

both phylogenetic and functional points of view. As is inevitable with any anatomical description which follows the organ system plan rather than the regional one, it is not now possible to obtain a complete picture of any part of *Latimeria*. The authors have included some pertinent remarks about blood vessels, nerves, and the brain; but for most of these details we must await the succeeding volumes. They have greatly enhanced the usefulness of the text by making frequent comparisons with the fossil coelacanths and with the rhipidistians.

The illustrations, including x-rays, photographs, and drawings, are numerous and excellent. There are a few unfortunate omissions, and some of the figures have no labels or are inadequately labeled. A lateral view of the complete skull plus visceral arches is, surprisingly, absent, although it would be very helpful. Additional drawings of the visceral skeleton, including the basi-branchial elements, would be very desirable.

This volume, and the others to come, represent one of the most important additions to the literature of vertebrate morphology in many decades. The authors are to be congratulated for the thorough manner in which the investigation is being carried out.

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Records of the American-Australian Scientific Expedition to Arnhem Land. vol. 3, *Botany and Plant Ecology*. R. L. Specht and C. P. Mountford, Eds. Melbourne University Press, Melbourne, Australia, 1958 (order from Cambridge University Press, New York). xv + 521 pp. Illus. \$19.50.

Arnhem Land, an aboriginal reserve on the northern coast of Australia, was the site in 1948, of a joint American-Australian scientific expedition. Seven months were spent by the participants at selected stations on the mainland and on a large offshore island; during this time, nearly 45,000 specimens of plants and animals were collected, as well as vast quantities of data and specimens for ethnologic and anthropologic study.

R. L. Specht, one of the coeditors of this second volume of the four planned to report the results of the expedition, served as the botanist and ecologist on the venture. He is also the author or co-author of the sections of the report concerned with the identity of the higher plants and their ecological and phyto-geographical interrelationships; the final section, on the ethnobotany of the re-

gion, is also written by Specht. Various specialists have contributed chapters on the fresh-water algae, on the Characeae, the marine algae, the Basidiomycetes (with the exception of the Agaricaceae, which are treated in a separate section), the lichens, the bryophytes, and the pteridophytes. A number of new taxa are described in several of these groups, especially among the fresh-water algae.

This is a scholarly work which does not purport to be entertaining reading; it is a technical report of a well-executed scientific study. As such, it is an exceedingly valuable addition to the botanical literature for that part of the world. The two chapters on climate, soils, plant ecology, and the geographical relationships of the flora should be especially useful.

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The Tarantula. William J. Baerg. University of Kansas Press, Lawrence, 1958. 88 pp. Illus. \$3.

"To anyone who has learned to know this spider, it is as handsome as a gold-finch, and fully as interesting." Though many an open-minded biologist might understandably take issue with the first assertion, after reading W. J. Baerg's lively and authoritative account of the tarantula, he could not help but subscribe, perhaps with sudden surprise, to the second. Tarantulas are indeed shown to be interesting animals in this small but factually saturated work.

"Tarantula," technically a misnomer, popularly refers to certain reputedly primitive and chiefly tropical spiders of the suborder Orthognatha (or Mygalomorphae). For the uninitiated they are too often the spidery horrors par excellence; their gargantuan proportions, often hairy massive bodies, huge projecting fangs, and unlikely turret of tiny gleaming eyes have somehow gained them an often unshakably sinister reputation. Their presumed invariably fatal bites, propensity for bullying human beings, and ability to leap fantastic distances, and other macabre characteristics, are investigated, discussed, and usually discounted by the author in his easy conversational and frequently witty style. He defends tarantulas vigorously and might well have asked, as did one eminent araneologist, why people regard tarantulas' hairy bodies and long, thin legs with frank horror when these same characteristics in Russian wolfhounds are quite acceptable if not desirable.

