

Cambridge University Press

978-1-107-60589-3 - Plant-Animals: A Study in Symbiosis

Edited by Frederick Keeble

Frontmatter

[More information](#)

---

The Cambridge Manuals of Science and  
Literature

PLANT-ANIMALS

Cambridge University Press

978-1-107-60589-3 - Plant-Animals: A Study in Symbiosis

Edited by Frederick Keeble

Frontmatter

[More information](#)

---

Cambridge University Press

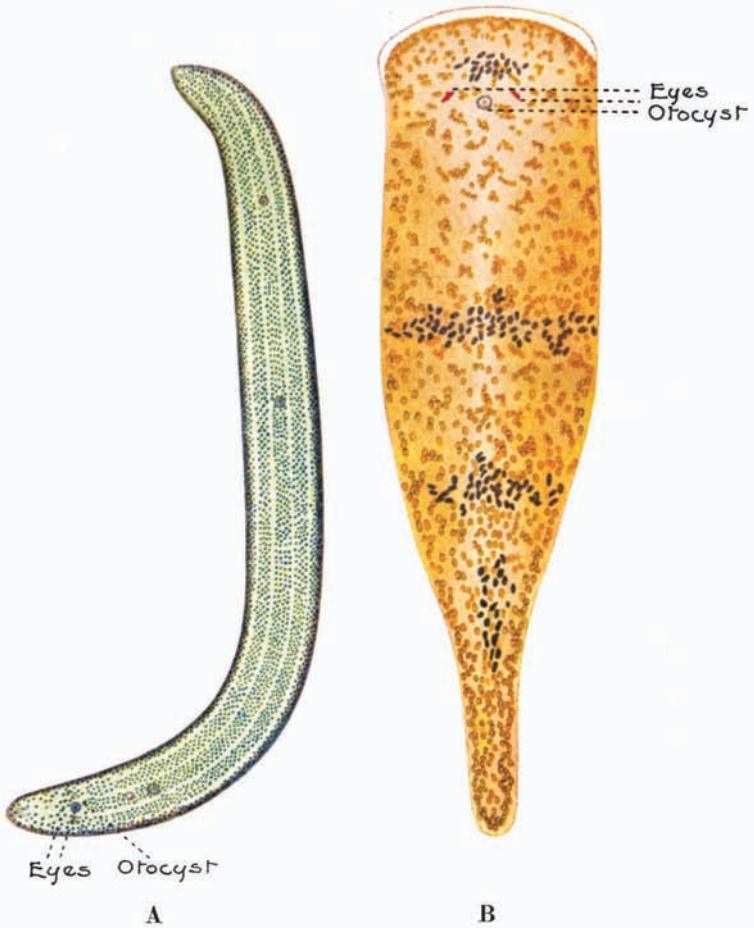
978-1-107-60589-3 - Plant-Animals: A Study in Symbiosis

Edited by Frederick Keeble

Frontmatter

[More information](#)

