assessment then became essentially one of soil type, climate and land form subject to current technology.

The book outlines in Part I the methods used, which relied heavily on computer coding and extraction of data, the overall potential classifications, and discusses trends in development of crop and pasture potential. Part 2 indicates how the computer stored data may be accessed. The data base covers 3282 land units in 114 shires in Queensland.

The report is accompanied by four wall maps covering (i) crop potential (ii) sown pasture potential (iii) native pasture communities (iv) dominant land suitability, each at a scale of 1:2 500 000 and a series of microfiche appendices. These provide data on potential and current land use at land unit, shire, regional and state levels of assessment. This information is also provided for vegetation zones, native pasture communities and soil texture groups. Additionally on microfiche are statistics for gross and net crop, sown grass and sown legume potential and a listing of the basic data available.

As the summary says "This report contains information for government and industry administrators, for research planners and for educators. Many facets of the States natural resources are quantified in the statistics". On the broadest scale the Queensland land resource of 172.8 m ha provides a cropping potential of 14.2 m ha annually (presently 2.1 m ha used); a sown pasture potential of 40.6 m ha (currently 3.9 m ha developed). With full development of these the present 154.8 m ha native pastures would contract to 105.9 in ha. As these types of data are shown shire by shire and land unit by land unit their availability have a major impact on the states future development.

D. G. CAMERON

Terrestrial Nitrogen Cycles, Processes, Ecosystem Strategies and Management Impacts.—Eds. F. E. Clark and T. Rosswall, 1981. ISBN 91-546-0290-4. Ecological Bulletin (Stockholm) No. 33 709 pp. Sw. Kronor 250

This publication is based on the proceedings of an international workshop held in Sweden, September 1979, sponsored by the SCOPE/UNEP International Nitrogen Unit of the Royal Swedish Academy of Services and the Commission for Research on Natural Resources of the Swedish Council for Planning and Coordination of Research. The seven-hundred odd pages of the book are organized into forty-one chapters excluding the nine chapters that comment on each group of presented papers. The chapters are organized into four sections namely Introductory Papers, Processes, Ecosystem Strategies and Management Impacts.

The publication is a well balanced mixture of technical and review articles and although it would be of most value to those actively involved in the field, I (a legume bacteriologist) found it very interesting, informative and readable. Each section of the book is logically linked to those preceding and following it.

The Introductory Papers provide an imaginative overview of the history and state of the art of N-cycling, together with a major emphasis on modelling with one article which attempts to integrate both the carbon and nitrogen cycles. If one of the aims of modelling is to raise questions and to indicate the areas where data is lacking, this has been constructively achieved by the Introductory Papers.

The breadth and depth of the topics covered in the section on Processes is impressive as all the major mechanisms of the N cycle are critically discussed. The physical and biological avenues by which nitrogen can enter and leave a cycle are evaluated and articles are presented on the fixation of ammonium to soil particles, the mobility of the ammonium ion in soil and the mineralization of organic matter and the role of soil fauna in this process. The section contains comprehensive articles on ammonia volatilization, nitrification, dentrification and a chapter by J. M. Tiedje *et al.* which contains a simultaneous investigation into assimilatory and dissimilatory

reduction of nitrate to ammonium and to nitrous oxide and nitrogen gas using a double label.

The effect of mycorrhizae on nitrogen uptake is included in this section as are chapters on nitrogen uptake by plants and a review of the biochemistry of plant growth in relation to nitrogen supply. Such processes as soil erosion, leaching and ammonia volatilization which remove nitrogen from the soil-plant system are also discussed. An interesting article by C. V. Cole and R. D. Heil presents the hypothesis that with sufficient time a relationship is established between the level of available phosphorous and the nitrogen supply.

In the section dealing with Ecosystem Strategies, descriptions of the nitrogen cycle in all the major ecosystems have been discussed. These include the tundra, coniferous and deciduous forests, grasslands and savannas, deserts and tropical rainforests. An article by W. A. Reiners on ecosystem succession is very interesting and provides some unity to the section.

The effects of agriculture, especially additions of nitrogenous fertilizers, on the nitrogen cycle are discussed in several papers. The underlying motivation for conducting some of this research seemed to be to increase efficiency of nitrogen fertilization. By understanding the changes induced in the cycle by the application of fertilizers it is hoped to be able to manage the system more effectively and most importantly, to reduce the detrimental effects upon the environment. It is evident from the articles that much more work needs to be done. Other topics in this section include the effects of grazing, irrigation, drainage, clearing and fire on nitrogen within a range of ecosystems.

A concluding chapter by P. Newbould, titled "Terrestrial nitrogen cycles: Problems, present knowledge and future research needs" provides incisive comments together with a summary of the book and his thoughts on the major avenues of research that should be followed.

The book is excellent value and is highly recommended for research workers and others concerned with the nitrogen cycle. It is an asset to have the wide scope and depth of interest presented in this publication within one book.

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