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BIOLOGY
AND MAN

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Marine Biological Laboratory



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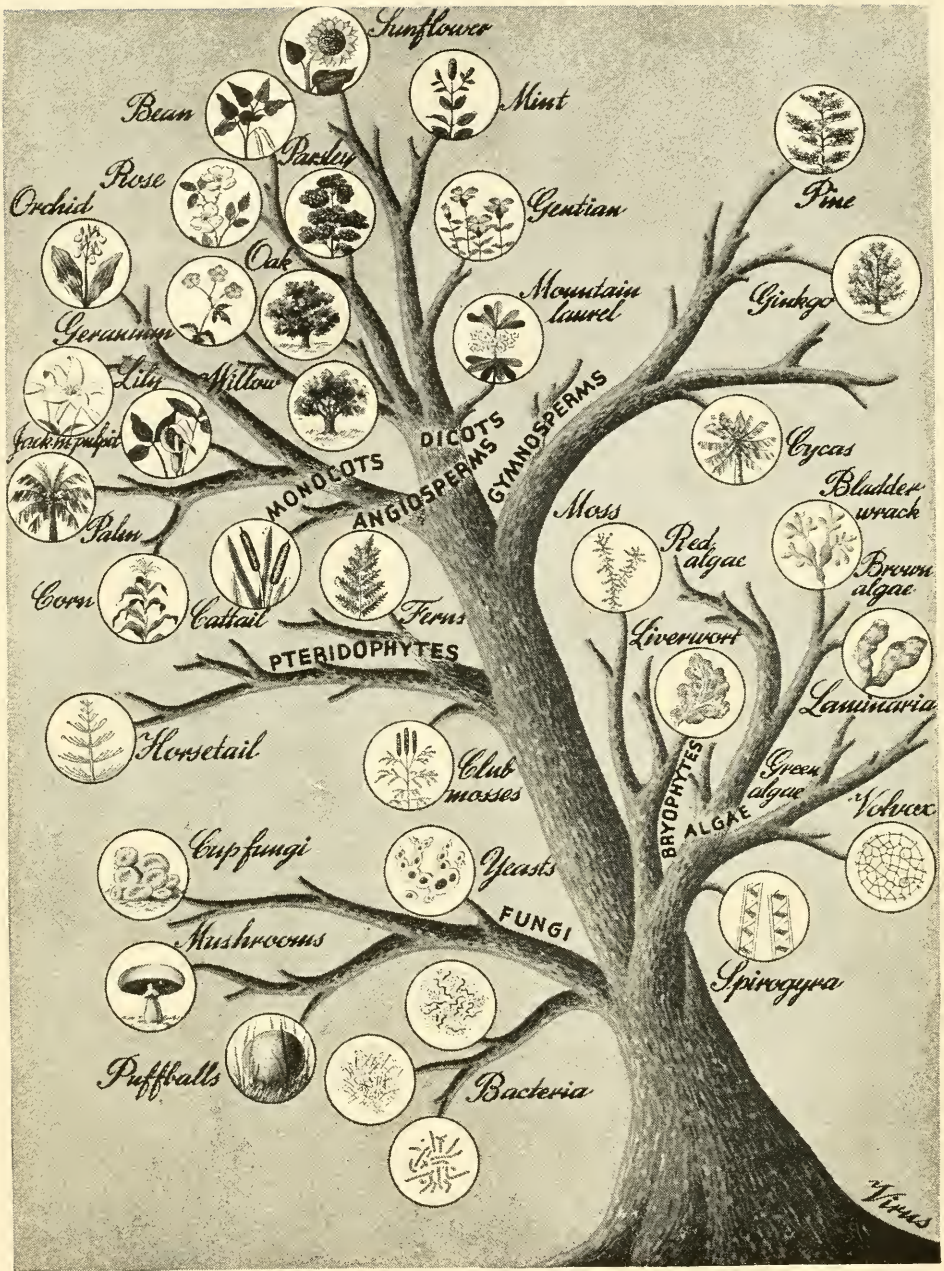
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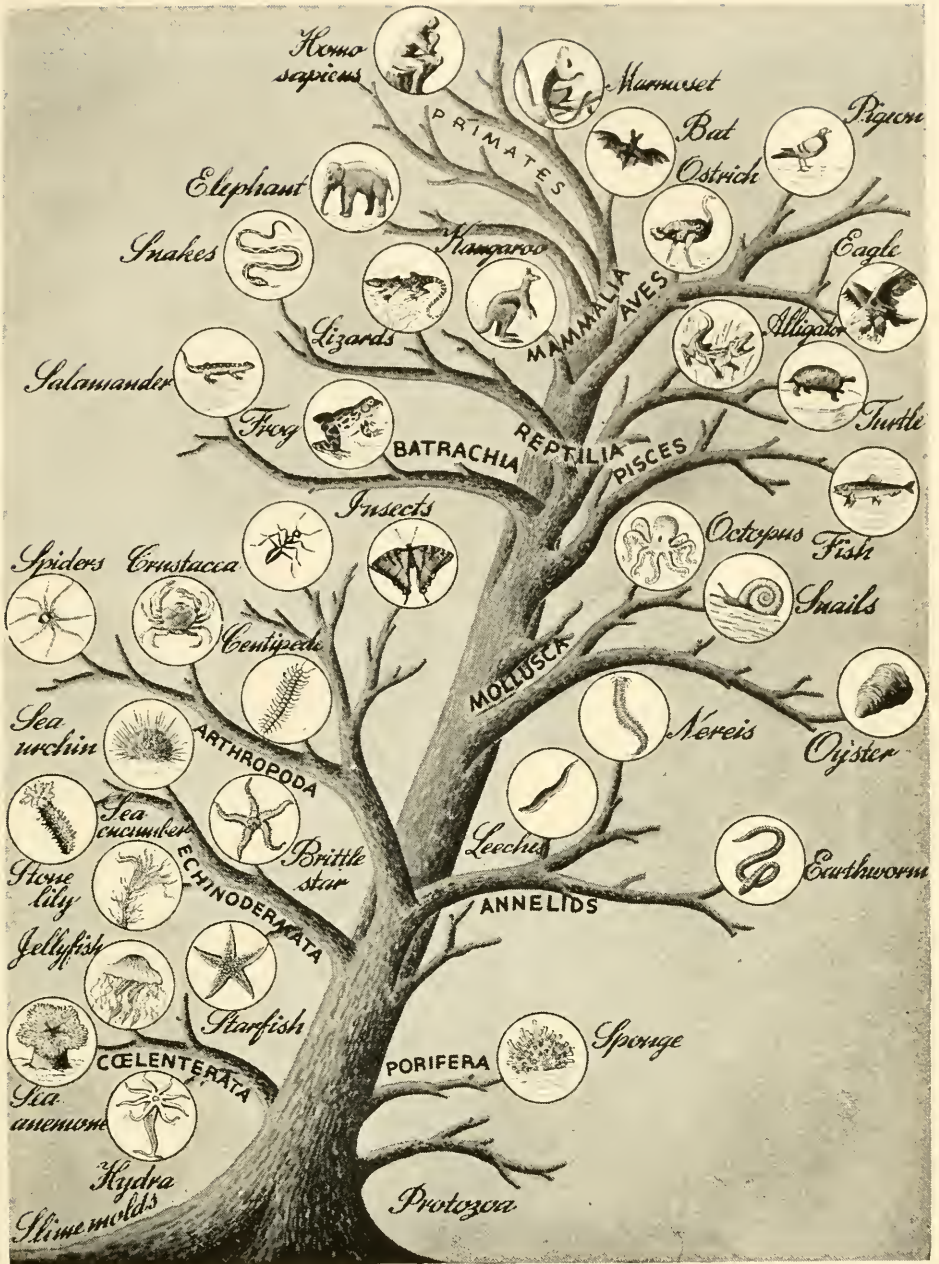


