

best part of an otherwise sketchy bibliography. Further, he has supplied both a general introduction and specific topical ones which, though containing some small errors of omission and commission, are rather good.

But all is not positive. Bugge's account itself has some failings. As Crosland points out, one of them is that the breadth of coverage is frequently achieved by the sacrifice of depth. Crosland finds this particularly upsetting in the case of the metric system materials; I find it so in the case of educational institutions, and particularly the treatment of the School of Geographers where Bugge's special competence led one to hope for useful details on a little-known establishment, but where he did not even provide its address. More important than this kind of thing, however, is the pronounced anti-Jacobin bias which runs throughout and occasionally distorts Bugge's account and is probably based to a considerable extent upon his reading of Grégoire's famous report on vandalism, the source of so many myths about the infamous period of the Terror.

Unfortunately, Crosland seems to share that bias, for, while correcting Bugge on numerous small points, he never enters a caveat against this, and, in fact, does not even rectify the error of one year in Bugge's dating of Grégoire's report (p. 183). A greater failure to correct occurs in the case of Bugge's conversion of the name of a French artisan from Caroches to Laroche (pp. 169-70). Indeed, not only did Crosland not catch this error, he credits Bugge with "rescuing from obscurity" (p. 155) an instrument maker of significant stature; Bugge, that is, created a ghost that Crosland did not lay to rest. But even more serious than slips and not-provided supplements is the matter of Crosland's deletions from Bugge's account. He has removed some materials of considerable consequence. For example, Bugge several times visited the Observatory of Paris, and his observations thereon are, by Crosland's own admission, among the most important in the entire work. Why, then, did Crosland choose to delete such items as Bugge's critical comments on the mounting of instruments? Is not this, after all, precisely the kind of thing we should want more of?

Despite these flaws, this is a valuable contribution which will place historians of the science of the Revolution in the same kind of debt to Crosland

that historians of the science of the Napoleonic period already owe him by virtue of his interpretative study of the Société d'Arcueil and his editing of that body's *Mémoires*.

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Practical Biology

The Biological Basis of Medicine. E. EDWARD BITTAR and NEVILLE BITTAR, Eds. Academic Press, New York, 1968-1969. Six volumes, illus. Vol. 1, xvi + 590 pp., \$19.50; vol. 2, xvi + 578 pp., \$21; vol. 3, xvi + 494 pp., \$17.50; vol. 4, xii + 396 pp., \$14; vol. 5, xvi + 548 pp., \$19.50; vol. 6, xvi + 618 pp., \$19.50.

This six-volume compendium is clearly superior—in purpose, scope, readability, and pertinence—to most of the recent massive biomedical publications. Much of the credit for this excellence must go to the editors, the brothers Bittar. The topics covered are timely, and the various chapters are cogent and well written and all have the same format. Each chapter is preceded by an outline, most end with a summary, many contain a clinical section, and the reference system is uniform. (Unfortunately, the titles of the articles cited were omitted to save space.) Whether the choice of topics seems acceptable, poor, or excellent will depend on the individual interests of the reader. It is unfortunate that there is no master index to all six volumes.

In the space available I cannot list the titles of the 85 chapters, but must indicate the headings of the 21 major sections: The Dynamic State of the Cell; Growth; Cell Injury; Ageing (vol. 1); Hormones; Control of Metabolic Processes; Mechanism of Action of Biological and Physical Agents (vol. 2); Blood; Connective Tissue; Synovial Membranes and Skeletal Muscle; Bone (vol. 3); Molecular Genetics; Immunology and Transplantation (vol. 4); The Nervous System; The Liver and Gall Bladder; The Alimentary Tract; The Cancer Cell (vol. 5); Hair and Skin; The Cardiovascular System; The Lung; The Kidney (vol. 6).

Many of the chapters deal with subjects far from my field of interest and could not be reviewed by me with any authority. However, many other chapters were of compelling interest, often because they discuss ma-

terial I wanted to explore, either because I was unfamiliar with the subject and had never come across a review that could be read conveniently ("The nature of the ageing process"; "The thymus in immunity"; "The biochemistry of mental illness"; "Transplantation of the kidney: the present position"), or because they discuss reasonably familiar topics which I wanted to review ("The control of respiration in health and disease"; "The effects of raised intrapulmonary pressure"; "Selected aspects of lung metabolism"; "The basis of uremic toxicity"; "The metabolism of heart muscle in health and disease"; "Effect of low temperature on tissues of the body"; "Host defense and the reticulo-endothelial system"; "Autoimmunity and disease").

Each chapter just listed goes far toward achieving the editors' stated aim for the volumes—that is, "providing a balanced treatment between contemporary medical science and the applications of cellular biology in medicine." Because of this virtue I think these volumes belong in all but the smallest, or most specialized, biomedical libraries. Many biomedical investigators will also want them for their personal, or departmental, libraries.

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Groups in the Animal Kingdom

Principles of Comparative Anatomy of Invertebrates. W. N. BEKLEMISHEV. Translated from the third Russian edition (Moscow, 1964) by J. M. MacLennan. Z. Kabata, Ed. Vol. 1, Promorphology. xxx + 490 pp., illus. Vol. 2, Organology. viii + 532 pp., illus. Oliver and Boyd, Edinburgh, 1970, £10. University of Chicago Press, Chicago, 1970, \$35.

The two volumes that make up Beklemishev's treatise on comparative anatomy will be welcome to all non-Russian-reading invertebrate and general zoologists. They represent a unique approach and have no parallel in modern zoology.

