ЕЖЕГОДНИКЪ
ЗООЛОГИЧЕСКАГО МУЗЕЯ
ИМПЕРАТОРСКОЙ АКАДЕМІИ НАУКЪ.

1897.

№ 3.

Изданіе Императорской Академіи Наукъ.

ANNUAIRE
DU
MUSÉE ZOOLOGIQUE
DE
L'ACADÉMIE IMPÉRIALE DES SCIENCES
DE ST.-PÉTERSBOURG.

1897.

№ 3.

С.-ПЕТЕРБУРГЪ. 1897. ST.-PÉTERSBOURG.
ТИПОГРАФІЯ ИМПЕРАТОРСКОЙ АКАДЕМІИ НАУКЪ.
Вас. Остр., 9 лин., № 12.

ОГЛАВЛЕНІЕ. — SOMMAIRE.

On Some Additional Crustacea from the Caspian Sea.

By

G. O. Sars.

[Plates XIII—XVI.]

(Présenté le 30 Avril 1897.]

INTRODUCTION.

In the present paper I propose to describe and figure a number of Caspian Crustacea not mentioned in my previous papers, and belonging to 4 different orders, viz., *Schizopoda*, *Cumacea*, *Amphipoda* and *Isopoda*. They were derived partly from collections made in the North Caspian Sea by Messrs. Warpachowsky and Borodine, partly from the collection of Dr. Grimm, which, as may be known, was chiefly procured from the southern part of that basin. The species figured in the plates, are 8 in all, 5 of which are new to science, whereas the other 3 have turned out to be identical with previously recorded species, although their occurrence in the Caspian Sea may be regarded as of considerable interest. In addition to these, some few species previously described by the present author, are briefly noticed in this paper, in order to elucidate their distribution in the Caspian Sea. The accompanying plates have been prepared in the authographic manner, and will, I hope, make recognition of the species easy.

Schizopoda.

Of this group I have previously described no less than 16 Caspian species, all belonging to the family *Mysidæ*, but referable to 7 different genera. In the following pages an additional species will be described, increasing the number of species to 17, or, including the 2 as yet imperfectly described species, *Mesomysis aberrans* Czern. and *Paramysis armata*, to 19 in all. The Caspian species are all referable to the sub-family *Mysinæ*, as defined by Mr. Czerniawsky.

Metamysis strauchi, Czern.

(Pl. XIII.)

Paramysis Strauchi, Czerniawsky, Monographia Mysidarum Imperii Rossici, Fasc. 2, p. 56 (tabula synoptica).
Syn.: *Paramysis Ullskyi*, Czern. (pro parte).

Specific Characters. Body rather slender, and somewhat attenuated both in front and behind. Carapace comparatively smaller than in the type species, leaving the whole dorsal face of last pedigerous segment uncovered, frontal margin perfectly straight, interocular spine wholly exposed, very broad, triangular. Eyes short and thick, scarcely projecting beyond the sides of the carapace. Antennal scale oblong linear in form, exceeding the peduncle by only 1/4 of its length, tip obliquely truncated, with the inner corner considerably projecting, spine of the outer corner not particularly strong. Posterior maxillæ with the terminal joint of the palp very broad, spatulate, and carrying on the outer edge about 9 short, thick setæ, exognath rather large, with the marginal setæ remarkably elongated. Legs of a similar structure to those in *M. Grimmi*. Inner plate of uropoda with numerous (up to 21) spines inside, the outer most 2 somewhat removed from the others. Telson fully as long as the last segment of metasome, and gradually narrowed distally, tip about half as broad as the base, and transversely truncated, without the slightest trace of a sinus, terminal edge armed, between the coarse spines of the outer corners, with a regular, comb-like row of 16 delicate denticles. Body more or less densely mottled

with a darkish pigment, forming irregular shadows, the 5 anterior segments of metasome having also the usual dorsal pigmentary stars. Length of adult female 20 mm., of male about the same.

Remarks. It seems to be beyond doubt, that Mr. Czerniawsky, under the name of *Paramysis ullskyi*, has confounded 2 distinct species, which even belong to 2 different genera. This may easily be accounted for by the perplexing similarity of the 2 species, as regards their outward appearance. The one form, of which I have had for examination some specimens labelled by that author as above, I have described and figured in my first paper on Caspian Crustacea as *Mesomysis ullskyi*, having found that it exhibited all the characters peculiar to the genus *Mesomysis*. The other form is that here treated of and is undoubtedly referable to the genus *Metamysis*, as defined by the present author in his account of the *Mysidæ* in the collection of Dr. Grimm. Some of the figures given by Mr. Czerniawsky, and especially figs. 13, 19 and 23, on Pl. XXVI, undoubtedly refer to the present species, whereas fig. 16 on the same plate, representing the extremity of the telson, is more properly referable to *Mesomysis ullskyi*. The specific name here used is given by Mr. Czerniawsky only in the synoptic table preceding the descriptions of the species of the genus *Paramysis*, whereas, in the descriptive part itself, the species is named *Paramysis ullskyi*. I do not, however, see any objection in restricting the former name to the species here treated off. It is very nearly allied to *Metamysis grimmi* G. O. Sars from the southern part of the Caspian Sea, but differs in some particulars, thus entitling it to be regarded as specifically distinct.

Description of the female. The length of the largest specimen, measured from the front to the end of the telson, is about 20 mm., and this form is accordingly rather inferior in size to *M. grimmi*, which reaches to a length of 38 mm.