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THE FAMILY TREE OF PLANT LIFE

When we try to sort living things (or any other things, for that matter), we find our arrangements branching off the main line and branching off again and again, like the twigs of a tree. Some living forms cannot be classed definitely as plants or definitely as animals



Drawings by Robert Blattner

THE FAMILY TREE OF ANIMAL LIFE

The farther a type is from the base of the trunk, the more complex and the more distinctive it is, as a rule. If we suppose that each living form descended from another plant or animal, the arrangement suggests that in the course of time species departed from ancestral types

BIOLOGY AND MAN

By

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PREFACE

Our secondary schools today are common schools in the sense that elementary schools were *common* fifty years ago. That is, they enroll somewhat over two thirds of the boys and girls of the age they are designed to serve. In the past our high schools were responsible for special services to boys and girls who were in line for careers in the professions or for leadership in their communities. Today our high schools must furnish guidance, instruction and training of value to everybody. We have tried in this book to introduce a unified science of living things, which we regard as a valuable part of our common heritage.

Like the traditional three R's of our common schools, this introduction opens the way for all, expecting that each will continue as far as he wishes or needs to along particular lines. Some will wish to go further with botany or entomology, for example, or with gardening or breeding, whether as a hobby or as a profession. Some will wish to become nurses or technicians, physicians or administrators, and so will follow their "biology" in different directions. And some will find that this book will serve as a solid and ample foundation for college work.

