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BY

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CONTENTS.

I. Introduction.

On the Danish Investigation Steamer "Thor" in the summers 1905 and 1906 and occasionally also in 1908, I made a series of observations on the distribution of the larvae of the common fresh-water eel (*Leptocephalus brevirostris* or *L. Anguillae vulgaris*).[1] At the same time as these investigations were being made some Leptocephali belonging to other Muraenoids were taken. As far as I know there are no other species of Leptocephali known from the Atlantic off the West Coast of Europe than that of the Conger (*L. Morrisii* or *L. Congri vulgaris*), so that I must mention in what follows those we have found with the "Thor" and give a general account of them on the basis of our investigations.

It may be said that, for most of the species, I have been unable to refer them to their parent forms and probably it will be a long time yet before this can be done. The deep-water eels, especially of the large swift type, are difficult to catch, so that it becomes difficult to secure the needful specimens for comparison with the Leptocephali (e. g. to count the vertebrae). In spite of the fact that most of the species of Leptocephali cannot be referred to their progenitors a description and figure of them will still not be without importance, both because very characteristic forms are found amongst them and because they occur so near to the European Coasts. Finally, there are several young amongst them not yet grown out of their larval form which add to our knowledge of the developmental history of the Muraenoids.

I shall in the following describe the individual species separately and then make some few, more general remarks. With respect to the description of the various "new" species, I have not used many words on the pure form but refer instead to the figures on Pl. I & II which are reproduced from photographs taken immediately after the "Thor"s return home from the expedition, direct from the specimens preserved in formol.

I mention here only the species belonging properly to the "genus" *Leptocephalus*, not those with long whip-shaped tail which are referred to the "genus" *Tilurus*.

My best thanks are due to Cand. mag. Ad. Jensen, Zoologisk Museum, Copenhagen, because, as early as 1906, before I myself had the opportunity or time to be occupied with any other species of Leptocephali than *L. brevirostris*, he submitted my collections to an examination and communicated to me his opinion that the species described as No. 4 in the present work belonged to *Synaphobranchus pinnatus*. After personal examination of the collections I have to acknowledge the correctness of this determination, the proofs of which I mean to convey in the following pages.

[1] Johs. Schmidt: Contributions to the life-history of the eel (*Anguilla vulgaris* Turt.). (Rapport de la Commission C. 2, Vol. V des Rapports et Procès Verbaux du Conseil International pour l'Exploration de la Mer, Copenhague 1906.)

Idem: Remarks on the metamorphosis and distribution of the larvae of the eel (*Anguilla vulgaris*, Turt.). (Meddel. f. Kommiss. f. Havunders., Ser. Fiskeri, Bind III, No. 3, Copenhagen 1909.)

II. Leptocephalus species taken in the Atlantic by the "Thor".

In the following, I shall describe and discuss the different Leptocephalus species taken on the expeditions with the "Thor" in the Atlantic. I exclude however *Leptocephalus Anguillae vulgaris* (*L. brevirostris*) or the larvae of the common fresh-water eel, of which I have already given a detailed account in my paper already cited (p. 3).

1. *Leptocephalus latus*, nov. sp.

Pl. 1, Fig. 6.

One specimen only of this characteristic species has been taken, on the 8. June 1906 at Lat. 48° 41′ N., Long. 11° 30′ W., depth: 2600 meters, 300 meters wire out (Station 72). The total length of this specimen is 43 mm. The peculiarity of this form is the great breadth of the body (the maximum height is ca. 14 mm.). Although the tail is rather short it tapers posteriorly, so that in shape it reminds one of certain leaves. The snout also is very short, whilst the mouth opening is directed upwards very much, so that it makes an angle of ca. 45° with the longitudinal axis. Further, the front teeth of the upper jaw are extremely long (nearly $1^1/_2$ mm.). Finally, one may mention amongst the distinctly peculiar features, that the intestinal canal, which in its anterior portion is uniformly slender (without swellings), swells greatly near its termination for a distance of about 6 mm. right to the anus. This posterior portion of the alimentary canal is covered with pigment spots. On all other parts of the animal pigment is entirely absent. Although the species described is probably not full-grown (teeth present, fin rays not distinct) the anus is nevertheless situated unusually very far forward (the preanal length is ca. 20 mm.).

The following information may also be given. The snout is very short; the distance from the point of the snout to the orbit is only ca. 1 mm. The under jaw (reckoned from the point to the angle of the lower contour) is a little over 3 mm. long and protrudes beyond the upper jaw. The teeth of the lower jaw are all short and insignificant. Altogether 2 (9—10) were counted. The front pair of teeth in the upper jaw (which has ca. 9 on each side) are of extraordinary length (nearly $1^1/_2$ mm.), almost straight and relatively very slender. The next two teeth on each half of the jaw are also long and slender (yet far from reaching the first ones in length). The rest (ca. 6) however are very small and insignificant.

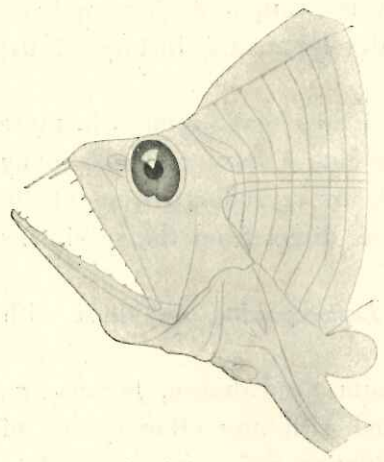


Fig. 1. *Leptocephalus latus.*

The horizontal eye diameter (measuring from the anterior to the posterior border of the orbit) is nearly $1^1/_2$ mm.

The pectoral fins are fan-shaped lobes without true rays but with the first indications of interspinous elements. The preanal segments count about 40 whereas the number of postanal is very large, far over 200 (the posterior are so small that it is only with difficulty they can be counted). The segments are small and they are almost at right angles to the longitudinal axis.

The tip of the notochord is almost quite straight. The caudal fin has no rays. The anal and dorsal fins show the beginnings of the interspinous elements, and in the rows formed by the interspinous bones one can distinguish the individual elements. The rays in the anal and dorsal fins are not yet distinct.

Probably this species is a southern warm-water form whose northern limits have been touched in the "Thor's" investigations.

2. *Leptocephalus rostratus*, nov. sp.

Pl. I, Fig.s 4—5.

We have two specimens of this peculiar gigantic species both taken in 1906, the one in June, the other in September[1].

This species is distinguished chiefly by the snout being produced into a long proboscis which is about 3 cm. long. Further, it attains a very considerable size, about 25 cm., and in form it belongs to the elongated type like the Leptocephali of the *Conger* and *Synaphobranchus*. With respect to other peculiarites it may be mentioned that, like *L. Synaphobranchi pinnati*, it has telescopic eyes; it has a very elongated head with horizontal mouth; both nostrils, which are placed close together and are turned toward the side, are situated well forward removed from the eyes; and finally, the alimentary canal on almost the whole of its length has on the under side some large black pigment rings, about 18 in number (on the anterior and posterior portions of the digestive canal there are further smaller and less distinct pigment spots). On the proboscis there are also 3—4 widely spaced, rather indistinct, ventral pigment spots. Otherwise there is no pigment.

Externally the alimentary canal shows no special peculiarity, neither does the tail which has 15 rays. The teeth are not specially strong; one peculiarity is that the first tooth of the upper jaw is turned almost directly downwards.

Small pectoral fins are present.

The shape of the segments is not unusual (cf. fig.s 4—5, Pl. I), they are angularly bent and their distal portion is short. The middle line is narrow.

The following additional particulars may be given.

Specimen No. 1. Taken on 17th June 1906 at Station 80 (51°34′ N., 11°50′ W., depth 1200 meters), in a haul of the young-fish trawl with 200 meters wire out and consequently scarcely 100 meters from the surface.

The total length from the tip of the tail to the point of the snout is 246 mm., whilst the distance from the tip of the tail to the point of the under jaw is 212 mm. The distance from the tip of the tail to the anus is ca. 81 mm. The greatest body height is quite 20 mm. There are 98 preanal and 93 postanal segments, 191 in all.

The nostrils are separate, but placed close together and well forward (the distance from the posterior border of the anterior to that of the posterior is ca. 0·6 mm.; the distance from the posterior border of the posterior nostril to the eye is quite 2 mm. and the anterior nostril begins a little behind the point of the lower jaw). The nasal openings are narrow-oval with a horizontal position and the anterior one is slightly tubular.

The thickness of the snout at the base is about 0·65 mm. There are 12—13 teeth in each half of the upper jaw and a similar number in the lower jaw. As usual the front teeth are the most powerful and those of the under jaw are more powerful than those of the upper jaw.

As mentioned before the front teeth of the upper jaw are turned downwards whilst the rest of the teeth slope forward as usual.

