BIHANG TILL K. SVENSKA VET. AKAD. HANDLINGAR. Band 5. N:o 18.

ON

A NEW GENUS AND SPECIES

OF

HARPACTICIDA

BY

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WITH FOUR PLATES.

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STOCKHOLM, 1879.
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In the month of June 1878, when at Wadsö in East-Finmark, Norway, on the Waranger-fjord, the author and his companion Mr C. W. Forsstrand observed on the baleen-plates of a *Balænoptera Sibbaldii* Gray just captured a number of large yellowish-white spots, which on a closer examination were found to consist of innumerable crowds of a Copepod in all stages of development, from the new-hatched Nauplius to the adult Cyclops, all firmly adhering to the plates by means of strongly armed limbs, and evidently at home there. Concluding from this very singular and hitherto unobserved mode of living to its frequent occurrence on this species of whale, I searched every specimen of it, as well as of *B. musculus* Comp., that was captured during our stay at the establishment of Mr Svend Foyn, but always in vain. Still this epizoic Copepod may not be so very rare, although easily overlooked.

Its most marked character, the strongly developed claws, is clearly in accordance with its epizoic manner of living. For if allied genera of Copepods are in need of their claws is order to cling to seaweeds and similar objects, this genus is still more so for the purpose of adhering to the surface of the baleen-plates while the water is violently rushing through them. The only species known is the type of the new genus

BALÆNOPHILUS*) nov. gen.

Char. gen. Corpus fere cylindricum. Antennæ anticæ octoarticulatæ; posticæ biarticulatæ, ramo secundario articulo uno parvo. Palpus mandibularum minimus, tubereulo setigero formatus. Palpus maxillarum simplex. Maxillipedes

*) φάλαινα whale and φίλος friend.

anteriores processibus cylindraceis duobus; posteriores validi, subcheliformes. Pedes primi paris prehensiles, rami ambo triarticulati; pedes secundi paris ramo interno bi-, externo triarticulato; tertii et qvarti paris ramo interno uni-, externo triarticulato; qvinti paris rudimentarii. Sacculi ovigeri duo. Larva naupliformis transversaliter ovalis pedum tribus paribus non articulatis, brevibus.

Generic Char. Body almost cylindrical. Anterior antennæ eight-jointed; posterior two-jointed, with a secondary branch, consisting of a single small joint. Mandible palp rudimentary, reduced to a setiferous tubercle. Maxillary palp undivided. Anterior foot-jaws having two marginal setiferous processes; posterior strong and chelate. First pair of feet strongly clawed; both their branches three-jointed; second pair of feet having the inner branch two- and the outer three-jointed; third and fourth pairs of feet with the inner branch one-, the outer three-jointed; feet of fifth pair rudimentary. Ovisacs two. Nauplius transversally oval, with three pairs of short appendages, destitute of joints.

By its mode of living, as well as by its rudimentary mandible palp and the one-jointed inner branch of the third and fourth pairs of feet, this genus in the adult state is seen at the first glance to differ from all the other genera hitherto described in the family of *Harpacticida*, and the larva in its first state of development recedes still more widely from all larvæ of *Copepoda* known at present. At the same time, when the question is strictly to determine its place among others, it will be found that by the development of the first pair of feet into strong, prehensile, clawed membres it differs profoundly from all genera referable to the subfamilies proposed by BOECK*): *Setellina*, *Porcellidina*, *Westwoodina*, *Tachidina*, *Amymonea* and *Longipedina*. It differs also by the number of joints in the anterior antennæ from most of the genera belonging to the above-named subfamilies, and from the *Longipedina* moreover by the chelate hand of the posterior foot-jaws. There remain therefore only the genera belonging to BOECK'S subfamilies *Harpacticina* and *Ameirina*, but to these *Balænophilus* hardly is referable, provided the limits

*) BOECK A.: Oversigt over de vid Norges Kyster iagttagne Copepoder. Forhandlinger i Videnskabsselskabet i Christiania. Aar 1864.

drawn by that author are to be maintained; for in the structure of the first pair of feet it completely agrees with some genera of *Harpacticina*, i. e. *Harpacticus* M. EDW. and *Thalestris* CLAUS, and evidently differs from *Ameirina*, while in the development of the mandible palp and of the secondary branch of the posterior antennæ, it resembles *Ameirina* much more than *Harpacticina*. These organs are namely in *Ameirina* much less developed than in *Harpacticina* and thus more like their rudimentary state in *Balænophilus*. By its two distinct ovisacs it resembles again the genus *Diosaccus* BOECK. Consequently *Balænophilus* seems to constitute a remarkable uniting link between the above-named two subfamilies by presenting characters belonging to both, and these characters still more strongly marked even than in their typical genera.

According to the limitation, given by G. BRADY*) to the subfamilies and genera of *Harpacticida*, *Balænophilus* may belong to *Harpacticina* and come nearest to the genus *Thalestris* CLAUS. But from this genus it differs widely by having the mandible palp rudimentary and the maxillary palp simple, unbranched.

One species only being known, the following description will comprise the generic as well as the specific characters.

Balænophilus unisetus nov. spec.

