

**COLLINS' CLEMENTARY SCIENCE
SERIES. AN INTRODUCTION TO THE
STUDY OF GENERAL BIOLOGY:
DESIGNED FOR THE USE OF
SCHOOLS AND SCIENCE CLASSES**

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649055890

Collins' Clementary Science Series. An Introduction to the Study of General Biology: Designed for the Use of Schools and Science Classes by Thomas C. MacGinley

Except for use in any review, the reproduction or utilisation of this work in whole or in part in any form by any electronic, mechanical or other means, now known or hereafter invented, including xerography, photocopying and recording, or in any information storage or retrieval system, is forbidden without the permission of the publisher, Trieste Publishing Pty Ltd, PO Box 1576 Collingwood, Victoria 3066 Australia.

All rights reserved.

Edited by Trieste Publishing Pty Ltd.
Cover @ 2017

This book is sold subject to the condition that it shall not, by way of trade or otherwise, be lent, re-sold, hired out, or otherwise circulated without the publisher's prior consent in any form or binding or cover other than that in which it is published and without a similar condition including this condition being imposed on the subsequent purchaser.

www.triestepublishing.com

THOMAS C. MACGINLEY

**COLLINS' CLEMENTARY SCIENCE
SERIES. AN INTRODUCTION TO THE
STUDY OF GENERAL BIOLOGY:
DESIGNED FOR THE USE OF
SCHOOLS AND SCIENCE CLASSES**

Collins' Elementary Science Series.

AN INTRODUCTION
TO THE STUDY OF
GENERAL BIOLOGY.

DESIGNED FOR THE USE OF
SCHOOLS AND SCIENCE CLASSES.

BY
THOMAS C. MacGINLEY,
PRINCIPAL, CROAGH NATIONAL SCHOOL, COUNTY DUBLIN.

WITH 124 ILLUSTRATIONS.



LONDON AND GLASGOW:
WILLIAM COLLINS, SONS, & COMPANY.

1874.

[All rights reserved.]

✓ Eduet 20338.74.545



Miss M. M. Oliver

PREFACE.

THE very best preparation for the study of the laws of LIFE, under its various manifestations, is first to become thoroughly conversant with the characters of a few well-marked typical beings, with which all others may be compared, and around which, as centres, they may be conveniently grouped. As every true classification of plants and animals must be founded on their structural affinities, care has been taken in the present work to place before the student a clearly detailed statement of the form, functions, and minute structure of every part of the organism brought under his notice. With this object in view, numerous illustrations have been introduced, which, it is hoped, will render the facts of anatomy and physiology more intelligible, and more easily remembered. The student is, however, earnestly recommended to verify these by actual observation. The illustrations, for the most part, are either drawings from nature, or *diagrams* of the Author's own designing. A few, however, are taken from the works of recent writers on the subjects to which they severally refer. The use of technical terms has been by no means avoided, inasmuch as it is believed to be absolutely impossible to understand thoroughly any department of special study without a good knowledge of the technical language employed by

the more eminent among the authorities who treat of it. In the present work, these terms are explained as they occur, and in the Glossary their derivations and literal meanings are also given along with their technical applications.

In the preparation of this work, designed, as it is, to meet the wants of junior science students in connection with the Science and Art Department, the Syllabus of the Elementary Stage in General Biology has been followed. It is not intended, however, to supersede the use of the scalpel or microscope, or oral instruction from a competent teacher. On the contrary, it is hoped that, with its aid, and with the other helps recommended, the student will examine the great field of nature for himself, and thus acquire that kind of knowledge which it is most desirable and delightful to possess—namely, the knowledge derived from a patient questioning and examination of those objects in nature to which one's studies are specially devoted.

Of the works consulted, the author must here express his indebtedness to those of Balfour, Silver, Houghton, Carpenter, Nicholson, and Huxley. He must also acknowledge his obligations to Messrs. P. Doyle, and G. H. Begley, Portaferry, and to Messrs. J. C. Ward and P. O'Byrne, Killybegs, for the aid kindly rendered while the work was passing through the press.

THOMAS C. MACGINLEY.

CROAGH, DUNKINEELY, DONEGAL,
March, 1874.

CONTENTS

CHAPTER I.

THE TORULA.

	PAGE
Introduction — Plasma of Torula — Pasteur's Fluid— Morphology — Protoplasm — Protein — Reproduction — Collateral Results of Torula's Existence — Fermenta- tion — Production of Carbonic Acid and Alcohol — Theories,	9

CHAPTER II.