The interspinous elements in the dorsal and anal fins are distinct, but rays are still absent. The caudal fin has quite developed rays, of which H^1 bears 8, H^2 7. H^1 and H^2 are large and broad, almost of the same shape. Between the base of the foremost rays of the caudal fin and the hindmost rays of the dorsal and anal fins there is a distance of nearly 2 mm., so that the caudal fin is sharply defined from the unpaired fins.

[1] Further a specimen has been taken by the "Thor" in March 1909 in the Bay of Biscay (Stat. 74, 9 March 1909, 44° 21′ N., 7° 55′ W., Depth: > 2000 meters; young-fish trawl 600 meters wire out).

Specimen No. 2. Taken 2nd September 1906 at Station 178 (48°04′N., 12°40′W., depth more than 4000 meters) in a haul with the young-fish trawl with 1800 meters wire out.

The total length is 242 mm. The length from the tip of the tail to the tip of the under jaw 213 mm., from the tip of the tail to the anus 85 mm.

There were counted 95 preanal and 93 postanal segments and consequently 188 in all.

Specimen No. 2 agrees well in all details with No. 1, but is perhaps somewhat more advanced in development, which may be seen from the fact that the alimentary canal is more slender posteriorly. As in the first, fin rays are entirely wanting in the dorsal and anal fins, although the interspinous elements, especially posteriorly, are fully developed, and there is also here a sharp distinction between the caudal fin and the unpaired fins, the interspace being about 2 mm. long.

The pectoral fins are fan-shaped lobes with embryonic rays but without the least trace of the beginnings of rays or interspinous elements.

3. *Leptocephalus Holti* n. sp.

Pl. I, fig. 7.

Only one specimen of this peculiar species was taken, namely, on 21st May 1906 in Lat. 48° 55′ N., Long. 12°03′ W., depth: 1170—1080 meters, 200 meters wire out (Station 53). The total length of this specimen is 34·5 mm.

This species, which is not unusual in form, is distinguished particularly by the pigmentation. In the middle line of the body (along the notochord) there are five large, round pigment spots, the first of which is placed on the 16th preanal segment (No. 2 on segment 29, No. 3 on segment 45, No. 4 on 60, No. 5 on 72), the most posterior a little behind the anus. Further, there is a small line-like pigment mark on the under jaw in the proximity of its point (together with a faint one just over this on the upper jaw). On the alimentary canal there are 6 large pigment patches, the most anterior a little behind the pectoral fin and the most posterior one a little in front of the anus. Finally, there are two small pigment spots just under the dorsal row of interspinous bones (the most posterior of the spots is placed a little in front of the anus).

There is also this peculiarity that the snout is very long, namely, almost 3 mm. or nearly three times as long as the horizontal diameter of the eye (reckoning from the anterior border of the orbit to the most posterior edge of the same).

In addition, the following may be mentioned. The length of the under jaw (measuring from the tip to the angle on its under contour) is ca. 3¾ mm. It protrudes a little further than the upper jaw. The mouth opening is almost parallel with the longitudinal axis of the body. There are ten teeth on each half of the upper jaw (on the space between the point of the snout and the eye), and the most anterior which is directed forward is large and powerful. The following teeth are directed downwards (rather downwards and forwards) and they decrease in strength backwards, the first four especially are very powerful. On each side of the under jaw there are ten teeth, the first of which is directed almost vertically upwards. In strength the teeth of the under jaw are less powerful than those of the upper jaw.

The pectoral fins are fan-shaped lobes with embryonic rays.

There are 67 preanal and ca. 45 postanal segments; the most posterior postanal however cannot be counted with certainty. The segments are very narrow; they are almost at right angles to the longitudinal axis.

The point of the notochord is very strong and almost straight. At all events in its most posterior portion, the notochord is composed of several rows of cells.

The beginnings of rays and interspinous elements are entirely absent from the tail fin. On the other hand, the first appearance of interspinous rays is seen in the dorsal and anal fins like a faint line

above and below in the neighbourhood of the margin of the embryonic fin, beginning ca. 1/3 mm. in front of the point of the notochord and stretching forward (dorsally, until ca. 16 mm. from the point of the tail; ventrally, to the anus). In this line of the developing interspinous rays the individual elements are not yet formed. There are embryonic rays in the dorsal and anal fins but true rays are quite absent.

The total length as already mentioned is ca. 34·5 mm. and the preanal length (distance from tip of snout to anus) ca. 25·5 mm. The alimentary canal is not straight in the whole of its course but undulates for the greatest part. Behind the pectoral fin it has a slight swelling, after that there follows a short thinner portion which is straight, and finally, a long much thicker portion which is wavy so that at three places it even touches the contour of the body.

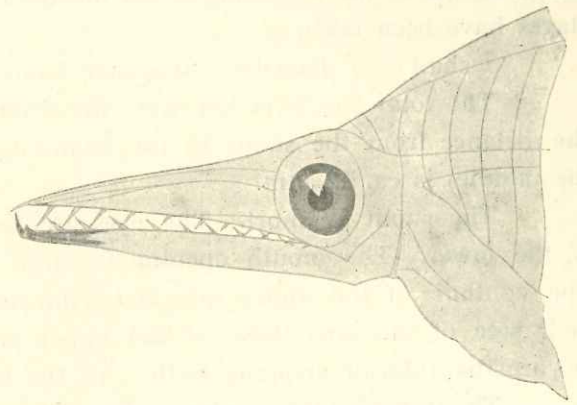


Fig. 2. *Leptocephalus Holti.*

I have taken the liberty of naming this interesting species after the eminent naturalist, Mr. E. W. L. Holt of Dublin, to whom we are indebted for so many important investigations in this region of the Atlantic and who, more than any other, has supported me in my investigations on the larvae of the eels.

It is probable that this species, as also the two previous, *L. latus* and *L. rostratus*, are southern warm-water forms which have been taken at their northern limits in the "Thor's" investigations.

4. *Leptocephalus Synaphobranchi pinnati.*

Pl. IX, figs. 4—6 in Johs. Schmidt, l. c. 1906.

After the larvae of the common fresh-water eel (*L. brevirostris*), the larvae of *Synaphobranchus pinnatus* are the Leptocephali which occur in greatest numbers in our hauls from the "Thor". Thus, there are specimens from June 1905, as also May and June 1906, which were all found in the stage immediately preceding the metamorphosis (the full-grown larval stage). In addition, there is a pair of examples from September 1905 and 1906 whose metamorphosis has begun, but still is not far advanced; and finally, both from May 1904 and May—June 1906, there are metamorphosed young bottom-stages as well as older specimens of this species. On the whole, the investigations of the "Thor" show that *Synaphobranchus pinnatus* is a very common species in the Atlantic west of Europe, and specimens are got in the region stretching from the South of Iceland to the North of Spain.

Leptocephalus Synaphobranchi pinnati is a peculiar form which is very easily known from the others hitherto under discussion. The most distinctive features are briefly as follows. They have larval telescopic eyes just like the gigantic *Leptocephalus rostratus*. In form they are slender and elongated, even more slender than the Leptocephalus of the Conger. There is a very broad median stripe and the segments have a peculiar curved form (see figs. in my work 1906, l. c., Pl. IX, figs. 4—6). The upper jaw projects a little in front of the lower jaw. The caudal fin is very narrow and tolerably long, containing 16—17 rays. Pigment is entirely absent on the body with the exception of a small black pigment spot on the tip of the tail and the tail fin, consisting of small black points. The pigment is only slightly conspicuous and is scarcely seen with the unaided eye, so that the animal, casually looked at, appears to be entirely without pigment. The pigmentless alimentary canal shows no unusual character. The teeth are comparatively weak.

Just as in the case of the Leptocephali of *Anguilla* and the *Conger* we have only taken the full grown specimens of this species (the developing rays are strong in the pectoral fins, in the anal and dorsal fins they are very strong and the rays of the tail fin are likewise quite complete).

Virtually all the specimens (taken in May—June) are in Stage I, the highest point of the larval development before the beginning of the metamorphosis; only two specimens (taken in September 1905 and 1906) are in the beginning of the metamorphosis. In addition, numerous, quite metamorphosed bottom stages have been taken.

I shall first describe a specimen from June 1906.

The total length is 116 mm., the distance from the point of the snout to the anus is 91 mm., and the distance from the snout to the beginning of the dorsal fin ca. 82 mm. The greatest height (behind the middle) is ca. 12 mm.

The snout is short. The eyes are large and telescopic. The upper jaw projects a little in front of the lower. The mouth opening is large and nearly parallel with the longitudinal axis of the body. The contour of the under side lacks the angle present in so many species. There are ca. 17 teeth on each side of the jaw, those of the upper jaw being the weakest As a rule the teeth are weak and so too are the anterior gripping teeth. All the teeth slope obliquely forward.