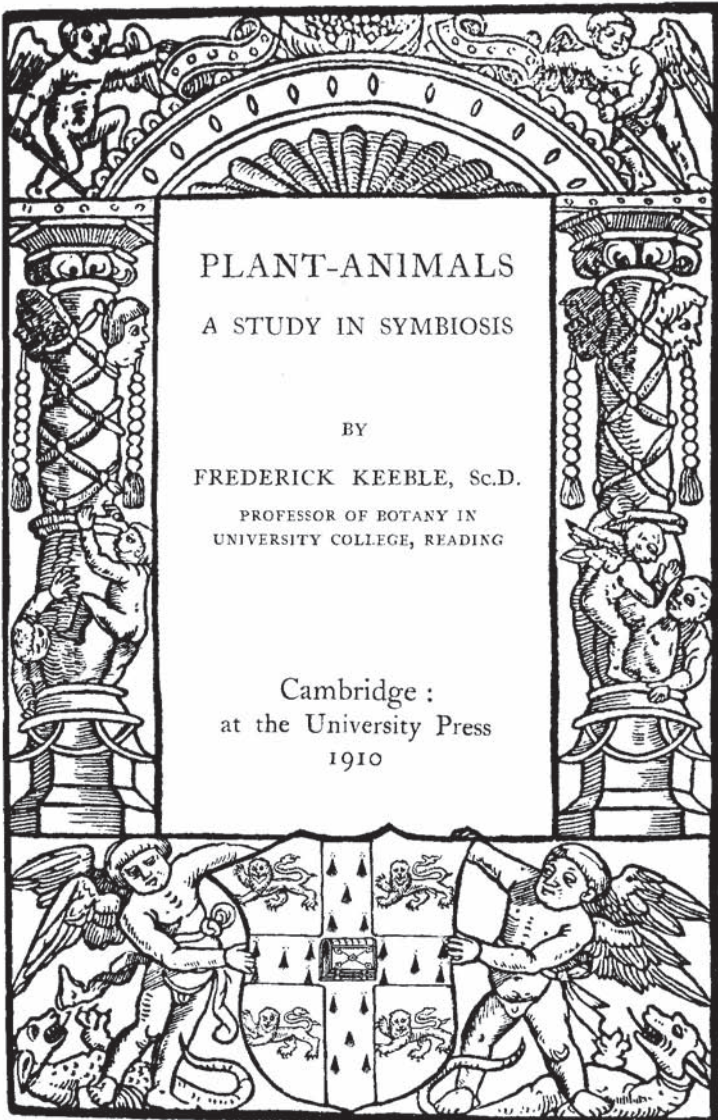
---



- A. The Green Plant-animal (*Convoluta roscoffensis*).  
B. The Yellow-brown Plant-animal (*Convoluta paradoxa*).  
40 times natural size.

This image is available in colour for download from [www.cambridge.org/9781107605893](http://www.cambridge.org/9781107605893)

Cambridge University Press  
978-1-107-60589-3 - Plant-Animals: A Study in Symbiosis  
Edited by Frederick Keeble  
Frontmatter  
[More information](#)



Cambridge University Press  
978-1-107-60589-3 - Plant-Animals: A Study in Symbiosis  
Edited by Frederick Keeble  
Frontmatter  
[More information](#)

---

CAMBRIDGE UNIVERSITY PRESS  
Cambridge, New York, Melbourne, Madrid, Cape Town,  
Singapore, São Paulo, Delhi, Mexico City

Cambridge University Press  
The Edinburgh Building, Cambridge CB2 8RU, UK

Published in the United States of America by Cambridge University Press, New York

[www.cambridge.org](http://www.cambridge.org)  
Information on this title: [www.cambridge.org/9781107605893](http://www.cambridge.org/9781107605893)

© Cambridge University Press 1910

This publication is in copyright. Subject to statutory exception  
and to the provisions of relevant collective licensing agreements,  
no reproduction of any part may take place without the written  
permission of Cambridge University Press.

First published 1910  
First paperback edition 2012

*A catalogue record for this publication is available from the British Library*

ISBN 978-1-107-60589-3 Paperback

Additional resources for this publication at [www.cambridge.org/9781107605893](http://www.cambridge.org/9781107605893)

Cambridge University Press has no responsibility for the persistence or  
accuracy of URLs for external or third-party internet websites referred to in  
this publication, and does not guarantee that any content on such websites is,  
or will remain, accurate or appropriate.

*With the exception of the coat of arms at  
the foot, the design on the title page is a  
reproduction of one used by the earliest known  
Cambridge printer John Siberch 1521*

Cambridge University Press  
978-1-107-60589-3 - Plant-Animals: A Study in Symbiosis  
Edited by Frederick Keeble  
Frontmatter  
[More information](#)

---

## PREFACE

**D**URING some ten years' work in a small marine laboratory in Brittany it has fallen to me not infrequently to attempt to explain to curious visitors what were my objects in going to and fro upon the shore, in wading among the sea-weeds and in bringing into the laboratory minute, worm-like animals which represented often my sole "catch."

I discovered that many of the visitors to the laboratory became interested in the work that was going on, and that, though they disclaimed a knowledge of biology, they followed with understanding and interest the story of the behaviour and life histories of "the worms":—indeed, they succeeded generally in putting to me pertinent and unanswerable questions with respect to these "plant-animals."