THE PROTOCOCCUS.

Plasma — Morphology — Mobile Forms — Physiology— Growth and Development — Protooccus and Torula Compared — Action of Chlorophyll under Sunlight— Cilia,	16
--	----

CHAPTER III.

THE AMOEBA AND THE COLOURLESS CORPUSCLES OF THE BLOOD.

Plasma of Amoeba — Morphology — Physiology — Conditions of Existence — Colourless Corpuscles of Human Blood: their Origin and Functions — Morphology, Chemical Composition, and Physiology of Torula, Protooccus, and Amoeba (comparative view),	20
--	----

CHAPTER IV.

THE BACTERIUM.

Plasma — Morphology — Brownian Movement — Reproduc- tion — Putrefaction — Experiments — Spontaneous Generation,	26
---	----

CHAPTER V.

THE PENICILLIUM.

	PAGE
Plasma—Morphology—Hyphæ—Mycelium—Conditions of Existence—Reproduction—Peronospora—Potato Blight—Conjugation—Achlya—Fungi, their Distinctive Characteristics—Mushroom—Histology,	29

CHAPTER VI.

THE CHARA.

Plasma—Morphology—Segmentation—Homology of Parts—Nodes and Internodes—Primordial Utricle—Chlorophyll—Cyclosis—Physiology—Mode of Growth—Reproduction—Summary,	37
---	----

CHAPTER VII.

THE FERN.

Morphology—Rhizome or Root-Stock—Axis—Tissues—The Frond: its Mode of Growth—Absorption and Decomposition of Carbonic Acid—Stomata—Fixation of Carbon—Evolution of Oxygen—Nutrition—Exhalation and Inhalation of Moisture—Reproduction, Asexual and Sexual—Spores—Prothallium—Embryo—Alternation of Generations,	45
---	----

CHAPTER VIII.

THE BEAN (MORPHOLOGY).

Axis and Appendages—Flower—Stem—Stomata—Intercellular Spaces—Tissues,	54
---	----

CHAPTER IX.

THE BEAN (PHYSIOLOGY).

Cell Growth—Growth in Stem, Root, and Leaves—Veins—Branches—Flower—Stamens—Carpel—Fertilization of Ovule—Seed—Gamogenesis—Asexual Propagation (Agamogenesis)—Flowering Plant Compared with Fern,	60
--	----

CONTENTS.

vii

CHAPTER X.

NUTRITION IN PLANTS.

	PAGE
Cells and Intercellular Spaces—Sources of Nutriment— Organic Matter in Soil not Essential—Functions of Chlorophyll—Ascent of Crude Sap—Endosmose— Elaboration and Distribution of Sap,	71

CHAPTER XI.

EXOGENS AND ENDOGENS—MODIFICATIONS OF LEAF.

Exogens—Pith—Arrangement of Fibro-vascular Bundles —Medullary Rays—Cambium—Bark—Alburnum or Sap Wood—Duramen or Hard Wood—Endogenous Stem—Mode of Growth—Disposition of Fibro-vascu- lar Bundles—Roots—Leaves in Exogens—Modifica- tions of Leaf—Stipules—Bracts—Bud-scales—Spines —Tendrils—Phyllodes—Pitchers—Venation, Reticu- lated and Parallel—Differences between Exogens and Endogens,	75
--	----

CHAPTER XII.

THE FRESH-WATER POLYPE (HYDRA), AND THE
SEA-ANEMONE (ACTINIA).

Cœlenterata—Their Distinctive Characters. <i>Hydra</i> — Morphology—Thread Cells—Muscular Fibres—Physi- ology—Alimentation—Irritability—Locomotion—Re- production, Asexual and Sexual. <i>Actinia</i> —Morph- ology—Irritability—Physiology—Locomotion—Re- production, Asexual and Sexual—Coralligena—Coral Reefs,	82
--	----

CHAPTER XIII.

THE FRESH-WATER MUSSEL (ANODON).

Morphology—Pallium—Foot—Organ of Bojanus—Gills— Valves—Pallial and Adductor Impressions—Physi- ology—Alimentary System—Liver—Blood Circulation —Heart—Pericardium—Functions of Organ of Bojanus —Respiration—Locomotion—Muscular System— Nervous System—Ganglia—Reproduction,	96
--	----