

COPEPODA PARASITICA

FROM THE BELGIAN COAST II

(INCLUDED SOME HABITATS IN THE NORTH-SEA)

The Royal Belgium Museum of Natural History possesses a large collection of parasitic Copepoda, which material has been collected under the Direction of Prof. G. Gilson during the exploration of the North Sea by this Museum. Since this exploration covered a lot of years many species are represented in the Brussels collection even by several hundreds of specimens, which fact is of certain importance in view of the geographical distribution of the species all over the area which had been explored. Most species are rather well known, yet of some of the most common species as for example *Lernaëocera branchialis* so much material was available that I could undertake a close examination of the oral extremities, which are almost unknown as far as the grownup female regards. For the same species I will likewise give a survey over the variation of the antlers, which peculiarity was neglected until now by my predecessors. Like in the first paper on this group of parasites I will treat the material in systematic order.

ORDER I : CYCLOPIFORMES

FAMILY CHONDRACATHIDAE

Genus ACANTHOCHONDRIA OAKLEY.

1. — *Acanthochondria soleae* (KROYER)

15 ♀ ♀ from the belgian coast, Aug. 1912.

3 ♀ ♀ in gill chamber of *Pleuronectes platessa*, Ostende, 24.V.05.

15. Potje van Panne, 20.V.03, 3 *Pleuronectes flesus* with respectively 2 ♀ ♀, 1 ♀ and no parasites.

18. De 51°16'N., 2°57'E., à 51°15'N., 3°17'E., 18.VI.03; 28 ♀ ♀ on *Pleuronectes platessa*.

23. Limite intérieure du banc de Nieuport, 17.VI.'03, 11 *Pleuronectes flesus* with respectively : 4, 1, 3, 3, 6, 2, and 3 ♀ ♀, other *Pleuronectes* with no parasites.

25. 7 headends of *Pleuronectes flesus* with respectively : 4, 11, 6, 0, 2, 3 juv. and 3 ♀ ♀.
44. 51°32'N., 3°17'E., 3 *Pleuronectes flesus* with respectively : 19, 10, and 9 ♀ ♀ in their gill chambers.
2012. De 51°16'N., 3°16'E. à 51°25'N., 3°16'E. : 2 ♀ ♀ from *Pleuronectes flesus*.
5683. En face de Raverzyde, 17.VIII.21 : 2 ♀ ♀ and 1 juv.
5708. En face d'Ostende jusqu'en face de Breedenegeat, 12.VIII.21 (en dehors du Stroombank et en dedans de la limite) : 5 ♀ ♀.
5709. En face de Breedenegeat jusqu'en face de Wenduine, 10.VIII.21 (en dedans du Zand et en dehors de la limite) : 1 ♀ and 1 juv. in gill chamber of *Pleuronectes flesus*.
5710. En face de Middelkerke jusqu'en face d'Ostende, 17.VIII.21. En dedans de la limite : 9 ♀ ♀.
5714. En face de Breedenegeat jusqu'en face de Mariakerke. Sur le Stroombank et dedans de la limite, 1.IX.21 : 3 ♀ ♀.
5716. En face d'Ostende jusqu'en face de Spanjaardsduin en dedans de la limite, 9.IX.21 : 3 ♀ ♀.
5717. En face du Coq jusqu'en face d'Ostende. En dedans du Vaarwater et en dehors de la limite, 7.IX.21 : 6 ♀ ♀ on *Pleuronectes flesus*.
5722. En face de Breedenegeat jusqu'en face du Coq, en dedans du banc de Wenduine et de la limite, 9.IX. : 3 ♀ ♀.
5737. En face de Raverzyde jusqu'en face de Lombardzijde, en dedans du banc de Middelkerke et en dehors de la limite, 15.XI.21 : 3 ♀ ♀.
- This species therefore is found everywhere along the belgian coast.
- CP. 1. De la limite française à Coxyde, 10.VII.07; 7 *Pleuronectes flesus* with respectively : 8, 2, 1, 2, 2, 4, 2 ♀ ♀.
- CR. 329. En face de Middelkerke, près de l'Estran, 11.X.07 : 16 ♀ ♀.

2. — *Acanthochondria depressa* (F. SCOTT)

5 ♀ ♀ on *Pleuronectes flesus*, No. 2012, between 51°16'N., — 51°25'N. and 3°16'E.

ORDER CALIGIFORMES

FAMILY CALIGIDAE

Genus CALIGUS O. F. MUELLER

1. — *Caligus rapax* (MILNE EDWARDS)

This species belongs to the commonest species found along the belgian coast, no wonder that a great many specimens were present in the Brussels Museum Collection; both Chalimi and fullgrown specimens were present :

412. Heluse Demey, Ostende, 27-31.I.08 : 4 ♀ ♀, 2 juv. ♀ ♀, 1 ♂, 9 Chalimi.
467. *Cydopterus lumpus* with, 1 ♀, 1 ♂, and 2 Chalimi.
246. 1 ♀.

1010. Deal, 2.V.09 : 1♂, 1♀.
4340. En face de Duinbergen, 19.VII.07 : 1♂.
4348. 51°16'25"N., 2°55'20"E., 19.VIII.07 : 1♀.
4350. En face de Mariakerke, 19.VII.07 : 1♂.
4415. En face de Wenduyn, 1.X.07 : 1 Chalimus.
4436. 51°17'30"N., 2°56'E., 25.X.07 : 2♀♀.
4436. Same habitat : 1♂, 1♀.
4437. Du port d'Ostende au pont de Slijkens devant le Port : 1♀, 1 juv. ♂.
4443. Ostende, font de Slijkens (entrée du Port), 27.XII.07. Last chalimus stage.
4455. Font de Slijkens en Mer, entrée du Port, 11.II.08 : 1♀ with epizootic trematoda.
4458. En face de Flessingue dans l'Escaut, 12.II.08 : 3♂♂, 2♀♀.
4459. Font du port de Nieuwenhaven à Flessingue, 13.II.08 : 1♂.
4460. A l'ancre devant le 4° brise-lames à l'Ouest de Nieuwesluis : 2♂♂.
4462. Ostende, entrée du Port au font de Slijkens : 1 Chalimus.
4468. En face de Mariakerke, 23.III.08 : 1♀.
4476. Entrée du port d'Ostende, font Demey, 3.IV.08.
4482. En face d'Ostende, 9.IV.08 : 1♀.
4705. Près de la bouée de Breskens, écluse de Flessingue, 13.V.08 : 1♂.
5139. En face de Heyst, 25.VI.09 : 1 Chalimus.
- 5139'. Same habitat : 1♀.
5144. En face de Blankenberghe, 28.VI.09 : 1 juv.
- 5144'. Same habitat : 1♀.
5176. Dans le Westdiep, en face de Nieuport, 21.VII.09 : 1♂, 6 Chalimi.
5184. Devant l'entrée du port de Blankenberghe, 4.VIII.09 : 2 Chalimi.
5209. En face d'Ostende, 6.X.09, Hostspecies *Gobius minutus* : 1 Chalimus on dorsalis, 3 Chalimi at analis, 1 Chalimus at pectoralis, besides 6 Chalimi free from their host, 1♂ and 1♀.
5211. Au large entre Raversyde et Middelkerke, 6.X.09 : 1♂, 1♀.
5213. Au large de Westende, 6.X.09 : 1♀, 1 *Gobius minutus* with Chalimus on the right ventral.
5215. En face d'Ostende près de l'Estran, 7.X.09 : 5 Chalimi and 4 *Gobius minutus* with each 1 Chalimus attached to the ventral.
5217. En face du Coq, 7.X.09 : 2 juv., 2 Chalimi and 3 Chalimi on ventral of *Gobius minutus*.
5219. En face de Blankenberg, 7.X.09, Host *Gobius minutus* : 1 Chalimus on ventral, 1 Chalimus on ventral, 1 Chalimus on ventral, 9 Chalimi and 5 juv. ♀♀.
5220. En face de Uytkerke, 8.X.09 : 10 free Chalimi, 1 juv. ♀ and 2 *Gobius minutus* with each a Chalimus attached to the ventral.
5222. En face de Duinbergen : 7.X.09 : 10 Chalimi of which 4 on *Gobius minutus*, one fish with 1 Chalimus at base of dorsal and another at base of pectoral, a second fish with 1 Chalimus on lower surface of head, third fish with Chalimus at base of ventral.