The book is entirely concerned with the ethology of these spiders, not with their distribution, classification, or iden-

tification. Drawing upon 35 years of experience with them, Baerg outlines, probably for the first time, a complete life history, from birth to death, of each sex—no small task when one considers that these chelicerate Methuselahs may live for 20 years or even longer. He provides a first-hand account of their mating habits, describes their seasonal activities, and deals briefly with their natural enemies—chiefly pompilid wasps.

There is a most entertaining and enlightening—though perhaps for some readers a chilling—description of Baerg's quests for the great spiders and their lore in Mexico, Central America, and the Caribbean area. Baerg concludes with a short though informative treatment of tarantula venom and its effects upon laboratory animals and even upon himself. Injection of the venom may be painful, he says, but in the case of the majority of species, the venom seems essentially harmless to man.

The little book was obviously written affectionately and from the vantage points of dedication and much experience. It is good reading, but in addition it is a valuable scientific contribution. In closing Baerg writes: "In fact, for anybody who has the good fortune of having one or more of them living in the backyard, as several of my colleagues have, tarantulas are good neighbors. . . . They stay long enough for one to become much attached to them." In 35 years of close association the author has clearly become attached to them as well as expertly informed about them.

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The Submicroscopic Organization and Function of Nerve Cells. *Experimental Cell Research*, suppl. 5. Academic Press, New York, 1958. 644 pp. Illus. Cloth, \$14; paper, \$12.

Under the auspices of the Venezuelan Institute of Neurology and Brain Research of Caracas, Venezuela, a group of distinguished investigators from Venezuela, the United States, and several other countries reported, at a symposium held 15–22 March 1957, in Caracas, on recent advances in the fine structure and function of nerve cells.

The collected papers in this volume are grouped under five major headings: "The nerve fibers," "The nerve cell membrane," "The neurons," "The synapses," and "The receptors." These symposium papers do not represent an integrated approach to any one topic but are concerned with various problems of both investigative and theoretical interest. Some of the data presented are not

new, having been published, *in toto* or in part, elsewhere. Other papers are literature reviews. Although some of the topics have already received much attention in earlier published works, emphasis has been placed not only on additional new data but—what is perhaps even more important—on attempts to correlate structure and function through the use of a wide variety of experimental techniques. Among the methods employed by the various investigators were x-ray diffraction, electron microscopy, light microscopy, histochemistry, biochemistry, pharmacology, and electrophysiology. In most instances the investigators employed more than one experimental method. This approach has yielded a clearer understanding of the topics under consideration. Moreover, it presents the most recent morphological, biochemical, and physiological data in relation to current thought and research trends in certain areas of cellular neurobiology.

In addition to the papers dealing with nervous structure and function, four studies are included in the collected papers of the symposium which are of peripheral but, nonetheless, current interest. The high level of the papers is punctuated by an amusing addendum to one of the studies.

This book will be of value chiefly to those investigators whose interests lie in similar research areas. It should also be of value to cellular and comparative biologists with adequate backgrounds in the field of neurobiology, but it will not be easy going for the casual reader.

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The Biological Way of Thought. Morton Beckner. Columbia University Press, New York, 1959. 200 pp. \$6.

The biologist today is a curiously nervous fellow. He is beset by an ever-increasing need for physicochemical techniques and at the same time is alone in the task of reassembling the extracted parts into the living organism. Latter-day mechanists consider biology to be merely a complex extrapolation of physics and chemistry, while the modern heirs to vitalism, the "organismic biologists," vehemently reassert that the whole is greater than the sum of the parts. Reductionism versus emergence is still being argued.

Morton Beckner's book is a useful clarification of the position that biology is a unique and autonomous discipline which requires its own techniques of theory formation despite its use of physicochemical data. To this end, he restates the philosophic basis of organismic

biology and examines the qualities of organization, directiveness, and historicity which are attributed to living things alone. In effect, Beckner concludes that in our present state of ignorance the biologist has, perforce, to develop a methodology and a philosophic approach which is far removed from the physical and chemical mechanisms underlying the behavior of biologic material. This is best illustrated in such areas as taxonomy, evolution, and selection theory and genetics, where the New Systematics may be successful in resolving many problems of classification. Of more general interest is the closely reasoned case for the utility of model explanation and the teleological explanation in approximating biologic "truth."

