

PREFACE

IT is now more than thirty years since, at my suggestion, Ethel Sargant sowed the grains of wheat and maize which formed the starting-point of work upon the grass seedling which we did together. Before her death in 1918, I had turned to a more general examination of the monocotyledons; but in course of time I began to feel that it might be possible to get a clearer view of the questions arising out of this study, if I combined it with more intensive work upon some one of the great monocotyledonous orders. With this in view, I returned to the Gramineae, and for the last ten years they have seldom been far from my thoughts. My concern with them was at first purely morphological, but, as I came to visualise the nexus of problems presented by the life of bamboo and grass, as well as by the history of the cereals—so inextricably interwoven with the history of man—these wider fields began to fascinate me almost as much as the more limited and technical facies of my own special studies.

The grasses are a vast group, and a correspondingly vast mass of information about them has been accumulated by botanists. If this information were brought together and correlated, it would form a library rather than a volume. In the present book I have had no such encyclopaedic aim, but I have deliberately limited myself to those aspects of the subject which happen to make the greatest appeal to me personally. It is difficult to map out these aspects in a few words. I hope that some picture of them will emerge in the following pages, so I will only now say that I have sought, primarily, to detect the pattern and rhythm underlying that complex of plant types called the Gramineae; but, though I have tried never to let this central clue slip through my fingers, I have not hesitated to turn aside, from time to time, down any passage of the labyrinth which has taken my fancy. About my omissions it is easier to be explicit than about my aims. The reader will notice, for instance, that the references to ecology are incidental only; this is not due to any lack of appreciation of the work that has been done in this field, but to the fact that the ground has already been covered by an important recent volume—*The World's Grasses*, by Professor J. W. Bews—

which is written throughout "from the standpoint of ecological differentiation". It is hoped that the table on pp. 410-11 of the present book, which gives the taxonomic grouping of all the genera named in the text, will facilitate its use in conjunction with *The World's Grasses*, and with the standard systematic accounts of the family.

If the argument in the following chapters maintained an entirely logical order, it would begin with a rigidly scientific account of the Gramineae, while their relation to man would be ignored, or consigned to appendices. I found it easy to construct such a logical skeleton, but difficult to endow it with vitality. When I desisted from the attempt, and allowed the book, as it were, to write itself, I discovered that its spontaneous course pursued an historical rather than a logical path. Man, in his primitive state, thought of plants merely in connection with himself and his needs, and it was only gradually that this egocentric interest matured into the objectivity of pure botany. This book follows a corresponding sequence; it begins with the study of the grasses in relation to man, and the more strictly botanical aspect is treated as developing out of the humanistic.

For the last seven years I have done my research upon the grasses at home; I have to thank both Girton College, and my own college—Newnham—for the loan of apparatus, equipment and books which has made this possible. I am indebted to the Dixon Fund Committee of the University of London for grants towards the running expenses of my little laboratory.

Except for reproductions of the work of artists of the seventeenth century and earlier, the illustrations in this book are all from my own drawings, with the addition of a few by Ethel Sargent. The Oxford University Press, and the Editors of *The Annals of Botany*, have kindly allowed me to use seventy-nine blocks from a series of ten articles of mine upon the grasses, published in that journal, while one figure is taken from my previous book, *Monocotyledons*. The one hundred remaining illustrations, initialled [A.A.] in the legends, have been drawn specially for this volume. Albrecht Dürer's water-colour of a sod of turf ("Das grosse Rasenstück"), which forms the frontispiece, is used by kind permission of the Staatliche Kunstsammlung, Albertina, Vienna.

