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ARTHUR REUBEN COOPER

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NORTH AMERICAN
PSEUDOPHYLLIDEAN CESTODES
FROM FISHES

WITH THIRTEEN PLATES

BY
ARTHUR REUBEN COOPER

Contributions from the
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under the direction of Henry B. Ward, No. 127

TABLE OF CONTENTS

	PAGES
Introduction.....	7
Historical Data.....	8
Explanation of Terms.....	10
Key to the Families, Subfamilies, Genera and Species.....	11
Order PSEUDOPHYLLIDEA.....	13
Family DIPIHYLLOBOTHRIIDAE.....	15
Ligulinae Lühe 1899.....	16
Ligula Bloch 1782.....	17
<i>Ligula intestinalis</i> (Linnaeus 1758).....	18
Schistocephalus Creplin 1829.....	30
<i>Schistocephalus solidus</i> (O. F. Müller 1776).....	30
Haplobothriinae Cooper 1917.....	42
Haplobothrium Cooper 1914.....	43
<i>Haplobothrium globuliforme</i> Cooper 1914.....	44
Cyathocephalinae Lühe 1899, e. p.....	53
Cyathocephalus Kessler 1868.....	53
<i>Cyathocephalus americanus</i> Cooper 1917.....	53
Bothrimonus Duvernoy 1842.....	62
<i>Bothrimonus intermedius</i> Cooper 1917.....	63
Marsipometrinae Cooper 1917.....	70
Marsipometra Cooper 1917.....	70
<i>Marsipometra hastata</i> (Linton 1897).....	71
Triaenophorinae Lühe 1899.....	81
Triaenophorus Rudolphi 1793.....	81
Triaenophorus sp. larv.....	82
Fistulicola Lühe 1899.....	88
<i>Fistulicola plicatus</i> (Rudolphi 1819).....	89
Family PTYCHOBOTHRIIDAE.....	93
Ptychobothriinae Lühe 1899.....	94
Bothriocephalus Rudolphi 1808.....	95
<i>Bothriocephalus scorpii</i> (Müller 1776).....	96
<i>Dibothrium angustatum</i> (Rudolphi).....	112
<i>Bothriocephalus darviceps</i> (Goeze 1782).....	114
<i>Bothriocephalus cuspidatus</i> Cooper 1917.....	123
<i>Bothriocephalus manubriiformis</i> (Linton 1889).....	133
<i>Dibothrium laciniatum</i> (Linton).....	145
<i>Bothriocephalus histiophorus</i> (Shipley).....	147
<i>Bothriocephalus occidentalis</i> (Linton 1898).....	149
Clestobothrium Lühe 1899.....	153
<i>Clestobothrium crassiceps</i> (Rudolphi 1819).....	154
Amphicotylinae Lühe 1902.....	171
Abothrium van Beneden 1871.....	171
<i>Abothrium rugosum</i> (Batsch 1786).....	172
<i>Abothrium crassum</i> (Bloch 1779).....	186

Bibliography.....	201
Explanation of Plates.....	211
Index of Hosts.....	237
Index.....	241

INTRODUCTION

Soon after commencing the study of *Haplobothrium globuliforme* Cooper the writer (1914, 1914a) saw that, apart from the early and somewhat brief reports and descriptions by Leidy and the later, but yet pioneer work of Linton on both marine and fresh-water species, very little had been done on the members of the order in America. Consequently the desire for an opportunity to work up other species which had in the meantime been collected at the Canadian Lake Biological Station on Georgian Bay, located at Go-Home Bay, Muskoka District, Ontario, and at the Marine Biological Station at St. Andrews, New Brunswick, grew with the feeling that something of a comprehensive nature ought to be undertaken in order not only to ascertain to what extent European species are to be found in this continent, but also to locate properly in the classification at least some of the new forms formerly described, especially by Linton. Altho the material then at hand was investigated to a certain extent at the University of Toronto, it was not until the writer came to the University of Illinois that it was studied at all thoroly with the aid of other material for comparison from the collection of the University of Illinois, under the care of Professor Henry B. Ward.