A. Adult form.

Description: *Body* (Pl. I. Fig. 1—3.) elongated, slightly higher than broad, attenuated behind; last segment of the abdomen half as broad as the first large part of the body. This part provided with a distinct, but obtuse rostrum, and being in the male about 0,25, in the female 0,29, of the whole length of the body. The four posterior thoracic segments free as usual; abdomen in the male composed of five, in the female of four free segments, exclusive of the furca. The first and second abdominal segments of the female are namely

*) BRADY G.: Monograph of the free and semi-parasitic Copepoda of the British Islands. Vol. I. London 1878.

united in one piece, a little broader than the preceding and following segments. Furca as long as each of the nearest joints and bearing on each side, at the apex, only a single, long, non-ciliated seta, a little more than half as long as the body. Each branch of the furca bearing also on its outer margin a short, but rather stout, inarticulate seta, reaching to or slightly beyond the distinctly marked basal joint of the tail-seta, and on its upper margin, just within the place where the small seta is fixed, a similar finer triarticulate one. There are also some small spines round the base of the tail-seta.

The anterior antennæ present a different structure in the two sexes. Male: (Pl. I. Fig. 4.) Antennæ consisting of eight joints; the fourth of these bearing the sword-shaped appendage, the first of the following four joints very short, and the third swollen on its inside; last joint long, of equal breadth throughout, having two terminal setæ, of which one is very long and simple, the other shorter and trifid. Moreover there are several setæ on the outer margin of the second, third and fourth joints, one on the same margin of the sixth and seventh, one in the middle and two on the inner margin of the last joint. Besides the ordinary sword-shaped appendage at the distal end of the fourth joint, there is also a similar one at the same end of the third. At the base of the fourth joint there is a setiferous tubercle which, when the antenna is extended, covers the end of the third joint. — Female: (Pl. I. Fig. 5.) Antennæ differing from those of the male by being shorter and of a much more slender structure, and by the four last joints being of almost equal length and of the usual shape. Fourth joint destitute of the tubercle and the sword-shaped appendage of the male, seventh joint having at its apex the longer terminal seta much shorter. The other setæ almost similar to those of the male.

The posterior antennæ (Pl. I. Fig. 6.) two-jointed and alike in the two sexes. First joint destitute of setæ on its margins, but having near the middle of the outer margin some small spines, placed in a semicircle, and a little above the middle a small secondary branch, scarcely reaching to its apex and provided with three setæ. At the one margin of the secondary branch there appears a notch where the subapical seta is placed in the genus *Canthocamptus* WESTWOOD. Second joint broader above than at its base, having its distal end

cut off obliquely and provided with three long geniculate setæ, finely curled in the knee itself. Outside of these there are on the outer margin four spines a little curved, the upmost of which is the longest, the others gradually shorter. The geniculate setæ non-ciliated; spines on their lower margin finely crenulate.

The upper lip (Pl. I. Fig. 7.) consisting at its apex of two crenulate ciliated laminæ, terminating on the outer side in two flattened and probably moveable spines. Lateral margins rather thick and convex on their inner side.

The mandibles (Pl. I. Fig. 8, 9.), the shape of which is best shown by the figure, bear at their apex four rows of short and obtuse teeth, of which the uppermost row alone is visible on the outside; palp quite rudimentary as in *Cyclops* O. F. MUELLER, and consisting only of a small tubercle, bearing three setæ on its top. On the inner side below the rows of teeth, there is a rather long ciliated seta, directed inwards under the upper lip. On the anterior margin there are two tubercles, separated by a furrow, which probably assist in supporting the mandibles against the upper lip by taking up its margin between them.

The under lip (Pl. I. Fig. 10.) consisting of two side-halves, channel-formed behind, separated by a deep incision and having their margins highly ciliated.

The maxillæ (Pl. I. Fig. 11.) are broad and slightly tapering towards the dentate apex. The masticatory lobe seems to be the immediate continuation of the basal piece, whereas the palp rather presents itself as an appendage on its outer side. Palp lying close to the masticatory lobe, completely undivided and bearing at its apex as well as just below it two setæ. It has moreover two setæ at its inner margin near the apex, three in the middle of its outer margin, and a large one in the proximal corner, all these representing the processes found in other genera.

The anterior or inner foot-jaws (Pl. I. Fig. 12.) small, shorter than the maxillæ and provided with two cylindrical or digitate processes on the basal piece. Uncinate process rather small, having one tooth at the apex and two setæ on the outer side. Digitate processes having each two ciliated setæ at their apex. Posterior pair of foot-jaws developed in a strong clasping organ, consisting of a basal joint, bearing two setæ

in the upper inner corner, and of a broad middle joint which constitutes with the claw-like, terminal joint a chelate, prehensile hand. The margin of the hand, directed towards the claw, however, is not concave, but almost straight. The claw has in the inner margin a small notch, bearing a short seta.

The first pair of feet (Pl. I. Fig. 1.) are highly developed clasping organs, twice as long as the following pairs of feet, which do not reach farther than to the end of the second basal joint of the first pair. This first pair of feet destitute of ciliated setæ. Basal joints of equal breadth throughout, more than twice as long as broad. Outer branch only half as long as the inner and consisting of three joints. First joint short, bearing a spine at its outer margin; second joint fully as long as the two others together and armed with a spine, similar to that of the first, and besides with some small spines on the outer margin; last joint as short as the first and bearing at its apex two claws af unequal length, bent outwards and having two setæ at their base First joint of the inner branch longer than the whole outer branch and about six times as long as the two other joints together, exclusive of the claws; second joint very short and destitute of all sorts of appendages, as well as the first; third joint bearing two claws of unequal length and much curved outwards. The peculiar glenoid surface of articulation between the first and second joints intimates a great mobility of the claws.

