Koskinas' nomenclature is used. A brain map in color, numerous drawings, and excellent photomicrographs illustrate the work.

The main chapters of the book are devoted to description of cortical fields and to critical discussion of the work of earlier authors. The criticism makes stimulating reading, but it does not always appear quite fair, since a number of apparent discrepancies, e.g. in the frontal region, seem to result from differences of interpretation rather than from essentially different findings. As regards whole cortical regions, the divisions suggested by the authors actually are similar to those of Brodmann, but the more detailed characterizations are frequently materially different.

Although it is emphasized that cortical fields often fade inconspicuously into one another, the morphological characteristics as a rule are described rather rigidly as if the fields were uniform. Variability within a cortical sector, if discussed at all, usually is mentioned casually in relation to some specific point the authors wish to make. This treatment of the material may cause some difficulty in understanding the significance of variants which are considered constant and even more difficulty in understanding why the authors hesitate to grant clear status to a number of variants which they describe and discuss. In addition, it is sometimes hard to appreciate in photomicrographs the structural differences in different sectors of the same variant, since it is not always sufficiently clear which variations are considered random and which constant. The problem of distinguishing random and constant variability, however, is of great importance. The authors reject the approach of the Vogts and numerous other workers who recognize as separate fields cortical sectors which show constant, though slight,

structural differences. While the view of the Vogts may be opposed by a variety of arguments and although the view favored by the authors appears more practical in relation to certain functional considerations, it seems unsound to disregard altogether the vast amount of evidence presented by the Vogts and their adherents unless it can be shown that their finer subdivisions are mere random variations. This, however, seems quite improbable. If, on the other hand, a cortical field varies in a constant manner, then, regardless of whether such a variability is considered a characteristic of the field or is expressed by further subdivisions, as the Vogts propose, the fact itself remains, and such a gradient of morphological change is likely to be functionally more significant than the authors are willing to admit.

Despite these difficulties, the book will be of great value for anyone who wishes to familiarize himself with the cytoarchitectonics of the macaque's cortex, and every worker interested in the experimental study of this brain will find it indispensable.

JERZY E. ROSE

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The ways of fishes. Leonard P. Schultz (with Edith M. Stern). New York: D. Van Nostrand, 1948. Pp. xii + 264. (Illustrated.) $4.00.

The purpose of this book is to share with the uninitiated a little of the enjoyment which ichthyologists have in finding out the very diverse and often surprising or impressive manner of life of different fishes.

Simply and enthusiastically written, it is well qualified to interest one in the subject. Especially to be commended to the reader's attention are passages descriptive of the author's personal experiences with fishes in various parts of the world, and those of his friend and colleague, the late Hugh M. Smith.

Sound and sight, locomotion and migration, feeding habits, electric powers and luminescence, association with other animals, breeding habits of fishes, etc. are discussed. Size and growth are considered in a chapter entitled "Giants and Dwarfs," where we also find a method for estimating the weight of a fish from its length. But the mathematics on which this is based are obscure, and we do not believe that any method which does not also take the girth into consideration will prove satisfactory. There are special chapters on fishes dangerous to man (possibly overdramatized), controllable by man, and aquarium fishes.

No attempt is made, however, to give a comprehensive picture of the behavior of fishes, of which there are an estimated 40,000 different kinds, ranging in length, when adult, from ⅓ inch to more than 45 feet and inhabiting seas, lakes, rivers, and torrents from high altitudes in the mountains to the depths of the ocean, and from the North Polar Sea to the edge of the Antarctic Continent. It is also true that the ways of any particular fish are complex, often obscure. Descriptions of them here are frequently, of necessity, brief and unqualified. It follows that some of the statements or seeming implications are open to argument, the prerogative of any enthusiastic student of fishes, or fisherman; but it should be born in mind that Dr. Schultz (who is curator of fishes at the Smithsonian Institution) is one of our soundest and most experienced of the former, and that his opinions are always worth consideration. Hence, this book as a whole, not only an appended classification of fishes, will have reference value on a serious naturalist's shelf as well as giving pleasure to the lay reader.

J. T. NICHOLS

The American Museum of Natural History

Animals alive. Austin H. Clark. Toronto-New York-London: D. Van Nostrand, 1948. Pp. viii + 472. (Illustrated.) $4.00.

From a broad background of personal experience, wide professional contacts, and intimate familiarity with the literature, Dr. Clark has compiled a fascinating volume of simple, direct description and narration. Although it was written for the nonprofessional reader, the technical scientist will here find many fresh facts sandwiched between familiar observations on habits, distribution, and habitats of a vast array of animal forms. Food habits are treated in a particularly appealing manner, as are the chapters devoted to man in his relations to the rest of nature. Domestication of animals as an influence on human culture and on history is dealt with in some detail.

No single basis of organization is followed. Taxonomic groups form the chief framework for treatment in some chapters, although habits, habitats, and distribution provide titles for others. The 38 chapters are grouped by sections as follows: Man and the Animal World; Land Animals; Fresh-Water Animals; and Sea Life.

A great amount of sound natural history is presented without resorting to highly technical terminology. Strictly scientific names are avoided so far as possible, but of necessity the author often refers to genera and other systematic names when no popular or familiar names are available. The editorial omission of initial capitals is an apparent effort to reduce technical names to a popular level. In the index, scientific names are given for all the common names listed. In fact, 38 pages are devoted to a faunal roster from "Aardvark (*Orycteropus capensis*)" to "Zebu (*Bos indicus*)."

The plates are not particularly meaningful, since there is no direct reference to figures in the text. In fact, many of them are not especially well done. Availability of cuts in the Museum files seems to have been the chief basis for selection and inclusion rather than attractiveness and appeal to the general reader.

Intimate and often weird interrelationships of animals are particularly stressed. The past and the present are woven together in considering the balances between animals and their environments. Often, provocative attention is drawn to the upset of balance in nature.

There are few direct references and no literature lists, although works of specialists are often mentioned in intimate personal references.

This book is a distinctively worth-while contribution to a wider general appreciation of "animals alive."

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