In the fresh-water section the physical and chemical factors of the environment are presented, such as the temperature, heat budgets, light penetration and oxygen tension of lake waters. These are followed by a discussion of the animal communities of running and standing waters. In the latter attention is given to the various types of lakes as well as to the life of the different zones, such as the forms that live in the shallow water, on the bottom and in the limnetic region. The unique and interesting faunas of Lake Baikal and Tanganyika receive special mention. Running waters offer a different set of environmental conditions from standing waters, and their animal communities are correspondingly different in many respects.

The third section deals with the distribution of land animals, including the various kinds of communities such as those found on dry land, in forests, in swamps, on islands and in alpine, polar and subterranean environments. The final chapter considers some of the effects of man on the distribution of other animals; the effects of deforestation, cultivation of the land, intentional and unintentional transportation of animals, as well as the pollution and artificial modification of lakes and streams, are discussed in this connection.

The book is well written and the text is illustrated with 135 figures. Extensive bibliographies are given at the ends of the various chapters. It is a very welcome addition to the literature dealing with animal distribution from an ecological standpoint.

CHANCEY JUDAY

UNIVERSITY OF WISCONSIN

BIFURCATION IN SERPENTS

Axial Bifurcation in Serpents. By BERT CUNNINGHAM. Duke University Press, Durham, N. C. 1–91, fig. 1, pls. i–xii. $2.50. 1938.

MOST herpetologists are aware that for many years past dicephaly in reptiles has been one of Professor Cunningham's interests. In the present volume he brings together all the reliable records of dichotomus snakes that he has accumulated, together with the results of his own examinations and x-ray studies of much of the existing material. Grouping this material principally into three sections—those exhibiting cephalic, anterior and posterior dichotomy, he proceeds to deal with it chronologically.

Some of the citations in the historical section are very entertaining, as for example: "Also this yeere (1349) in the countie of Oxforde, nigh unto a towne called Chippingnorton, there was found a serpent having two heads, and faces like women, one being shaped after the newe tyre of that time; another after the manner of Flinder-mouse or Batte" (p. 14).

It was a surprise to this reviewer to learn that for snakes as many as 170 to 225 cases of such monstrosities are on record. Rhyne's account in 1680 of Javan two-headed nakes (p. 14) should, however, surely be referred to some such species as *Cylindrophis rufus* or *Maticora intestinalis,* which carry their tails poised like a head and in some instances have them appropriately colored.

The whole work bears such evidence of care and thoroughness that reviewers will be hard put to it to find flaws in its presentation. One might point out that the "*Coluber natrix,* taken near Drakensburg" (p. 25), if the identification is correct, is not "probably South Africa" (whose mountains are spelt Drakensberg), but Drakensburg in Hanover, Germany, where *N. n. natrix* is a common species. Similarly, as *N. s. fasciata* does not occur in Nicaragua, there is something amiss.

The concluding chapter consists of a summary and discussion as to the causative factors of dichotomy. Dr. Cunningham rejects shock or sudden change of temperature as the probable cause, considering that additional embryonic discs on a single yolk, or multiple organization centers originating from different egg nuclei, are more likely to furnish the correct explanation.

A good index and an extensive bibliography are included. An index or appendix in the nature of a systematic catalogue with modern nomenclature would have been an asset, but Professor Cunningham has furnished reasons (p. 67) for its omission. Many of the 134 figures are excellent photographic reproductions of prints from early works.

ARTHUR LOVERIDGE

MUSEUM OF COMPARATIVE ZOOLOGY,
HARVARD UNIVERSITY

SPECIAL ARTICLES

THE RESPONSE OF THE MYASTHENIC STATE TO GUANIDINE HYDROCHLORIDE

DALE, Feldberg and Vogt[1] in 1936 demonstrated that acetylcholine is liberated when a motor nerve to a striated muscle is stimulated and concluded that acetylcholine is essential for the transmission of motor impulses. Loewi and Navratil[2] had previously shown that physostigmine inhibits the action of enzymes which are normally present in body fluids and which hydrolyze acetylcholine to choline and acetic acid.

[1] H. H. Dale, W. Feldberg and M. Vogt, *Jour. Physiol.,* 86: 353, 1936.

[2] O. Loewi and E. Navratil, *Pflug. Arch. f. d. gesamt. Physiol.,* 214: 678 and 689, 1926.