The following three pairs of feet resemble each other very much as to the essentials of their structure, but it is, however, easy to distinguish them from each other, and they differ also in the two sexes. The basal part of all pairs short and broad, consisting of two pieces, immoveably joined and in the posterior pairs not clearly distinguished from each other.

The outer branch of second pair of feet (Pl. II. Fig. 1. 2.) three-jointed. First joint the longest and bearing a spine at the upper part of the outer margin; second joint bearing also a spine on the outer margin besides a long ciliated seta in the middle of the inner margin; third joint having three spines on the outer margin, two ciliated setæ at the apex itself and two similar ones on the inner margin. Inner branch two-jointed and so short as not to reach farther than

to the first joint of the outer branch; its first joint bearing no setæ, but very small spines on the inner side, like all the other joints of this pair of feet; second joint having at its apex three setæ, long, fine and ciliated in the female, but in the male consisting of a ciliated thorn and two doubly-curved spines on its outer side. This prominent character reminds one of something like it in the genus *Westwoodia* DANA.

The outer branch of the third pair of feet does not differ from that of the second pair excepting that it has two spines only on the outer margin of the third joint. The three upper spines of the outer margin in the male provided on their sides with small spines, disposed in pairs. Inner branch one-jointed, having two setæ at its apex and being alike in the two sexes.

The fourth pair of feet (Pl. II. Fig. 3. 4.) completely resembles the third excepting that the outer branch has but one seta at the inner margin of its third joint. The male has the same spines, provided with small ones, as in the third pair.

The fifth pair of feet rudimentary, consisting of two laminæ, passing without articulation into the indistinct basal piece. This formation is usually regarded as a two-jointed foot, the first joint of which has a process on the outer side. This, of course, in purely morphological point of view is correct, but in consequence of the development of the feet in the larva it seems to me to be indisputable that this foot, as well as all the preceding ones, is fundamentally composed of a basal piece and two branches, the outer of which alone differs somewhat more distinctly from the basal piece, while the inner appears to be only a process. The development of the larva shows also, as will be set forth at greater length in the following description, that the branches are at first only processes. I therefore consider it quite certain that what has been termed second joint of the fifth pair of feet is homologous with the outer branch of the other pairs of feet, whereas the process of the first joint is homologous with the inner branch, and I will also, in order to intimate this, call them branches.

The two laminæ, (Pl. II. Fig. 5.) forming the branches of the fifth pair of feet, in the male much smaller than in the female, the inner and smaller branch bearing at its apex

two setæ, the outer having also two setæ at the apex and three on the outer margin.

The inner branch in the female (Pl. II. Fig. 6.) has five setæ, the two inner shorter and, as it were, flattened towards the apex; outer branch having three longer and three very short setæ.

The first abdominal segment of the male has on the ventral surface two elevations (Pl. II. Fig. 5.), separated by a median furrow, but coherent at the base, each bearing one seta, a little curved, at the apex. They resemble very much the inner branches of the fifth pair of feet, and it may be that they are a still more rudimentary pair of feet. On the first abdominal segment of the female, the sexual apertures (Pl. II. Fig. 7.) appear in the form of two oval recesses, meeting in the middle. The outer part of their anterior margin has a small tubercular lamina, with two setæ; the middle of the same margin, with a conical process. A little behind the sexual apertures there is, in a cavity situated in the middle line of the ventral surface, a small semicircular lamina, ciliated at its margin. Ovisacs two, with about twenty eggs in each.

If now the sexual differences are recapitulated, it is found that the male differs from the female by 1:o the structure of the anterior antennæ, 2:o the shape of the setæ at the inner branch of the second pair of feet, 3:o the seta at the outer margin of the outer branch in the third and fourth pairs of feet, 4:o the more rudimentary state of the fifth pair of feet, 5:o the distinctly marked first and second abdominal segments, 6:o the laminar appendages on the first abdominal segment.

B. Development.

The new-hatched young is a Nauplius having the body scarcely more than three quarters as long as broad. Although it be possible that in this stage of development the young moults several times, yet I have not met with more than two slightly differing forms. One, the smaller, probably represents the animal when leaving the egg, and differs from the larger by having but one rudimentary pair of feet at the posterior end of the body and one spinous seta on

the anterior antennæ. This being the only difference between the two forms, it may be sufficient to describe the larger of them.