The nostrils are characteristic. The most anterior is short, tubular, turned forward and a little to one side. The posterior one, which is turned to one side, has a vertical direction. It is oval or nearly triangular with the broadest part uppermost. It is placed slightly in front of the eye, and there is a considerable space between it and the anterior opening which has its position further forward.

The most posterior rays in the anal and dorsal fins are strong, and there is only a very short interspace between them and the caudal fin rays, which number 17, 8 of which are borne by H^1 and 9 by H^2. The shape of H^2 is unusual and characteristic. Whilst H^1 has the usual form (cf. fig. 6) with curved posterior border from which the rays issue, the posterior border of H^2 which is nearly straight and not at all in line with that of H^1 is turned downwards making an angle of about 45° with the longitudinal axis. On this account the caudal rays grow out in part from the under side of the tail (see fig. 3).

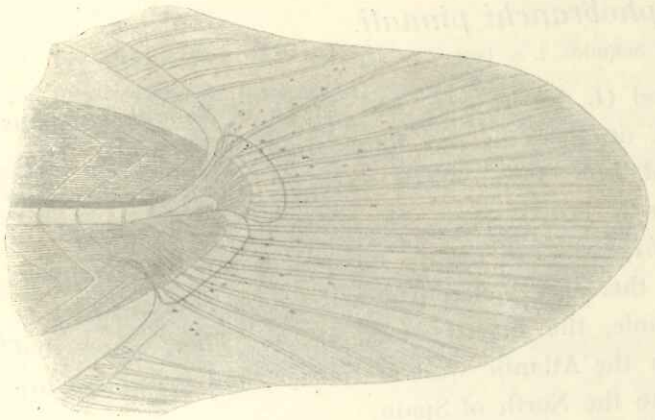


Fig. 3.

Only very few of this species have been taken in the retrograde metamorphosis. This condition is shown externally in the upper lip becoming rounded, in the teeth falling out, and in the anus being drawn forward, as can be seen in Pl. IX, fig. 6 in my work of 1906 on the biology of the common fresh-water eel.

Verification of the identification of the larvae with *Synaphobranchus pinnatus*.

In nine adult specimens of *Synaphobranchus pinnatus* taken in the trawl of the "Thor" off the South-West Coast of Ireland, Cand. STRUBBERG found the following number of vertebrae (on skeletonised specimens).

No. 1	had	147 or 148	vertebrae
No. 2	„	150	
No. 3	„	150	
No. 4	„	146 or 147	
No. 5	„	146	
No. 6	„	146	
No. 7	„	147	
No. 8	„	148	
No. 9	„	151	

The anus in this species is placed well forward, and thus most of the vertebrae are caudal, only ca. 30 anterior being abdominal vertebrae.

The number of vertebrae in *Synaphobranchus pinnatus* is thus found to vary from 146 to 151 in the 9 specimens examined. In the Leptocephali the following number of segments were found.[1]

	preanal	postanal	total
No. 1....	102	49	151
No. 2....	104	43	147
No. 3....	103	43	146
No. 4....	102	44	146
No. 5....	105	43	148
No. 6....	103	48	151
No. 7....	103	47	150
No. 8....	102	45	147
No. 9....	81	68	149

From this we see that there is complete and constant agreement between the adult specimens of *Synaphobranchus pinnatus* and those of the larvae here mentioned.

There is also agreement in the number of rays in the caudal fin. In the older *Synaphobranchus pinnatus* the following numbers were found:

No. 1 18 rays (H^1 9, H^2 9)
No. 2 17 „ (H^1 8, H^2 9)
No. 3 16 „ (H^1 8, H^2 8)
No. 4 17 „ (H^1 8, H^2 9)

In the following Leptocephali there were:

No. 1 17 rays (H^1 8, H^2 9)
No. 2 16 „ (H^1 8, H^2 8)
No. 3 16 „ (H^1 8, H^2 8)
No. 4 18 „ (H^1 9, H^2 9)
No. 5 17 „ (H^1 8, H^2 9)

In the pectoral fins of adult *Synaphobranchus pinnatus* there were found:

No. 1 14
No. 2 14 } rays
No. 3 16

In the following Leptocephali there were found in the pectoral fins:

No. 1 14
No. 2 15
No. 3 13 } rays
No. 4 16

In all these numbers we find the most complete agreement between the Leptocephali here mentioned and *Synaphobranchus pinnatus*. This is also true as regards the position of the nostrils and the

[1] By the author and Cand. STRUBBERG. The numbers were determined in the same manner as mentioned by Grassi and Calandruccio, viz: by counting the segments and spinal ganglia.

Table I. Occurrence of *Leptocephalus Synaphobranchi pinnati.* 1905 and 1906.

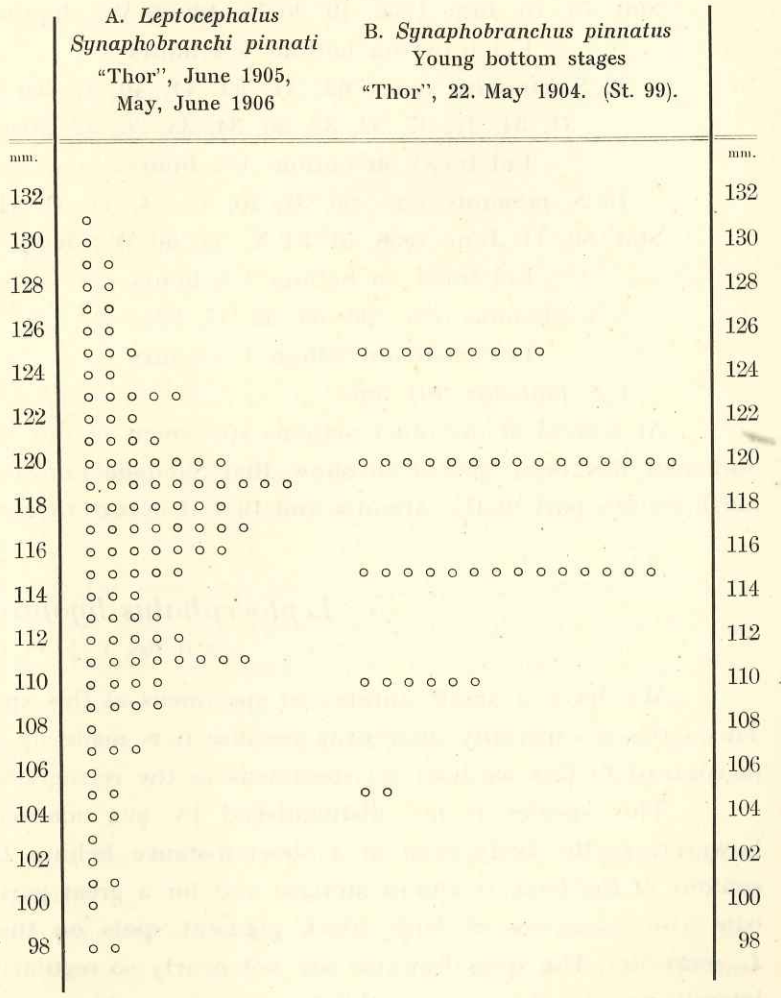
Stat. No.	Date	Position	Depth (meters)	Young-fish trawl, meters wire out	Duration of haul	Total number of specimens caught	Total length (Preanal length) mm.
167	1. IX 1905	57° 46′ N., 9° 55′ W.	1260	1500	2 hours	1	115 (68)
88	23. VI 1906	55° 05′ N., 12° 20′ W.	ca. 3000	300	2 hours	1	110 (84)
80	16.—17. VI 1906	51° 34′ N., 11° 50′ W.	1200	100	2 hours	1	117 (91)
			1140	200	2 hours	7	113 (88), 118 (90·5), 119 (92), 119 (92·5) 120 (94), 126 (97·5), 128 (100).
			1140	250	2 hours	2	125 (95·5), 127 (97·5).
81	13.—14. VI 1905	51° 32′ N., 12° 03′ W.	1090—1330	200	2 hours	2	
			960—1490	300	11 hours	11	102 (79·5), 104 (80), 109 (88), 112 (86·5), 116 (89·5), 116 (90·5), 117 (90), 118 (91·5), 123 (95), 128 (100).
82	18. VI 1906	51° 08′ N., 13° 05′ W.	ca. 2000	200	2 hours	2	112 (87), 122 (93).
61	31. V 1906	51° 04′ N., 11° 39′ W.	....	300	2 hours	13	118 (92·5), 119 (91), 119 (92), 119 (93), 119 (93·5), 120 (93·5), 120 (93·5), 121 (94), 123 (94), 125 (96·5), 127 (97), 129 (98), 131 (100·5).
			1300—1450	600	2 hours	2	107 (81·5), 112 (86·5).
			1450	800	2 hours	1	115 (90·5).
82	14.—15. VI 1905	51° 00′ N., 11° 43′ W.	1020—1370	300	7½ hours	19	98 (74), 101 (77·5), 101 (79), 103 (80·5), 105 (81·5), 106 (82·5), 107 (83), 107 (84), 109 (85), 109 (86), 110 (86), 111 (86), 116 (89·5), 117 (88·5), 117 (90·5), 117 (91), 120 (92), 125 (98·5).
			840 - 1350	1200	2 hours	4	
77	13. VI 1906	50° 45′ N., 11° 53′ W.	> 2000	200	1 hour	2	124 (95·5), 130 (102·5).
62	4.—5. VI 1906	50° 25′ N., 12° 44′ W.	2480	200	2 hours	27	100 (79), 111 (87·5), 112 (86), 113 (87·5), 114 (86), 114 (88), 115 (88), 116 (89), 116 (90), 117 (88·5), 117 (91), 118 (90), 118 (91·5), 119 (90·5), 119 (91·5), 119 (94), 120 (91·5), 120 (92), 121 (93·5), 121 (94). 121 (94), 122 (93·5), 122 (95), 123 (95), 123 (96), 124 (95), 126 (97·5).
			2480	300	2 hours	5	98 (76·5), 110 (85), 112 (86), 113 (88), 123 (95).
			2775	1500	2 hours	2	108 (83·5), 115 (92).
76	12. VI 1906	49° 27′ N., 13° 33′ W.	> 2600	200	2 hours	2	104 (81), 111 (87).
93	25. VI 1905	49° 25′ N., 12° 20′ W.	1270 – 1310	200	2 hours	1	
55	22. V 1906	49° 23′ N., 12° 12′ W.	1330	200	2 hours	1	114 (89·5).
64	5.—6. VI 1906	49° 17′ N., 14° 03′ W.	> 4000	200	2 hours	1	129 (99·5).
				300	2 hours	2	111 (86·5), 118 (91).
54	21. V 1906	49° 13′ N., 11° 58′ W.	940—975	300	2 hours	2	111 (87·5), 115 (88).
52	21. V 1906	48° 43′ N., 12° 05′ W.	1860—1945	300	6 hours	3	111 (86), 115 (90).
67	7. VI 1906	48° 29′ N., 14° 15′ W.	0/4000	200	2 hours	6	111 (87), 116 (89), 116 (91), 117 (91·5), 119 (91·5), 120 (93).
180	3. IX 1906	48° 19′ N., 13° 53′ W.	0/4000	300	1 hour	1	110 (84·5).
88	20. VI 1905	48° 09′ N., 8° 30′ W.	600—995	300	6 hours	1	105 (82·5).
69	7. VI 1906	47° 40′ N., 12° 41′ W.	0/4000	200	1 hour	3	111 (87·5), 113 (88), 118 (91·5).
179	2.—3. IX 1906	47° 20′ N., 12° 23′ W.	> 4000	600	2 hours	1	109 (77).