5222. Same habitat : 1 ♀, 2 ♀ ♀ Chalimi, *Gobius minutus* specimens : I with 2 Chalimi on the right ventral, II, III and IV each with a Chalimus on the left ventral, V & VI each with a Chalimus on both right and left ventral, VII with 2 Chalimi of different size on the left ventral.
5223. Dans le Appenzak, bouée n° 1 du Paardemarkt, W.-N.-W. : 7.X.09 : 3 ♀ ♀, 2 ♂ ♂, 2 juv.
5224. 50°19'20"N., 3°17'20"E., 12.X.09. *Gobius minutus* with 1 Chalimus on ventralis and second fish with Chalimus on left ventral.
5225. Dans le Appenzak, bouée n° 1 du Paardemarkt, W.-N.-W., 7.X.09 : 3 Chalimi, 1 juv. ♀ and a Chalimus attached to the pectoral of a *Gobius minutus*.
5227. Escaut près de Suikerplaat, Schaar d'Everdingen, 13.X.09 : 1 ♀.
5230. En face de Mariakerke, 31.I.10 : 1 Chalimus.
5480. En face d'Ostende, 17.VII.12 : 1 ♂, 4 juv.
5578. En face de Nieuport, 17.VIII.13 : 1 ♀.
5583. 51°12'N., 2°50'10"E., 1.VIII.13 : 4 ♀ ♀, 2 juv.
5618. En face de Nieuport, 11.IV.14 : 1 ♂.
5633. Sémaphore de Zeebrugge S.E.Q.E., 13.VI.14 : 1 ♀.
5636. Entre Spanjaardsduin et Ostende, 13.VI.14 : 6 M. Chalimus on *Clupea spratus*.
5645. Spanjaardsduin S., 26.VI.14 : 3 juv. ♀ ♀, 1 Chalimus.
5646. Phare d'Ostende, 1 1/2 S.-E., 4.VII.14 : 1 ♀, 1 ♂.
5659. Près du Coq « Villa Christine », S.-W. 1/2 S., 4.VII.14 : 1 ♀, 1 ♂.
5698. En face de Middelkerke sur le banc de Middelkerke : 3 ♀ ♀, 3 juv. ♂ ♂ and 21 Chalimi on skin of *Cyclopterus lumpus*.
5821. Entrée du port d'Ostende au fond de l'avant-port (Yacht Club), 28.V.23 : 6 ♀ ♀, 1 ♂, 5 juv.
- P 403. 51°48'N., 2°10'E.; profondeur, 43,5 M., sable grossier néritique, 10.XI.05 : 1 ♀.
- P 932. 51°48'N., 2°10'E; profondeur, 50,96 M., sable grossier, 10.XI.08 : 1 ♀.
- P 1278. 1 ♂.
- P 1546. 50°58'40"N., 1°27'25"E., 24.XI.12; profondeur, 52 M. : 2 ♀ ♀, 1 ♂.
- P 1549. 50°54'40"N., 1°32'25"E., 24.XI.12; profondeur, 40 M. : 1 ♂.
- P 1563. 51°52'30"N., 1°50'E., 4.II.13; profondeur, 38 M. : 1 ♂.
- P 1596. 51°42'30"N., 2°10'E., 29.IV.13; profondeur, 47 M. : Chalimus on *Gadus merlangus*.
- P 1634. 51°22'N., 2°26'E., 25.VIII.13; profondeur, 31 M. : 1 ♂.
- P 1672. 51°48'10"N., 2°10'20"E., 10.XI.13; profondeur, 54 M. : 2 ♀ ♀, 1 ♂.
- P 1692. En rade de Deal, 11.XI.13 : 1 juv. ♀.
- P 1697. 51°22'20"N., 2°26'20"E., 2.II.14; profondeur, 29 M. : Chalimus on *Clupea*.
- P 1700. 51°32'30"N., 2°40'E., 2.II.14; profondeur, 36,4 M. : 3 ♂ ♂.
- P 1706. 51°57'45"N., 1°51'E., 3.II.14; profondeur, 40 M. : 2 ♂ ♂.
- P 1744. En rade de Deal, 3.II.14 : 4 ♀ ♀, 1 juv. ♀, 1 ♂, 1 Chalimus with *lunulae*.
- P 1720. 50°58'N., 2°27'E., 4.II.14; profondeur, 54,6 M. : 1 ♂.
- P 1724. Gris-Nez, S., 47°E., 4.II.14 : 1 ♀.
- P 1729. Gris-Nez. S. 1/4 W., 5.II.29 : 3 ♂ ♂, 1 ♀.

As far as the spot, where the Chalimi are attached to their host concerns, it is remarkable, that all parasites are attached to their host with the head in the direction of the head of their host and at the same time in the dorsal or in the ventral line of the host, where watercurrents strike the parasites symmetrically and where they are exposed least to friction due to those watercurrents, which is in accordance with what we know from other parasitic Copepoda of the same group, confer SCHUURMANS STEKHOVEN, 1935. The species in question is common along the whole belgian coast as well as in that area of the North Sea, which is adjacent to Belgium, Holland and the S. E. part of England.

2. — *Caligus diaphanus* (NORDMANN)

C 9. De Mariakerke à Middelkerke entre le Stroombank et le Wenduyne Bank, 2.VI.05 : 1 ♀.

3. — *Caligus curtus* (O. F. MUELLER)

Several specimens on the gills of *Rhombus maximus*, Ostende, 16.IV.'05 (No. 243). No. 242, 5 specimens, 6.IX.'98, without indication of findingplace.

Genus LEPEOPHTHEIRUS NORDMANN

1. — *Lepeophtheirus pectoralis* (O. F. MUELLER)

Ostende, 26.X.03, *Pleuronectes flesus* with 6 ♀ ♀ and 2 ♂ ♂.

Ostende, 14.V.05, same host with 64 ♀ ♀, 1 ♂.

15. Dans le Potje devant La Panne, 20.V.03 : 1 ♀.

15'. Same habitat, 20.V.03, same host, fish I , 3 ♂ ♂ left pectoralis.

III, 1 ♀ on left pect.; 1 ♀ on right pect.

18. De 51°16'N., 2°57'E. à 51°15'N., 2°53'E., 17.VI.03, *Pleuronectes platessa* : 21 ♀ ♀ on left, 5 ♀ ♀ on right pectoralis.

23. Limite intérieure du banc de Nieuport, 17.VI.03 : 13 ♀ ♀.

25. 7 *Pleuronectes flesus* with respectively :

I. 2 ♀ ♀ on left pect.; 3 ♀ ♀ right pect.; 1 ♀ on right ventr., — on left ventr.

II. 1 ♀ on left pect.

III. 3 ♀ ♀, 1 ♂ right pect.

IV. 3 ♀ ♀ on left pect.; 3 ♀ ♀ right pect.

V. 2 ♀ ♀ on left pect.

VI. 2 ♀ ♀ on left pect.

VII. 4 ♀ ♀ on left pect.; 2 ♀ ♀, 1 ♂ right pect.

23. Limite intérieure du banc de Nieuport, 17.VI.03, 11 *Pleuronectes flesus* with respectively.

- I. 4 ♀ ♀ on left pect.; 1 ♀ on right pect.; 1 ♂, 1 ♀ on right ventr.; 1 ♂ on ventr. surface.
- II. 3 ♀ ♀ on left pect.; 1 ♀, 1 ♂ on right pect.
- III. 1 ♀ on left pect.; 1 ♀ on right pect.
- IV. 1 ♀, 1 ♂ on left pect.
- V. 1 ♀ on left pect.
- VI. 7 ♀ ♀ on left pect.
- VII. 1 ♀ on left pect.
- VIII. 2 ♀ ♀ on left pect.
- IX. 3 ♀ ♀ on left pect.; 2 ♀ ♀ on right pect.
- X. 2 ♀ ♀ on left pect.
- XI. 1 ♀, 1 ♂ on left pect.; 1 ♂ on right pect.
44. 51°32'N., 3°23'E., 24.IX.03, 3 *Pleuronectes flesus* with respectively on
 I : 9 ♀ ♀ on left pect.; 2 ♀ ♀ on right pect.; 1 ♀ on right ventr.; 1 ♀ on left ventr.
 II : 6 ♀ ♀ on left pect.; 2 ♀ ♀ on right pect.; 1 ♀ on right ventr.; 1 ♀ on left ventr.
 III : 3 ♀ ♀ on left pect.; 2 ♀ ♀ on right pect.; 1 ♀ on right ventr.
88. 51°21'N., 2°51'E., 12.VIII.04 : 43 ♀ ♀, 6 ♂ ♂.
101. Au large d'Ostende, S.Q.W., 9 1/2 Miles à 51°25'30"N., 2°49'30"E., 2.IX.04 : 13 ♀ ♀ on *Pleuronectes flesus*.
102. De 51°27'N., 3°03'E. à 51°25'30"N., 2°59'28"E., 20.IX.04 : 7 ♀ ♀ on *Pleuronectes flesus*.
106. De 51°17'N., 2°47'E. à 51°16'N., 2°49'E., 22.IX.04 : 11 ♀ ♀ and a pectoral of *Pleuronectes flesus* with 4 ♀ ♀.
109. 51°15'30"N., 2°16'E. à 51°15'30"N., 2°49'E., 22.IX.04. Fins of *Pleuronectes flesus*, I with 4 ♀ ♀, II with 2 ♀ ♀.
11. De l'intérieur du banc d'Ostende à 51°16'N., 2°45'E., 26.IX.04 : 14 ♀ ♀ and in another phial of the same spot, 210 ♀ ♀.
115. Près de 51°15'N., 2°47'E., autour de l'église de Nieupoort un peu à l'Est du nouveau phare : 8 ♀ ♀.
127. De 51°12'N., 2°40'E. à 51°13'N., 2°41'E., 14.X.04 : 40 ♀ ♀ and some pectorals apparently from a *Pleuronectes* sp. with respectively 6, 5, 5 ♀ ♀.
165. De 51°22'N., 2°40'E. à 51°18'20"N., 2°45'E., 14.VI.05 : 56 ♀ ♀, 1 juv. ♀.
244. Ostende, 9.VI.05 : *Pleuronectes flesus* with 29 ♀ ♀.
245. Ostende, 23.III.23 : 1 ♂, 1 ♀.
5683. En face de Raverzijde, 17.VIII.21 : *Pleuronectes flesus* with 3 ♀ ♀ on right and 9 ♀ ♀ on left pectoral.
5708. En face d'Ostende jusqu'en face de Breedenegat : 4 ♀ ♀ on left and 1 ♀ on right pectoral, 1 ♀ at the right ventral.
5709. En face de Breedenegat jusqu'en face de Wenduïne. En dedans du Zand et en dehors de la limite, 10.VIII.21 : *Pleuronectes flesus* with 6 ♀ ♀ on left pectoral and 1 ♂ & 1 ♀ on ventral.
5710. En face de Middelkerke jusqu'en face d'Ostende, 17.VIII.21 : *Pleuronectes flesus* with 7 ♀ ♀ on left and 4 ♀ ♀ on right pectoral, 1 ♀ on left and 1 ♀ on right ventral.