Nauplius: (Pl. III.) Body transversal, rather high and convex, bearing three pairs of developed limbs, and two rudimentary ones, represented by setæ. First pair, from which the anterior antennæ apparently arise, least developed, very short, obtuse and quite destitute of joints. They are very distant from each other in the middle, but scarcely visible outside the anterior margin of the body; their posterior margin going backwards and meeting the margin of the large mouth-shield or upper lip. Antennæ having two larger spinous setæ at their anterior margin, two simple setæ at the apex itself, a singular cirrus and a seta at the posterior margin. Second pair of limbs much more complex, consisting of four different parts or branches: 1:o a dentate process, directed inwards, moveable backwards and forwards under the mouth-shield and bearing a small secondary branch in the curve of the outer side; 2:o a slender branch, situated next to the outside and a little behind the preceding, with two setæ at its apex, both these branches in the natural state of the animal slightly standing out from the body, at least not more than the mouth-shield itself; 3:o a short, but stout part, bearing a strong claw and some setæ at the apex, this part standing out almost perpendicularly from the lower surface of the body, but not visible outside its margin; 4:o a longer branch, being the outmost, bearing four spinous setæ at the apex, and situated for the most part outside the margin of the body.

Third pair of feet simpler, consisting of only a clawed piece rather resembling the third branch of the preceding pair of feet, but larger and bearing a tubercular process with three setæ at the outer margin, four setæ at the base of the claw on a lamelliform lobe, and lastly a small spinous secondary branch on the inner side. This pair of feet also stands out very much from the lower side of the body. Behind it there is on each side a spinous seta on a tubercle, and between these in the middle of the posterior part of the body there are moreover two broader elevations, bearing two spinous and one simple seta. This pair is missing in the first stage of development and is consequently younger than the other, although the latter is less developed. The appearance of

the limbs of the larva fully indicates that they are no swimming-organs, or very little so, but that, instead of this, they serve to attach the animal to the baleen-plates by their sharp claws. If the larva now described be compared with the figure of the larva of *Dactylopus Strömii* BAIRD, given by CLAUS,*) it is found that there are also the same parts in its pairs of feet, although they appear in a quite different form.

One specimen alone of the larva in this stage of development, among many hundreds that I have had occasion to observe, was a little more elongated behind, so that the body was as long as broad, but otherwise it completely resembled the larva described here. This specimen may possibly be a transition to the first Cyclops-stadium which differs otherwise very much from the Nauplius.

The larva in the first Cyclops-stage (Pl. IV. Fig. 1.) has five-jointed body, exclusive of the furca; first segment half as long as the whole body. Furca (Pl. IV. Fig. 6.) having on each side two setæ, the outer of these short and ciliated. Two tail-setæ being the ordinary number in the other *Harpacticida*, the larva thus resembles them in this more than does the adult animal. Anterior antennæ (Pl. IV. Fig. 2.) consisting of three or four joints, the basal piece being indistinctly divided into two parts. Posterior antennæ (Pl. IV. Fig. 3.) two-jointed, having three spines at the outer margin, but only two geniculate setæ at the apex, the third still having the indifferent form of a simple seta, shorter and stouter than both the others. Secondary branch of a strange appearance, being very short and broad, with irregular small tubercular processes on the sides and three setæ at the apex. Mouth-organs and foot-jaws having already received a form differing in no essentials from that of the full-grown animal. First pair of feet, (Pl. IV. Fig. 4.) having the basal part two-jointed, but the branches one-jointed and of almost equal length. Outer branch bearing two sharp claws and two fine, curved setæ; the inner having at the apex a very small spine and a larger one, the apex of which is produced in a fine seta. One might say that this seta, as to its lower part, is transformed into a claw, although it cannot act as such till the upper part has disappeared. Hence it seems that there is not so great

*) C. CLAUS. Die freilebenden Copepoden. Leipzig 1863. Tab. XVI fig. 2.

a difference between the genera that have clasping and swimming-feet on the first thoracic segment, and that the clasping-foot is a transformation of the swimming-foot. Second pair of feet (Pl. IV. Fig. 5.) consisting of one undivided basal piece and two branches not separated from it by any joint; the inner rudimentary, with a single seta at the apex, the outer having two longer setæ at the apex and three spines on the outer margin. Other pairs of feet wanting.

The body of the young in the second stage is six-jointed. Furca with only one seta at the apex, and having now assumed the same appearance that it has in the full-grown animal, the outer seta, belonging to the preceding stage, having disappeared. Anterior antennæ six-jointed, with two basal joints of equal length and four terminal ones. Posterior antennæ having three geniculate setæ and differing from those of the full-grown animal by having only three spines at the outer margin. Secondary branch slender and having almost its final appearance. The branches of the first pair of feet, now two-jointed, having distinct claws, and the inner branch twice as long as the outer. Second pair of feet (Pl. IV. Fig. 7.) has changed so that the outer branch is two-jointed and has received one seta more in the upper part of the inner margin; the proximal of the three spines on the outer margin is now situated on the first joint. The appearance of the inner branch is unchanged. The new-formed third pair of feet (Pl. IV. Fig. 8.) is almost entirely similar to the second pair of feet of the young in the preceding stage, the only difference being that the outer branch has two spines instead of three on its external margin. Fourth and fifth pairs of feet wanting.