These young men and women honestly want to understand the essential facts of personal and social life and the practical implications of these facts for themselves. These students are already on the verge of being the adult workers and voters and policy-makers of their time. They will have to decide scores of issues involving human beings as organisms—organisms that want food and shelter, that want to be well and to prolong their lives, that have to live together without destroying one another. These young men and women want to know more about the human species than they can possibly get out of the specialized subjects that ignore the organic nature of man, and more than they can possibly get out of a "biology" that ignores the distinctively human characteristics of this particular species—its intellect, its imagination, its inventiveness, its emotions and sentiments, and the very sociality that makes it possible for us to have any science at all.

We have accordingly tried to depict life in terms sufficiently broad to include man himself and sufficiently concrete to be within the grasp of the common mind. This has meant developing the material from points of view that are generally meaningful, the familiar functions, activities and relationships of living things: eating and breathing, growing and maturing, origins and developments and death, health and sickness, the helps and hindrances to life that come from the inanimate world and from other living things—and from the doings and intrusions of man.

Each unit and each chapter of this book starts with a number of questions that represent, in our experience, the common curiosities and wonderings of young people. These questions focus the interest and attention of the reader and give direction to the discussion. But there is no pretense that these questions are about to be answered; for while they are genuine and relevant enough, they cannot always be answered in the form they take. Many imply assumptions that are at least of doubtful validity; others involve ambiguous terms. Even a question consisting of but a few familiar words may be quite unanswerable. Why is sugar sweet? Or, Why is blood red? The easiest answers to give and to "understand" and to remember are of course the oldest answers—the kind that primitive man could think up and that the race has indeed remembered to this very moment. Since we frequently are not satisfied with such answers, for we believe them to be often not only evasions of the questions but in most cases effective obstacles to further thinking, we have assumed that it is a large part of our task to clarify the very questions for which answers are sought. At the ends of the chapters are questions (sometimes the "same" questions) which we assume now have new meanings, explore new understandings; and, again, there are questions that can be answered only by interpreting meanings.

Accepting the scientific way of constructing knowledge out of thought and experience, we suggest at the ends of the chapters numerous "explorations and projects", through which students may obtain practical experience in organizing material to guide and check their thinking. (These activities are referred to by number in footnotes at the points in the chapters where they are likely to be most helpful.)

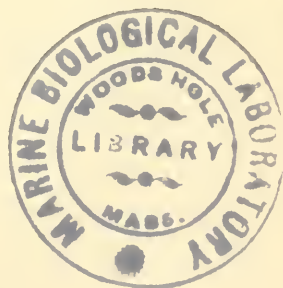
Another characteristic of the scientific method is the analysis of materials and problems into smaller and smaller bits in search of the ultimate atoms. This leads to a rapid expansion of our knowledge; but it often results in forms of thinking that disregard major problems of daily living. We hope to counteract such atomism by making it clear that life is essentially an integrative process, one of bringing various elements together into dynamic wholes. We consider it of special importance today to further a common understanding of the role of co-ordination wherever there is "division of labor", in social life as well as in organisms. This need seems to us quite urgent in a time when the great conflicts of the world arise from the efforts of the several self-conscious groups, associations, classes, nations and other fragments of mankind to control for private ends the social and cultural values to which all have contributed and which arise in any case only from social and cultural interactions.

We have taken special pains with the illustrations and are particularly grateful to the artists, photographers and others, whose co-operation is acknowledged throughout. The drawings are by Bernard Friedman, Hag-

strom Company, Marcel Janinet, Herbert Paus, Hugh Spencer, and Karsten Stapelfeldt. Although many of the illustrations are more or less self-contained in that each conveys a complete idea, they, with their accompanying legends, are intended to be integral supports for the text. Many are, of course, convenient devices for conveying ideas of structure or of form; but most of them involve ideas of process, of relationship, of historical development, or of logical development. In some cases they raise questions that cannot be answered on a purely "factual" basis. All these graphic pieces are intended to facilitate the work of the student, but for the most part they cannot be lightly skimmed over like items in a picture book: they call for close attention and reflection.

We have been helped in our work by the many colleagues in the business of teaching and by the many students through whom we think we have come to understand the problems of the learner and his world. We wish to acknowledge especially the helpful suggestions and criticisms and detailed information and other material received from Dr. Louis I. Dublin, Chief Statistician, Metropolitan Life Insurance Company; Dr. A. H. Ebeling, Lederle Laboratories; T. Swann Harding, United States Department of Agriculture; Dr. Charles R. Knight, American Museum of Natural History; Professor Oliver Laud, Antioch College; Algernon Lee, New York; Dr. Lloyd A. Rider and Dr. Milton Hecht, Abraham Lincoln High School, Brooklyn; and Mrs. Emily Eveleth Snyder, High School, Little Falls, New York.

B. C. G.
N. E. B.





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