5714. En face de Breedenegeat jusqu'en face de Mariakerke. Sur le Stroombank et dedans de la limite, 1.XI.21 : *Pleuronectes flesus* with 2 ♀ ♀, 1 ♂ on left pect.; 2 ♂ ♂ on right pect.; 1 ♀ ventr.
5716. En face d'Ostende jusqu'en face de Spanjaardsduin. En dedans de la limite, 9.XI.21 : *Pleuronectes flesus* with 6 ♀ ♀ on right pect.; 1 ♀ on left ventr.; 1 ♀ on right ventr.
5717. En face du Coq jusqu'en face d'Ostende. En dedans du Vaarwater et en dehors de la limite, 7.IX.21 : *Pleuronectes flesus* with 4 ♀ ♀ on left pectoral and 3 ♀ ♀ on right pectoral.
5722. En face de Breedenegeat jusqu'en face du Coq. En dedans du banc de Wenduyne et de la limite : *Pleuronectes flesus* with 11 ♀ ♀ on left and 1 ♂ on right pectoral.
5737. En face de Raverzijde jusqu'en face de Lombartzijde. En dedans du banc de Middelerke et en dehors de la limite, 15.XI.21 : 10 ♀ ♀ on left pectoral of *Pleuronectes flesus*.
- C 21. De Westende jusque devant le port d'Ostende, près de l'Estran, 22.VIII.05 : 1 ♀.
- C 33. Entre le Stroombank et le Wenduynebank à ½ mille de la côte, 8.X.05 : 7 ♀ ♀.
- C 87. En face d'Ostende jusqu'en face de Raverzijde, 22.III.06 : 2 ♀ ♀.
- CP 1. De la limite française à Coxyde, 10.VIII.07 : 7 *Pleuronectes flesus* with on :
- I. 16 ♀ ♀ on left pect.; 8 ♀ ♀, 1 ♂ right pect.; 3 ♀ ♀, 1 ♂ left ventr.; 1 ♀ on right ventral.
 - II. 5 ♀ ♀ on left pect.; 8 ♀ ♀, 1 ♀ left ventral.
 - III. 2 ♀ ♀ on left pect.
 - IV. 2 ♀ ♀ on left pect.
 - V. 1 ♀ on left pect.
 - VI. 2 ♀ ♀ on left pect.
 - VII. 1 ♀ on left pect. (moreover loosened from the host : 3 ♀ ♀).
- CP 3. Depuis le phare de Nieuport jusque devant Coxyde, pectorals of Pleuronectid with respectively 5, 3, 4, 2, 3, 2 ♀ ♀, free 7 ♀ ♀.
- CP 14. Devant Middelerke jusque devant La Panne, 29.V.08 : pectoral of *Pleuronectes flesus* with 2 ♀ ♀ and free 2 ♀ ♀.
- CP 26. Dans le Potje devant La Panne, 13.VIII.08 : 12 ♀ ♀ and on pectorals of *Pleuronectes flesus* respectively 1, 1, 2, 5, 4, 2 ♀ ♀.
- CR 329. En face de Middelerke, près de l'Estran, 11.X.07 : *Pleuronectes flesus* with 15 ♀ ♀, 10 on left pect.; 3 ♀ ♀, 1 ♂ on right pect.; 1 ♀, 1 ♂, on left ventr.; 1 ♀ on right ventr.

Common along the belgian coast and in the North Sea between England and Belgium.

2. — *Lepeoptheirus thompsoni* (BAIRD)

667. 51°40'N., 2°39'E., 29.VIII.00. *Lepeoptheirus thompsoni* from *Rhombus maximus*.

Genus CECROPS LEACH

Cecrops latreilli (LEACH)

238. 51°19'N., 2°56'E., 4.VIII.99, 5 ♀ ♀, 1 ♂ from *Orthogoriscus mola* Gills. Further *Cecrops Latreilli*. Exp. I Mer, 23.III.?? : 1 ♂.

FAMILY LERNAEOPODIDAE

Genus LERNAEOPODA DE BLAINVILLE

1. — *Lerneaopoda scyllicola* (LEIGH SHARPE)From *Scylliorhinus canicola*, mer du Nord, III.30.

Genus CLAVELLA OKEN

1. — *Clavella devastatrix* (LEIGH SHARPE)All specimens were found on *Gadus merlangus*.

110. De 51°15'30"N., 2°33'30"E. à 500 mètres N.-N.-W. de 51°16'N., 2°36'E., 24.IX.04 : 1 specimen.
- C 23. Depuis le phare d'Ostende jusque Breedenegeat, 5.IX.05 : 1 ♀.
- C 32. De Raverzijde jusqu'au port d'Ostende, 4.X.05 : 1 ♀.
- C106. Devant Ostende jusqu'en face de Middelkerke, 10.V.16 : 6 ♀ ♀.
- C107. Devant Ostende jusqu'en face de Westende, 11.V.06 : number of specimens not noted.
- C113. Devant Ostende jusqu'en face de Mariakerke, 26.V.06 : 1 ♀ and 1 ♀ with adhering to it a ♂.

FAMILY LERNAEIDAE

Genus LERNAEENICUS LE SUEUR

1. — *Lernaenicus sprattae* (SOWERBY)

This species seems to be very common along the belgian coast, as well as between England and Belgium. Lastly it was redescribed by LEIGH SHARPE together with the next species, *L. encrasicola*. So it would be superfluous to give here a redescription together with figures as I had planned to do. LEIGH SHARPE's excellent drawings fit well to get an idea of the existing differences between the species in question. I can only confirm LEIGH SHARPE's observations. Host *Clupea sprattus*.

167. De 51°14'30"N., 2°50'E. à 51°12'20"N., 2°42'20"E., 22.VI.05 : site eyes.
173. De 51°15'30"N., 2°55'E. à 51°13'N., 2°45'E., 1.VII.05 : 3 sp. with infested eyes.
237. De 51°19'N., 2°42'E. à 51°24'N., 2°43'E., 30.V.06 : 10 sp. with inf. eyes.
242. De 51°16'40"N., 2°47'E. à 51°15'30"N., 2°38'45"E., 15.VI.06 : 4 sp. with inf. eyes.
243. 51°12'N., 2°41'45"E., 25.VI.06 : 1 sp. with inf. eyes.
247. 51°22'N., 2°56'E., 5.VII.06 : 1 sp. with 2 ♀ ♀ in right eye.
280. De 51°27'30"N., 2°47'30"E. à 51°23'40"N., 2°40'E., 17.IV.07 : 6 sp. with eyes infested.
5771. En face de Spanjaardsduin jusqu'en face de Middelkerke, 15.III.22 : inf. eyes.

5808. Devant Ostende, 17.I.23 : 1 ♀.
5815. Hors du Stroombank, en face de Middelkerke, 12.IV.23 : 1 ♀ on left eye.
5821. Entrée du port d'Ostende, au fond de l'avant-port (Yacht Club).
5825. Entrée du port d'Ostende, au fond de l'avant-port (Yacht Club), 28.V.23 : 1 ♀.
6012. Devant Ostende jusque devant Raverzijde en dehors du Stroombank, 10.VIII.22 : 2 ♀ ♀ on left eye.
6030. Devant Wenduïne jusque devant Spanjaardsduin, près de l'Estran, 13.X.22 : 2 ♀ ♀ on right eye, 1 ♀ in skin above ventralis, 1 under eye.
6048. Devant Nieuport jusque devant Middelkerke, près de l'Estran, 12.XII.22, eyes : 2 ♀ ♀.
6051. Devant Lombardzyde jusque devant Mariakerke (sur le banc de Wenduïne), 22.I.23 : 1 ♀.
- C120. Devant Raverzijde jusque devant Ostende (en dehors du Stroombank), 24.VIII.23 : 1 ♀.
- C141. Devant Ostende jusqu'en face de Raverzijde, 8.VIII.06.
- C 4. Devant la Panne jusque devant Nieuport, 23.VIII.07 : eye.
- CP 6. Devant Oostduinkerke jusque devant Middelkerke, 25.IX.07 : eye.

2. — *Lernaeenicus encrasicola* (TURTON)

237. De 51°19'N., 2°41'E. à 51°25'N., 2°43'E., 30.V.06 : *Clupea sprattus* with specimen in the skin.
243. 51°12'N., 2°41'45"E., 25.VI.06 : 1 *Clupea sprattus* with infested skin.

Genus LERNAEOCERA DE BLAINVILLE

I had to my disposition specimens of 3 species of *Lernaeocera* : 1 *Lernaeocera branchialis*, 2 *Lernaeocera minuta* and 3 *Lernaeocera lusci*, either still attached to their host or dissected out. In the case the specimens were still embedded in the host's tissues I have prepared them carefully and dissected out of the surrounding tissues. From a lot of specimens of all three mentioned species I have prepared the antennal plate as well as the oral cone in order to compare the oral extremities. It might be expected, that when there exist real differences between the mentioned species, that these differences would be best seen in the shape or structure of the oral appendages. At the same time I have compared the antlers and I have tried to point out the degree of variation of these appendages in *L. minuta* and *L. branchialis* just as I have done in my former paper with *L. lusci*.