In the third cyclops-stage, the body of the young has seven free segments. Anterior antennæ (Pl. IV. Fig. 9.) now have three-jointed basal pieces, although the second joint is very indistinctly separated from the third, and thus seven joints in all. Posterior antennæ and first pair of feet having the same shape as before. The inner branch of the second pair of feet (Pl. IV. Fig. 10.) one-jointed and having one seta at the apex as in the preceding stages; outer branch having received one spine more at the outer margin and one seta more in the inner margin of the terminal joint. The inner branch of the third pair of feet (Pl. IV. Fig. 11.) now having two setæ at the apex, the outer branch two-jointed and completely resembling

the same branch af the second pair of feet in the preceding stage. Fourth pair of feet (Pl. IV. Fig. 12) consisting of two one-jointed branches and very similar to the second and third pairs of feet, when first coming forth. Fifth pair of feet wanting.

In the fourth stage of development, the young has eight-jointed body and five pairs of feet. Anterior antennæ eight-jointed and like those of the female; posterior having received one spine more on the outer margin and being thus quite similar to those of the full-grown animal. The branches of the first pair of feet remaining two-jointed. First joint of this as well as that of all the other pairs of feet separated from the two others that constitute the terminal joint. The outer branch of the second pair of feet (Pl. IV. Fig. 13.) has received one seta more at the inner margin of the outer joint, but is two-jointed and still destitute of one spine at the outer margin; its inner branch is one-jointed and has received two setæ more at the apex, but the outmost of these is almost invisible and curved like a small claw. It therefore constitutes, as it were, a medium between the forms of the male and female. The outer branch of the third pair of feet (Pl. IV. Fig. 14.) is two-jointed, has received one spine more on the outer margin and another seta on the inner, so that it now completely resembles the outer branch of the second pair of feet in the preceding stage of development; inner branch one-jointed, with two setæ at the apex. The outer branch of the fourth pair of feet two-jointed, the inner one-jointed, with two setæ at the apex. The basal joint of the outer branch bearing a spine on the external margin, and the terminal joint having three spines on the outer margin, two setæ at the apex and a similar one on the inner margin. It differs thus from the third pair of feet in this stage by having one seta less on the inner margin, and from the same pair of feet in the preceding stage by having one spine more at the outer margin. Fifth pair of feet consisting of two laminar branches, separated by a low furrow, destitute of joints and placed on the same basal part. Outer lamina bearing four small setæ, but the inner only one at the rounded margin.

In the fifth stage, the young almost completely resembles the female, but may be distinguished by its size as well as by the fact that the inner branch of the first

pair of feet is two-jointed, the setæ of the fifth pair of feet shorter and less developed, and the first abdominal segment equal to the others, being neither shorter nor longer.

All these young forms described here resemble one another in the outline of the body as well as in the mouth organs, which are alike. Of course they present no sexual differences, but are destitute of the characters belonging to the male, and in general resemble the female most. I think it very possible that during these different stages the skin may be moulted several times without any external transformation. This would explain the singular fact that the individuals of the first cyclops-stage are much rarer than the nauplius and the later cyclops-stages. It is also possible that the first cyclops-stage moults as many times as the other stages, but that it is passed through in a much shorter time.

Measurement.

Male: length of body with tail-setæ: 3,75 mm.
» » » without tail-setæ: 2.2 mm.

Female: length of body with tail-setæ: 3,60—3,75 mm.
» » » without tail-setæ: 2,25—2,5 mm.

Eggs: diameter: 0,11—0,125 mm.

Nauplius: first stage: length 0,15 mm., breadth 0,27 mm.
second stage: length 0,20—0,25 mm., breadth 0,30—0,35 mm.

Cyclops: first stage: length with tail-setæ: 0,85 mm.
» » » without tail-setæ: 0,66 mm.
second stage: length with tail-setæ: 1,3 mm.
» » » without tail-setæ: 0,83—0,85 mm.
third stage: length with tail-setæ: 1,90—1,95 mm.
» » » without tail-setæ: 1,15—1.25 mm.
fourth stage: length with tail-setæ: 2,4 mm.
» » » without tail-setæ: 1,5 mm.
fifth stage: length with tail-setæ: 2,85—3,1 mm.
» » » without tail-setæ: 1.85—2,15 mm

Explanation of the Plates.

PLATE I.

Fig. 1. Female seen from right side.
2. Female seen from above.
3. Male seen from above.
4. Anterior antenna of male.
5. Anterior antenna of female.
6. Posterior antenna.
7. Upper lip seen from inner side.
8. Left mandible seen from inner side.
9. Left mandible seen from outer side.
10. Right side-half of under lip seen from inner side.
11. Right maxilla seen from outer side.
12. Anterior foot-jaw.
13. Posterior foot-jaw.

PLATE II.