The pleasant recollection of hours spent in this way is responsible primarily for my undertaking to

Cambridge University Press  
978-1-107-60589-3 - Plant-Animals: A Study in Symbiosis  
Edited by Frederick Keeble  
Frontmatter  
[More information](#)

---

contribute this volume to *The Cambridge Manuals of Science and Literature*.

If it succeeds in interesting the layman, success will be due to the severe educational régime to which my visitors submitted me in their cross-questionings as to the bearings and objectives of my biological work.

If it fails, they must bear the blame: for had they not exhibited a fondness for "Convoluta" I should scarcely have ventured to publish its doings to the world at large. Of these friends I would mention particularly Mr Alfred Dutens, whose interest in "Convoluta roscoffensis" has been a source of constant encouragement to me.

The biological facts recorded in this volume are the outcome of researches carried on for some years by Professor Gamble and myself, and, subsequently, without Professor Gamble's co-operation.

Throughout the whole time during which the work has been in progress, it has benefited more than may be stated explicitly by the unremitting assistance rendered by my wife. To her, are due the long and patient records of the periodic changes of behaviour of the plant-animals—*Convoluta roscoffensis* and *C. paradoxa*:—records which entailed visits to the Convoluta colonies at all phases of the tide and at all hours of the day and night. Though an adequate



Cambridge University Press  
978-1-107-60589-3 - Plant-Animals: A Study in Symbiosis  
Edited by Frederick Keeble  
Frontmatter  
[More information](#)

---

## PREFACE

vii

expression of my thanks to my wife were out of place here, I beg leave to give myself the pleasure of acknowledging how great has been her share in this work.

The original memoirs, giving detailed accounts of the life histories of the plant-animals, have appeared in the *Quarterly Journal of Microscopic Science*. A list of these memoirs and of other researches to which reference is made in the text is included in the short bibliography appended to this volume. The dates, enclosed within brackets in sundry places in the text, refer each, to the year of publication of the research which is cited and indicate that the title of the research in question may be found in the bibliography under that date.

The black and white illustrations have been prepared specially for this volume by Mrs Seward from the original drawings made by Miss Dorothea Richardson in the laboratory at Trégastel. I am deeply indebted to Mrs Seward and Miss Richardson for their kind assistance, and to the skill and patience which they have bestowed on the drawings I offer a sincere and admiring tribute.

Should the reader find that the main arguments exposed in the course of the volume are intelligible, he may, perhaps, be inclined to forgive the use, which I hope is as occasional as inadvertent, of un-

Cambridge University Press  
978-1-107-60589-3 - Plant-Animals: A Study in Symbiosis  
Edited by Frederick Keeble  
Frontmatter  
[More information](#)

---

viii

## PREFACE

familiar biological terms. I have endeavoured to avoid this pit-fall, but have doubts as to the completeness of my success. I shall be obliged therefore if readers will point out passages which require elucidation, so that, in the event of another edition being published, the defects may be remedied.

FREDERICK KEEBLE.

TRÉGASTEL,  
CÔTES-DU-NORD,  
FRANCE.  
*September, 1910.*

Cambridge University Press  
 978-1-107-60589-3 - Plant-Animals: A Study in Symbiosis  
 Edited by Frederick Keeble  
 Frontmatter  
[More information](#)

## CONTENTS

### PART I

#### THE BEHAVIOUR OF THE PLANT-ANIMALS

CHAP.		PAGE
I.	Introductory: the worms, <i>Convoluta roscoffensis</i> and <i>Convoluta paradoxa</i> : their habits and habitats	3
II.	The origin and significance of the habits of <i>Convoluta roscoffensis</i> and <i>Convoluta paradoxa</i>	37

### PART II

#### THE NATURE OF THE PLANT-ANIMALS

III.	The green cells of <i>Convoluta roscoffensis</i> and the part they play in the economy of the plant-animal	75
IV.	The origin and nature of the green cells of <i>Convoluta roscoffensis</i>	100
V.	The significance of the relation between coloured cell- and animal-constituents of the plant-animals	130
	BIBLIOGRAPHY	159
	INDEX	161

WITH TEXT-FIGURES, 1—22.

COLOURED FRONTISPIECE. The Green Plant-Animal, *Convoluta roscoffensis* and the Brown Plant-Animal, *Convoluta paradoxa*.