BRAIN SLABS

The Uncertain Nervous System

By B. Delisle Burns. Pp. viii + 194. (London: Edward Arnold, 1968.) 65s.

DR BURNS says, disarmingly, in his preface: "... I wrote the pages that follow primarily for my own amusement". A reviewer must assume that he succeeded and apply some other criterion for judging his book. Its public function, which is obviously not to be a text in the accepted sense, must be either to stimulate thought, or at least to bring together data not available so conveniently elsewhere. The theme of the book is the statistical analysis of central neuronal activity. The author's own work, which forms the bulk of the material considered, is mostly concerned with recordings of single-unit activity with extracellular microelectrodes. The activity of the cortex is deduced from these recordings alone. Within these limits I found the account coherent and indeed stimulating, although it was not always easy to assess the true significance of a result from the material presented.

The introductory chapters discuss the various models proposed for integrated neuronal activity and their statistical implications. There is no discussion of whether it is a justifiable approach to average analyses over time; of whether, for example, one should expect successive neuronal responses to a repeated stimulus to be superposable to form a linear average. Indeed, this method of analysis is applied to a "conditioning" paradigm described in the penultimate chapter of the book, where the expected behaviour is non-linear. But even though the brain is not performing an averaging operation on a temporal sequence of events, it is probably unfair to cavil at this approach; the problem of the cortex is so obscure that all conceptually simple tools should be used wherever possible.

The climax of the book, reached after a consideration of more established neurophysiology, particularly that of the cat's visual system, is the attempt to uncover the laws that underlie the changes in conductivity across central synapses that are assumed to be the basis of learning. Dr Burns's technique is to prepare an isolated slab of unanaesthetized cortex, stimulate it by two pathways, one from the white matter below the slab and one from the pial surface. If this is accepted as a reasonable model of the learning brain, then the results presented seem to rule out any simplistic notion of "synaptic facilitation". It is difficult to be sure what conclusions are really justified, at least from the data presented in this book; but Dr Burns and his colleagues have published an account of the relevant experiments and the somewhat original mathematical analysis in the *Journal of Physiology* (195, 339-367; 1968), with more detail of methods and results.

In the last chapter Dr Burns shows that he is well aware of the limitations placed on neurophysiologists by the complexity of the brain and he suggests some alternative approaches to the problem. This book is amusingly and clearly written, with a pleasantly idiosyncratic style. As an investment it is expensive for its size, but it does contain an unusual collection of facts and ideas.

ANTHONY ROBERTSON

SMOOTH SKINNED VERTEBRATES

Amphibians of Malawi

By Margaret M. Stewart. Pp. ix + 163 + 20 plates. (Albany, New York: State University of New York Press, 1967.) \$7.50.

Not only the children of Malawi, to whom the book is dedicated, but the naturalists who are keen to further their knowledge, the specialists and the students of herpetology will benefit greatly from reading and using this expert account.

Professor Stewart's book could justifiably be described as a field guide on a grand scale, blown-up but not padded. Often a field guide suffers from over-condensed descriptions and from various omissions such as data on life history and sex dimorphism and authorities for statements on habits and habitats; this one does not. The book provides the reader with a comprehensive species list with scientific names, authorities and common names and a wealth of accurate information on each form known to occur in Malawi. An added attraction is the author's artistic and technical ability with both pen and camera, each species being illustrated with line drawings and some with a colour photograph. For diagnostic purposes the drawings could scarcely be better, but aesthetically the photographs have the greater appeal. A glossary, a key for the identification of the species and instructions on how to use a taxonomic key, and a guide to collecting and preserving techniques increase the scope of the book. Mrs Stewart's field experience and familiarity with the species and their biotopes are particularly worthwhile ingredients, but the book is further enriched by her having discussed her work with experts on amphibian taxonomy, by her knowledge of the pertinent literature and by her having had access to museum research collections.

It is unfortunate that her basic definition of amphibians is given as "vertebrate animals with smooth skins" and is followed by two colour plates of rough and warty skinned toads. Despite her qualifying statements, one cannot help wondering whether some readers would confidentially classify as an amphibian a naked ape with webbed toes.

This book will slip into only a poacher's pocket, but that does not detract from its value as a field guide, for how many collectors grabbing agile frogs on slippery banks of streams, in marshes and in bush would want to be encumbered with a book? Better that *Amphibians of Malawi* should be on the library shelves, in the home or in camp ready to be seized upon when a collector returns with his catch.

A. G. C. GRANDISON

DISPOSAL OF WASTE

Agriculture and the Quality of Our Environment

Edited by Nyle C. Brady. (A Symposium presented at the 133rd Meeting of the American Association for the Advancement of Science, December 1966. Publication No. 85.) Pp. xv + 460. (Washington, DC: American Association for the Advancement of Science; London: Bailey Bros. and Swinfen, 1967.) 162s.

HUMAN food producing systems must be capable of increased output to meet the demands of increasing and often wealthier populations and, at the same time, be persistent over decades and indeed centuries. Both increased food output and persistence are exposed to three major sources of long term ecological instability: soil erosion, soil salinity, especially in irrigated areas with hot or warm dry climates, and environmental pollution. Though developed countries have made some progress in combating the first two, the third but growing problem, pollution, is substantially unsolved. It is largely the product of industrialization, urbanization, automobiles, rising living standards and technologically advanced agriculture. "Domestic, industrial and agricultural activities generate unwanted materials (wastes) which must be collected... and transported to sinks for ultimate disposal, i.e. the land or the oceans". Air and water cannot be "means of permanent disposal" but "means of transport from source to sink... Limited air, land and water resources must not only support a society in which population, industrialization, urbanization and mobility are constantly increasing but also assimilate" the materials it rejects as wastes.

This quotation from a paper (at page 367) by C. D.