characteristically narrow form of the tail fin. Also the characteristic shape and position of H^2 (and H^1) as mentioned in the description of the Leptocephali are found again in *Synaphobranchus pinnatus*, so that, from what has been shown, there can be no doubt but that this Leptocephalus is actually the young form of *Synaphobranchus pinnatus*, which in addition, according to the observations of the "Thor", are found in great numbers in the Atlantic Ocean at the place where the Leptocephali were also found in numbers.

On the occurrence of the different stages of *Synaphobranchus pinnatus*.

All our collections of *Leptochepalus Synaphobranchi pinnati* are given in the accompanying list. It is seen that they have been taken from the Bay of Biscay northwards to the West of the most Northerly part of Scotland; in the greatest numbers South West of Ireland and off the English Channel where we have taken as large a number as 27 individuals in a half-hour's haul of the young-fish trawl, and many times we have taken over 10 specimens per haul. By far the greatest number of specimens were taken beyond the 1000 meters curve, and in contrast to the behaviour of *Anguilla* and *Conger*, whose larvae during development move inshore towards the coasts, there is nothing whatever in our investigations suggestive that the same takes place in the case of *Synaphobranchus pinnatus*. On the contrary, they appear to remain out in great depths and during their metamorphosis to descend into deep water until they finally reach the bottom, where their growth takes place in similar great depths to those over which they spent their pelagic life in company with the larvae of *Anguilla* and the *Conger*. In this connection it may also be said, that the larvae of *Synaphobranchus* were never taken by the "Thor" so near the surface as those of *Anguilla* and *Conger*; they were never higher up than ca. 100 meters from the surface (200 meters wire out).

Table II.



There are given in the table the lengths in mm. of our specimens of *Leptochepalus Synaphobranchi pinnati* taken in May and June 1905—06 as well as the very young bottom forms of this species which were taken in a haul with the young-fish trawl on the bottom at Station 99, 22. May 1904, 61° 15′ N., 9° 35′ W., depth: 970—872 meters, West of the Færoes. We see that the larvae (of the first stage) vary in length from 98—132 mm. (the majority from 110 to 120), and that the bottom stages vary from 105 to 125 mm. in length. Hence one must conclude that in the course of the year, which corresponds in time from May—June to the end of the following May, during which time the metamorphosis is accomplished, the young bottom stages have not yet grown so much that their length exceeds the length the

Leptocephali had a year previously, so that in consequence there seems to be quite a similar relation in the metamorphosis of this species as in the common eel (a very considerable length reduction is found before the fry, after the completion of the metamorphosis, begin to eat and grow). The young newly transformed bottom stages of *Synaphobranchus* have been captured at several other stations than those mentioned in the table. Thus, it may be mentioned that at Station 76, 11. June 1906, 49° 27′ N., 13° 33′ W., in a haul with the young-fish trawl with 2800 meters wire out, when the trawl worked near the bottom, a quite young *Synaphobranchus pinnatus* of a length of 115 mm. was taken; and at Station 43, 15. May of the same year (43° 37′ N., 2° 08′ W., depth 1500—480 meters) with the young-fish trawl on the bottom, there was likewise taken a very young specimen of 120 mm., etc.

We have also taken older stages of *Synaphobranchus pinnatus* in large numbers. I may give here some of the most important catches.

Stat. 164, 12. July 1903, 62° 10·8′ N., 19° 36′ W., depth: 2150 meters.
Otter trawl 1 hour:
1 *S. pinnatus* (ca. 60 cm.)

Stat. 74, 9. June 1906, 49° 23′ N., 12° 13′ W., depth: 1170—1298 meters.
Eel trawl (i. e. Danish "Aaledrivvaad") 2500 meters wire out (on bottom) 1 hour:
22 *S. pinnatus* (cm. 52, 30, 36, 39, 38, 32, 32, 37, 36, 35, 33, 27, 24, 26, 29, 38, 36, 29, 30, 34, 35, 31).

Stat. 75, 10. June 1906, 49° 20′ N., 12° 39′ W., depth: 1520 metres.
Eel trawl on bottom 1½ hours:
32 *S. pinnatus* (cm.: 62, 41, 53, 41, 40, 37, 34, 41, 41, 36, 36, 38, 37, 31, 37, 38, 33, 36, 38, 33 31, 34, 37, 37, 32, 33, 36, 34, 35, 36, 32, 20).
Eel trawl on bottom 1½ hours:
13 *S. pinnatus* (cm.: 60, 37, 40, 37, 34, 35, 31, 41, 34, 31, 32, 36, 38).

Stat. 80, 11. June 1906, 51° 34′ N., 11° 50′ W., depth: 960—1140 meters.
Eel trawl on bottom 1½ hours:
5 *S. pinnatus* (cm.: 36, 33, 32, 17, 32).
Eel trawl on bottom 1½ hours:
1 *S. pinnatus* (104 mm.).

At several of the other stations specimens of this species were also taken but in smaller numbers. Sufficient has been quoted to show that *Synaphobranchus pinnatus* has both a wide distribution in the north-eastern part of the Atlantic and that it occurs in great numbers.

5. *Leptocephalus hyoproroïdes*, nov. sp.

Pl. II, figs. 1—7; Pl. I, fig. 8.

We have a small number of specimens of this species varying in length between 3½ and 9 cm. This series is especially interesting because it is made up of the larval stages which are not fully grown; in contrast to this we have no specimens in the retrograde metamorphosis.

