tinuity. The artificial division of snake venoms into semi-chemical, semi-pharmacological and semi-clinical persuasions is disquieting, and when I found that there are no published papers in the chapter beyond 1962 I was very disappointed, especially because of the significant contributions to the literature on this subject since that date. The abundance of unevaluated and unpublished observations casts further ripples on the waters.

Barne's contribution on sea snakes is excellent. He covers his subject in an interesting and comprehensive manner. Klemmer has done his usual good work on a check list of the European, North African and certain Asian venomous snakes; Leviton has contributed a similar fine check list of the venomous terrestrial snakes of East Asia, India, Malaya and Indonesia; and Broadley has provided one on the venomous snakes of Central and South Africa.

For the most part the remaining chapters are about the venoms of snakes, based on the geographical distribution of the snake. Several of these chapters are well done, but the arbitrary division of the subject matter on the basis of geography is unfortunate, for it leads to a very inconsistent handling of the chemical and biological properties of the venoms, and, more disturbing, to a degree of repetition that makes reading a chore. Some statements are quoted four or five times in three or four different chapters without any significant additional contribution being made. One of these chapters gives only one reference beyond 1961, and again, this is very disappointing, because more than 100 papers have appeared on this particular subject since that date.

The several chapters on the clinical problem of envenomation are good. There are some sweeping generalizations (and I wonder how a section on spiders survived editing), but these do not detract from the value of the chapters. The book has excellent author and subject indices.

The text falls short of being a compendium of our knowledge on venomous vertebrates. Most distressing is the finding that one of the most important areas of study, the structure of the venom glands of snakes, is conspicuous by its absence from the book. Because of the many fine works on this subject it is difficult to understand how this topic can be omitted; and there is no evidence in the listing of "tentative" subjects for the subsequent two volumes that it will be included. There are other serious omissions of subject material.

This was a difficult book for me to review, because I know or have met all but two of the authors, and I have great respect for these gentlemen and their works. I trust they will forgive my harshness. Nevertheless, I see little reason for this work having been published as a text. The critical papers could just as well have been published as separate works in the biological or medical journals. I hope that the editors will reorganize their thoughts and material, and present a more comprehensive and readable treatise if future volumes are published.

F. E. RUSSELL

state of knowledge of the morphogenetic processes of protozoa, is of special significance. The systems of intracellular determination, inhibition, or regulation, and the part played by the cell cortex and kinetosomes, best exemplified in the ciliates by reference to Tartar's own work, have implications for cells in general. The changes in cell form seen in nutritional gigantism, in the transformation of the amoeboid-flagellates between amoeboid and flagellate forms, in encystment and excystment, and between other life cycle stages, invite a comparison with the expression or masking of genes in the development of multicellular organisms, although they are often, if not always, triggered by changes in external rather than purely internal conditions.

The chapter by D. M. Prescott and G. E. Stone describes the course of DNA replication and RNA production in relation to the cycle of cell growth and cell division. Impressive autoradiographs are reproduced which illustrate the process of DNA replication in the macronucleus of *Euphotis*. This chapter also contains interesting observations on the unexplained behaviour of nuclear proteins in *Amoeba*. The origin of cytoplasmic RNA is attributed almost entirely to the nucleus, but the effects of enucleation on cell activity are not pursued.

Anisogamonty, pseudo-anisogamety, and all the other sexual aberrations of protozoa are analysed and reduced to order by K. G. Grell. Where possible, Grell discusses the relation of myosis to the life cycle and the genetic or phenotypic nature of any heterosexuality which occurs. The ecology of free-living protozoa is comprehensively discussed by L. E. Noland and M. Gojdics in terms of the effects of environmental factors, in a most useful and scholarly review. Progress in the quantitative ecology of protozoa is surprisingly backward and the analysis of ecological situations using artificially established laboratory populations has not been pursued by protozoologists with the vigour which might have been expected.

A long and important chapter by A. C. Giese describes the effects of all kinds of electromagnetic radiations on protozoa. A survey of the effects of visible light includes the relations of light with circadian rhythms. The discussion of the effects of ultraviolet irradiation includes action spectra in relation to possible effects on nucleic acids or proteins, and attempts to infer the biochemical nature of the damage. A stimulating account of the effects of ionizing radiations emphasizes the interaction of nucleus and cytoplasm and the contribution which protozoa can make in a study of the mechanisms of radiation damage.

In the chapter on growth of parasitic protozoa in tissue cultures, W. Trager and S. M. Krassner review recent progress in the transformation of trypanosomes through life cycle stages in culture, the cultivation of exoerythrocytic stages of avian *Plasmodium*, and the prolonged culture of *Toxoplasma* under conditions suitable for a study of environmental effects.

The contributions in this volume do justice to the title—they deal with fields of protozoology in which research is active and fundamental.

J. A. KITCHING

RESEARCH ON PROTOZOA

Research in Protozoology

Vol. 2. Edited by Tze-Tuan Chen. Pp. vii + 399. (Pergamon Press: Oxford, London and New York, 1967.) 110s. ; \$17.

VOLUME 2 of *Research in Protozoology* demonstrates once again that studies of protozoa encompass a whole range of fundamental biological problems for which these organisms provide excellent material. Each author in his chapter has interesting and important things to say, but the first chapter, by Vance Tartar, outlining the present

PSYCHIATRIC PROBLEMS

Biological Psychiatry

A Review of Recent Advances. By J. R. Smythies, Alec Coppen and Norman Kreitman. Pp. viii + 112. (Heinemann Medical: London, 1968.) 30s.

Heredity and Environment in the Functional Psychoses
An Epidemiological-Clinical Twin Study. By Einar Kringlen. Pp. 200. (Universitetsforlaget: Oslo; Heinemann Medical: London, 1967.) 65s.

THERE is a growing tendency in Britain to follow the trend in the United States and to reject the biological basis of psychiatry. Dr Smythies has been a consistent