BOOK REVIEWS

Grass—A story of Frankenwald by Edward Roux. Oxford University Press: Cape Town 1969. Price (Australian) $7.80.

Edward Roux has given us the story of Frankenwald, the field research station of the Botany Department, University of the Witwatersrand, South Africa, in a most readable manner. This book will appeal to layman, farmer and scientist alike for Roux has the undoubted ability to communicate research findings to all of these groups in an interesting way. It is an important book because Frankenwald, which was established in 1931 by the well-known Professor John Phillips, became the main fount of South African philosophy on natural pasture management and its use.

Roux has brought out some interesting conflicts in philosophy in these pages. He does not entirely agree with Phillip's wholistic or organismic approach which is the biological extension of his mentor's (General Smuts) philosophy. This we would now call an ecosystem approach. Roux is right in suggesting that we need to investigate the individual parts of the ecosystem in depth while Phillips is right to suggest that we try to look at it collectively. However, we are often handicapped by not knowing the extent of the ecosystem, and this tends to be enlarging all the time. There is also the danger that the ecosystem is only as large as the investigator's interests! It is this conflict that leads into Roux's intellectual searching for the explanation of the purple veld succession in his penultimate chapter. Here the conflict between R. L. Davidson and R. M. Jones is brought out where Davidson considers the succession to be due to each successional stage making its own environment unsuitable for itself and Jones considering availability and quantity of seed to be the governing factor. Roux takes a rational view of both sides which seems more satisfying. Succession cannot and should not be governed by any one set of rules. In a sense it is analogous to organic evolution except that the process is reversable. Sometimes succession proceeds in orderly, well defined stages because the factors controlling it are simple but significant. These are the classical cases of succession and generally they are repeatable. In environments of considerable variability or instability or with depleted vegetations succession is less likely to be predictable because so many more factors are involved. In southern Queensland light grazing over a 100 year period has eliminated *Themeda australis* from a *T. australis* climax grassland to form a *Heteropogon contortus* sub-climax and this is generally non-reversible due to the loss of the Themeda seed source. Heavy grazing of, or high nitrogen applications to *H. contortus* grassland brings about reversion to either *Cynodon dactylon, Chloris divaricata* or *Bothriochloa decipiens* dominance, apparently according to the respective availability of seed, which is partly a matter of chance, partly historical and partly related to the particular sequence of seasons and hence grazing levels the grasslands have experienced.

The interesting feature of the work in South Africa which emerges from this book is the strong preoccupation with natural grassland succession. In a sense this is starting at the opposite end of things from ourselves in Australia. They have been concerned with assessing the environment more or less as it was or is rather than with assessing its absolute potential as we have. At some stage it is necessary to look at the whole spectrum and we are now finding it desirable to begin looking at the other end of it while we also continue to search for the optimum. Throughout the book Roux refers to the desirability of maintaining high protein levels in the grasses and he even considers the large scale use of ammonium sulphate on native pasture as an economic proposition, but the only mention of the use of a pasture legume is that of having supplementary areas of lucerne in one instance.

Surely, here is a profitable field of endeavour completely neglected. Furthermore, very little effort has been put into plant nutrition work, even though the soils of Frankenwald are acknowledged as being poor. This is perhaps the lesson to be learned from a preoccupation with the climax.

Timely, perhaps, is the chapter on the philosophy of dung which graphically describes the activities of dung beetles. These remarkable insects have recently been released in several places in northern Australia and it will be interesting to see if the fascinating story which Gillard tells of their behaviour and effect on Frankenwald grasslands is duplicated here.

The intervening chapters of the book deal with a wide range of specific studies which contribute to the understanding of these grasslands. They display graphically how well the research station has served the Botany Department in providing an invaluable resource and environment for student and faculty research.

The final chapter entitled "Outlook for grass" is disappointing though we must remember that Roux was seriously ill when he was writing this book. However, one idea, which is not new, of harvesting and managing wild animals has merit, especially in Africa but also in Australia. It has generally been found that greater production can be achieved by grazing different types of animals together rather than separately because their diets do not entirely coincide.

The book is well printed, and the illustrations attractive. However, the continuous tone photographs are generally rather poor and "muddy". This is a pity for an otherwise well-produced book.

J. C. TOTHILL

Australian Grasslands, edited by R. Milton Moore. 455 pp. 1970. Australian National University Press, Canberra. Price $15.00.

The delegates to the XIth International Grassland Congress, held at Surfers Paradise in Queensland in April 1970, had the pleasant surprise of finding a copy of this book among the many pounds of papers handed out to them. The more than 800 delegates to the Congress now possess an up-to-date and thorough review (the book covers over 1200 literature references) of Australian grasslands, and Dr. R. Milton Moore is to be congratulated on achieving the formidable task of getting 35 contributors, who represent the major organizations of agricultural research in Australia, to write 28 chapters covering the environment, a description of all types of grasslands in Australia, the important production factors, and the major livestock industries.

Grassland research has been in the forefront of scientific endeavours in Australia and has contributed greatly to the adoption of modern management techniques—including replacement of species. Especially in the last thirty years very considerable advancements in grassland technology have been made. The book under review is the first to bring together aspects of grassland production from the southern, northern and interior parts of the continent. To date, most emphasis of research has been on pasture species (introduction, selection and breeding), plant nutrition, nodulation of the legumes and grazing management. It can be expected that in the future studies of soil-plant-animal ecosystems, which are being carried out already, will receive most attention. These ecosystem studies do not get much treatment in the book and this is no criticism, because they are mostly still in the initial stages. However, because of this change in emphasis the book has come at a very opportune time. It is a comprehensive account of grassland science as it has developed in Australia up to the present.