Unfortunately, the working biologist is likely to be overwhelmed by the tortuous terminology used. Furthermore, a more immediate problem confronting the biologist is not the need to rise above the physical sciences but, rather, the need for enough training in physics and chemistry to put the enzymes back into the cells. One must agree in substance with Beckner that the traditional approach of the biochemist will not resolve the question of what is life, but neither will the New Systematics.

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Mineral Nutrition and the Balance of Life. Frank A. Gilbert. University of Oklahoma Press, Norman, 1957. xv + 350 pp. Illus. \$5.95.

The book is a critical review of 1177 books and articles on the mineral elements necessary to life on earth. The following essential elements are discussed: phosphorus, calcium, magnesium, iron, potassium, sulfur, copper, manganese, zinc, iodine, boron, molybdenum, aluminum, silicon, sodium, chlorine, fluorine, arsenic, lead, selenium, and vanadium. Each element is treated separately with respect to its relation to plants and animals, its essentiality, and its occurrence in water, soil, and living tissues. The deficiency areas and deficiency symptoms in plants and animals and the connection of some of these elements with enzymes, vitamins, and hormones are shown. The final chapter deals with the relation of soil and fertilizer to mineral metabolism in plants and animals, with human nutrition, and with national health. This chapter, which consists of only eight pages, is much too short to convey even a most elementary understanding of such complex and difficult subjects.

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Die Haustiere Afrikas. Ihre Herkunft, Bedeutung und Aussichten bei der weiteren wirtschaftlichen Erschliessung des Kontinents. Caesar R. Boettger. Fischer, Jena, Germany, 1958. x + 314 pp. DM 31.20.

This remarkable book is probably the most complete, the most up-to-date, and the most critical account in existence of our knowledge of the origin, evolution, and distribution of domestic animals, of their value to man, and their influence on the development of cultural patterns. Although relatively few of the animals under domestication have their origin in Africa, most of the others have been introduced into this continent since prehistoric times, and, therefore, this book deals with almost all of them, even with bees, silk moths, and cochineal insects. The only domestic species not introduced, and therefore not discussed, are the reindeer, the three South and High Asiatic species of cattle—that is, the gayal, banting, and yak—and the South American llama and alpaca.

In contrast to widely prevailing views, it is pointed out that nomadic life is not the precursor of sedentary agricultural culture but that random food gathering, including hunting and fishing, preceded planting, that regular agriculture became possible only after suitable domestic animals had become available, and that the modern nomadic life is a secondary development brought on by the necessity of feeding too many livestock.

It is shown that the dog is the oldest domestic animal, that the pig is next in line, and that it was replaced in the Near East by cattle, sheep and goats. The origin of all these domestic animals is in the fertile crescent of anterior Asia, although later on related subspecies of the same forms were tamed, and frequently crossed, with the original stock in other parts of Asia, as in India, Malaysia, and China.

Whereas most species were domesticated for reasons of utility, cattle and the cat originally were taken on for cultic reasons. The same applies to the jackal in Egypt, which is no longer associated with man.

African origin is accepted for the donkey, cat, ferret, rabbit, pigeon, dove, guinea hen, and some breeds of bees. However, other species were temporarily kept in Egypt, such as the jungle cat (*Felis chaus*) (for cultic reasons), the striped hyena, three species of antelope, the Nile goose (*Alopochen aegyptiaca*), and the African elephant (in North Africa). Some of the introductions from Asia, the distribution of which is more restricted, are the horse, the water buffalo, and the dromedary. The latter is considered to be derived from a wild species different from the wild ancestor of the Asiatic two-humped camel.