

A NEW COURSE OF PLANTS AND ANIMALS'

BY M. A. GRIGG, B.Sc.

Senior Biology Mistress, Ealing Grammar School for Girls Formerly Lecturer in Biology, Dudley Training College for Teachers

BOOK II

CAMBRIDGE
AT THE UNIVERSITY PRESS
1958

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PREFACE

BIOLOGY is essentially a study of life, and not a book study. The best lessons are those which can be taken out-of-doors where living things can be studied in their natural surroundings. Unfortunately, very few of us can do this during school hours, so we must bring as many specimens as possible to school for examination, and then study them in their natural surroundings when we can.

In Secondary Grammar Schools, the Biology syllabus is sometimes ruled by the syllabus of the G.C.E. examinations, and general Nature Study is often neglected. The two books in this series are intended to guide the studies of boys and girls in Nature Study during the first three years of their Grammar School life, and to stimulate their interest in the living things around them. When once their interest has been aroused, they will be more observant, and will wish to learn more about the specimens which they find. They may then refer to the books mentioned in Appendix C and so acquire the habit of seeking for information on their own.

The first course of *Plants and Animals* was a re-issue of the Biology chapters from *Elementary Science*, which was written primarily for Secondary Modern Schools. The scientific terms were omitted so that all could read and understand the subject. This new course, based on the Biology chapters of *Modern Science*, has been entirely re-written, and some scientific terms have been introduced which will be useful for pupils who intend to take the G.C.E. examination. Where scientific terms have been used, simple descriptions have also

been given so that the book is suitable for all boys and girls in Secondary Modern Schools.

In Book I the work was based on the study of plants and animals found in habitats familiar to most boys and girls. It is impossible to study all the specimens that we find or see; but we can study families, each family consisting of animals or plants which are similar in structure. The first five chapters of Book II have been based on a simple study of families. This work not only incorporates the specimens described in Book I, but also gives an account of inhabitants of the sea shores, and of animals that can be seen in zoological gardens. Many common plants that do not have flowers have also been described. Simple experimental work has been given to enable pupils to study how a plant lives.

A chapter on Human Physiology has been included, as it is felt that all pupils should have some knowledge of the structure and functions of the body.

As far as possible, this book should be read with the living specimens at hand. Reading should guide observation. If animals are to be studied which cannot be brought to school, the teacher should illustrate the lesson by showing pictures (with or without epidiascope), film strips or films. Visits to a zoological garden or a museum would make the work more interesting.

M. A. GRIGG

27 July 1957

ILLUSTRATIONS

The following were drawn by Miss J. B. S. Willmore: 4(c) and (d), 9, 10, 11 (a), 33 (c) and (d), 75, 76, 81, 88 and 113. The rest are the work of the late Mr J. C. Hill.

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CHAPTER 1

PLANTS AND ANIMALS

Reason for classification

In Book I we learned a little about some animals and plants that live in different habitats.

Whilst studying the animals that live in fresh water, in the garden, or in the countryside you may have noticed that some animals are similar in structure; for example, the water skater and the wood louse; pond snails, land snails and slugs; gnats and butterflies. Unfortunately, we have not time to study every animal and plant that we find. All animals and plants, however, have been divided into families, and into each family are put those animals and plants which are similar in structure. The families that have certain things in common are placed together in still larger groups.

If we study one animal or plant from each family we shall know something about the structure of each member of that family, although the members or SPECIES of the family will differ in some respects from one another. You probably found it very easy to study land snails and slugs after studying pond snails. Living things are today classified by their structure, but in the past they have been classified in many different ways—according to their size, or where they lived, or whether they did or did not lay eggs.

Differences between plants and animals

All living things can be divided into two groups: (1) PLANTS; (2) ANIMALS.

How can you tell into which group a living thing should be placed? You will probably say that animals move about from

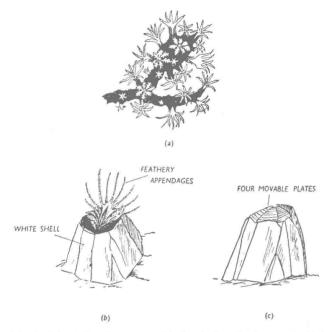


Fig. 1. Animals that do not move. (a) Coral: the animals are embedded in the calcium carbonate shell; (b) barnacle showing feathery appendages; (c) barnacle with plates closed

place to place, whilst plants remain rooted in the ground. This is true of most living things, but some animals, such as those which form coral, and barnacles (Figs. 1a and b), are fixed in one place; whereas some small algae swim about in the water (Fig. 2).

There are six chief differences between animals and plants:

- (1) The CELLS of plants are surrounded by a cell wall, which is made of a substance called CELLULOSE. This is not so in animals, where each cell is surrounded by a membrane.
- (2) Plants usually contain CHLOROPHYLL, but this is not found in animals. Some plants, such as bacteria and fungi, do not contain chlorophyll. The green hydra, on the other hand, although it is an animal, does contain chlorophyll, but it is not contained in the cells of the hydra's body but in small, round cells, which are really tiny plants that live between the cells of the hydra.
- (3) Plants that contain chlorophyll are able to make their own food. During the daytime the green parts of a plant are able to make sugar from carbon dioxide and water. This food, together with the minerals that are taken in by the roots, is changed into more complicated substances. Animals, however, cannot make their own food. They eat the foods that have been made by the plants, either by eating the plants or by eating animals that feed on plants.
- (4) Animals usually move from place to place in search of food, whereas plants remain in one place as they can make their own food.
- (5) Animals grow to a limited size and the number of parts in their bodies is fixed. Plants continue to grow as their size is unlimited.
- (6) Growth in animals goes on all over the body. In plants there are special growing regions, which are at the tips of the roots or shoots, or just beneath the bark in the stems and the roots.

Groups of living things

Plants can be divided into two large groups: (1) flowerless plants that do not produce seeds; (2) plants that do produce seeds.

Animals also can be divided into two groups: (1) INVERTE-BRATES, which have no backbone; (2) VERTEBRATES, which have a backbone.