This species is not distinguished by any marked peculiarities. It has a characteristic shape however, as the body even at a short distance behind the head becomes very high and after that the contour of the back is almost straight and for a great part parallel with the ventral contour. Characteristic also is a row of large black pigment spots on the alimentary canal similar to those found in *L. rostratus*. The spots however are not nearly so regularly arranged, neither in position (they are mostly lateral) nor in shape as in the latter species. There is no pigment with the exception of that on the alimentary canal; one finds however some fine spots on the caudal fin and on the tip of the notochord. The form of the head is very characteristic; it is sharply marked off from the body, its upper contour

is almost a straight line. The snout is very pointed and the mouth opening makes an acute angle with the longitudinal axis. The nostrils, which are united, are placed directly in front of the eye. The snout is long. The upper jaw protrudes a good bit in front of the under jaw. The alimentary canal is very thick, and this may perhaps be attributed to the fact that it is still functioning in the Leptocephali in question, which are for the most part still not fully developed specimens, in contrast to the condition in by far the most of the other Leptocephali taken by me. The pectoral fins are present and the anal fin, like the dorsal, has got rays. I have given this form the name hyoproroïdes because it recalls somewhat in its form the one first described by Kölliker (Verh. d. Phys. Med. Ges. in Würzburg IV, p. 101), *Hyoprorus messinensis.*

Finally, the following description is based on the oldest specimen, which presumably is grown up or approaches to it.

The length of this specimen is 93 mm. The distance from the point of the snout to the anus is ca. 68·5 mm. and the greatest body height a little over 17 mm.

There were 93 preanal and 49 postanal segments, or 142 in all. In the anal fin there were ca. 220 rays (counted with the help of the interspinous elements) which are not yet all distinct anteriorly. In the caudal fin there are 17 very distinct rays; H^1 bears 8, H^2 9 rays. The snout is long, so that the distance from the orbit to the point of the snout is ca. 4 mm. The horizontal diameter of the eye is ca. $1^1/_2$ mm. (measured from the anterior edge of the orbit to the posterior edge).

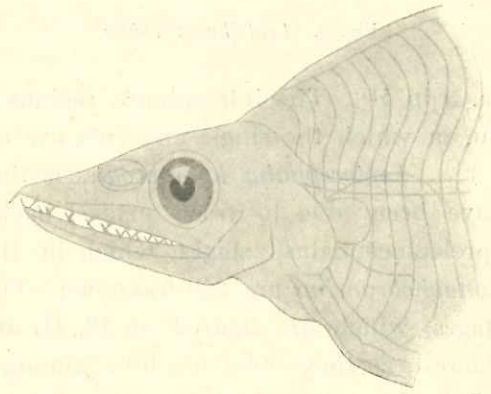


Fig. 4. *Lept. hyoproroïdes.*

The upper jaw protrudes a good bit (ca. $^3/_4$ mm.) in front of the under jaw. The length of the latter taken from the point to the angle of its lower contour is ca. 6 mm. The mouth opening is inclined upwards, making an acute angle.

The nostrils which turn to the side are placed close together slightly in front of the eye. They are narrow-oval and not separated. The distance from the front edge of the most anterior nostril to the point of the snout is ca. $2^1/_2$ mm., and the distance between the front edge of the anterior and the back edge of the posterior nostril is a little over 1 mm.

The front pair of teeth, both in the under as well as in the upper jaw, are large and powerful, and slope forward. The next teeth too are for the most part powerful. There are about 12 on each side of the jaw.

There are the beginnings of rays in the dorsal and anal fins, but they are short and not very powerful. The interspinous elements are however very distinct. The distance from the point of the tail to the beginning of the dorsal fin is ca. 52 mm. Between the anal and dorsal fins and the caudal fin there is a very short interval without rays. The caudal fin has apparently all its rays. The point of the notochord is bent up and reduced. H^1 and H^2 are broad fan-shaped plates both of whose curved posterior borders for the most part lie in line with each other. A little black pigment is present on the caudal fin.

The pectoral fin is a short, broad fan-shaped flap with embryonic rays and also with the beginnings of 4—5 still extremely weak and indistinct rays.

The next smaller specimen in the developmental series is 83 mm. long, and does not differ essentially from that just described. H^1 has 7 strong rays and 1 less strong, the uppermost, H^2 has 8 strong and 1, the lowermost, less strong. The interspinous bones in the dorsal and anal fins are distinctly formed as in the previous specimen, and there are short, faint traces of rays posteriorly in these fins. The distance from the end of the tail to the point of origin of the dorsal fin is almost

45 mm., but difficult to determine with accuracy as the anterior interspinous bones of the fin are not so very distinct.

Next follow a specimen of 66½ mm. and another of 62 mm. H^1 and H^2 have almost the same form as in the previous; H^1 has 7 rays, of which two are less distinct, and H^2 likewise 7 rays (the 2—3 of these are less distinct). The interspinous bones in the dorsal and anal fins are distinctly formed, especially posteriorly, but fin rays are lacking as yet.

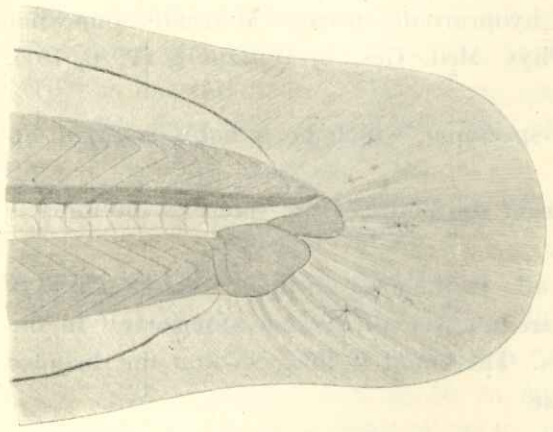


Fig. 5. *Lept. ?hyoproroïdes.*

The remaining smaller specimens are ca. 50 mm. In these H^1 and H^2 are less developed by not a little than in the previous specimens, but have nevertheless 7 rays, which are not all equally distinct. The region of the interspinous bones in the dorsal and anal fins is distinct and the single elements are also formed especially posteriorly.

The two smallest specimens to hand are respectively 42 and 36 mm. long. The tip of the notochord is but little bent up, but still a little reduced and both H^1 and H^2 are formed. H^1 is almost parallel with the end of the notochord and much less than H^2, which is a broad, almost isodiametric plate; ca. 4—5 faint traces of rays can be counted in H^2 and ca. 3 in H^1. The interspinous regions in the dorsal and anal fins appear as thin lines in the embryonic fin, in which the single elements are not yet formed (see fig. 5).

Leptocephalus hyoprorodïes is the species amongst all the Muraenoid larvae taken by me, which I have been able to trace furthest back in its developmental history, right down to the not fully grown "preleptocephalus" stages, which in the case of most of the other species, e. g. *Anguilla*, *Conger* and *Synaphobranchus* are still unknown. These not fully grown stages, which are figured on Pl. II are therefore of great interest, as they show us, how amongst other things the whole development of the fins and tail proceeds. Thus we see (cf. figs. on Pl. II and text figs. 5 and 6), that both the dorsal and anal fins arise out in the embryonic fin without any connection even with the contour of the body, and thence it follows that the clear transparent zone, which is found in all Leptochephali (thus also in *L. brevirostris*) between the body contour and the dorsal and anal fins, is identical with a portion of the original embryonic fin. In this respect, the developmental history of the Muraenoids recalls in great measure what I have pointed out previously[1] in the marine salmonoid Genus *Argentina*. Thus, by studying the figures of the development of *Argentina* (e. g. figs. 8—18 and figs. 17—20 on Pl. I l. c.) it is seen that both the dorsal and anal fin arise out in the embryonic fin without having any connection with the contour of the body, just as was the case in *Leptocephalus hyoproroïdes*. The fact that these fins are very short in *Argentina*, whilst they are long in the Muraenidae, and that the clear zone (the embryonic fin) between the dorsal (and anal) fin disappears more quickly in

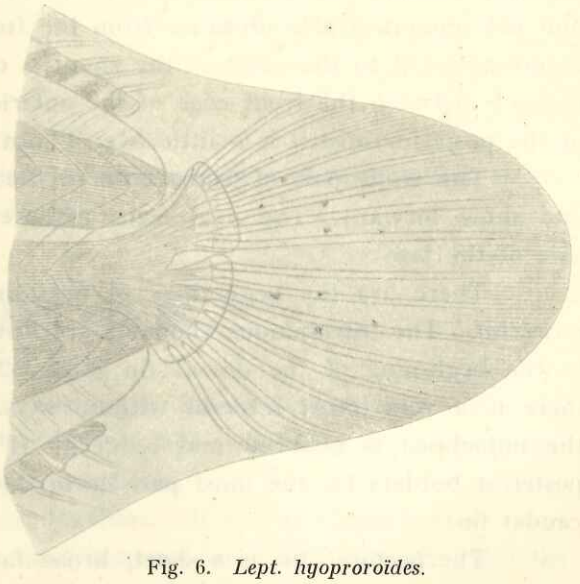


Fig. 6. *Lept. hyoproroïdes.*

[1] Johs. Schmidt: On the larval and post-larval development of the Argentines (Meddel. Kommiss. f. Havunders, Ser. Fiskeri, Bind II, Nr. 4, 1906).