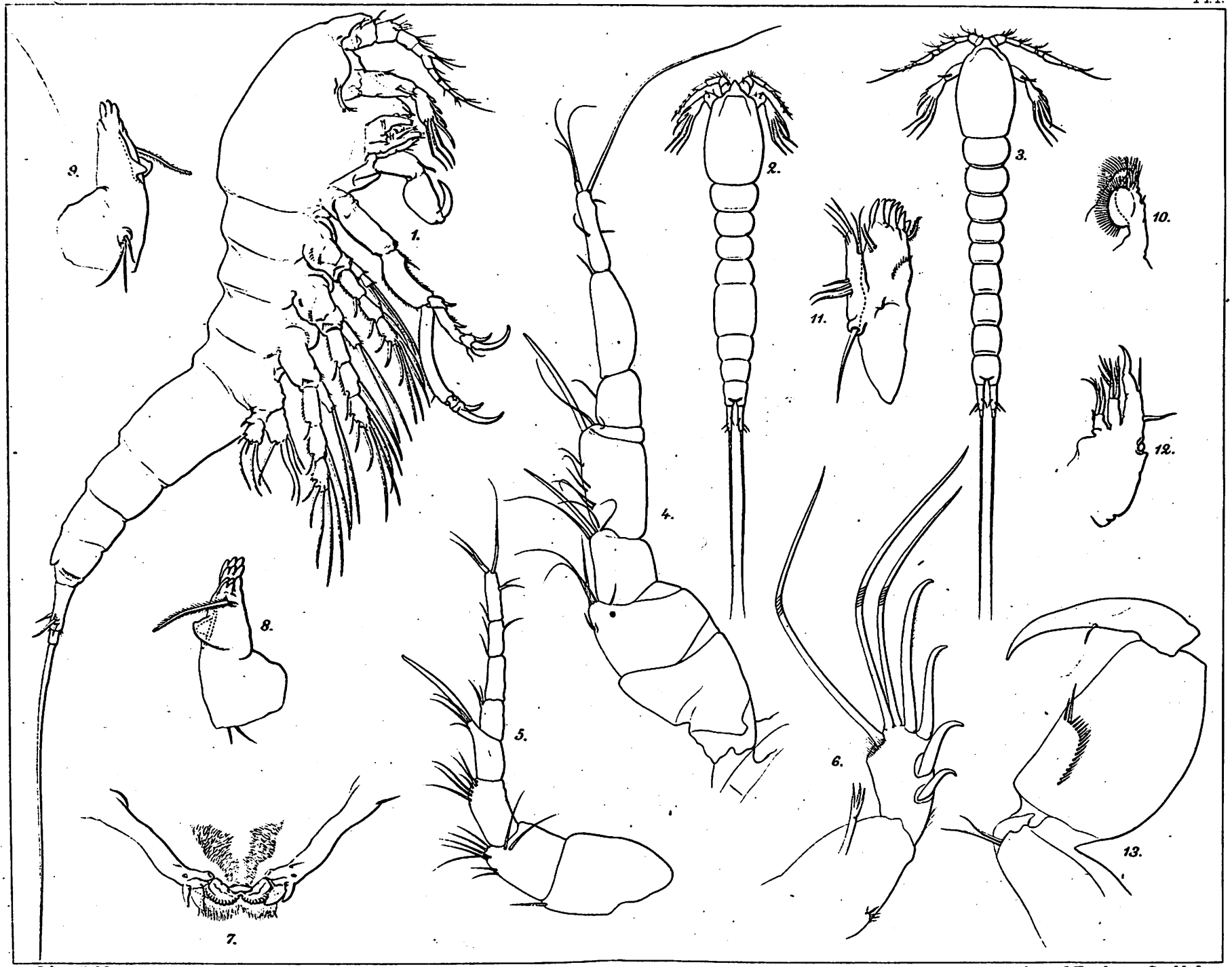
Fig. 1. Foot of second pair of male.
2. Foot of second pair of female.
3. Foot of fourth pair of male.
4. Foot of fourth pair of female.
5. Fifth pair of feet and first abdominal segment of male.
6. Foot of fifth pair of female.
7. Sexual apertures of female.

PLATE III.

Fig. 1. Nauplius in second stage seen from below.
2. Nauplius in second stage seen from above.

PLATE IV.

Fig. 1. First stage of the Cyclops seen from above.
2. Anterior antenna of same.
3. Posterior antenna of same.
4. Foot of first pair of same.
5. Foot of second pair of same.
6. Caudal segments of same.
7. Foot of second pair of second Cyclops-stage.
8. Foot of third pair of same.
9. Anterior antenna of third Cyclops-stage.
10. Foot of second pair of same.
11. Foot of third pair of same.
12. Foot of fourth pair of same.
13. Foot of second pair of fourth Cyclops-stage.
14. Foot of third pair of same.
15. Fifth thoracic segment with foot of fifth pair of same.