In the systematics of the Genus *Lernaeocera* the following items are of importance : 1 the lost species of which we must ask in how far there exists a host-specificity as for the different species, 2 the bodyshape, 3 the shape and division of the antlers and 4, which matter has still to be elucidated, the oral appendages.

1 As for the hostspecificity it should at once be remarked that this is not strict for *L. branchialis*, which is known to occur on *Gadus morrhua*, *G. aegle-*

finus, *G. merlangus*, *G. luscus*, *Labrax lupus*, *Pholis gunellus*, *Gallionymus lyra* and *Pleuronectes flesus* also on hosts belonging to not less than 4 families of fishes.

Lernaeocera lusci with which SCHUURMANS STEKHOVEN synonymizes *L. phycidis* LEIGH SHARPE is found on *Gadus luscus*, *Urophycis blennoides* and *Onos mustela*, and *Molva molva*. Thus although the known number of hosts is smaller than in the first case a strict host-specificity does not exist here. *Lernaeocera minuta* is so far only known from *Gobius minutus*, so that host-specificity seems to occur in the latter species like also is the case in *Lernaeocera lumpi* (recently brought to the Genus *Saussiconia* by Leigh Sharpe) from *Cyclopterus lumpus* and in *Lernaeocera brevicollis* from *Cottus scorpius*. The latter 2 species are rare and only found exceptionally. I have no material at hand to study these species in detail.

2 Bodyshape and size. It must be asked if not the bodyshape as well as the bodysize is dependent on the kind of host on which the species in question occurs. Likely the size of the body might be dependent on the space in the gill chamber especially wenn more specimens are present at the same time, as well as on the mass of food and the easiness with which this food can be caught by the parasite. A small sized host has comparatively less food available for the parasite as a host with much wider bloodvessels. One has only to compare *Gobius minutus* with for example *Gadus morrhua* to be sure that when the same *Lernaeocera* species could live on both hosts, the specimen found on *Gobius minutus* undoubtedly would be of a smaller size than that occurring on *Gadus morrhua*, since the specimen living on the latter host has to its disposition a much greater quantity of blood in a certain period than his mate which by chance did find *Gobius minutus* instead of *G. morrhua*. It always will remain smaller on *Gobius minutus* and one would not wonder when the small space available in the gill chamber of *Gobius minutus* had a certain influence on the curvature of the body of the parasite occurring in that habitat, so that seemingly but not really specific characters would be suggested to exist. A similar case could eventually be realised when comparing a specimen of *L. lusci* from *Gadus luscus* with a specimen of the same species from *Onos mustela* which host remains smaller than the first mentioned host-species.

3 For the antlers we may use the same arguing. In a large-sized host the distance from the skin to the bony case of the head, in which the large bloodvessels run or to the arteries in the branchial archs is larger than in a host of smaller size, where the antlers reach their aim much earlier. A clue for the specificity of the mentioned parasites might be delivered by : 4. the oral appendages. When these show like one might expect differences parallel with the other differences like they are described in the literature than one may be rather sure that the described characters are real and do not fall in the range of variation of the species due to the medium in which the parasite is obliged to live.

1. — *Lernaeocera branchialis* L.

(Fig. 1-11.)

Most specimens (Fig. 1-11) of the collection were found on *Gadus merlangus*, indicated as G. Me., a few on *Gadus aeglefinus* indicated as G. A. others on *Gadus morrhua*, indicated as G. Mo. whereas in a single case *Ammodytes tobianus* was the host of the fullgrown female. It is worth while to point to the fact that most specimens were almost fullgrown and only a few apparently were less developed.

10. 1 ♀ G. Me.
 78. 1 ♀ on the gills of G. Mo.
 80. Ostende, 18.IV.05 : 2 ♀ ♀ G. Mo.
 81. 20.VIII.04 : 1 ♀ G. Mo.
 82. 1 ♀ G. Mo.
 83. 1 ♀ G. A.
 109. 51°09'30"N., 2°38'E., 24.IX.04 : 1 ♀ G. Me.
 115. Près de 51°15'N., 2°47'E. à tour de l'église de Nieuport un peu à l'Est du nouveau phare, 21.IX.04 : 1 ♀.
 165. De 51°22'N., 2°51'30"E. à 51°18'20"N., 2°45'E., 14.VI.05 : 1 ♀ G. Me. (Fig. 1.)
 232. De 51°21'45"N., 2°46'E. à 51°25'N., 2°53'E., 22.V.06 : 1 ♀ G. Me.
 707. Entre le West Hinder et le Banc de Middelkerke, 23.X.13 : 2 ♀ ♀ left gill chamber of G. Me.
 789. 51°19'N., 2°36'E., 13.IX.1900 : 3 ♀ ♀ G. Me.
 5713. En face de Mariakerke jusqu'en face de Coq-sur-Mer. En dedans du Wenduynbank et en dehors de la limite, 25.VIII.21 : G. Mo. 1 ♀ at each side G. Me.
 5719. En face du Coq jusqu'en face de Mariakerke. En dehors du Wenduynbank et en dehors de la limite, 15.IX.21 : G. Mo. with 1 ♀ at left side.
 9262. Entre le « East-Dyck » et le « inner Ruytingen », 1.XII.33 : G. Me. with parasites.
 C 2. Limite sud du banc d'Ostende, 23.III.05 : 1 ♀ G. Me.
 C23. Depuis le phare d'Ostende jusqu'à Breedenegeat, 15.IX.05 : 1 ♀ G. Me. each side.
 C24. Devant Middelkerke jusque devant Ostende, entre la côte et le Stroombank, 11.IX.05 : 1 ♀ G. Me.
 C25. Entre le banc de Wenduyn et le Stroombank, 12.IX.05 : 1 ♀.
 C27. Devant le Coq jusque devant Spanjaardsduin, 14.IX.05 : 1 ♀ G. Me. right side. (Fig. 6, 7, 8.)
 C27. Devant le Coq jusque devant Spanjaardsduin, près de l'Estran, 14.IX.05 : 15 ♀ ♀ G. Me.
 C28. Entre Ostende et Middelkerke, 15.IX.05 : 1 ♀.
 C29. En face d'Ostende, 15.IX.05 : 1 ♀ G. Me.
 C30. De Spanjaardsduin jusque devant Ostende, 20.IX.05 : 2 ♀ ♀ G. Me.
 C32. De Raverzijde jusqu'au port d'Ostende, 4.X.05 : 3 ♀ ♀.
 C33. Entre le Stroombank et le Wenduynbank à $\frac{1}{2}$ mille de la côte : 3 ♀ ♀.
 C38. De Raverzijde jusque devant Ostende, 19.X.05 : 1 ♀ G. Me. 1 ♀ G. Mo.

- C41. Du port d'Ostende jusque Spanjaardsduin, 25.X.05 : 2 ♀ ♀ G. Me.
- C45. Devant le port d'Ostende jusqu'en face de Spanjaardsduin, 5.XI.05 : 2 ♀ ♀ G. Me. (Fig. 11.)
- C48. Devant Ostende jusqu'en face de Breedene et retour : 10.XI.05 : 4 ♀ ♀ .
- C50. En face d'Ostende jusqu'en face de Raverzijde, 15.XI.05 : 1 ♀ G. Me.
- C51. Ostende S.S.E. jusqu'en face de Raverzijde, 15.XI.05 : 2 ♀ ♀ .
- C52. De Raverzijde jusqu'en face d'Ostende, 6.XII.05 : 3 ♀ ♀ G. Me.
- C53. Du port d'Ostende jusqu'en face de Breedenegat, 7.XII.05 : 2 ♀ ♀ G. Me.
- C54. En face d'Ostende, 8.XII.05 : 3 ♀ ♀ G. Me. (Fig. 2.)
- C56. Same habitat, 10.XII.05 : 2 ♀ ♀ .
- C60. En face d'Ostende, 29.XII.05 : 2 ♀ ♀ G. Me.
- C78. Devant Middelkerke jusqu'en face d'Ostende, 22.II.06 : 2 ♀ ♀ .
- C79. Devant Middelkerke jusqu'en face d'Ostende, 22.II.06 : 1 ♀ .
- C81. Same habitat, 6.III.06 : 2 ♀ ♀ G. Me.
- C89. En face de Mariakerke, 31.III.06 : G. Me. 1 ♀ .
- C94. En face de Mariakerke, 2 ♀ ♀ G. Mo.
- C105. Devant Ostende jusqu'en face de Middelkerke, 10.V.06 : 1 ♀ G. Me.
- C106. Same habitat, 10.V.06 : 1 ♀ G. Me.
- C113. Devant Ostende jusqu'en face de Mariakerke, 26.V.06 : 1 ♀ G. Me.
- C136. En face d'Ostende, 5.VIII.06 : G. Me. 1 sp. 3 ♀ ♀ at right; other sp. 2 ♀ ♀ at right side.
- C143. Devant Ostende jusqu'en face de Breedenegat, 11.VIII.06 : 3 ♀ ♀ G. Me. (Fig. 10.)
- C148. Coq-sur-Mer S.Q.W. jusqu'à Breedene, église S.Q.W., 28.VIII.06 : 11 ♀ ♀ G. Me.
- C150. Devant Ostende jusqu'en face de Mariakerke, 3.IX.06 : 4 ♀ ♀ G. Me.
- C155. Devant Ostende jusqu'en face de Middelkerke, 8.IX.06 : 9 ♀ ♀ G. Me.
- C157. Devant Raverzijde jusqu'en face d'Ostende, 13.IX.06 : 2 ♀ ♀ G. Me.
- C158. Mariakerke Sud jusque Middelkerke Sud, 14.IX.06 : 2 ♀ ♀ G. Me.
- C159. Devant Ostende jusqu'en face de Raverzijde, 20.IX.06. (Fig. 3, 4.)
- C160^{bis}. Près du bateau-phare Wandelaar, 27.IX.06 : 1 ♀ G. Me.
- C162. Devant Mariakerke jusqu'en face d'Ostende, 2.X.06 : 1 ♀ G. Me.
- C165. Devant Ostende jusqu'en face de Middelkerke, 5.X.06 : 1 ♀ G. Me.
- C166. Devant Ostende jusqu'en face de Westende, 6.X.06 : 1 ♀ G. Me.
- C172. Du Wandelaar Sud jusqu'à la bouée 1 noire Est, à 100 m., 17.X.06 : 4 ♀ ♀ G. Me.
- C187. Proximité du bateau-phare Wandelaar (Boie Lucifer S.S.E. à bateau Wandelaar S.), 23.XI.06 : 2 ♀ ♀ G. Me.
- C245. Devant Ostende jusqu'en face de Middelkerke, 23.X.13 : 2 ♀ ♀ G. Me. left gill chamber.
- C245. Same habitat, 11.X.07 : G. Me. 1 ♀ .
- CP 2. Devant Oostduinkerke jusqu'en face de la Panne, en dedans du Broersbank, 17.VII.07 : 1 ♀ G. Me.
- CP35. Dans le Westdiep, 2.IV.09 : 4 ♀ ♀ G. Me. (Fig. 5, 9.)
- CP53. Près de la bouée de la Panne jusqu'à la bouée du banc de Nieuport, 31.VII.09 : 1 ♀ on *Ammodytes tobianus*.