Argentina than in the Muraenoids (where this occurs in the protracted retrograde metamorphosis, which we know best in *Anguilla*, e. g. see my work on the Eel, 1906, Pl. VIII and 1909, Pl. I, quoted here p. 3), is only consequently of secondary importance in comparison with the other.

On this point there is thus an important agreement between the Muraenoids and the deep-water salmonoid genus *Argentina*, but this is not the only one. As I have shown previously *Argentina silus* has a very large bathypelagic egg which in very many respects reminds one in great measure of those Muraenoid eggs described and figured by RAFFAELE, EIGENMANN and BOEKE, thus, both by their very large size and mode of occurrence, by their reticulated yolk (which we thus now know in Clupeoids, Muraenoids and Salmonoids, etc.) and when I first took the *Argentina* eggs out in the Atlantic, I believed that I had found a Muraenoid egg.

I have shown here these similarities between the Muraenoids and the salmonoid *Argentina*, both because they seem to me of significance in any judgment of the affinities of the two groups and because when compared with *Argentina* one can better understand the characteristic fin-structure and development of the Muraenidae (cf. the origin and importance of the clear zone in the Leptocephali between the unpaired fins and the contour of the body).

List of specimens.

Stat. 52. 21. May 1906, 48° 43′ N., 12° 05′ W.; depth 1860—1945 meters.
Young-fish trawl 300 meters wire.

1. Length: 36 mm., preanal length: 27·5 mm. (Pl. II, Fig. 1).
   No. of segments: ca. 139, preanal: ca. 79.
2. Length: 51 mm., preanal length: 35 mm. (Pl. II, Fig. 3).
   No. of segments: ca. 140, preanal: ca. 76.
3. Length: 62 mm., preanal length: 42 mm. (Pl. II, Fig. 4).
   No. of segments: ca. 138, preanal: ca. 70.

Stat. 62. 4. June 1906, 50° 25′ N., 12° 44′ W.; depth: 2480 meters.
Young-fish trawl 300 meters wire.

4. Length: 42 mm., preanal length: 30 mm. (Pl. II, Fig. 2).
   No. of segments: ca. 139, preanal: ca. 77.

Stat. 63. 5 June 1906, 49° 27′ N., 13° 22′ W.; depth: 2140 meters.
Young-fish trawl 300 meters wire.

5. Length: 66·5 mm., preanal length: 43 mm. (Pl. II, Fig. 5).
   No. of segments: ca. 133, preanal: ca. 71.

Stat. 67. 7. June 1906, 48° 29′ N., 14° 15′ W.; depth: more than 4000 meters.
Young-fish trawl 200 meters wire.

6. Length: 83 mm., preanal length: 64 mm. (Pl. II, Fig. 6).
   No. of segments: ca. 143, preanal: ca. 95.

Stat. 69. 7. June 1906, 47° 40′ N., 12° 41′ W.; depth: more than 4000 meters.
Young-fish trawl 200 meters wire.

7. Length: 92 mm., preanal length: 68·5 mm. (Pl. II, Fig. 7).
   No. of segments: ca. 142, preanal: ca. 93.

Stat. 93. 25. June 1905, 49° 25′ N., 12° 20′ W.; depth: 1270—1310 meters.
Young-fish trawl 200 meters wire.

8. Length: 50·5 mm., preanal length: 35 mm.
   No. of segments: ca. 138, preanal: ca. 77.

6. *Leptocephalus Congri vulgaris* (*L. Morrisii*).

Pl. I, figs. 1—3, Pl. III (distribution).

When I refer to figs. 1—3 on Pl. I, many words are not needed to describe the appearance of the larvae of the *Conger*, which have been taken on the "Thor's" expeditions. Altogether not more than 30—40 specimens were taken at the stages in development figured, still, by far the greatest number were in the first stage (fig. 1), and only a few were in process of transformation (figs. 2—3). The specimens caught varied in length from 112 to 159 mm. as appears from the accompanying list, where both the total length and the preanal length (the distance from the point of the snout to the anus) are given. In this way one can form an opinion as to the stage in the retrograde metamorphosis the specimen in question was at.

If the distribution of the larvae of the *Conger* be compared with that of the common fresh-water eel (cf. Pl. III with Pl. II in my paper from 1909 on the common eel), one will find a great likeness between the two species. For example, they occur together at the many stations west of the British Isles and France. On closer examination however it will be seen that there is a certain difference in the occurrence of the two species. In the first place the *Conger* larvae seem not to go as far north as those of *Anguilla*. Whilst these are found as far as the Færoes, the most northerly stations where the *Conger* larvae were taken lie to the West of the Hebrides in the Rockall Channel, and this agrees with our present knowledge that the fresh-water eel occurs in both Iceland and Færoe, whilst not a single example of the *Conger*, which is a fish very often taken in the trawl at other places, has ever been recorded from those islands. Altogether, therefore, the present hauls show that the *Conger* has a somewhat more southerly distribution than *Anguilla* and there have thus been taken by the "Thor" proportionately many more *Conger* larvae than *Anguilla* larvae in the Bay of Biscay than further north off the British Isles.

So, too, in regard to the depths over which the larvae are taken, there is a difference between the two species. As one can see from the accompanying list and the map of distribution, the *Conger* larvae, generally speaking, did not occur over such great depths and I have taken altogether only 5 specimens outside the 2000 meters curve although numerous hauls were made out here with good results in the case of the *Anguilla* larvae. If the list of *Conger* larvae is looked at we also find, that there exists a certain relation between the depth over which the specimens were taken and their preanal length, i. e. their degree of development. All the specimens which were in process of metamorphosis were taken over comparatively shallow water or even near to the coastal plateau (cf. Station 77, 1905 and 57, 56, 36, and 40, 1906), and it is plainly enough seen that the *Conger* larvae like the larvae of the common fresh-water eel during the retrograde metamorphosis move inshore towards the coasts of West Europe from the deep water, though they do not perhaps, as the present investigations seem to show, come from so great depths as the larvae of the fresh-water eel.

The *Conger* larvae have been found by the "Thor" in the period from May to the middle of September, thus in all the months in which we have carried on investigations in the Atlantic, but still most in May and June, a fact which probably may still be only due to chance and to the circumstance, that most work has been done in these months. With respect to the stage of development in relation to the time of the year, the *Conger* larvae seem to be somewhat different from the larvae of the fresh-water eel, of which in the spring we only found specimens of the first stage, whilst in the autumn we found virtually only such specimens which had begun their metamorphosis. Thus, I found in early summer, e. g. in the month of May, specimens both as shown in fig. 1 and in fig. 3; in September the specimens taken by me were in the first stage with the anus far back (i. e. KAUP's *Leptocephalus punctatus*); but other investigators have found specimens both at this stage and at others which were far forward in their metamorphosis (cf. with my paper from 1906 on the common eel, pp. 190, 191 and GILSON's report in

Table III. Occurrence of *Leptocephalus Congri vulgaris* 1905, 1906, 1908.

Stat. No.	Date	Position	Depth (meters)	Young fish trawl meters wire out	Duration of haul	Total number of specimens caught	Total length (Preanal length) mm.
12	28. VI 1908	57° 03′ N., 11° 20′ W.	0 / 2444	65	30 min.	1	125 (116)
77	12. VI 1905	55° 04′ N., 8° 58′ W.	116	65	30 min.	1	137 (108)
57	23. V 1906	51° 58′ N., 10° 25′ W.	75	25	1 hour	1	130 (97)
78	15. VI 1906	51° 35′ N., 11° 36′ W.	475	200	1 hour	1	136 (117)
			475	300	2 hours	1	158 (132)
80	17. VI 1906	51° 34′ N., 11° 50′ W.	1200	100	2 hours	1	134 (115)
81	13.—14. VI 1905	51° 32′ N., 12° 03′ W.	960—1420	300	11 hours	2	135 (113)
56	22. V 1906	51° 24′ N., 10° 20′ W.	130	25	1 hour	1	112 (94·5)
175	30.—31. VIII 1906	51° 11′ N., 11° 11′ W.	1030	100	1½ hours	1	
61	31. V 1906	51° 04′ N., 11° 39′ W.	1300—1450	300	4 hours	2	143 (121·5), 154 (132·5)
				600	2 hours	1	133 (112)
82	14.—15. VI 1905	51° 00′ N., 11° 43′ W.	1020—1370	300	7½ hours	3	113 (100·5), 120 (103)
62	4.—5. VI 1906	50° 25′ N., 12° 44′ W.	2480	200	2 hours	1	132 (115)
			2480	300	2 hours	1	130 (113·5)
177	1. IX 1906	49° 30′ N., 11° 38′ W.	550	300	2 hours	1	134 (115)
76	12. VI 1906	49° 27′ N., 13° 33′ W.	more than 2600	100	2 hours	2	121 (105), 130 (111)
93	24.—26. VI 1905	49° 25′ N., 12° 20′ W.	1270—1310	200	2 hours	1	137 (120)
74	10. VI 1906	49° 23′ N., 12° 13′ W.	1245	200	2 hours	1	125 (108·5)
181	4. IX 1906	49° 22′ N., 12° 52′ W.	1350	300	1 hour	1	124 (107·5)
92	24. VI 1905	48° 55′ N., 12° 20′ W.	1360—1450	300	1 hour	1	140 (119)
53	21. V 1906	48° 55′ N., 12° 03′ W.	1080—1174	300	2 hours	1	130 (113)
52	21. V 1906	48° 43′ N., 12° 05′ W.	1910—1945	300	6 hours	1	149 (127)
88	20. VI 1905	48° 09′ N., 8° 30′ W.	600—995	300	6 hours	3	133 (115), 137 (118·5)
36	10. V 1006	44° 21′ N., 2° 37′ W.	1035—1140	300	4 hours	1	159 (124)
40	11. V 1906	43° 23′ N., 2° 02′ W.	110	100	30 min.	1	154 (70·5)

