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Agnes Arber

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Water Plants

Agnes Arber (1879–1960) was a prominent British botanist specialising in plant morphology and comparative anatomy. In 1946, she became the first female botanist to be elected a Fellow of the Royal Society. First published in 1920, this volume provides a detailed anatomical study of aquatic flowering plants, with a discussion of their evolutionary history. Arber describes the general anatomical and reproductive organs, life histories and physiological adaptations of aquatic plants in detail, with interpretations informed from her previous experimental work. The final section of this volume discusses the evolutionary history of aquatic plants in the light of affinities to terrestrial flowering plants. Arber's account of aquatic plants was first general description of these plants published, and provides a classic example of the comparative anatomy studies which were central to botanical investigation during the early twentieth century. An extensive bibliography and over 170 illustrations are included in this volume.

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Nymphaea lutea, L. The Yellow Waterlily, showing rhizome and submerged leaves from a woodcut in Otto von Brunfels' *Herbarum vivae icones*, 1530 (reduced).

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WATER PLANTS

A STUDY OF AQUATIC ANGIOSPERMS

BY

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FELLOW OF NEWNHAM COLLEGE, CAMBRIDGE,

AND KEDDEY FLETCHER-WARR STUDENT OF THE
UNIVERSITY OF LONDON

WITH A FRONTISPIECE AND
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TO THE MEMORY OF

E. A. N. A.

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PREFACE

IT was affirmed a few years ago, by one of the most eminent of living biologists, that it “is no time to discuss the origin of the Mollusca or of Dicotyledons, while we are not even sure how it came to pass that *Primula obconica* has in twenty-five years produced its abundant new forms almost under our eyes.” To this statement I venture to demur. I yield to none in my admiration for the results achieved by the analytical methods introduced by Mendel, and I do not doubt the possibility that the direct experimental study of variations and their inheritance may eventually play a large part in bringing the tangled problems of evolution into the full daylight for which we all hope. But this is no reason for condemning those countless uncharted routes which may lead, even if circuitously, to the same goal. Any step towards the solution of the essentially *historical* problems of Botany—for example those concerned with the origin and development of such morphological groups as the Dicotyledons, or of such biological groups as the Aquatic Angiosperms—must necessarily contribute some mite to our conceptions of the course of evolution. These less direct methods of approaching the central problem of biology may perhaps, at the best, bring only a faint illumination to bear upon it, but in the deep obscurity involving all evolutionary thought at the present time, we cannot afford to despise the feeblest rush-light; even the glimmering of a glow-worm may at least enable us to read the compass, and learn in which direction to expect the dawn.

I approached the study of Water Plants with the hope that the consideration of this limited group might impart some degree of precision to my own misty ideas of evolutionary processes. Botanists seem to be universally agreed that the

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PREFACE

Aquatic Angiosperms are derived from terrestrial ancestors, and have adopted the water habit at various times subsequent to their first appearance as Flowering Plants. The hydrophytes thus present the great advantage to the student, that they form a group for whose history there is a generally accepted foundation. Throughout the present study I have constantly borne phylogenetic questions in mind, and the first three Parts of this book may be regarded as a clearing of the ground for the more theoretic considerations concerning the evolutionary history of water plants to which the Fourth Part is mainly devoted. In that section of the book, and sporadically in the earlier chapters, I have set down such speculations as have been borne in upon me in the course of a study of water plants with which I have been occupied more or less continuously for the last ten years.

The literature relating to Aquatic Angiosperms has now grown to such formidable proportions that I have felt the necessity of trying to provide some clue to the labyrinth. With this end in view I have given a bibliography of the principal sources, which includes a brief indication of the nature and scope of each work, with page numbers showing where it is cited in the text. For the convenience of those seeking information about any particular plant, I have indexed the families and genera named in the titles enumerated, and in the notes regarding the contents of each memoir. I found it impracticable to compile a subject index to the bibliography, but the references under the individual chapters to some extent serve this purpose.

It is a pleasure to express my grateful appreciation of the kindness of those botanists who have helped me in various ways during the preparation of this book. I am particularly indebted to Professor A. C. Seward, F.R.S. for valuable suggestions and advice; to Dr H. B. Guppy, F.R.S. for reading the pages in Part IV which treat of Distribution; to the Hon. Mrs Huia Onslow (Miss M. Wheldale) for some helpful criticism of the chapters dealing with physiological questions; to Mr F. W. Lawfield, M.A. for aid in fenland botany; and—

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last but not least—to Miss Gulielma Lister, who, many years ago, showed me the winter-buds of the Frogbit in a pool in Epping Forest, and awoke in me the desire to know more of the ways of water plants.

I have to thank the Councils of the Linnean Society, and the Cambridge Philosophical Society, and the Editors of *The Annals of Botany*, *The Journal of Botany*, and *The American Naturalist*, for permission to incorporate in this book parts of the text and illustrations of certain of my papers which have appeared in their publications.

Of the figures in the present book, about one-third are original; these are indicated by the initials A. A. The sources of the others are acknowledged in the legends, but I must take this opportunity of expressing my obligation to the numerous authors from whose memoirs they are derived. I am indebted to the Clarendon Press for the use of the block for Fig. 127. The photographic reproduction of a number of the illustrations has been carried out by Mr W. Tams, while some have been re-drawn by Miss Evelyn McLean. I have to thank my sister, Miss Janet Robertson, for the design reproduced on the cover, which is based upon a wood-cut of the Yellow Waterlily in Lobel's "Kruydtboeck," of 1581. I am much indebted to my father for reading and criticising my manuscript and proofs.

To my husband, E. A. Newell Arber, I owed the original impulse to attempt the present study, which arose out of his suggestion that life in Cambridge offered unique opportunities for the observation of river and fenland plants. To his memory I dedicate this book.

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