The form of the body (see Pl. XIII, fig. 1) is rather slender, exhibiting an unmistakable resemblance to that in *Mesomysis ullskyi* [1]). As in that species, the posterior division of the body is nearly twice as long as the anterior, both divisions being gradually narrowed distally. The carapace does not completely cover

1) See my paper on Caspian Mysidæ, Pl. III, fig. 1.

the anterior division, the whole of the last segment, and a part of the penultimate one being exposed dorsally. In *M. grimmi* the carapace is more fully developed, leaving only the posterior half of the last pedigerous segment uncovered. The cephalic part is well defined by the usual cervical sulcus, and is considerably narrower than the 1st segment of the metasome. The frontal edge (see fig. 2) is not at all produced in the middle, being perfectly straight, so as to leave the interocular spine quite uncovered. The latter is remarkably broad at the base, flattened, and of triangular form, terminating in a sharp point. Between the bases of the superior antennæ, as in the type species, another more slender spine is seen to originate.

The eyes (ibid.) are comparatively smaller than in *M. grimmi*, though of a similar short clavate form, and do not project laterally beyond the sides of the carapace. The corneal part is deeply emarginated above, and the pedicles are abruptly constricted at the base.

The superior antennæ exhibit the usual structure, their peduncles reaching about as far as those of the inferior antennæ. Of the flagella, the inner one is much the shorter, being scarcely more than half as long as the outer (see fig. 1).

The scale of the inferior antennæ (see fig. 3) is comparatively smaller than in *M. grimmi*, exceeding the peduncle by only $^1/_4$ of its length. It is oblong linear in form, about 3 times as long as it is broad, and not at all expanded distally. The outer edge is smooth and perfectly straight, terminating in an acute dentiform projection; the inner edge is likewise nearly straight and, as usual, fringed with strong setæ, which are continued around the considerably projecting inner corner, and extend along the oblique terminal edge as far as the dentiform projection of the outer corner.

The oral parts agree, on the whole, in their structure with those in the type species, though, on a closer comparison, some slight differences may be found to exist.

Thus the posterior maxillæ (fig. 5) are distinguished by the broad, spatulate form of the terminal joint of the palp, and this joint is, moreover, provided outside with only 8—12 comparatively short and thick setæ, whereas in *M. grimmi* their number amounts to 18—20. The exognath is rather fully developed,

and the marginal setæ are especially distinguished by their great length.

The legs (fig. 6) exhibit the robust structure characteristic of the genus, and on the whole resemble very closely those in the type species.

The inner plate of the uropoda (fig. 8) is distinguished by the great number of spines occurring inside, beneath the marginal setæ. No less than 19 such spines may be counted, whereas in *M. grimmi* only 9 occur. Of these spines, 2 are attached somewhat apart from the inner edge, on the lower face, just behind the otolith-cavity. The other spines extend along the inner edge to a short distance from the tip, the outermost 2 being somewhat longer than the rest, and set more widely apart.

The telson (fig. 9) is fully as long as the last segment of the metasome, and tapers quite gradually behind, the end being less contracted than in *M. grimmi*, and about half as broad as the base. The lateral edges are almost straight, and each armed with about 23 denticles, the hindmost of which is not far from the tip. The latter (see fig. 10), as in the type species, is transversely truncated, without the slightest trace of a median sinus. To each of the lateral corners, a rather strong spine is secured, and between these spines the terminal edge exhibits a regular, comb-like row of 16 very delicate spiniform projections.

The **adult male** is about the same size as the female, but is easily recognizable by the usual sexual characters.

The peduncles of the superior antennæ (see fig. 2) appear somewhat more strongly built than in the female, and each carry at the end, below the base of the inner flagellum, the usual hairy appendage, which is conical in form, and almost as long as the peduncle itself.

The penultimate pair of pleopoda (fig. 7) are very much elongated, reaching even somewhat beyond the caudal fan. Their structure agrees very closely with that found in the type species.

In both sexes, the body is more or less mottled with a darkish pigment, forming irregular shadows both on the anterior and posterior divisions. These shadows are more sharply defined on the carapace, appearing there as obliquely transverse bands. In the middle of the dorsal face of the 5 anterior segments of the metasome, moreover, the usual pigmentary stars may be easily distinguished, but their ramifications are only very

slight. The antennæ, ocular pedicles, and caudal appendages exhibit likewise a more or less distinct pigmentary ornamentation, and partly also the marsupial pouch and the legs.

Occurrence. Of this form, some specimens were collected in 1895 by Mr. Borodine in the eastern part of the North Caspian Sea at Stat. 2. Of the localities recorded by Mr. Czerniawsky for his *Paramysis ullskyi*, I believe that the 2 („northern part of the Caspian Sea" and „Kasp. Sea at Baku or Petrowsk") may more properly be referable to the present species.

Cumacea.

In my 2nd paper on Caspian Crustacea, I have recorded no less than 10 different species of this order, all belonging to a single genus, *Pseudocuma* G. O. Sars. Three additional species of the same genus will now be described, increasing the number of Caspian Cumacea as yet known, to 13 species in all. It is a highly remarkable fact, that this genus, so scantily represented in the Oceans, exhibits in the Caspian Sea such an abundance of species. This can only be accounted for by one of the 2 following hypotheses. According to the one hypothesis, it may be supposed, that the genus in earlier times has been rich in species also in the Oceans, but that, from some unknown causes, there has occurred a degeneration, so as to leave at present only a few species, whereas in the Caspian Sea the original richness in species has been preserved. According to the other hypothesis, which I regard as the more probable, there has been going on in the Caspian Sea, after its isolation from the Oceans, a true diverging evolution of species from a few, or perhaps even a single primitive marine form, which may have immigrated from the Black Sea or the Mediterranean. The great diversity, as regards outward appearance, observed in the Caspian species, is highly remarkable. It would indeed seem, that several distinct marine types of Cumacea are imitated in a most perplexing manner. This has already been pointed out in my previous paper, and it is still more obvious, as regards the 3 new species described below, which indeed in their outward appearance look so very different, that at first sight it is hardly possible to assume that they

belong to one and the same genus, the one exhibiting a habitus which reminds of certain species of the genus *Diastylis*, or perhaps still more that of *Leucon*, the 2nd recalling the species of the genus *Eudorellopsis*, and the 3rd exhibiting an unmistakable resemblance to the species of the very different genus *Campylaspis*. In the structure of the several appendages, however, all 3 species seem to agree very closely, exhibiting all the leading characters peculiar to the genus *Pseudocuma*.

