AN INTRODUCTION TO ENTOMOLOGY

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649056064

An Introduction to Entomology by John Henry Comstock

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

JOHN HENRY COMSTOCK

AN INTRODUCTION TO ENTOMOLOGY



INTRODUCTION

TO

ENTOMOLOGY

BY

JOHN HENRY COMSTOCK

PROFESSOR OF ENTOMOLOGY AND GENERAL INVERTEBRATE ZOOLOGY, EMERITUS, IN CORNELL UNIVERSITY

SECOND EDITION, ENTIRELY REWRITTEN

T E COMSTOCK PUBLISHING CO.

COPYRIGHT 1920

BY

THE COMSTOCK PUBLISHING COMPANY
REINTED IN UNITED STATES OF AMERICA

PREFACE TO PART I

THE following pages constitute the first part of a text-book of entomology that the writer has in preparation. This first part is published in advance of the completion of the entire work in response to the request of some teachers who desire that it be available for the use of their classes.

The early publication of this part of the book will not only render it immediately available but will also afford an opportunity for the suggestion of desirable changes to be made before it is incorporated in the complete work. Such suggestions are earnestly invited by the writer.

In writing this text-book much use has been made of material published in my earlier works, notably in "An Introduction to Entomology" published in 1888 and long out of print, "A Manual for the Study of Insects," in the preparation of which I was aided by Mrs. Comstock, and in the "Wings of Insects," more recently published. The more important of the other sources from which material has been drawn are indicated in the text and in the bibliography at the end of the volume. References to the bibliography are made in the text by citing the name of the author and the year in which the paper quoted was published.

A serious obstacle to the popularization of Natural History is the technical names that it is necessary to use. In order to reduce this difficulty to a minimum the pronunciation of these names is indicated by indicating the length of the vowel that receives the primary accent.

The original figures and the copies of published figures in the first chapter were drawn by Miss Anna C. Stryke; those in the three following chapters, by Miss Ellen Edmonson. I am deeply indebted to each of these artists for the painstaking care shown in her work.

Two objects are kept constantly in mind in the preparation of the text-book of which this volume is a part: first, to aid the student in laying a firm foundation for his entomological studies; and second, to make available, so far as possible in the limited space of a handbook, a knowledge of the varied phenomena of the insect world. It is hoped that those who use this book will find delight in acquiring a more intimate acquaintance with these phenomena.

JOHN HENRY COMSTOCK.

ENTOMOLOGICAL LABORATORY CORNELL UNIVERSITY JUNE 1919.

TABLE OF CONTENTS

	The setae
	The taxonomic value of setæ.
	A classification of setæ
	(I) The clothing hairs
	(2) The glandular hairs
	(3) The sense-hairs.
d.	The segmentation of the body
a.	The body-segments, somites or metameres.
	The body-segments, somites or metameres
	The transverse conjunctive.
e.	The segmentation of the appendages
f.	The divisions of a body-segment
	The tergum, the pleura, and the sternum
	The lateral conjunctivæ
	The sclerites
	The sutures
	The median sutures
	The piliferous tubercles of larvæ
	The homologizing of sclerites
g.	The regions of the body
	. 2. THE HEAD
a.	The corneas of the eyes
	The corneas of the compound eyes
	The corneas of the ocelli
b	The areas of the surface of the head
	The front
	The clypeus
	The labrum.
	The epicranium
	The vertex
	The occiput.
	The genæ
	The postgenæ
	The gula
	The ocular sclerites.
	The antennal scientes. The trochantin of the mandible.
	The maxillary pleurites.
	The cervical sclerites.
ε,	The appendages of the head
	The antennæ
	The mouth-parts
	The labrum
	The mandibles
	The maxillulæ
	The maxillæ
	The labium or second maxillæ.