In the decades during which I have been concerned with grasses,

PREFACE

ix

I have received so much assistance from botanists in different countries, that to record my gratitude in any complete fashion would be altogether impracticable. Some part of my indebtedness I have already acknowledged in my individual papers, and I will only now attempt to express my thanks to a few of those who have aided me during the actual preparation of this volume. I must name, in the first place, Mrs Agnes Chase, Associate Agrostologist in the Smithsonian Institution, Washington, who has allowed me to draw, time after time, upon her special knowledge; and Mr C. E. Hubbard, Temporary Botanist in the Herbarium, the Royal Botanic Gardens, Kew, who, by kind permission of the Director, Sir Arthur Hill, K.C.M.G., F.R.S., has repeatedly answered my enquiries and solved my problems. I am, moreover, particularly grateful to Mr F. L. Engledow, Drapers Professor of Agriculture in the University of Cambridge, for his help during my study of the cereals. Though there are many more to whom I should like to express my indebtedness in detail, I must content myself with a bare enumeration of those whom I have to thank for information and suggestions, guidance in questions of taxonomy, gifts of material, and help in connection with the literature: the Director, the Assistant-Director, and the Keeper of the Herbarium, the Royal Botanic Gardens, Kew; the Director and the Superintendent, the Cambridge Botanic Garden; the Directors of 's Lands Plantentuin, Buitenzorg, Java; of the National Botanic Garden, Kirstenbosch, South Africa; of the Botanic Gardens, Singapore, Straits Settlements, and Sydney, New South Wales; the Chief Conservator of Forests, Burma; Mr R. N. Aldrich-Blake; Mr J. Ardagh; Professor Ellsworth Bethel; Professor E. Blatter, S.J., of Bombay; Professor P. Bugnon of Dijon; Mr I. H. Burkill; Mlle Aimée Camus of Paris; Professor L. Corbière of Cherbourg; Professor G. N. Collins of Washington; Dr J. Burt Davy; Mr and Mrs Foggitt; Dr F. W. Foxworthy of the Forest Research Institute, Federated Malay States; the late Mr J. S. Gamble, F.R.S.; Miss S. Garabedian of the South African Museum, Cape Town; Professor Ruggles Gates, F.R.S.; Mr B. L. Gupta of Dehra Dun; Mr Cecil Hanbury, M.P., of La Mortola, Ventimiglia; Professor A. S. Hitchcock of Washington; Miss Gulielma Lister; Professor F. W. Oliver, F.R.S.; Professor L. R. Parodi of Buenos Aires;

Mr R. T. Pearl; Professor J. Percival; Mr P. W. Richards; Mr H. N. Ridley, F.R.S.; Professor B. Sahni of Lucknow; Professor E. J. Salisbury, F.R.S.; Professor A. C. Seward, F.R.S.; Dr T. A. Sprague; the late Dr O. Stapf, F.R.S.; Mr W. T. Stearn; Miss Sidney M. Stent of South Africa (Dep. of Agric.); Miss E. L. Stephens of the University of Cape Town; Mr J. R. Swallen of Washington; Dr Göte Turesson of Lund; Mr W. B. Turrill; Mr T. G. Tutin; Professor N. I. Vavilov of the U.S.S.R. Institute of Plant Industry; Professor P. Weatherwax of Indiana; and Mr W. C. Worsdell. To the Editors of *The New Phytologist* I am indebted for permission to incorporate two papers of mine which have appeared in their journal. My brother, D. S. Robertson, Regius Professor of Greek in the University of Cambridge, has given me his aid in various questions of scholarship, while, in matters of expression, I owe much to my daughter Muriel's criticism. I also wish to thank the staff of the Cambridge University Press for the patient and helpful way in which they have brought their expert knowledge to bear upon every problem which has arisen during the production of this book.

I received my training in research from Ethel Sargent, who dated her own initiation from the period during which she worked at the Jodrell Laboratory under Dr D. H. Scott, F.R.S. His death at the beginning of this year has brought a deep sense of loss to botanists all over the world. As one of those who owe more to him than they can well express, I am venturing to dedicate the present study to his memory, with the wish that it were worthier of a connection—even so slight as this—with his name.

As a last word, I wish to stress the fact that this is only one of numberless possible books, for which, to different minds, the grasses might supply material. I have of the Grass, as Coleridge had of the Rose-tree, "a distinct Thought", but I am continually conscious of his unanswered question—"what countless properties and goings-on of that plant are there, not included in my *Thought* of it?"

AGNES ARBER

CAMBRIDGE

June 15, 1934