The volumes cannot be read lightly and, since much of Beklemishev's terminology will not be familiar to most English-speaking zoologists, a major learning effort is called for in order to follow the text. New terms are consistently and carefully defined as they are introduced, and, fortunately, the introduction presents a synoptic outline of

the animal kingdom, or Zoa. This outline is particularly important since the groupings presented and defended in the text are in many instances quite unfamiliar. For example, when Beklemishev refers to scolecids he is referring to the phylum Scolecida, which includes all the flatworms, the Acanthocephala, the aschelminth complex, and the nemerteans. Likewise, the Kamptozoa as the phylum for entoprocts or Podaxonia as the name for Phoronidea and Bryozoa combined will surprise many zoologists, particularly those who interpret phoronids as deuterostomes. Surely a number of surprises are in store for many readers, and the division of the animal kingdom into subkingdoms, superdivisions, divisions, superphyla, phyla, subphyla, classes, and orders will almost certainly grate on tender spots in many individuals' views of the overall order and relationships of animals.

The first volume carries the subtitle "Promorphology," the second "Organology." Beklemishev rightly regards comparative anatomy as a part of biological systematics, and his treatment of his subject bears this out. In his approach he defines *techtology* as the division of the whole into parts and calls the synthesis of the whole from its parts the subject of *architectonics*. Promorphology for him becomes architectonics. The individual chapters in the promorphology volume range as broadly as the comparative approach will allow and do not proceed solely on a group-by-group approach. There are detailed chapters presented on symmetry, cellularity, dissymmetry, colonial form, and metamerism as well as the pure "architectonics" of some of the major groups. By choice, and because Beklemishev seems to believe they are byways, a number of minor groups are not discussed or do not receive the attention one could hope for.

The volume on organology is more purely comparative anatomy and presents some unique compilations and discussion of comparative relationships. The volume is divided into fairly classical accounts of the nervous system, sense organs, circulatory system, and the derivation of structures from the embryonic germ layers. However, the systematic position presented and defended varies so significantly from the one promulgated so well by Hyman that a whole generation of zoologists may well have its eyes opened by Beklemishev's expert exposition.

These volumes do not concern them-

selves with function or physiology, nor is ecology given more than the most minor consideration. Comparative embryology is used as a tool throughout the text but it is never treated as a whole. As a source book in its subject, comparative anatomy, the work is outstanding, and the 7 pages of Russian bibliography and 40-odd pages of non-Russian bibliography are a good measure of the depth and scholarliness of its contents.

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Cercopithecines

The Behavioral Repertoire of the Stumptail Macaque. A Descriptive and Comparative Study. MIREILLE BERTRAND. Karger, Basel, 1969 (U.S. distributor, Phiebig, White Plains, N.Y.). xii + 276 pp., illus. Paper, \$14.65. Bibliotheca Primatologica, No. 11.

There has been a considerable increase over the past decade in our knowledge of primate behavior, especially that of species not normally used as laboratory animals. Bertrand's monograph is an important contribution to this information. Her purpose is "to describe the behavioral repertoire of a primate which is very little known, yet is beginning to be used extensively in laboratories, and might be threatened with extermination in the near future." The monograph is most successful in this regard, being well organized and clearly written. The 102 photographs and sketches (by Nicole Duplaix) are excellent and are a major contribution to this book.

This study was primarily of captive monkeys (*Macaca speciosa*) living in groups of 8 to 17 and was conducted over a period of 3 years and 7 months. The captive study was complemented by a 4-month field study in Thailand. Bertrand has classified her study methods as quantitative, qualitative, experimental, and comparative. The kinds of behavior described range from relatively simple motor patterns, such as those used in locomotion, to very complex social signals and social interactions, such as redirected aggression and infant social behavior.

Throughout the text, Bertrand makes interspecific comparisons. In addition to literature references, she has been able to draw comparisons from her own

observations of captive rhesus and lion-tail macaques. These comparisons are enlightening and raise questions and offer suggestions concerning the effects of adaption to a particular ecological niche (arboreal versus terrestrial) on social behavior and behavioral profiles.

Each description of a behavior pattern is accompanied by information on the social or physical context, or both, in which it occurs. Impressions concerning the communicative significance of most of these patterns are also given.

The field study permitted valuable insights into the effects of captivity on behavior. For example, the introduction of "new" monkeys into a group of free-ranging monkeys was apparently without aggressive consequences. However, introduction of "new" monkeys into caged groups was accompanied by severe aggression, sometimes resulting in death.

A few criticisms must be made. I was confused by certain terms frequently used in the text which lacked operational definitions, such as "goalless," "pleasurable," "social rank," "voluntary," and "involuntary." In some cases the absence of an operational definition has only a minor effect on the interpretation of the results. The failure to define social rank, however, is critical, because Bertrand has calculated a significant Spearman rank correlation coefficient between social rank and aggressor rank. A lengthy section "explaining" why the terms "voluntary" and "involuntary" are used still leaves one wondering how to distinguish "voluntary" from "involuntary" behaviors.

There is no information on the phenomenon of supplantation (spatial and food), which is so common in other cercopithecines. If it is absent from the repertoire of stumptails, its absence is worthy of note.

At least one inconsistency in the classification of vocalizations was conspicuous. "The classification was based upon physical characteristics . . ." and yet in the category of squeak calls are included vocalizations whose properties are radically different; tonal, non-tonal, mixed, and compound.

These criticisms should not overshadow the merits of this monograph, which contains a wealth of information valuable to students of primate behavior in general and of the biology of stumptails in particular.

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