Ann. Soc. Zool. Malacol. Belgique, t. XLIII, 1908, where there is mentioned the capture of a *Conger* larva in the Channel at Cape Grisnez on 1. May, and where the earlier captures of the larvae of this species are referred to). After all, we must conclude that the various stages in the development of the larvae of the *Conger* are not much dependent on the different seasons, at all events not in the same degree as is seen in the case of the larvae of *Anguilla* and again, from this it seems to follow that the propagation of the *Conger* takes place more independently of the time of year than that of the common eel.

III. Concluding remarks.

All the Muraenoid larvae taken by the "Thor" were typical pelagic animals. This refers not only to the fully grown larval stages of all the species but also to the developing preleptocephalic stage of *Leptocephalus hyoproroïdes*, which, so far, is the only form whose preleptocephalic stages we have found. After we have thus shown that the growing stages are also pelagic just as we know that all known Muraenoid eggs are pelagic, there does not remain much to countenance the view expressed by many earlier investigators that the larvae of the eels lead a life hidden at the bottom of the sea.

It must naturally be admitted however, that so long as we have not found the preleptocephalic, developmental stages of most species, e. g. of the common eel, the question must remain open, even if the probability perhaps is, that not only *L. hyporoïdes* but also all the other species are pelagic, right from the egg until metamorphosis is completed.

It will not be without interest to bring together what we know of the relative frequency of the different species according to the investigations made by the "Thor" (as to the area explored see Pl. III).

If the total number of the different species is taken we get the following summary of the specimens taken in the years 1905, 1906 and 1908.

1.	*Leptocephalus Anguillae vulgaris*	790	specimens.
2.	— *Synaphobranchi pinnati*	126	—
3.	— *Congri vulgaris*	32	—
4.	— *hyoproroïdes*	8	—
5.	— *rostratus*	2	—
6.	— *Holti*	1	—
7.	— *latus*	1	—

From this it is immediately seen by what a great majority the larvae of the fresh-water eel exceed the other species in the region investigated, i. e. from the Bay of Biscay to the Færoes. Further, *Leptocephalus Synaphobranchi pinnati* occurs in considerable numbers (and its numbers would undoubtedly have been much greater if, in order to catch so many specimens of *Anguilla* larvae present in the upper layers, we had not taken so disproportionate a number of hauls near the surface, especially in autumn, at which time the larvae of *Synaphobranchus* seem to have already descended to greater depths than in spring), and this also holds good in part for the larval forms of the *Conger*. On the other hand the other four species have only been taken in such small numbers that there can hardly be any doubt but that the species we have to deal with are southern warm-water (oceanic?) forms, which have likely been taken at their northern (eastern?) limits on our investigation stations (all the four species named are only taken in the most southerly portion of our area, in the Bay of Biscay). This main conclusion must therefore be drawn, that only the first three species can be said to belong to the Atlantic north of the Bay of Biscay, and that of these again the *Conger* is undoubtedly a somewhat more southerly form, whose larvae are therefore in the more northerly portion of the area fewer in number compared with those of *Anguilla* and *Synaphobranchus*, which are also the Muraenoids met with furthest north in the eastern portion of the Atlantic.

Explanation of Plates.

Plate I.

figs. 1—3. *Leptocephalus Congri vulgaris.*
fig. 1 in the first stage
— 2—3 in the metamorphosis
} ca. 2 × nat. size.

figs. 4—5. *Leptocephalus rostratus.*
fig. 4 about natural size.
— 5 much enlarged.

fig. 6. *Leptocephalus latus.*
Slightly less than 3 × nat. size.

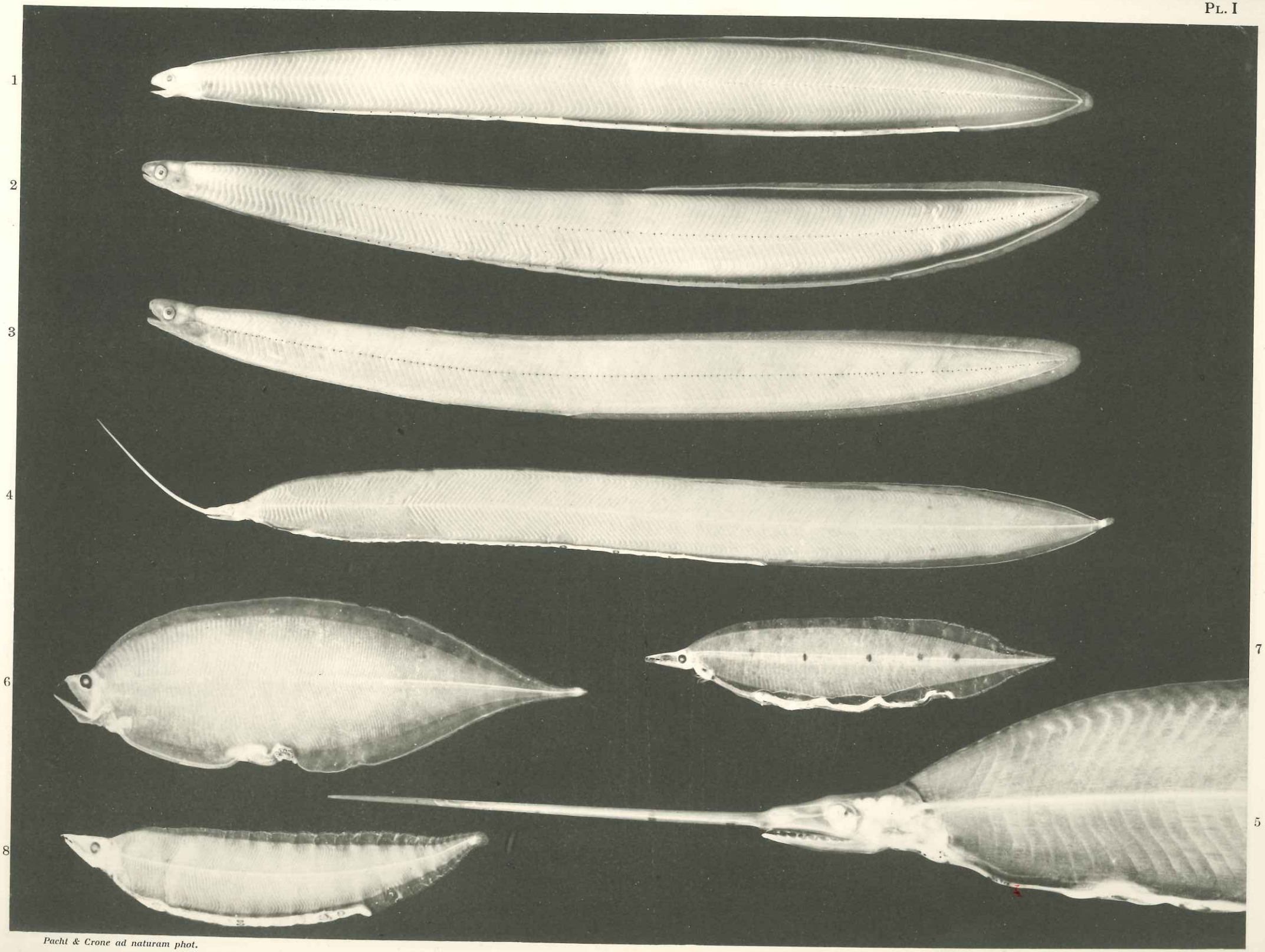
fig. 7. *Leptocephalus Holti.*
Slightly less than 3 × nat. size.

fig. 8. *Leptocephalus hyoproroïdes.*

Plate II.

figs. 1—7. *Leptocephalus hyoproroïdes.*
Ali the figs. ca. 2 × nat. size.