Cr 331A. En face d'Oostduinkerke, 11.XI.07 : 1 ♀ G. A.

Cr 331A. Same habitat, 11.X.07 : 1 ♀ at left side of G. Me.

Common along the belgian coast and between England and Belgium.

When on *Gadus merlangus*, *L. branchialis* is generally a large-sized animal. In fullgrown state the S-shaped trunk measured from where the neck passes into the genital segment till the anal opening, in a straight line 6-10 mm. Like Scott points to, the anal end of the body is distinctly curved at the dorsal side of the body, strongly concave, whereas the anal portion itself is finger-shaped.

The neck is generally long, the distance between the vertex of the head and the trunk measures in a straight line dependent on the question if the neck is rather straight or curved, from 5-7 mm. Never the neck is quite straight. It is rather slender.

As for the antlers I can confirm my former meaning, that the ramification of the antlers in this species allways begins quite a distance from their base, whereas these ramifications are found in *minuta* and *lusci* more close to the root of the same antlers.

Like in *L. lusci* one can select a series of specimens which shows how with increasing age the ramifications become more complicate, without however leading to those strongly ramified figures as in *lusci*.

In some specimens all three antlers remained unramified. The females in question were in possession of antlers which had penetrated into the buccal cavity.

In a ♀ from CP 35 (Fig. 5) all three antlers are almost of the same length, the mediodorsal antler shows a bifurcation, whereas near its tip small excrescences are to be seen, the right lateral antler remains unbranchéd, whereas the left lateral antler is bifid at its apex. The female in question was fullgrown and in the possession of voluminous eggstrings. In a third ♀, the mediodorsal antler of which has been broken off, both lateral antlers are distinctly bifurcated, the left one presents even very long secondary branches (Fig. 9). Another ♀ again has all three antlers distinctly bifurcated (Fig. 2). In the more complicated structures figure 3 derived from ♀ ♀ from the case C 159 tertiary branching of the secondary branches may be observed, but here, such in strict contrast to what was found in *L. lusci*, the branching remains more open than in the latter species, so that the type of branching peculiar to *L. branchialis* can be recognised. The shape of the abdomen in the lastmentioned ♀ ♀ was typically *branchialis*-like.

Now to the oral appendages and the antennae! Here the difficulties arise. Then often one or more of the appendages miss wholly or partly and comparatively seldom all appendages are fully present or distinctly visible.

Just like WILSON (1917) says the appendages are in reality not rudimentary nor obsolete. The adult female retains all the appendages that she ever

possessed and they are as fully developed in the adult as they were in the copepodite stage. The only change that has been made is that the parasite has ceased to use some of them and they have consequently become brittle and are easily broken off.

Although WILSON gives a fairly good description of the appendages of *L. branchialis*, the figure (104) he gives of the second maxillae of this species depicts the basal joint of these appendages only. The second maxillae are distinctly three-jointed; the basal joint possesses at each side at the base of its distal third a denticulation, the propus is swollen and faintly crenulated at its distal half, whereas the dactylus is broadly nailshaped and short, tapering gradually to the apex. The basal annulation appears to be the result of a fusion of more than 1 annulation.

The figure WILSON has given of the first maxillae of his *L. branchialis* do not fit for our specimens.

His figure 103 depicts a first maxilla which WILSON describes as short fingerlike papillae divided at the tip and each portion armed with a single large seta. On the outer margin of the papilla near the base is a small rounded palp-like protuberance.

When WILSON's figures are compared with my figures 3, 4, it must be stated, that in the few cases where I could observe the first maxilla, this was not divided at the tip and moreover that it was in the possession of three apical setae and a fourth apparently originating at the basal portion; so that I come to the conclusion, that the first maxillae are in reality 2-jointed a conclusion which is not in contradiction with WILSON's observations when we assume that the palp-like protuberance at the base of the fingerlike papillae as which WILSON describes the first maxillae is in reality the basal joint and that WILSON's *L. branchialis* is not conspecific with our species.

The ex- and intrusible short oral cone surrounded by oral flaps (one of which is the elliptical, smooth labrum) leads at its side into the buccal cavity which is strengthened by half circular chitinised ribs, which however are not quite closed but remain more or less open at both sides, distinctly so at the side of the oral flaps where they build thickenings. The walls of the oral cone are strengthened by chitinous struts. In a rare case I believe to have seen the tip of one of the mandibles. Seen on top the strong muscles which connect occiput and forehead are distinctly to be seen.

The antennae are shifted far dorsad. This phenomenon works in the family as a whole and is likewise one of the characteristics in the phylogenetic development of the Genera, as is seen in the Genus *Lernaeenicus*, where like LEIGH SHARPE has shown *Lernaeenicus sprattae* has antennae in the neighbourhood of the oral cone, whereas in *Lernaeenicus encrasichola* the antennae are to be found halfway between the oral cone and the antlers, confer *Trifur tortuosus* and *Pennella*. In *Peniculus* the antennae are shifted far dorsad, like

also in *Lernaeocera*. In *Haemobaphes cyclopterina* the antennae are quite near to the mouth. So one may make quite a series of species giving an idea how in this family there is tendency to the shifting of the antennae in dorsal direction.

In most females the first antennae were broken off. Where they were present, they are three or four-jointed, the apical joint bears at its tip one more very long seta and quite a number of short setae, whereas more to the base at the median side of the antenna other hairs are to be found most of them situated at or near the articulations. The second antennae are very strong and consist of a dactylus and two joints, the basal one anchored in the head by means of a chitinised bar, which presents at its distal end a distinct loop. The propus of the second antennae possesses a strong claw. In the groove formed by the propus and its claw the dactylus mostly lies hidden in part which is often the case in the other representants of the Lernaeid family confer WILSON'S figures. Mostly, particularly so in old females, not in very young ones, the antennae are situated at the upper limit of a slightly protruded antennal plate consisting of three semicircular unequal portions. Between the basal joints of the second antennae there is a small but distinct rostrum, rhombiform in shape and not unlike that depicted by WILSON for *Pennella instructa* (confer his figure 145).

2. — *Lernaeocera luscii* (BASSETT SMITH)

(Fig. 12-19.)

14. Ostende, 21.IV.05 : 1 ♀ G. A.
 79. Ostende, 21.IV.05 : ?? ♀ ♀ on G. A. (Fig. 15.)
 104. Dans le Duerloo en face de Haafduinen, 21.IX.04 : 1 ♀ on *Liparis vulgaris*. (Fig. 19.)
 177. De 51°31'N., 3°22'E. à Westcapelle, S.Q.S.W., 1.VIII.05 : 1 ♀ gill chamber of *Solea vulgaris*. (Fig. 16.)
 230. Près de 51°21'30"N., 2°56'E., 19.V.06 : *Motella mustela* with 1 ♀ in the musculature and 3 ♀ ♀ in the left gill chamber.
 5701. En face de Middelkerke jusqu'en face d'Ostende, 16.VII.21 : 1 ♀ on *Motella mustela* left side.
 C 26. Devant le port d'Ostende jusque devant Raverzijde, 13.IX.05 : 1 ♀ on *Agonus cataphractus*.
 CP2. Devant Oostduinkerke jusqu'en face de la Panne (en dedans du Broersbank), 17.VII.07 : *Motella mustela* with 3 ♀ ♀.
 CP10. Depuis Oostduinkerke jusque Zuidcoote (dans le Westdiep, 9.IV.08, *Motella mustela* : 1 ♀. (Fig. 14.)
 CP46. Du phare de Nieuport S. jusqu'à la Panne, S.Q.W. (dans le Westdiep), 11.VI.09 : *Motella mustela* with 3 ♀ ♀ at one side, 1 ♀ at the other side.
 CR51. A environ 50 m. de la bouée rouge, n° 43, de Saeftingen, *G. luscus* : 6 ♀ ♀. (Fig. 17.)
 CR100. De 51°9'30"N., 2°37'45"N., 2°30'E., 22.IX.06, *G. luscus* : with 6 ♀ ♀.

