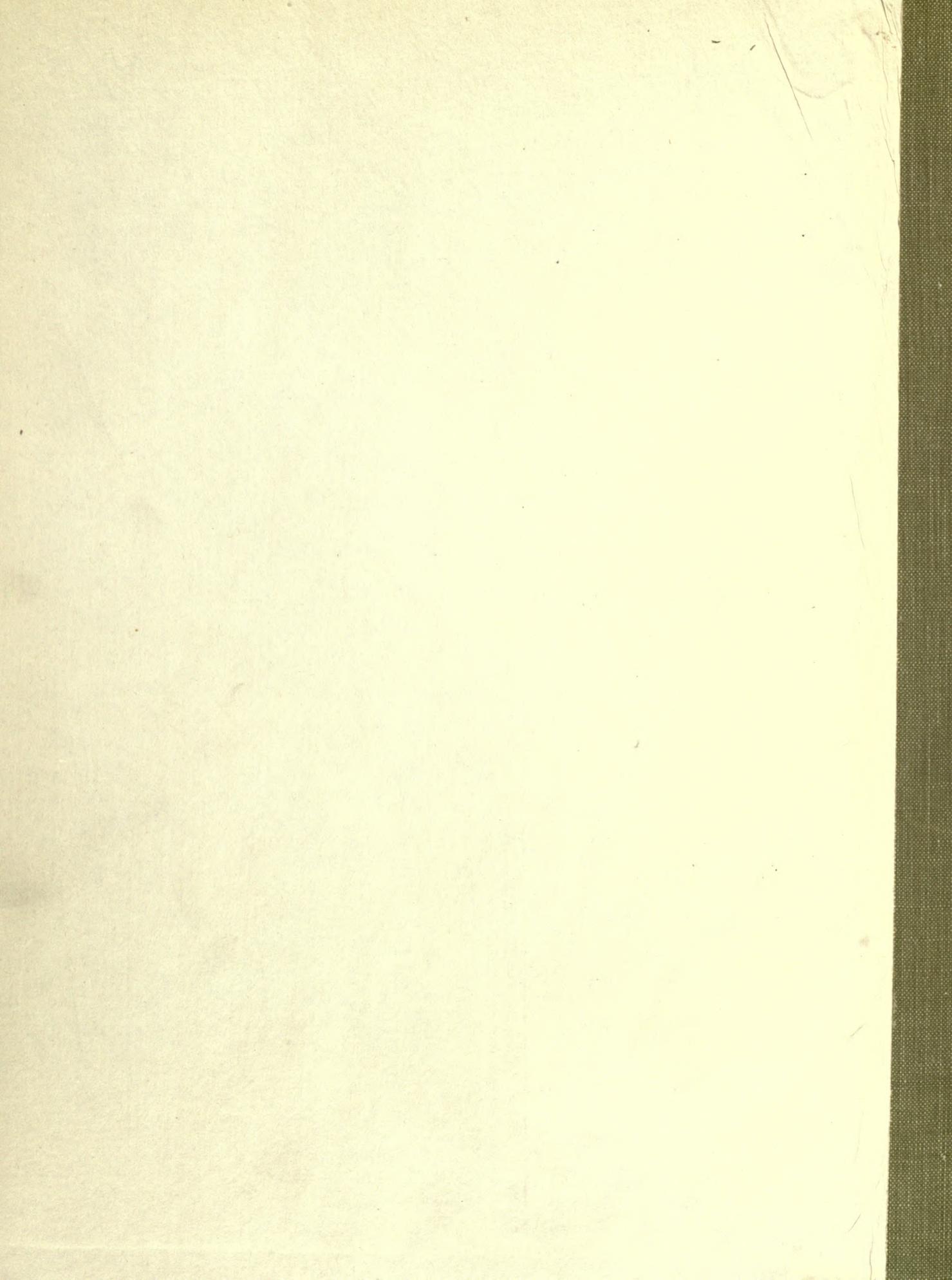


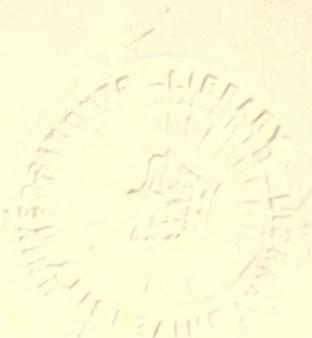
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AN ATLAS
OF
PRACTICAL ELEMENTARY BIOLOGY.