92	The epipharynx	46
	The hypopharynx	47
	I. The segments of the head	47
	3. THE THORAX	5.3
	. The segments of the thorax	48
	The prothorax, mesothorax, and metathorax	48
	The alitrunk	49
	The propodeum or the median segment	49
2	. The sclerites of a thoracic segment	49
	The sclerites of a tergum	49
	The notum	49
	The postnotum or the postscutellum	50
	The divisions of the notum	50
	The patagia	50
	The parapsides	51
(40)	The sclerites of the pleura	51
	The episternum	51
1.4	The epimerum	51
	The preepisternum	51
	The paraptera	51
	The spiracles	52
	The peritremes	52
	The acetabula	52
	The sclerites of a sternum	52
6	는 보았다. 한번 중 없다면서 그렇게 보고를 하는데 하고 있는 일을 하는데 하는데 하는데 하는데 하는데 아이에 나를 하는데	53
	The articular sclerites of the legs	53
	The trochantin	53
	The antecoxal piece	54
	The second antecoxal piece	54
	The articular sclerites of the wings	54
324	The tegula	54
	The axillaries	54
d	. The appendages of the thorax	55
	The legs	56
	The coxa	56
	The styli	56
	The trochanter	57
	The femur	57
	The tibia	
	The tarsus	57
	The wings	58
75	The different types of wings	59
	The margins of wings	60
	The angles of wings	60
32	The axillary cord	60
	The axillary membrane	60
	The alula	60
	The axillary excision	61

TABLE OF CONTENTS

xi

TABLE OF CONTENTS

	The posterior lobe	6
	The methods of uniting the two wings of each side	6
	The hamuli	6
	The frenulum and the frenulum hook	6
	The jugum	6
	The fibula	. 6
	The hypothetical type of the primitive wing-venation	6
	Longitudinal veins and cross-veins	6
	The principal wing-veins	6
	The chief branches of the wing-veins.	
	The veins of the anal area	6
	The reduction of the number of the wing-veins.	6
		6
	Serial veins	6
	The increase of the number of the wing-veins	6
	The accessory veins	6
	The intercalary veins	6
	The adventitious veins	7
	The anastomosis of veins	7
	The named cross-veins	7
	The arculus	7:
	The terminology of the cells of the wing	72
	The corrugations of the wings	7
	Convex and concave veins	7
	The furrows of the wing	7
	The bullæ	74
	The ambient vein	74
	The humeral veins	74
	The pterostigma or stigma	74
	The epiplurae	74
	The discal cell and the discal vein	74
	The anal area and the preanal area of the wing	73
	4. THE ABDOMEN	7
a.	The segments of the abdomen	7
ь.	The appendages of the abdomen	7
	The styli or vestigial legs of certain Thysanura	7
	The collophore of the Collembola	7
	The spring of the Collembola	7
	The genitalia	7
	The cerci	7
	The median caudal filament	7
	The prolegs of larvæ	7
	5. THE MUSIC AND THE MUSICAL ORGANS OF INSECTS	78
a.	Sounds produced by striking objects outside of the body	200
ь.		79
٥.	The music of flight	- 01

	2	
	TABLE OF CONTENTS	xiii
c.	Stridulating organs of the rasping type	81
***	The stridulating organs of the Acridiidæ	82
	The stridulating organs of the Gryllidæ and the Locustidæ	83
	Rasping organs of other than orthopterous insects	87
d.	The musical organs of a cicada	
6.	The spiracular musical organs	91
	The acute buzzing of flies and bees	55788
f.	Musical notation of the songs of insects.	91
g.	Insect choruses.	92
	111000 0100 01000	93
	CHAPTER III	
THE I	STERNAL ANATOMY OF INSECTS	94
	I. THE HYPODERMAI, STRUCTURES	95
a.	나는 가게 잘 하면 하면 하게 하면 가게 하게 하면	95
	Sources of the internal skeleton	95
	Chitinized tendons	95
	Invaginations of the body-wall or apodemes	95
	The tentorium	96
	The posterior arms of the tentorium	96
	The anterior arms of the tentorium	97
	The dorsal arms of the tentorium	97
	The frontal plate of the tentorium	97
	The endothorax	97
	The pragmas	97
	The lateral apodemes.	98
	The furcæ	98
ь.		98
0.	The mypoder margiands.	
		99
	Glands connected with setæ	99
	Venomous setæ and spines	100
	Androconia	100
	The specific scent-glands of females	100
	Tenent hairs	100
	The osmeteria	101
	Glands opening on the surface of the body	102
	Wax-glands	102
	Froth-glands of spittle insects	102
	Stink-glands	102
	The cephalic silk-glands	103
	The salivary glands	104
	2. THE MUSCLES	104
	3. THE ALIMENTARY CANAL AND ITS APPENDAGES	107
a.	The more general features	107
	The principal divisions	108
	Imperforate intestines in the larvæ of certain insects	108