Pseudocuma diastyloides, G. O. Sars, n. sp.

(Pl. XIV, figs 1—8.)

Specific Characters. ♀. Body rather slender and compressed, with the anterior division well marked off from the posterior, and, seen laterally, of oblong oval form. Carapace not very large, though somewhat exceeding in length the exposed part of the trunk, each of the branchial regions having above a serrated longitudinal crest abruptly bent down in front, gastric area with 2 juxtaposed, likewise serrated crests dorsally, ocular lobe well defined, semicircular; pseudo-rostral projection very prominent, horizontal, conically pointed, antero-lateral corners rectangular, serrated on the edges. Exposed part of trunk smooth above. Metasome, not including the uropoda, about the length of the anterior division, narrow, cylindric. Eye inconspicuous. Superior antennæ slender, attenuated, with the middle joint of the peduncle the longest, flagellum shorter than the last peduncular joint. Legs of the usual structure. Uropoda exceeding in length the last 2 segments of metasome combined, basal part slender, cylindric, with 4 spinules along the distal half of the inner edge; rami somewhat shorter than the basal part, and subequal in length, the inner one with 10 denticles inside, and terminating in a somewhat stronger spine; outer ramus finely ciliated inside, and carrying 3 unequal apical setæ. Telson quadrangular, with the lateral corners slightly produced. Length of adult female 10 mm.

Remarks. The present form may be easily distinguished from any of the other Caspian species by the shape and armature of the carapace, and the conically pointed pseudo-rostral projection. In external appearance, as above stated, it somewhat

recalls certain species of the genus *Diastylis*, especially the well-known form, *D. rathkei* Kröyer, though in the greatly compressed body, it perhaps shows a still closer resemblance to the species of the genus *Leucon*. The structure of the several appendages, however, stamps it as a true member of the genus *Pseudocuma*. Only female specimens have hitherto come under my notice.

Description. The length of the largest specimens, measured from the tip of the pseudo-rostral projection to the end of the telson, is about 10 mm., and this form, accordingly, grows to a rather large size, as compared with the dwarf marine species, and is only surpassed by one of the Caspian species, viz., *P. sowinskyi*.

The form of the body (see Pl. XIV, figs 1 & 2) is very slender and compressed, though the anterior division, at least in ovigerous specimens, appears, slightly tumefied, and very sharply marked off from the posterior. Seen laterally (fig. 2), the former division exhibits an oblong oval form, with the dorsal face but slightly vaulted. Seen dorsally (fig. 1), it appears much narrower and evenly tapering both in front and behind. The carapace is not very large, though a little longer than the exposed part of the trunk. The branchial regions are but little swollen, and each exhibit dorsally a coarsely serrated crest, abruptly bent down in front, so as to cause a well-marked notch at about the middle of the upper contour of the carapace (see fig. 2). The gastric area is somewhat flattened, and laterally defined by the usual curved fissure. It exhibits 2 longitudinal, juxtaposed keels, likewise distinctly serrated, and terminates in a well-defined, semicircular ocular lobe (see fig. 1). In front of the latter the pseudo-rostral projection extends horizontally as a rather large, conical prominence, composed, as usual of 2 converging lappets of the carapace. These lappets are in the present species contiguous along the whole dorsal face, though a well marked narrow fissure may be seen between them. At the tip, each of the lappets exhibits below, a number of small serrations, and at the base they are defined from the antero-lateral corners of the carapace by a well-marked, angular sinus. These corners are somewhat projecting and almost rectangular, and have the edge coarsely serrated.

The 5 exposed segments of the trunk do not form any true dorsal projections, though they are very sharply marked off

from each other, and the last 3 separated dorsally by distinctly impressed, thin-skinned interspaces. The 1st segment is, as usual, very narrow, whereas the 3 succeeding ones expand laterally to rather broad epimeral plates. The last segment is comparatively small, and has the lateral corners slightly produced.

The posterior division of the body is about the length of the anterior, and very slender, cylindric, with the segments well defined, and exhibiting the usual longitudinal relation.

The eye is inconspicuous, no trace of any pigment or corneal lenses being observable within the ocular lobe.

The superior antennæ (fig. 3) are slender and attenuated, with the 1st joint of the peduncle considerably thicker than the others and slightly curved. It exhibits a few small bristles on each edge, and is armed at the end above with 2 denticles. The 2nd joint is longer and much narrower than the 1st, and has only a single bristle at about the middle of the lower edge. The 3rd joint is still narrower, linear, but somewhat shorter than the 2nd. The flagellum scarcely exceeds half the length of the last peduncular joint, and is composed of 3 articulations, the outer 2 of which are extremely small. It carries at the tip the 2 usual band-like sensory filaments.

The inferior antennæ are extremely small and rudimentary, exhibiting the very same structure as in the females of the other species.

This is also the case with the several oral parts, of which I therefore do not consider it necessary to give here any detailed descriptions or figures.

The 1st pair of legs (fig. 4) are rather slender, and gradually narrowed distally, with the basal joint fully as long as the remaining part of the leg, and strongly curved at the base. It carries several short ciliated bristles both along the lower and upper edge, and has, outside the proximal part, an elevated ridge, along the upper side of which the exopodite is bent in, when at rest. Of the 5 outer joints, composing the terminal part of the leg, the first 2 are rather short and connected by a very oblique articulation. The 3rd joint is about twice as long as these joints combined, and the outer 2 joints successively decrease both in length and breadth, the last being extremely narrow, linear, and tipped with 3 slender bristles. The exopodite does not attain the length of the basal joint, and has the

terminal part composed of 5 articulations, the 1st of which is longer than the others combined.

