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MR. C. A. Gardner, Government Botanist of Western Australia, is the author of a recently-published 400-page work on the native and introduced grasses of this State. The book is the first part of a projected "Flora of Western Australia" which is expected to comprise at least six volumes.

In selecting the Gramineae as the subject of the first publication of the series, the author has been influenced by the importance of this family in the economic sphere. The grasses are the basis of our pastoral and agricultural prosperity as they include not only the vast number of indigenous and introduced pasture species but all our cereals and a number of summer fodder plants which have made valuable contributions to livestock husbandry.

Mr. Gardner's well-executed pen-and-ink drawings have long been a feature of his published works and are already familiar to many botanists and to readers of the West Australian Department of Agriculture's publications; recognition of the plants described in the book has been facilitated by the inclusion of 109 plates and illustrations from his portfolios.

Each genus has been illustrated, at least one species being depicted. Where the group is of importance, either by reason of its grazing value or as an important element in the flora, each species of the group has been shown.

Written for the botanist rather than the farmer, the book is essentially scientific in its treatment, but the inclusion of a comprehensive glossary of botanical terms and a number of explanatory diagrams will assist the layman in identifying plants.

The book contains reference to all recorded species of grasses in the State, both native and naturalised. Keys, both generic and specific are provided, and although they must of necessity be somewhat technical, a genuine attempt has been made to make them as simple as possible, without destroying their scientific value.

The systematic arrangement of the species is original in its conception and consistent in its execution. The whole of the grass family as represented in the Western Australian flora has been treated from first principles, the two sub-families being divided into sixteen tribes on characters which are different, at least in part, from those on which the conventional tribes are based. Nor has the author necessarily followed the accepted principles in the delineation of groups or sections within the genera,
but has sought out characters which, from his personal experience are known to be reliable and easily verified.

Perhaps the most important departure made by the author is the restriction of the limits of the tribe *Aveneae*. As usually defined by authors, this tribe contains genera in which, among other characters, the lemmas are awnless, or are awned from the back or sinus of the two-lobed tip. The tribe as defined in this book, contains only those genera in which the lemmas are provided with a usually twisted dorsal awn arising from the middle or below the middle of the organ. On this character of the awn, the tribe in Western Australia consists of only five genera. Of the other genera which are usually included, *Astrebla* has been transferred to the *Chlorideae*, whilst *Danthonia*, *Schismus*, *Eriachne*, *Pentaschistis*, *Koeleria*, *Trisetum* and *Avellinia* have been added to the large tribe *Festuceae* with which they have a greater affinity than they have with those genera which have been retained in the *Aveneae*. This arrangement serves also to bring together such genera as *Triodia*, *Plectrachne*, *Danthonia* and *Eriachne* which have many features in common and are closely related.

The author has not maintained the tribes *Eragrosteae* and *Leptureae* of Hubbard. The genera of the *Eragrosteae* have been divided between the *Chlorideae* and the *Festuceae*, while the *Leptureae* has been incuded in the *Hordeae*, together with the closely related genus *Lolium*. This redistribution of the genera makes the tribe *Festuceae* a fairly large one, but no major difficulties have arisen in the construction of the keys to the genera, and the whole appears to be a uniform and closely related group.

In choosing key characters, emphasis has always been placed on those which the author's experience has shown to be reliable. This is particularly noticeable in the genus *Stipa*, a group which offers many difficulties due partly to the fact that the character often used in subdivision is the nature, and the degree of twisting of the awn. It can be shown that the awn varies considerably during the process of drying, so that a key based on herbarium specimens is liable to give faulty results if applied to living plants. The ligule of the leaf and the vestiture of the awn, are constant for each species, and have been employed in the key, together with the nature of the lemma and palea.

A welcome feature of this volume, and one that is very infrequently seen in modern works on systematic botany, is the inclusion of the derivation of the generic names. The origin of some of the names is most obscure, and a great deal of research was necessary for the compilation of such a complete list. It is interesting to note that, as a result of this work, several derivations given here do not agree with those published in other works.

In addition, the reference to the original description is given for every indigenous species. Naturalised species are not described as fully as the native plants, while no reference is given to the original description.

Although designed especially as a taxonomic handbook, the volume contains much information of value to workers in other fields. For example, chromosome numbers are recorded for all those species which have been examined, but these are, unfortunately, wholly introduced grasses of economic importance. The very scarcity of information regarding the native species will, it is to be hoped, foster cytological interest in the Western Australian native flora.

Mr. Gardner has written much on plant distribution within the State of Western Australia, and it is fitting that in a book of this nature, the introduction should take the form of a general survey of the grass flora of the State. He is well acquainted with large areas of all three of the Provinces of the Western Australian flora, and much is to be...
learned from the article, short though it is. From the tropical North where grasses are the main ground flora of all formations, to the South-West where they are poorly represented all phases of climatic and edaphic influences on grass distribution and development are fully dealt with, making the introduction a most valuable part of the book.

—R.D.R.

["Flora of Western Australia—Gramineae," by C. A. Gardner. Published by the Government Printer, Perth—Retail price, 45s.]

SHEEPFARMING ANNUAL

ALTHOUGH dealing primarily with conditions in New Zealand, the 1951 Sheepfarming Annual published by the Massey Agricultural College contains much that will be of interest to Australian sheepmen.

