

heating and thermal sensation, physiological responses to heat and to cold, hypothermia, and temperature regulation. Perhaps the least represented are studies on the metabolic mechanisms of heat generation in relation to environmental temperature changes, but the biophysical and physiological aspects have been very well covered.

The volume is hardly for undergraduates, but the professional scientist without sophistication in this field can learn a great deal and the expert will be pleased to have the material available in so useful a form. The volume represents a valuable exposition of the present state of knowledge in a field of great practical and theoretical interest. If the contributors sometimes disagree, if the reader occasionally encounters something which bothers him scientifically or which seems to be incomplete—well, the subject is not closed and there are plenty of problems yet to be solved.

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Entomology

The Mosquitoes of the South Pacific (Diptera, Culicidae). vols. 1 and 2. John N. Belkin. University of California Press, Berkeley, 1962. vol. 1, 620 pp.; vol. 2, 412 pp. Illus. \$20.

Little systematic collection of mosquitoes was attempted in the South Pacific area prior to 1940, and most of the available records were the result of mere samples of the fauna, principally that of the better-known islands. But the arrival and establishment of Allied troops in the area during World War II awakened a wide interest in arthropod-borne disease, and various epidemiological units eventually combed the islands and collected probably several hundred thousand specimens of all stages of the developing mosquito, over 100,000 of which are now preserved in institutional and private collections.

In these two volumes the author attempts to describe, illustrate, and key out all species of mosquitoes now known from the South Pacific and to present the readily available information on their bionomics, disease relationships, and distribution. He has

not only succeeded admirably in this task, but he has also laid a foundation for future studies on the derivation of the mosquito fauna of the area as a whole and of its various parts. The 82-page introduction makes fascinating reading for one whose general interests lie in the general faunistic problems of the area. Belkin's tentative conclusions about the movement of people and populations within the area promise to provide a stepping stone to further investigations along these lines, which may be valuable to anthropology.

Of principal importance to alpha taxonomists is the section on systematic treatment, which comprises most of the pages of the first volume and all of the second (the illustrations). The genera are grouped by tribe, and each species is discussed from the standpoint of synonymy, descriptive taxonomic characters, systematics in the broadest sense (including discussions of variations and relationships), bionomics, disease relationships and economic importance, and distribution (for the most part by individual island or island group). The subfamilies, tribes, and genera are characterized in much the same way wherever possible.

Belkin's wide personal knowledge of, and experiences in, the South Pacific area lend his work an authenticity seldom found in works of such broad scope.

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The Spine—in Full Color

A Stereoscopic Atlas. David Bassett. Section 8, *The Back*. Sawyer's, Portland, Ore., 1962. 112 views. \$14.50.

Section 8, *The Back*, maintains the quality of the color photography and the choice selection of instructive dissections that have distinguished the preceding sections of the atlas. Views of a corrosion preparation which illustrate the arterial supply of the vertebral column of a year-old infant (views 211:1 through 211:7) provide an interesting study of some developmental and arterial relations in the vertebral canal of the infant. A thorough and detailed presentation of the anatomy of the back, in the adult (including a number of radiographs of the different

segments of the vertebral column), is given in this section of the atlas. This presentation includes skeletal, joint, muscular, vascular, and neurological relations. Anatomical details are displayed with respect to the related head, neck, thoracic, abdominal, and pelvic structures, in anterior, lateral, and posterior views.

Students, teachers, and practitioners will find this section a valuable source for review.

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Biological Handbook

Growth, Including Reproduction and Morphological Development. Compiled and edited by Philip L. Altman and Dorothy S. Dittmer. Federation of American Societies for Experimental Biology, Washington, D.C., 1962. xiv + 608 pp. Illus. \$12.50.

This is another biological handbook which has been prepared and issued under the direction of the Committee on Biological Handbooks of the Federation of American Societies for Experimental Biology and under the general auspices of the National Academy of Sciences—National Research Council. Much of the data appeared in more truncated form in the *Handbook of Biological Data*, edited by W. S. Spector (Saunders, 1956), which was also prepared under the auspices of NAS-NRC.

Data are presented under 13 section headings: Chromosome numbers; Linkage groups, heritability, and hybridization; Cells and tissues; Vertebrate reproduction; Invertebrate reproduction; Plant reproduction; Prenatal vertebrate development; Postnatal vertebrate development; Plant development and comparative morphology; Comparative animal morphology; Sex ratios and life spans; Environmental factors and growth; Growth regulators and inhibitors.