The 2nd pair of legs (fig. 5) are much shorter than the 1st, and are extended more laterally. The basal joint is shorter than the remaining part of the leg, and is but slightly curved, carrying along the lower edge several ciliated setæ. The 2nd joint is very short, the 3rd somewhat longer, and the 4th about as long as these joints combined, and of linear form, carrying outside, 5 ciliated setæ, inside, a single such seta, and at the tip a strong spine. The 5th joint is rather small, somewhat widening distally, and armed at the tip inside with 3 spines. The 6th or last joint is twice as long as the 5th and somewhat narrowed distally. It carries several spiniform setæ, 3 of which issue from the tip and are rather elongated. The exopodite is well developed, and of a structure similar to that of the 1st pair.

The 2 succeeding pairs of legs (fig. 6) are of the same structure and nearly equal in size, both pairs exhibiting, as in the other species of this genus, outside the basal joint, a very small and rudimentary, biarticulate exopodite. The 2 outer joints are so very small as easily to be overlooked, forming together a biarticulate apical spine. The antipenultimate joint is somewhat flattened, and provided along one of its edges with a dense row of strong, unciliated setæ terminating in a very thin curved point; and on the preceding, considerably larger joint several similar setæ are also secured. From the tips of the 1st and the very short 2nd joints, moreover, a dense fascicle of partly ciliated setæ is seen to originate.

The last pair of legs (fig. 7) resemble in structure the 2 preceding pairs, except that the basal joint is considerably shorter and without a trace of an exopodite.

The uropoda (see fig. 9) are rather elongated, exceeding somewhat in length the last 2 segments of the metasome combined. The basal part is narrow linear in form, and exhibits along the distal half of the inner edge 4 denticles. The rami are subequal in length, and somewhat shorter than the basal part. The inner ramus is uniarticulate and slightly narrowed distally, carrying along the inner edge 9 small denticles, and at the tip 2 somewhat stronger denticles, the outer of which is the stronger. The outer ramus is composed of 2 well-defined joints, the 1st of which, however, is rather short, whereas the 2nd is

long and narrow, finely ciliated inside, and carrying on the tip 3 unequal bristles.

The telson (ibid.) is well defined from the last caudal segment, but, as in the other species of this genus, very small, and without any distinct armature. It is quadrangular in form, with the lateral corners distinctly projecting.

Occurrence. Some specimens of this very distinct species are contained in the collection of Dr. Grimm, having been taken in 3 different Stations of the South Caspian Sea, the depth ranging from 28 to 90 fathoms. A single specimen was, moreover, found in one of the samples containing pelagic Entomostraca, but it is most probable that this specimen was also derived from the bottom.

Pseudocuma abbreviata, G. O. Sars, n. sp.

(Pl. XIV, figs. 9—12.)

Specific Characters. ♀. Body unusually short and compact, with the anterior division well marked off from the posterior, and, seen laterally, of a pronouncedly clavate form. Carapace large and deep, considerably exceeding in length the exposed part of the trunk, and, like the latter, having the surface quite smooth, branchial regions only slightly defined, gastric area plain, pseudo-rostral projection comparatively short and obtusely rounded, its lateral parts only meeting just in front of the ocular lobe, being otherwise wide apart, so as to exhibit a deep emargination in front, antero-lateral corners defined from the pseudo-rostral projection by a slight sinus, and obtusely rounded, with a few small marginal denticles. Posterior division of body, not including the uropoda, scarcely attaining the length of the anterior, narrow cylindric, and perfectly smooth. Eye distinct, exhibiting 3 corneal lenses placed in a transversal row. Superior antennæ with the middle joint of the peduncle considerably expanded, and carrying above a dense row of upturned setæ. Uropoda comparatively short, with the rami longer than the basal part, the inner one conically tapered, and very finely denticulated inside, tip carrying a single elongated spine, outer ramus narrower than the inner, but of about the same length. Telson semicircular in form. Length only 3 mm.

Remarks. This form is allied to the species described by the present author in his paper on Caspian Cumacea, as *P. scabriuscula*, but is at once distinguished by the complete absence of the numerous small spikes clothing the whole surface in that species. The form of the carapace is also somewhat different, and the whole anterior division less tumefied and more club-shaped.

Description. The length of the solitary specimen examined, which is of the female sex, with the incubatory pouch in process of formation, is only 3 mm., and this form is accordingly of very small size as compared with most other Caspian species.

The form of the body (see Pl. XIV, figs. 9 & 10) is very short and robust, exhibiting an unmistakable resemblance to that in the arctic form, *Eudorellopsis deformis* Krøyer. As in that Cumacean, the anterior division of the body, when seen laterally (fig. 10), appears somewhat clavate in form, gradually widening in front, with the dorsal face but slightly vaulted. Seen dorsally (fig. 9), it exhibits a narrow oblong form, with the greatest width considerably less than the height, and the posterior extremity more narrowed than the anterior. The whole surface of the body is perfectly smooth, without any trace of spikes or hairs. The carapace is comparatively large and deep, considerably exceeding in length the exposed part of the trunk, and exhibits, in a lateral view of the animal (fig. 10), a somewhat quadrangular form, with the dorsal contour nearly straight and horizontal, and the lower edges slightly arched in the middle. The branchial regions are not very sharply defined, and the gastric area appears quite plain, without any longitudinal keels. At the end of the latter, the ocular lobe is seen as a rather short and broad, semi-elliptical expansion. The pseudo-rostral projection is but little prominent and is bluntly rounded at the tip. In a dorsal view of the animal (fig. 9), the 2 lappets composing this projection are found to be widely apart in front, only meeting for a very short distance just in front of the ocular lobe, and on this account the projection appears divided by a deep emargination, as is also the case with some others of the Caspian species. Below the projection, the anterior edges of the carapace form a shallow sinus defining it from the antero-lateral corners, which are rounded off and fringed with a few small denticles (see fig. 11). The exposed segments of the trunk are closely crowded together, and do not

differ much in length, whereas they rapidly decrease in height and also somewhat in width, the last one being rather small, with the lateral corners rounded off.