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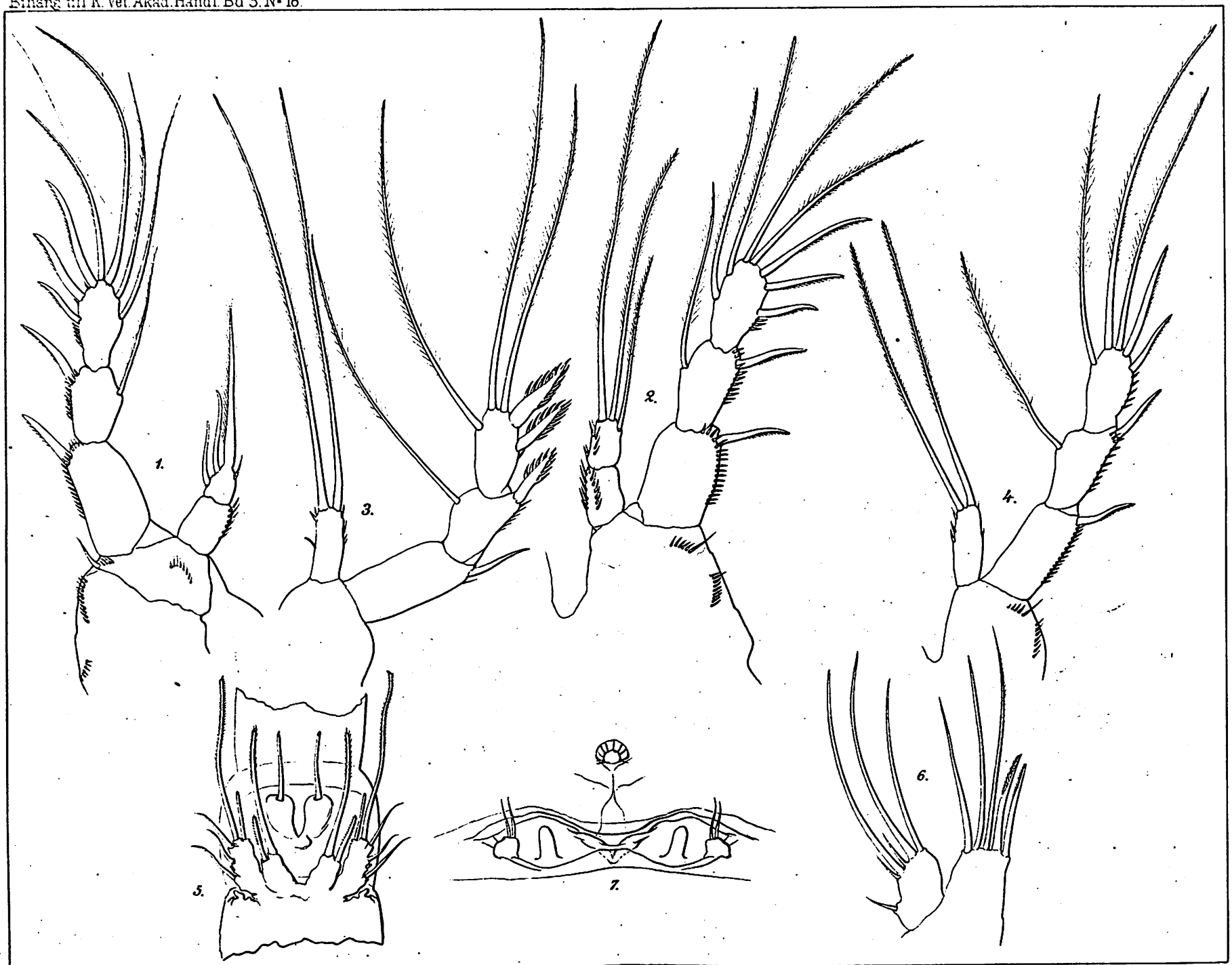

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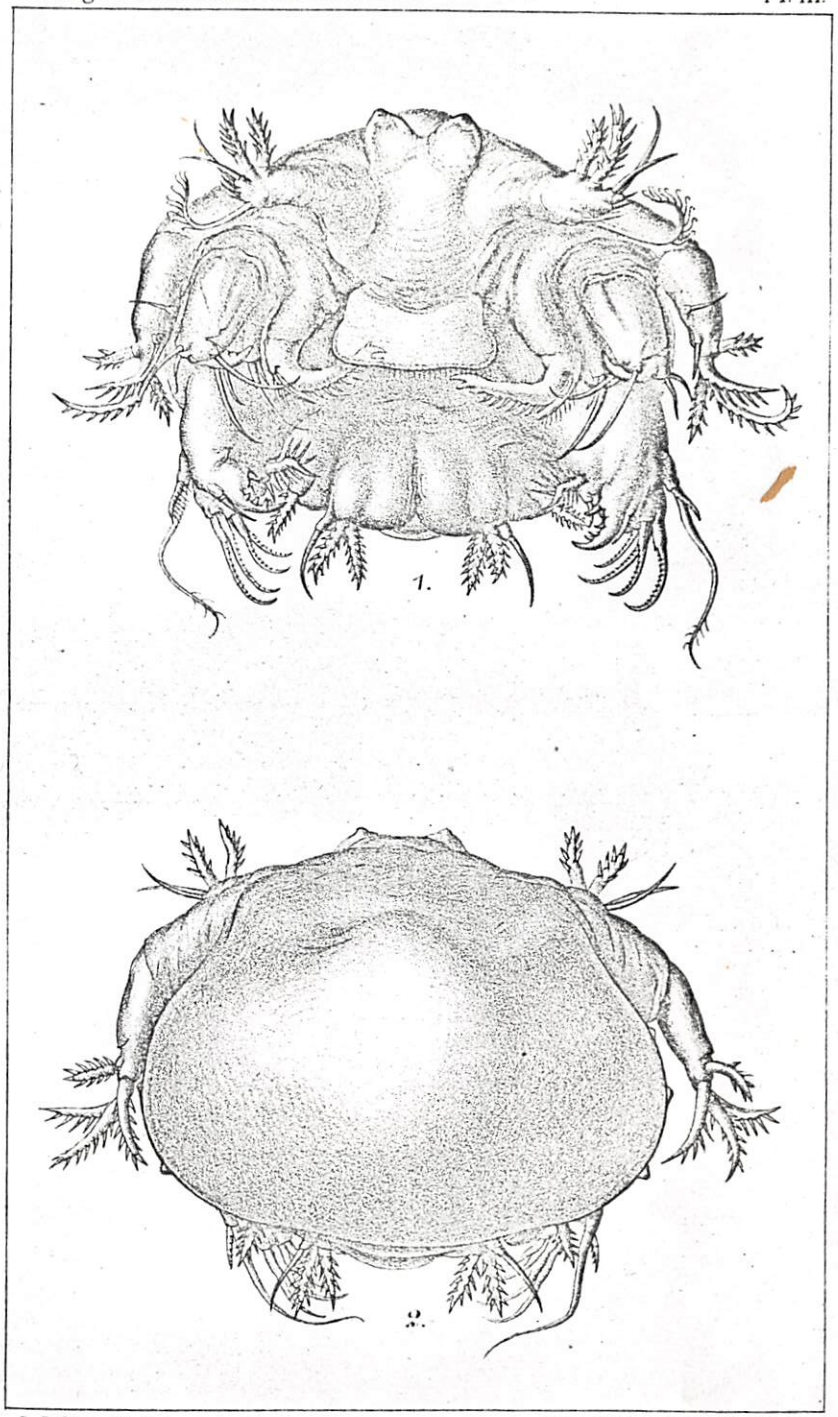