The Superintendent of the Ruakura Animal Research Station (Dr. C. P. McMeekan) recently visited Uruguay as a member of the Food and Agricultural Organisation of U.N.O., and his article on sheep and cattle farming in that country makes interesting reading.

The use of aircraft for spraying and dusting has already attracted attention in Western Australia, but New Zealand, with large areas of difficult hill country, has gone farther and used aircraft for large-scale topdressing with superphosphate.

P. B. Lynch, an officer of the N.Z. Department of Agriculture, discusses the means used to drop 45,000 tons of phosphatic fertiliser on to about 450,000 acres of farm lands in 1950. Other writers describe methods of reducing costs of aerial topdressing, also the spraying of weed-infested country and the dropping of rabbit poison from the air.

Cheviot sheep, although practically unknown in Western Australia, play an important part in hill-country sheepfarming in New Zealand and several articles are devoted to the results of trials of Cheviot half-breeds and Romneys.

There is an interesting article on "Sheep and Wool Improvement in the U.S.A." describing some of the new American breeds such as the Columbia, Targhee and North Star and the lesser-known Panama and Romeldale breeds. These are mainly based on Rambouillet strain with infusions of Lincoln, Romney, Oxford and Corriedale blood, followed by inbreeding to fix the type.

The articles printed in the Sheepfarming Annual are the scripts of addresses given at the annual meeting of sheepfarmers, organised by the Massey College and they are followed by questions and discussions following each talk, a feature which helps to bring out many points of general interest.

Talks on the growth of the fleece, on the design and construction of sheepyards and on copper and mineral deficiencies are among other interesting sections.

The book is obtainable from the Massey Agricultural College, Palmerston North, New Zealand, and the price is 15s. in New Zealand currency.

DAIRYFARMING ANNUAL

ANOTHER valuable service to the dairying industry has been given by Massey Agricultural College, New Zealand, in its publication of the "Dairyfarming Annual," the 1951 issue of which is now available at 15s. This 180-page record of the addresses and discussions at the College's annual meeting of dairyfarmers at Palmerston North last June covers a wide field of modern practical farming, many of the improvements in which have been due to the results of research and the experiences of dairyfarmers themselves. In this respect the book, well printed and adequately illustrated, is up to the minute, as it were, in such timely practices as spray irrigation, use of hormones on control of weeds, rationed grazing...
which the College itself was instrumental in introducing) and testing and servicing of milking machines.

The College, assisted by a committee of agricultural specialists and successful dairyfarmers, has not only chosen its subjects well, but has called upon some of the best-known authorities in New Zealand to prepare the papers. The Annual opens with nine articles on aspects of pasture improvement, ranging from pasture establishment, and nitrogen in pasture production, to such practices as spray irrigation, weed control with hormones, and rationed grazing, which has been shown to be an improver of pastures as well as of the annual milk and butterfat returns. This practice of using the versatile electric fence is dealt with under four headings, by Professor W. Riddet (Massey College), two successful dairyfarmers, and the New Zealand Dairy Board's consulting officer for Taranaki.

Much information of interest to the farmer is contained in a lengthy article by Dr. M. M. Burns, director of the New Zealand Fertilizer Manufacturers' Research Association, on the phosphatic fertilizer position in relation to the dairyfarmer. The rival claims of production per cow and production per acre cause a debate between A. H. Ward, Supervisor of Herd Improvement, New Zealand Dairy Board, and Dr. W. M. Hamilton, Assistant Secretary, Agriculture and Biology, D.S.I.R. The animal itself is treated in three articles—“Research in Animal Breeding” (Dr. J. F. Filmer, Director, Animal Research Division, Department of Agriculture), “Trichomoniasis” (D. McFarlane, Chief Diagnostic Officer, Wallaceville), and “Calf-rearing” (Professor I. L. Campbell, Massey College). The milking shed and its output come into the picture under the headings of “Testing and Servicing of Milking Machines” and “The Work of the Dairy Research Institute.” The final article, on expansion of British agriculture (D. S. Hendrie, Agricultural Adviser to the U.K. High Commissioner), strikes this comforting note for New Zealand: “It is a happy thought that New Zealand's main export products (butter, meat and wool) do not embarrass British agricultural economy, but, in fact, fit in well with it even if the expansion programme there is fully achieved.”

The discussions following the papers are in many respects as interesting as the main addresses. Many points covering everyday experience on the farm emerge from these exchange and from the Open Forum session.

PET RABBITS

A NUMBER of inquiries have recently been received by the Department of Agriculture concerning the legality of keeping rabbits as pets.

The Chief Vermin Control Officer (Mr. A. R. Tomlinson) states that anyone keeping or purchasing rabbits as pets should note that the Vermin Act provides a heavy penalty for the keeping of live rabbits unless a permit has been obtained. This applies to all types of rabbits.

The permits allow domestic breeds of rabbits to be kept as pets conditional upon them being confined in hutches within rabbit proof enclosures. They must not be permitted to roam loose on a property.

Permits may be obtained from the Chief Vermin Control Officer, at the Adelaide Terrace Branch of the Department of Agriculture, Perth. Full name and address should be given with each application together with a description and details of the hutch and enclosures.