The posterior division of the body is rather poorly developed, not attaining the length of the anterior, and is very narrow, cylindric in form, with the penultimate segment, as usual, the largest.

The eye is distinctly developed, 3 corneal lenses, arranged in a transversal row, being easily observable within the ocular lobe (see fig. 9).

The superior antennæ (see fig. 11), as in the genera *Eudorella* and *Eudorellopsis*, are curved upwards, exhibiting an elbow-like bend between the 2 first joints of the peduncle. The 2nd joint is distinctly expanded distally, with a dense row of strong upturned setæ along the outer part of the upper edge. The flagellum is about the length of the last peduncular joint, and of the usual structure.

The inferior antennæ and oral parts could of course not be examined more closely in the solitary specimen before us.

As to the legs, they do not seem to exhibit any essential difference in their structure from those in the other species of the genus.

The uropoda (see fig. 12) are comparatively short, scarcely exceeding in length the last 2 segments of the metasome combined. The basal part is short and thick, slightly widening distally, and exhibits a number of very small spinules inside, near the end. The rami considerably exceed in length the basal part, and are of about equal length. The inner ramus is conically tapered, and very minutely spinulose inside, carrying on the tip a single rather elongated spine. The outer ramus is much narrower than the inner, and is also tipped by a single spiniform seta.

The telson (ibid.) is semicircular in outline, its outer part being evenly rounded, without any projecting lateral corners.

Occurrence. The solitary specimen described above was found among other Crustacea taken by Mr. Warpachowsky in the North Caspian Sea, at St. 63.

Pseudocuma campylaspoides, G. O. Sars, n. sp.

(Pl. XV, figs. 1—3.)

Specific Characters. ♀. Body short and robust, with thickly incrusted integuments. Anterior division sharply marked off from the posterior, and rather tumid, with the dorsal face boldly vaulted. Carapace very large and deep, being fully twice as long as the exposed part of the trunk, and considerably broader, seen laterally, rounded oval, with the upper contour obliquely declining, lower one strongly curved in the middle, seen dorsally, abruptly constricted in front of the greatly swollen branchial regions, ocular lobe very small, pseudo-rostral projection short and blunted at the tip. Exposed part of trunk almost perpendicularly deflexed, with the 1st segment extremely short, band-shaped. Posterior division of body, not including the uropoda, scarcely as long as the anterior, and pronouncedly depressed, all the segments being expanded laterally. Eye inconspicuous. Antennæ and legs apparently of the usual structure. Uropoda short and stout, not attaining the length of the last 2 segments of metasome combined, basal part but little longer than it is broad, and carrying inside a few spiniform bristles; inner ramus nearly twice as long as the basal part and slightly tapering distally, being armed inside with a few scattered denticles, and at the tip with 2 unequal spines; outer ramus considerably shorter than the inner, conically tapering and provided with 3 apical setæ of unequal length. Telson semi-oval in outline, with the tip narrowly rounded. Length 3 mm.

Remarks. This is a very distinct species, considerably differing in its outward appearance from the other known *Pseudocumæ*, and in this respect exhibiting a perplexing resemblance to the species of a widely different genus, viz., *Campylaspis* G. O. Sars; hence the specific name here proposed. Though an exact anatomical examination could not be instituted, owing to the scantiness of the material at my disposal, I cannot doubt that, like all the other Caspian *Cumacea*, it is referable to the genus *Pseudocuma*.

Description. The solitary adult specimen examined, which is of the female sex, measures only 3 mm. in length, and is accordingly about the same size as *P. abbreviata*.

The form of the body (see Pl. XV, figs. 1 & 2) is very short and stout, and the integuments remarkably hard and incrusted. The 2 chief divisions of the body are sharply marked off from each other, and are of about the same length, the anterior one being rather tumid and boldly arched above, with the greatest curvature behind the middle. The carapace is of considerable size, fully twice as long as the exposed part of the trunk, and in the lateral view of the animal (fig. 2), exhibits an irregular oval form, with the upper contour obliquely declining, the lower strongly curved in the middle. Seen dorsally (fig. 1), it appears very broad in its posterior part, owing to the greatly swollen branchial regions; but immediately in front of them, it is abruptly contracted, exhibiting on each side a somewhat concave area. The gastric region is comparatively small, and at the end of it, there is an extremely minute ocular lobe. The pseudorostral projection is quite short and, seen laterally (fig. 2), blunted at the tip, with the upper corner well marked, the lower evenly rounded. The 2 lappets composing it, are in close contact above, so as not to exhibit any emargination between them. The antero-lateral corners of the carapace scarcely project at all, and are obtusely rounded off. The surface of the carapace is quite smooth, without any keels or denticles, and exhibits a roughly granular structure.

The exposed part of the trunk is composed of the usual number of segments; but of these the 1st is so very short, as easily to be overlooked, appearing merely as an extremely narrow, band-like stripe encircling the posterior margin of the carapace. The dorsal face of this part is evenly vaulted, and declines very steeply to the base of the tail. The epimeral parts of the segments are but slightly expanded and evenly rounded.

As is generally the case in the species of the genus *Campylaspis*, the posterior division of the body exhibits a pronouncedly depressed form, all the segments being expanded laterally, so as to form along each side of the tail a distinct shelf-like keel. Seen dorsally (fig. 1) this division therefore appears much broader than in a lateral view (fig. 2). The difference in size between the segments is very slight.

Of ocular pigment or corneal lenses, I have failed to detect any trace.

The superior antennæ are seen projecting immediately beneath the pseudo-rostral prominence, extending laterally. Their structure would seem to be that characteristic of the genus. The oral parts could of course not be examined in the solitary specimen before us, and the legs too, lie so densely crowded together beneath the trunk, as only with great difficulty to admit of being examined in detail. As far as I could see, however, they do not exhibit any peculiarity in their structure.