The question of whether this book is worth the price and whether one should consider owning it can scarcely be answered in the negative. Sooner or later it will prove of service to almost anyone engaged in research or teaching in the areas that it covers, and \$12.50

is not a prohibitive price for a compendium of this sort. Is it worthwhile for those who already own the 1956 *Handbook*? My answer is "yes." If for no other reason, the inclusion of literature references (there are none in the 1956 *Handbook*) makes this volume considerably more useful than its predecessor. Essentially this is an expansion of sections 2 and 3 and parts of section 8 of the 1956 *Handbook*. The expansion has been accomplished in various ways: the data is presented in a more readable form (the type is larger and the tables are less compressed), more data are presented in most cases, and literature references are included. For example: In this volume data on chromosome numbers of organisms is presented in 57 pages and includes 1861 literature citations. In the 1956 *Handbook* equivalent material was covered in five pages and did not have literature citations. In addition, the data is presented, with respect to taxonomic classification, in a much more usable way.

The index is different. It is based largely on taxonomy and the scientific names of organisms. At first this sort of indexing seemed awkward to me, but

when I used it in conjunction with the table of contents, as the editors advise, it proved quite workable.

This is not the sort of book which one can "read" and criticize in a comprehensive way. Its value will be ascertained only after repeated searches have been made for specific information. It is quite easy to wonder why certain types of information are not included, but it is probably equally easy to realize that not everyone approached for data compilation was willing to cooperate; the compiling of data is tedious. Even so, I should like to make some criticisms. It seems to me that data on hybrid vigor in corn were somewhat better organized in the older volume—and that it is somewhat less easy for a nonexpert on corn to extract meaningful information from this one. If data on mitotic indexes were to be included at all, why were they restricted to mammals and amphibia? I fail to see the significance of the inclusion of some data on the growth, in organ culture, of tibial rudiments from several animal embryos. In the first place, considerably more data is available about cultured bone rudiments; in the second place, this and a list of tissue culture

cell lines is all that is provided about animal tissue culture (the heading of the table on tibial growth in culture contains the single typographical error which I detected: "floating lens technique" instead of "floating lens paper technique"). Data on the effect of temperature on chick development could have included correlative data on humidity involvement. This is an important consideration, and the data is readily available.

Lest I appear carping, let me hasten to indicate that most of the material seems to be quite good. I spent several evenings browsing through the volume, and my general impression is that, in view of what was intended, the volume is quite satisfactory and that it will be useful to have around. I suspect, again, that some of the criticisms which I have raised result from the probable fact that the committee was turned down by those who could have provided the information. These few grumbles are not intended to be destructive of a worthy project which, in most respects, is very well done.

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HISTORY AND PHILOSOPHY OF SCIENCE

On Laws That Govern the Growth of Science

A good deal of the substance of Derek Price's *Little Science, Big Science* (Columbia University Press, New York, 1963. 144 pp. \$4.50), which is based on the 1962 Pegram lectures, has been previously published in a shorter form, entitled "Diseases of science," chapter 5 of Price's *Science Since Babylon*. That book was itself based on a series of lectures, given in 1959; so we now have a book based on a series of lectures which were based on a chapter of a book that was also based on a series of lectures. It is, to that extent, a book twice removed from a lecture—and it suffers for it.

This apparently accounts for the paucity of credits.

In *Science Since Babylon*, Price put forth two "laws" of the growth of science. It is to these laws that he devotes a major portion of this latest effort. Price attempts to treat science as a measurable quantity. His aim is to elucidate what is new in the age of Big Science that makes Big Science different from Little Science.

Throughout, we find references to "this mathematical analysis"; yet right at the start we are told, "My approach will be to deal statistically in a *not very mathematical fashion*, with gen-

eral problems of the shape and size of science and the rules governing growth and behavior of science-in-the-large" (p. viii, emphasis added). One worries about a study which is statistical in a not very mathematical way. And one is further confounded by an ominous mixing of metaphors in the next paragraph. In Price's view, the methods he is going to use are similar to those used in thermodynamics. But then we read that, "according to this metaphor [the four lectures are concerned, respectively] with the volume of science, . . . the velocity distribution of its molecules, . . . the way in which the molecules interact with one another, and . . . the political and social properties of this gas" (p. viii).

What Price here describes is, however, nothing that resembles thermodynamics. The analogy, that is closer than any other one, would be statistical mechanics. But the kinds of answers one gets in statistical mechanics depend entirely on the kinds of assumptions that one makes about the interactions and velocity distributions; analogously, the kinds of answers that Price comes