Supplementary material, which in many cases was all that was available, was obtained by Professor Ward from the United States National Museum and the Bureau of Animal Industry, but apart from a few vials no European specimens could be procured, owing to the present international conflict. On account of the lack of the latter most of the determinations have been made with the aid of the literature only, a fact which the writer feels may necessitate future changes in connection with a few species which have been more or less tentatively regarded to be the same as those in Europe. In all cases, however, the specific details of the American forms have been emphasized, so that if changes have to be made later, the basis for such will be at hand. The writer would like to point out in this connection the comparative lack from a systematic standpoint of adequate descriptions of many of the European species which have been known for many years. It was this fact which in the absence of the original material for comparison made the present work one attended with not a little difficulty.

In the main the classification of the order adopted by the writer is that proposed by Lühe (1902) and later (1910) retained with only a few modifications. The family of the Caryophyllaeidae is, however, not included, so that the order is considered to be rather that of Carus (1863), with Lühe's later conceptions of the other families. One of the latter must now again be modified considerably owing to the present study of two quite aberrant species, namely, *Haplobothrium globuliforme* Cooper and *Marsipometra hastata* (Linton) which have been found by the writer to be very disturbing to the classification.

The writer wishes here to tender his thanks in the first place to the Biological Board of Canada for placing means and facilities at his disposal in connection

with his earlier collecting at the above-mentioned Canadian Biological Stations; to the University of Illinois for the opportunity of collecting further material at the Marine Biological Laboratory at Woods Hole, Massachusetts, and at the Harpswell Laboratory, South Harpswell, Maine, during the summer of 1916, and to the staffs of these institutions as well as to that of the Marine Laboratory of the United States Bureau of Fisheries at Woods Hole for assistance and direction in connection with the same; to the Smithsonian Institute and the Bureau of Animal Industry, from whom valuable material was obtained for comparison, in the latter case thru the kind offices of Dr. C. W. Stiles of the Hygienic Laboratory, Washington; and to the following investigators for alcoholic specimens: Professor O. Fuhrmann, University of Neuchâtel, Switzerland, Professor Edwin Linton, Washington and Jefferson College, Professor E. M. Walker, University of Toronto, Dr. H. J. VanCleave, University of Illinois, Dr. G. R. LaRue, University of Michigan, Dr. A. S. Pearse, University of Wisconsin, and Messrs. H. R. Hill and R. P. Wodehouse.

Finally to Professor H. B. Ward the writer wishes to express his sincere indebtedness not only for the use of his extensive private library and collections and for the procuring of rare books and specimens, but for his constant and stimulative interest in, and valuable criticism of, the work which has resulted in the following paper.

HISTORICAL DATA

Apart from Gmelin's (1790) collecting together the data given by the older writers such as Linnaeus, Pallas, Müller, Goeze, Bloch, Fabricius, Batsch, Schrank and Abildgaard, and Zeder's (1800, 1803) treatises, the first most important work on the bothriocephalid cestodes was the *Entozoorum Historia Naturalis* by Rudolphi (1808-1810). In this he reviewed the earlier literature, making valuable comments on the same, and described species of *Ligula*, *Trienophorus* and *Bothriocephalus*, the latter name being used for the first time. While Lamarck (1816) dealt with only the more common species, Rudolphi in his second work of major importance, the *Entozoorum Synopsis* (1819), made some corrections of his earlier publication and further contributions in the way of a few new species. F. S. Leuckart (1819), who did not receive Rudolphi's *Entozoorum* until after his own work was in print, dealt only with species of the genus *Bothriocephalus* as conceived by Rudolphi, which then contained members not only of the Pseudophyllidea but also of the Tetraphyllidea and the Trypanorhyncha. Nitzsch (1824) briefly defined the species of the same genus, while later Creplin (1839) dealt with them more in detail and erected the new genus *Schistocephalus*. Drummond (1838) was one of the first to report bothriocephalids from the British Isles, while Bellingham (1844) and Thompson (1844) made further contributions, all three dealing with forms from Ireland. Eschricht (1841) published some of the earliest data on the internal anatomy of the group, and Kölliker (1843) made a study of the development of the eggs of a few species. The next and perhaps most important work was that by Dujardin (1845) who, while following Rudolphi in the