The uropoda (see fig. 3) are very short and stout, scarcely attaining the length of the last 2 segments of the metasome combined. The basal part is but little longer than it is broad, and slightly widens distally, having inside a few slender bristles. The inner ramus, as in the other species of the genus, is uniarticulate and somewhat tapering distally. It is almost twice as long as the basal part, and has the outer edge perfectly smooth, whereas the inner edge is armed with a few, irregularly disposed denticles. From the tip of the ramus 2 rather strong spines of somewhat unequal length issue, the outer one being the larger. The outer ramus is considerably shorter than the inner, and also narrower. It consists, as usual, of 2 well-defined joints, the 1st being quite short, the 2nd conically tapered, and carrying at the end 3 unequal setæ, the innermost of which is at some distance from the tip.

The telson (ibid.) is well defined, and of a semi-oval form, with the tip narowly rounded and perfectly smooth.

Occurrence. The above described specimen was found in one of the samples of pelagic Entomostraca belonging to the collection of Dr. Grimm and taken at Stat. 108. As the tow-net was stated to have been immerged to a depth 40 fathoms, it is highly probable, that the specimen was derived from the bottom. A very small young one of apparently the same species was also found in the sample taken by Mr. Andrussow in the bay of Karabugas.

All the previously recorded Caspian Cumacea having been described from specimens collected by M. Warpachowsky in the North Caspian Sea, I think it advisable to give below a list of the species which have proved to occur also in the middle and southern part of that basin.

1. **Pseudocuma pectinata,** Sowinsky. A few immature specimens of this form, occurring so abundantly in the North Caspian

Sea, were found in the sample taken by Mr. Andrussow in the Bay of Karabugas. This species was not in Dr. Grimm's collection.

2. **Pseudocuma rostrata** G. O. Sars. Of this species a quite young specimen is found in the collection of Dr. Grimm, taken in the southern part of the Caspian Sea from a depth of 15 fathoms.

3. **Pseudocuma cercaroides** G. O. Sars. Numerous specimens of this form, males and females, occurred in the sample taken by Mr. Andrussow in the Bay of Karabugas. Three specimens of the same species are moreover in the collection of Dr. Grimm, having been taken in the Bay of Baku from a depth of 3 fathoms.

4. **Pseudocuma gracilis** G. O. Sars. Some few specimens of this form were found in the sample taken by Mr. Andrussow in the Bay of Karabugas.

5. **Pseudocuma tenuicauda** G. O. Sars. Found together with the preceding species in the sample from the Bay of Karabugas.

6. **Pseudocuma eudorelloides** G. O. Sars. Two or 3 specimens of this form are in the collection of Dr. Grimm, having been taken in the southern part of the Caspian Sea from a depth of 15—28 fathoms. Two specimens were also found in one of the samples in the same collection, containing pelagic Entomostraca, and taken at Stat. 108.

7. **Pseudocuma diastyloides** G. O. Sars. See above.

8. **Pseudocuma campylaspoides** G. O. Sars. See above.

Amphipoda.

Fam.: *GAMMARIDÆ.*

Gen. **Niphargoides**, G. O. Sars.

Of this genus no less than 6 species have been described in my previous papers on Caspian Crustacea. A new species is now added, increasing the number of the as yet known species to 7 in all.

Niphargoides borodini, G. O. Sars, n. sp.

(Pl. XV, figs. 4—9.)

Specific Characters. ♀. Body resembling in form that in the type species, *N. caspius*, though somewhat more compressed. Cephalon comparatively small, with the lateral corners somewhat produced, and narrowly rounded at the tip. Anterior pairs of coxal plates nearly twice as deep as the corresponding segments, and densely setous at the distal edge; 1st pair not expanded distally; 4th pair of moderate size, deeper than they are broad. The 2 posterior pairs of epimeral plates of metasome densely setous at the lower edge, last pair nearly rectangular, and without any setæ outside the lateral corners. Urosome quite smooth above. Eyes of moderate size, oval reniform. Superior antennæ about twice the length of the cephalon, 1st joint of the peduncle very large, fully twice as long as the other 2 combined, flagellum not attaining half the length of the peduncle, and composed of 8 articulations, accessory appendage somewhat smaller, and 6-articulate. Inferior antennæ scarcely longer than the superior, and of the usual structure; flagellum about the length of the last peduncular joint, and 9-articulate. Gnathopoda somewhat resembling in structure those in *N. quadrimanus*, but having the propodos, especially of the 2nd pair, comparatively broader. Pereiopoda of the usual structure, basal joint of last pair very large and expanded. Last pair of uropoda projecting considerably beyond the others, and having the terminal joint of the outer ramus well defined. Telson cleft to the base, each half with 3 apical spines. Length of adult female 13 mm.

Remarks. This new species, which I have much pleasure in dedicating to its discoverer, the Russian zoologist Mr. Borodin, somewhat resembles, in outward appearance and size, the type species, *N. caspius* Grimm, though on a closer examination it is found to differ in several particulars, thus somewhat resembling another species, viz., *N. quadrimanus* G. O. Sars. It is, however, without doubt specifically distinct from either of them.

Description. The solitary specimen procured is of the female sex, and has the incubatory pouch filled with a great number of comparatively small eggs. It has a length of about 13 mm., and is accordingly fully as large as adult specimens of *N. caspius*.

In general form, the body (see Pl. XV, fig. 4) exhibits a great resemblance to that in the last-named species, being somewhat elongated, with the back perfectly smooth throughout and broadly rounded. Seen dorsally, however, it appears somewhat less tumid, and in this respect more resembles *N. quadrimanus*.