550. 19/4 1909.



Pacht & Crone ad naturam phot.

Fig. 1—3. *Leptocephalus Congri vulgaris;* Fig. 4—5. *Leptocephalus rostratus;* Fig. 6. *Leptocephalus latus;* Fig. 7. *Leptocephalus Holti;* Fig. 8. *Leptocephalus hyoproroïdes.*

(Fig. 4 natural size; the other figures enlarged.)

1

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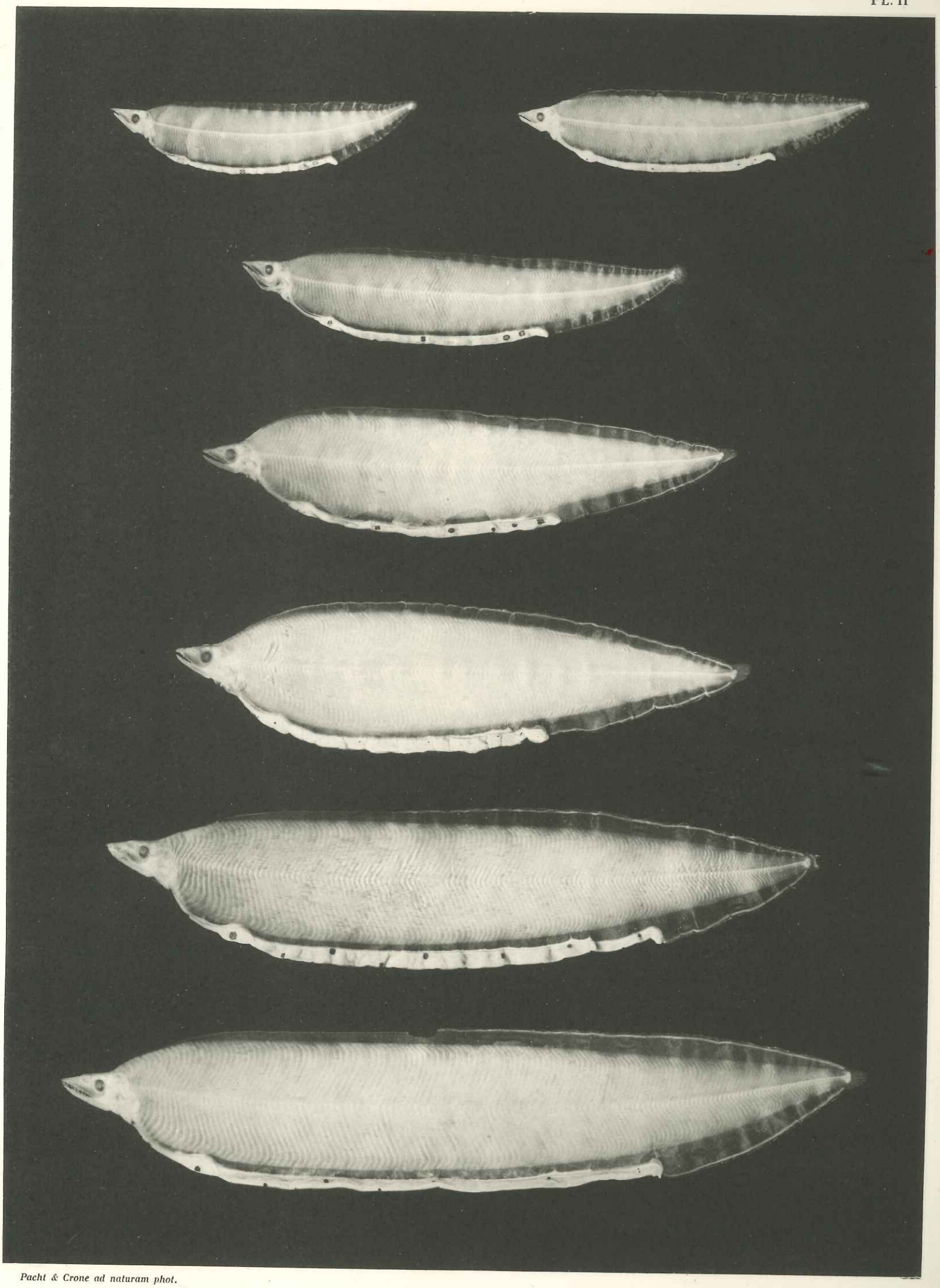
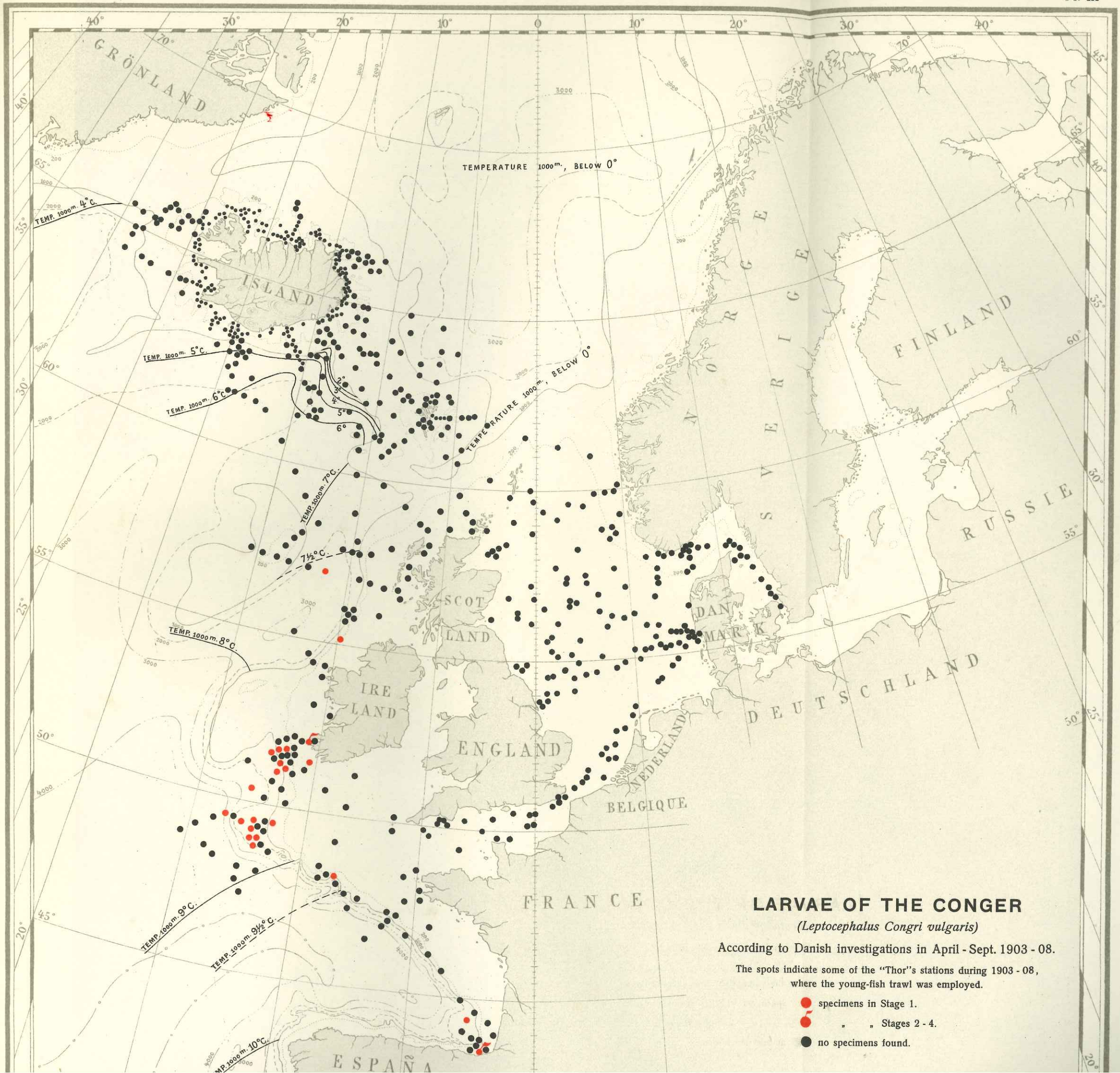


Pacht & Crone ad naturam phot.

Fig. 1—7. *Leptocephalus hyoproroïdes.*

(All the figures ca. 2 x nat. size.)



LARVAE OF THE CONGER

(Leptocephalus Congri vulgaris)

According to Danish investigations in April - Sept. 1903 - 08.

The spots indicate some of the "Thor"s stations during 1903 - 08, where the young-fish trawl was employed.

- specimens in Stage 1.
- „ „ Stages 2 - 4.
- no specimens found.