CR202. Entre Ostende et Breedene, près de l'Estran, 20.VI.06, *Motella mustela* : 1 ♀ on the back just in front of the second dorsal fin.

CR203. Entre Ostende et Breedene, près de l'Estran, 20.VI.07, *Motella Mustela* : with 4 sp. (Fig. 18.)

In my former paper I have already given quite a series of figures of the variations in the antlers, so that it may be sufficient to give here only a few figures of those specimens of which I have studied also the oral appendages and the other essential features.

As one of the essential features SCOTT mentions the fact, that in *L. lusci* the genital segment is not curved. Now this is really the case in most specimens dissected out of *Motella mustelus* and of *Gadus luscus* although we may meet some specimens in which the genital segment is not typically swollen but more or less fingerlike and even slightly curved. In all cases however the genital segment remains proportionally short.

The head and especially the protrusible proboscis is much longer than in *branchialis*, the oral cone strengthened by distinct chitinous bars. The oral appendages have almost the same shape as in *branchialis*, Here however the dactylus of the second maxilla is more slender and bears in good preserved specimens a series of fine grooflets, basal joint of the same with 2 denticulations which apparently are slightly shorter than in *branchialis* and at the same time slightly unequal in length.

About the female taken from *Gadus aeglefinus* it must be stated that in this female, which possessed antlers like in *L. lusci*, a distinct antennal plate and a short genital segment which neither fits to the scheme of *L. branchialis* — for this it is too short and likewise somewhat swollen to the tip —, nor quite to that of *lusci*, — for this it is too much fingerlike —, the oral appendages were absent, so that it is not quite certain, although very probable that the identification of this specimen was quite right. The female from *Solea vulgaris* brought likewise some difficulties. The antlers are more of the *branchialis*-type, the head is elliptical elongate as in *lusci*, the genital segment is quite like in the latter species and moreover the dactylus of the second maxillae is slender like in that species, so that I felt justified in bringing it to the said species. Undoubtedly *L. lusci* ought to be considered as a good species, distinct from *L. branchialis*, although not confined to a single hostspecies like former authors thought. Apart from *Gadus luscus*, it may be encountered in *Motella mustelus*. *Agonus cataphractus*, *Solea vulgaris*, *Liparis vulgaris* and *Gadus aeglefinus*. In the four lastnamed species it seems to occur seldom. In *Gadus luscus* and *Motella mustelus* it is quite frequently found.

3. — *Lernaeocera minuta* T. SCOTT.

(Fig. 20-25.)

Host *Gobius minutus* indicated as G. M.

159. De 51°10'40"N., 2°36'30"E. à 51°12'20"N., 2°43'10"E., 6.VI.05 : 1 ♀ in each gill chamber. (Fig. 23, 24.)
244. De 51°19'N., 2°43'E. à 51°13'30"N., 2°49'45" E., 26.VI.06 : 1 ♀. (Fig. 25.)
5826. En dehors du Stroombeek de Middelkerke à Westende, 21.VI.23 : 1 ♀ in left gill chamber.
6084. Devant Ostende, jusque devant Raverzijde, en dedans du banc de Wenduïne, 19.IV.23 : 1 ♀ in right gill chamber.
- C 21. De Westende jusque devant le port d'Ostende, près de l'Estran, 22.VIII.05 : 1 ♀ in each gill chamber.
- C 23. Depuis le phare d'Ostende jusque Breedenegeat, 5.IX.05 : 1 ♀.
- C169. Devant le Coq jusqu'en face de Spanjaardsduin, 11.X.06 : 2 sp. with 1 parasite attached to the gill cover, one of the lateral horns of the parasite has penetrated the latter.
In the second hostspecimen the parasite is attached to the inner wall of the gill chamber.
- C170. Sur le banc de Wandelaar, près du bateau-phare « Wandelaar », 11.X.06 : 1 ♀ at the right side of the host.
- C172. Du Wandelaar S. jusqu'à la bouée noire E. à 100 m., 17.X.06 : 1 ♀.
- C187. Proximité du bateau-phare « Wandelaar », bouée Lucifer, S.-S.-E., à bateau « Wandelaar », 23.XI.06 : 2 ♀ ♀ in left gill chamber. (Fig. 20, 21.)
- C195. Devant Westende jusqu'en face d'Ostende, entre le banc d'Ostende et le Zand, 12.XII.06 : 1 ♀.
- C275. Depuis le phare de Nieuport jusque devant Middelkerke, 7.VII.07 : 1 ♀ surrounded by tumour on inner side of left gill cover.
- CP 6. Devant Oostduinkerke jusque devant Middelkerke, 25.IX.07 : 1 ♀.

T. SCOTT's definition of this species is far from clear. He calls the head moderately enlarged, not very clearly defined and merging into the rather short and stout terminal appendage (meant is here the dorsomedian antler) which is somewhat distorted and furnished with small marginal papillae. Two very short lateral appendages (antlers S. S.) also present with their ends obscurely bifurcate. Neck very short, narrow and somewhat abruptly joined to the genital segment; this segment which is sigmoid, having the proximal half considerably swollen, but tapering somewhat towards the bluntly rounded and slightly recurved extremity.

As far as I may conclude from the specimens at hand, apart from the minute size — distance from end of neck till tip of genital segment 4-5 $\frac{1}{2}$ mm.— *L. minuta* is characterised by the more or less balloonshaped proximal half of

the genital segment, much so than in *lusci* to which it resembles in this respect. The neck although generally rather short may be long in some specimens. Where the neck passes into the genital segment incisions in the chitin may be present. The head is of the *branchialis*-type, that is the proboscis is bluntly rounded and short; the antlers, especially so the lateral antlers resemble those of *lusci*. The dactylus of the maxillae II is as in *branchialis*, the denticulations on the basal joint of these appendages are very small although distinct. Antennal plate tripartite, distinct, shifted to the vertex of the head. Oral head-end with three flaps. Mx. I with 2 terminal setae.

The anal end of the genital segment may be tapering a little although in other specimens, as in my opinion in the majority of them, it is not distinctly narrower than at the base.

Although a closer study, especially of the proboscis is urgently wanted from fresh material I come to the conclusion that *L. minuta* is a distinct species and not a *L. branchialis* or a *L. lusci*, especially adapted to this special kind of host.

REFERENCES

- LEIGH SHARPE, W. H., Two Copepods (*Lernaenicus*) parasitic on *Clupea* Parasitology, 27 : 270-275, 1935.
- VAN OORDE-DE LINT, G. & SCHUURMANS STEKHOVEN, J.-H. JR., Copepoda parasitica in Grimpe & Wagners Tierwelt der Nord und Ostsee. Lieferung 29, 1936, under press.
- SCHUURMANS STEKHOVEN, J. H. JR., 1934, Ueber die Sinnesphysiologie von *Lepeophtheirus pectoralis* und *Acanthochondria depressa*. (*Z. f. Parasitenkde*, 7 : 338-362.)
- 1935; Copepoda parasitica from the belgian coast I. (*Bull. Mus. roy. d'Hist. nat. de Belg.*, 11.VII.1935.)
- WILSON, C. B., North american parasitic copepods belonging to the *Lernaeidae* with a revision of the entire family. (*Proc. United States Nat. Mus.*, 53 : 1-150, 1917.)
-

EXPLANATION OF PLATES

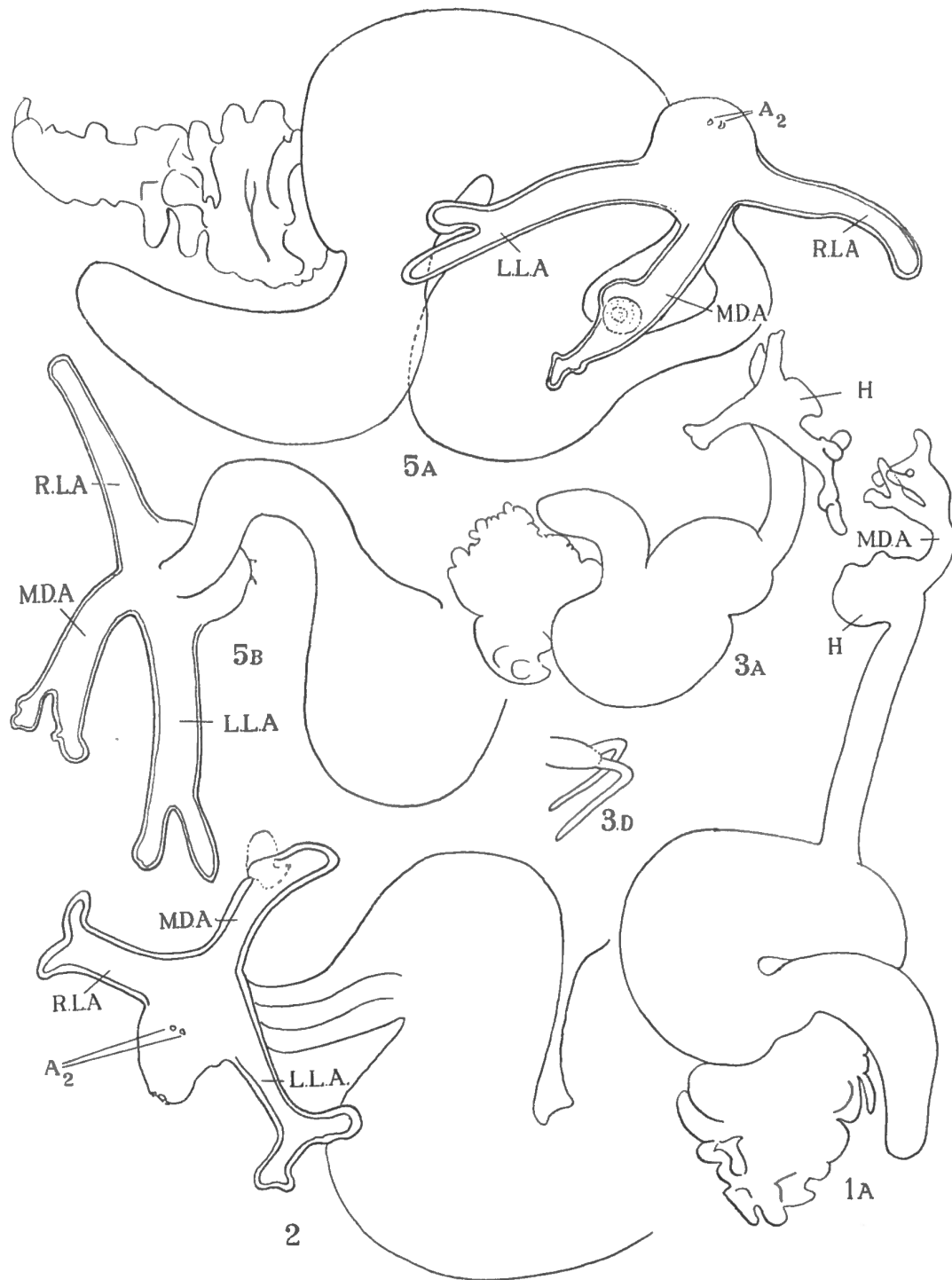
EXPLANATION OF PLATE I.