The cephalon is comparatively small, and but very slightly vaulted above. It projects between the bases of the superior antennæ to a short rostral prominence, and has the lateral corners considerably produced and narrowly rounded at the tip. Behind them, the inferior edges of the head form on each side a broad emargination encircling the greatly swollen basal joint of the inferior antennæ, and project below the emargination in an angular corner.

The anterior pairs of coxal plates are comparatively larger than in the type species, being nearly twice as deep as the corresponding segments, and are also less discontinuous. They successively increase in size posteriorly, the 1st pair being, like the 2 succeeding ones, oblong quadrangular in form and not at all expanded distally. The 4th pair are considerably larger than the preceding ones, though not as broad as in several of the other species, and they exhibit the usual irregularly angular shape. On all the plates the distal edge is clothed with bristles, but these bristles are not nearly so densely crowded and elongated as in the type species. The 3 posterior pairs of coxal plates, as in the other species of the genus, are very small.

The epimeral plates of the metasome are of moderate size, the 2 posterior pairs being somewhat deeper than the 1st, and are densely setiferous along the lower edge. The last pair are nearly rectangular, and do not exhibit any trace of the oblique row of bristles found outside the lateral corners in the type species, as also in some of the other species.

The urosome is perfectly smooth above, without any trace of spines or hairs. Its 1st segment is rather large, and exhibits on each side, below the base of the corresponding uropod, a fascicle of slender hairs.

The eyes are well developed, though not particularly large, and of oval reniform shape, with dark pigment.

The superior antennæ (fig. 5) are about twice as long as the cephalon, and have the 1st joint of the peduncle exceedingly large, fully twice as long as the other 2 combined, and slightly

narrowed distally. It is strongly muscular, and is clothed in the outer part of the lower edge with delicate, hair-like bristles. The last peduncular joint is very small, scarcely longer than it is broad, and has below, like the 2nd, a dense fascicle of hair-like bristles. The flagellum does not attain half the length of the peduncle, and is composed of 8 articulations of nearly equal size. The accessory appendage is somewhat shorter than the flagellum, and 6-articulate.

The inferior antennæ (fig. 6) are of about the same length as the superior, and, as usual, are curved downwards and somewhat laterally. The basal joint is greatly swollen and globular in form, partly covering the short 2nd joint, which projects below into the usual olfactory spine. The 2 succeeding joints are each expanded below to a rounded lobe densely clothed with hair-like bristles. The last peduncular joint is of about the same length as the penultimate, but much narrower, linear in form, and provided posteriorly with several transverse rows of short stiff bristles. The flagellum scarcely exceeds this joint in length, and is composed of 9 short articulations.

The gnathopoda (figs. 7, 8) are rather strongly built, and somewhat unequal, the posterior ones being the larger. In both pairs the propodos is large and expanded, of a somewhat quadrangular form, with the palm slightly oblique, and defined below by a projecting corner carrying 3 or 4 strong spines; but in the posterior pair it is considerably broader than in the anterior, its width nearly equalling the length.

The pereiopoda resemble, on the whole, in their structure those in *N. quadrimanus*. As in that species, the basal joint of the last pair is very large and lamellarly expanded, the expansion being edged behind with a dense row of bristles.

The 2 anterior pairs of uropoda exhibit the usual structure. The last pair (see fig. 9) are, however, considerably more elongated than in the type species, projecting far beyond the others. They otherwise exhibit the structure characteristic of the genus, the inner ramus being very small and scale-like, with 3 short apical spines, whereas the outer ramus is well developed and densely fringed with setæ. The proximal joint of this ramus has, moreover, a number of coarse spines secured to 2 distinct ledges on the outer edge. The distal joint is less rudimentary than in most of the other species, and is fringed all round with setæ.

The telson (ibid.), as in the other species, is cleft to the base, the cleft being rather narrow. Each half is oblong oval in form, and carries 3 juxtaposed spines on the blunted tip.

Occurrence. The above-described specimen was taken by Mr. Borodin in the eastern part of the North Caspian Sea, at Stat. 15.

Isopoda.

Unlike what is the case with the *Amphipoda*, the present order is but very scantily represented in the Caspian Sea, only 4 species, belonging to as many separate families, having as yet been found. Of these, only one has been recorded by earlier authors as belonging to the Caspian fauna, viz., *Chiridothea entomon* Lin.

Fam.: *IDOTHEIDÆ.*

Gen. **Chiridothea,** Harger.

By most recent authors, the 2 well-known arctic species *Idothea entomon* and *sabini* have been referred to the genus *Glyptonotus* of Eights, established to include a large Idotheid from the Antarctic Ocean. In this view, however, I cannot agree. For, according to the more detailed description given by Dr. Georg Pfeffer[2]) of the type species, *Glyptonotus antarcticus* Eights, there are so many essential differences between this form and the arctic species, that, in my opinion, it is quite inadmissible to combine them in one and the same genus. On the other hand, the characters given by Harger for his genus *Chiridothea*, established to include 2 North American forms, are fairly well applicable to the arctic species, and this genus accordingly ought to replace that of *Glyptonotus*, as regards the northern species. In the above restriction, the genus comprises at present 6 species, viz., *C. coeca* Say, *C. tuftsii* Stimpson, *C. sabini* Kröyer, *C. megalura* G. O. Sars, *C. entomon* Linné and *C. sibirica* Birula,

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2) Die Krebse von Süd-Georgien I. (Jahrbuch der wissenschaftlichen Anstalten zu Hamburg, IV).

the last-named species having recently been established to include the form recorded by Dr. Stuxberg under the name of *Idothea entomon* from the glacial sea of Siberia. As to the Caspian form, it ought certainly to be referred to *C. entomon* Linné, though exhibiting some few differences from the typical form, which entitle it to be regarded as a distinct variety.

Chiridothea entomon Linné,

(forma caspia).

(Pl. XVI, fig. 1.)