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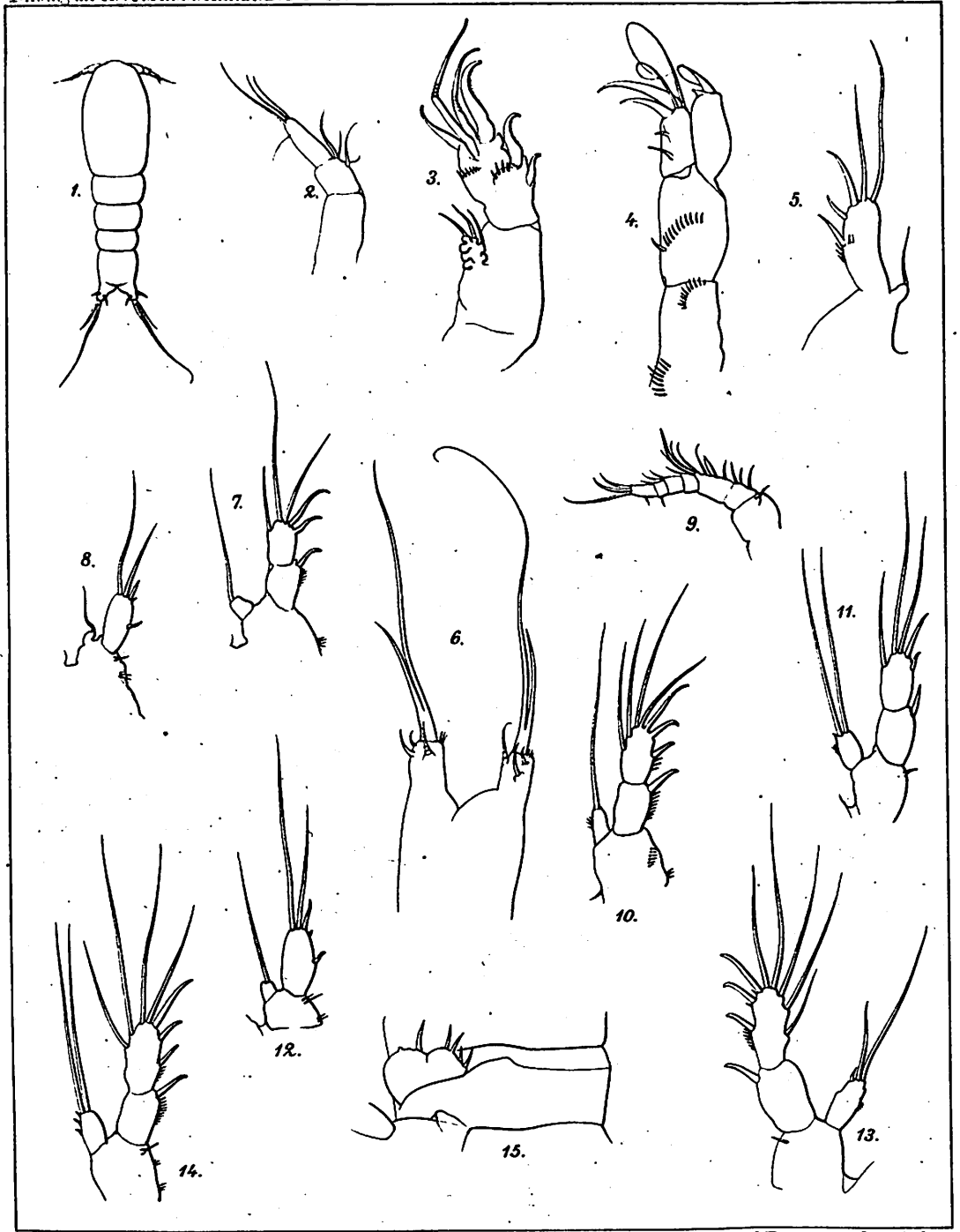

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