Lernaeocera branchialis L.

1, 2, 3, 5 = different females with their antlers.

3D = First maxilla of female 3.

Letterings. — A2 = second antennae; H = Head; MDA = mediodorsal antler; LLA = left lateral antler; RLA = right lateral antler.



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EXPLANATION OF PLATE II.

Lernaeocera branchialis L.

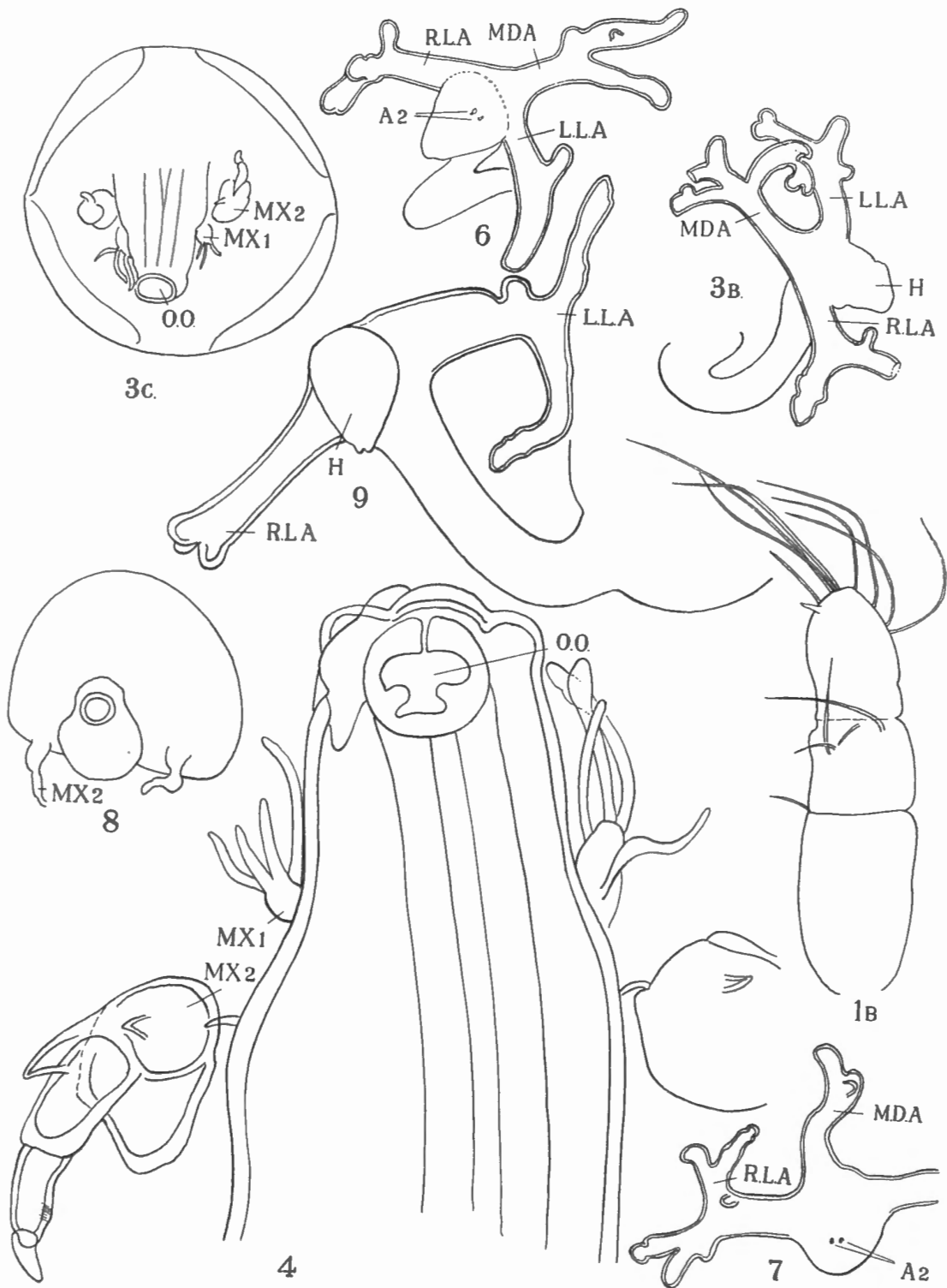
1B - First antenna of female 1.

3C - Oral shield of Female 3; 3B Head and antlers of female 3.

4 = Oral cone and oral appendages of female 4.

6 = Head and antlers of female 6; 7 = idem of female 7; 8 = oral end of the head of female 8; 9 = idem of female 9.

Lettering as in Plate I. — OO = oral opening; Mx1 and Mx2 = First and second maxillae.



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EXPLANATION OF PLATE III.

Lernaeocera branchialis L.

10 Head and antlers of female 10.

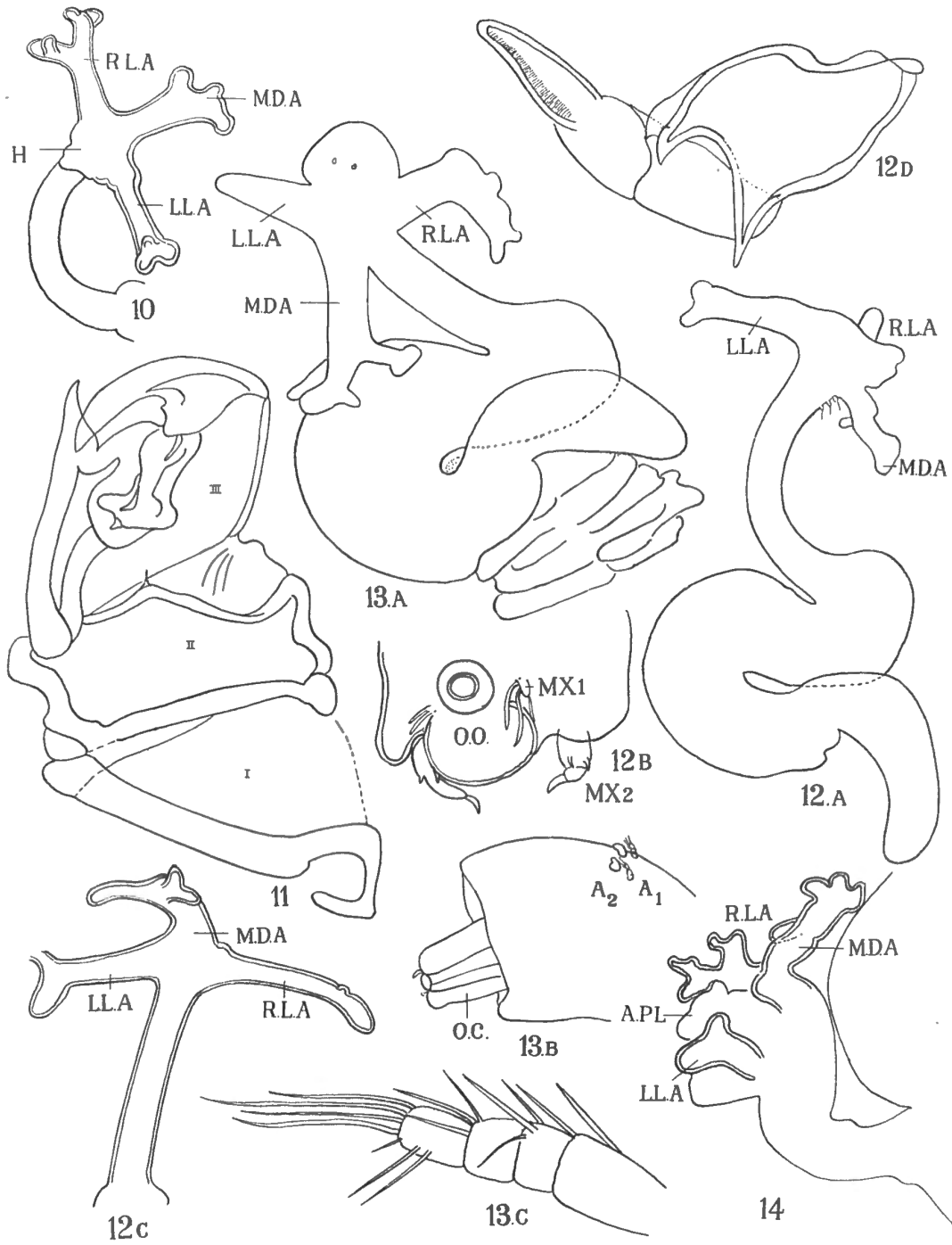
11 A2 of female 11.