AN
ATLAS
OF
PRACTICAL ELEMENTARY
BIOLOGY



BY
George Bond
G. B. HOWES,

DEMONSTRATOR OF BIOLOGY, NORMAL SCHOOL OF SCIENCE AND ROYAL SCHOOL OF MINES. LECTURER ON COMPARATIVE ANATOMY,
ST. GEORGE'S HOSPITAL MEDICAL SCHOOL, LONDON.

WITH A PREFACE
BY
PROFESSOR HUXLEY, P.R.S.

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PRINTED BY
WEST, NEWMAN, AND CO.,
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TO
A. H.,
FRIEND AND ADVISER,
THIS WORK IS DEDICATED
BY
THE AUTHOR.

AUTHOR'S PREFACE.

THIS work has been designed with a view of furnishing the beginner with an evenly balanced series of drawings, illustrative of the typical facts in the structure of living things. The types chosen are for the most part identical with those adopted in Huxley and Martin's "Elementary Biology."

The information imparted by a competent teacher ought to receive ample illustration at his hands, and while it is hoped that this book may be of service to the student thus happily placed, in producing it the author has been especially mindful of the less fortunate inquirer, compelled to work unaided in a field beset with snares and pitfalls, and byways which lead only to a laborious idleness.

An extensive and fully illustrated literature is within reach of the student, when once he has acquired that method which can alone enable him to use it rightly; and where this is the case for the organisms here dealt with, attempts have been made to supplement it as far as possible.

All the figures are drawn, unless otherwise stated, from preparations made specially with a view to the capacity of this work, and the plates are arranged in that order in which it is most desirable the beginner should work them over. The paper used in printing will take colour, provided the ordinary precautions are observed to avoid going over the same surface twice while wet.

The text is confined exclusively to a description of the precise manner in which each preparation was made, and as a number of valuable papers on many of the

subjects dealt with have appeared since the publication of our current zoological textbooks, I append a bibliography of them, together with certain classical monographs indispensable to those desirous of extending either their own knowledge, or that of their fellows, in the matter concerned.

The titles of the above-named works are arranged under heads and numbered for purposes of reference in the text.

In preparing this work, it has been my good fortune to have had the counsel of Professor HUXLEY, and I have to acknowledge my indebtedness to Professors T. J. PARKER and E. R. LANKESTER, and to Mr. F. O. BOWER. My friend Mr. M. M. TERRERO and certain of my pupils have rendered me welcome aid in the matter of cutting sections, and my thanks are due to my lithographer, Mr. M. P. PARKER, for the able manner in which he has carried out my wishes.

GEO. BOND HOWES.

NORMAL SCHOOL OF SCIENCE AND ROYAL SCHOOL OF MINES,
SOUTH KENSINGTON, *February, 1885.*

PREFACE.

WHEN, in the year 1872, the system of practical instruction, which is at present pursued in the Biological Laboratory of the Normal School of Science and Royal School of Mines, was established, one of my first cares was the creation of a teaching collection for the use of the students who were following that course of instruction. This collection was to contain, in the first place, a series of preparations and dissections illustrative of every important fact in the structure of the animals and plants selected for study; and, in the second place, a corresponding series of drawings of the dissections, of large size and executed in such a manner as to facilitate the comprehension of the structures represented.

The construction of such a teaching collection as this has involved the expenditure of a great deal of time and skill; and the whole burden of the work has fallen upon my former demonstrator, Mr. T. J. PARKER (now Professor of Biology at Otago), and Mr. GEORGE HOWES, who succeeded Mr. PARKER, and now holds the office.

Ten years ago, assisted by Prof. MARTIN, I published "A Course of Practical Instruction in Elementary Biology," which exemplifies the method of instruction pursued in the Biological Laboratory, and is intended to take the place of the oral instruction which we supply there. The absence of illustrations, however, has greatly interfered with the usefulness of this work, and I am therefore very glad that Mr. Howes has undertaken to make good the defect by the publication of the present Atlas, which, while starting from part of the work with which he has been occupied in our Laboratory, contains so many accurate and well-devised additional illustrations that it will be hardly less useful to students who are engaged in the Laboratory than to those who work independently of it.

No doubt, the direct instruction of a teacher is very valuable; but, with the aid of this Atlas, I think that an intelligent student, who is unable to obtain that advantage, will find no difficulty in working through "The Course of Practical Instruction in Elementary Biology" by himself.

T. H. HUXLEY.

SOUTH KENSINGTON,
April 24th, 1885.

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