Lernaeocera luscii BASSETT SMITH.

12A ♀ from *Moitella mustela*; B, oral cone (o.c.) with oral appendages; C, antlers;
D, MX1 of the same.

13 A, ♀ from same host; B, oral cone and head; C, A1 of the same; 14 head of female 14.

Lettering as in Plate I and II : A. Pl. = Antennal plate.

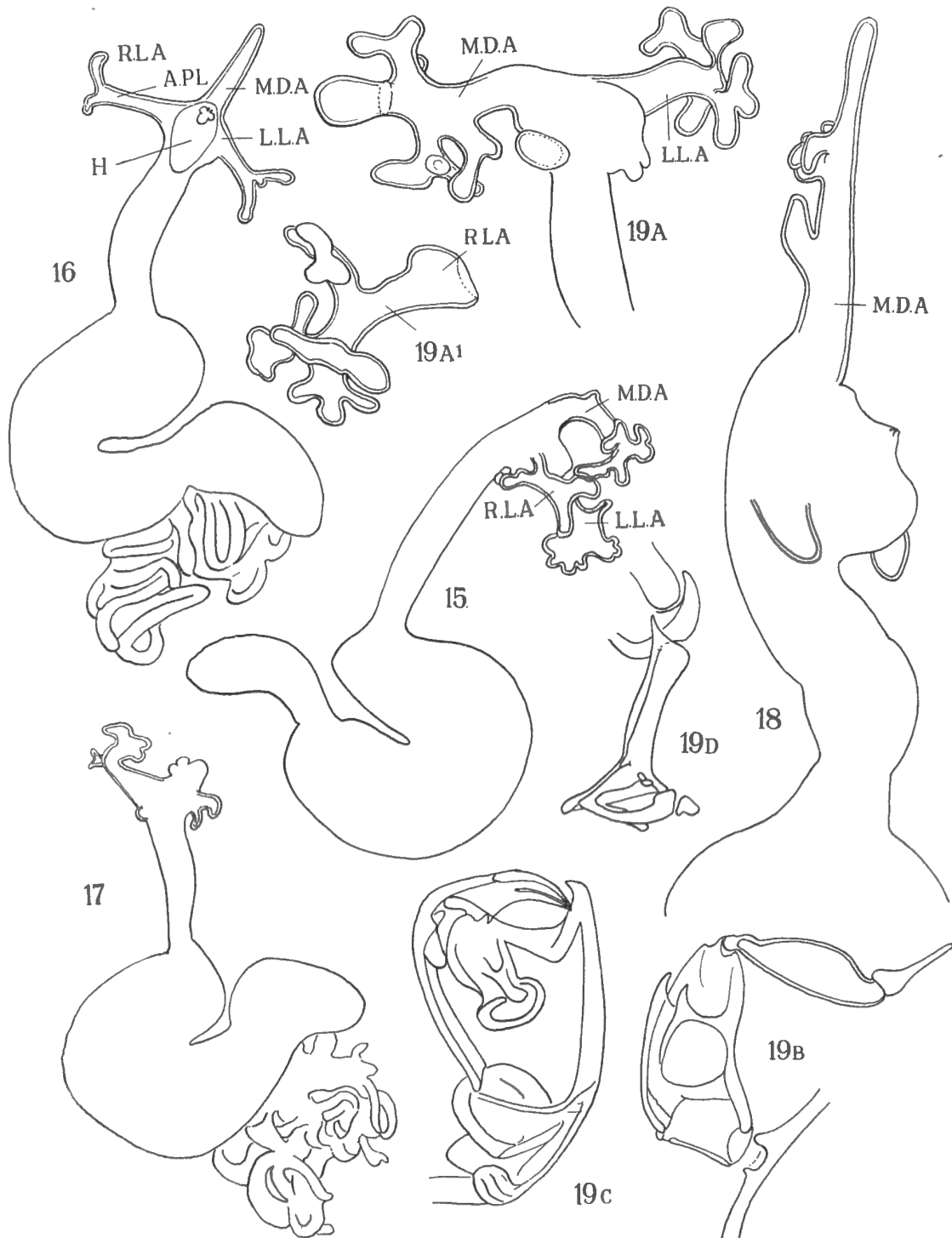


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EXPLANATION OF PLATE IV.

Lernaeocera lusci BASSETT. SMITH.

- 15 ♀ from *Gadus aeglefinus*;
16 ♀ from *Solea vulgaris*.
17 ♀ from *Gadus luscus*.
18 ♀ from *Motella mustela*.
19 ♀ from *Liparis vulgaris*. A, antlers; B = MX1; C = A2; D, Anchoring of the Antennae II. Lettering as in Pl. I-III.
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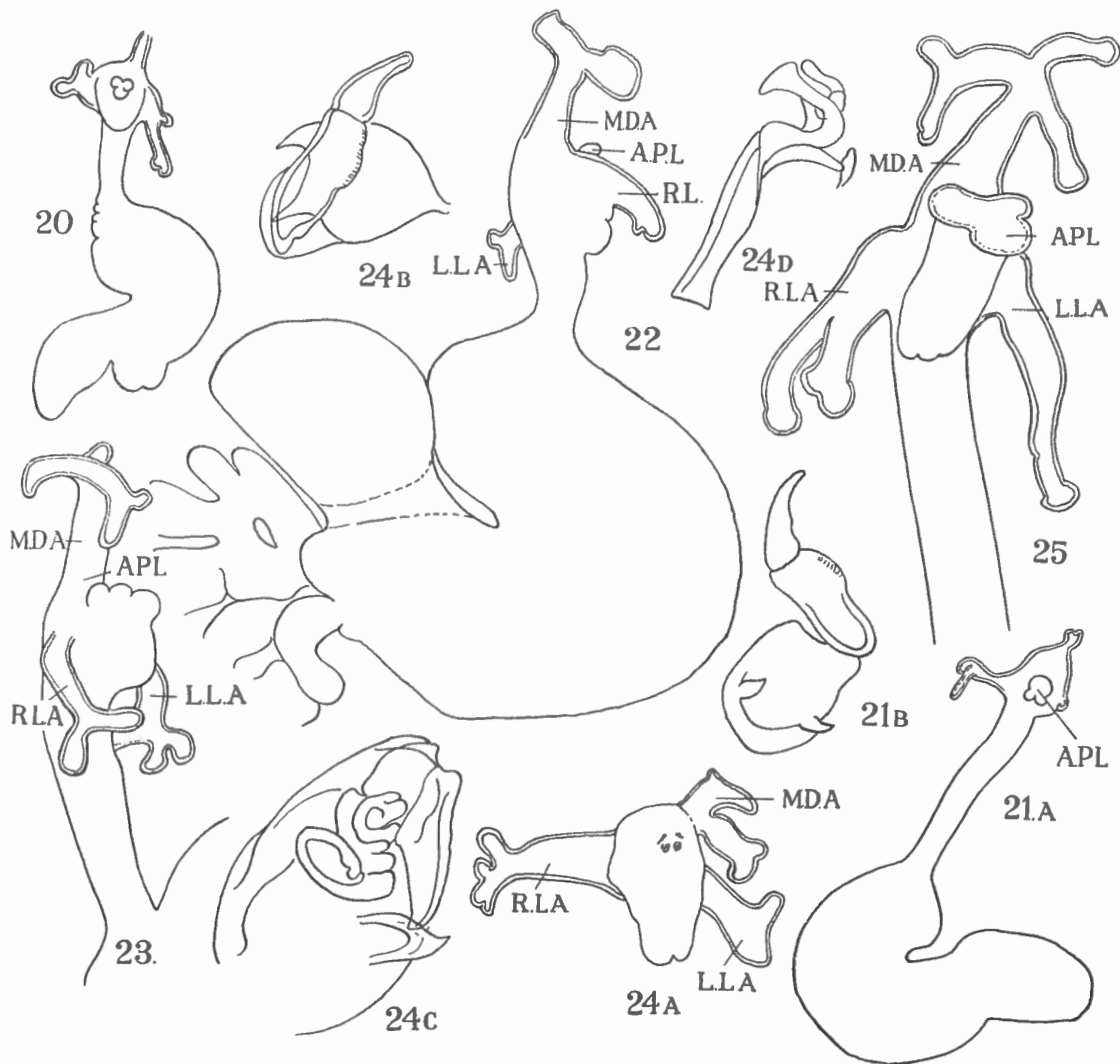
EXPLANATION OF PLATE V.

Lernaeocera minuta T. SCOTT.

20, 21 22, different ♀ ♀ from *Gabius minutus*; 21 B, Mx 1 of female 21.

23 Head with antlers.

24A, Head of female 24; B, Mx, 1 of the same female; C = A2; D = Anchoring of A2 of the same female. Lettering as in Pl. I-IV.



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Copepoda parasitica from the Belgian coast II.