Oniscus entomon, Linné, Syst. nat. ed. 12. II, p. 1060.
Syn.: *Squilla entomon,* de Geer.
„ *Idothea entomon,* Bosc.
„ *Glyptonotus entomon,* Miers.

This species being well known, and having been subjected to a close examination by several authors, I do not consider it necessary to give an exhaustive description of it, but will only point out the differences which the Caspian form exhibits, as compared with that occurring in the Baltic and in the Arctic Ocean, referring to the exactly-drawn figure given on Pl. XVI.

The length of the largest male specimens does not seem to exceed 42 mm., and the present variety is accordingly rather inferior in size to the typical form, of which I have had for examination specimens of fully 60 mm. length. Dr. Hansen even records that the largest specimens from the Kara Sea attain a length of 100 mm., but this statement, I believe, might be accounted for by that zoologist having confounded it with the nearly-allied species, *C. sibirica* Birula, which indeed grows to that enormous size, a fact that I have recently been enabled to confirm by the examination of a splendid specimen of the species kindly presented to our Museum by the Imperial Academy of St. Petersburg.

As compared with the typical form occurring in the Baltic and in the Arctic Ocean, the form of the body in the Caspian variety (see Pl. XVI, fig. 1) appears considerably narrower, thereby somewhat resembling the shape characteristic of *C. sabini.* Thus, the greatest width of the anterior division, including the coxal plates, scarcely exceeds $^2/_3$ of the length, whereas in the typical form it generally equals the length of the whole trunk

or mesosome. The posterior division of the body, or metasome, somewhat exceeds the median length of the mesosome, and this is also the case both in the Baltic and arctic forms of the present species, whereas in *C. sibirica* Birula it only attains the length of the 5 posterior segments of the mesosome combined.

The cephalon exhibits the shape characteristic of the genus, being deeply notched in front, and forming on each side a lamellar expansion, which is divided in the middle by a narrow fissure into 2 rounded lobes fringed with delicate hairs. It is sunkfar in to the 1st segment of the mesosome, the lateral parts of which to a greater extent encompass it at the sides. The dorsal face is rather uneven, being very convex in the middle, and exhibiting, at some distance from the thickened frontal margin, a transverse depression. At the outer ends of this depression, just inside the lateral expansions, the small punctiform eyes are visible, and these organs accordingly, as in all the other species of this genus, occupy a pronouncedly dorsal situation. According to the description of *Glyptonotus antarcticus* given by Dr. Pfeffer, both the shape of the head and the position of the eyes in this form differ considerably from what is observed in the species of the present genus.

The dorsal face of the mesosome is slightly vaulted, with the posterior edges of the segments somewhat elevated, and exhibits on each side of all the segments an irregular rounded prominence, which, however, in the Caspian variety is rather slight and much less conspicuous than in the arctic form. The 1st segment has the lateral parts greatly, and almost securiformly expanded, and does not exhibit any separate coxal plates, though the outer part of the expansions may answer to these plates. On all the other segments, however, the coxal plates are very sharply marked off from the body, and exhibit a broadly lanceolate form, pointing obliquely backwards. They successively increase somewhat in size to the penultimate pair, which are conspicuously larger than the last pair. In the genus *Glyptonotus*, on the other hand, according to the statement of Dr. Pfeffer, only the last 3 pairs of coxal plates are distinctly defined, whereas on all the 4 anterior segments these plates are quite confluent with the body. This is a difference of such essential value, that it alone will suffice to keep this genus apart from that of *Chiridothea*.

The posterior division of the body, as in all other species of the present genus, is very much narrower than the anterior, and is conically tapered behind. It is composed of 5 segments, the 4 anterior of which, however, are very small and scarcely broader than the proximal part of the last, or caudal segment. The 4th segment does not exhibit any epimeral plates, whereas on the 3 anterior segments such plates may be discerned though in a rather rudimentary condition. The caudal segment is very large, about 5 times as long as the 4 preceding segments combined, and exhibits a narrow oblong, or somewhat conical form, with the greatest width, which does not attain half the length, at the very base. It gradually tapers distally, though a very slight swelling may be observed somewhat beyond the middle, and it terminates in a narrowly truncated point, which is somewhat upturned. Along the middle of the segment a very slight and rounded dorsal keel may be distinguished. Otherwise the segment is perfectly smooth.

The several appendages of the body seem to agree perfectly with those in the typical form, and although a complete dissection of a specimen has been made, and all the appendages isolated and examined, I have not thought it necessary to give here detailed descriptions and figures of them.

Occurrence. The occurrence of this remarkable Isopod in the Caspian Sea was first stated by Dr. Grimm, and, indeed, numerous specimens are in his collection, all off them having been taken by the aid of the dredge from very considerable depths in the southern part of that basin. A single specimen moreover, was sent to me several years ago, from the Zoological Museum of St. Petersburg, taken, according to the label, by the late Academician Baer from a depth of 55 fathoms, the exact locality not being stated. In the rather extensive collections made by Messr. Warpachowsky and Borodin in the North Caspian Sea, on the other hand, not a single specimen of this form was found, and it therefore appears to be confined to the deeper parts of the basin lying south of the peninsula Mangyschlak. According to a note in Dr. Stuxberg's work, Dr. Grimm has recorded this Isopod also from the Bay of Karabugas and from the Sea of Aral.

The occurrence of this form in the Caspian Sea is of considerable interest, not only in biological, but also in geological respects. For there cannot be any doubt that the present form

is of true arctic origin, and that accordingly its presence in the Caspian Sea fully proves the correctness of the assumption that this basin, at some previous time, must have had a direct communication with the Arctic Sea. This Isopod constitutes indeed a remnant of the arctic fauna, which at that time must have prevailed, and which subsequently, by some other changes in the geological conditions, has been mixed up with elements of more southern origin.

Distribution. This species has long been known from the Baltic, where it occurs in many places rather plentifully, from the Gulf of Bothnia to the Kallebodstrand (Øresund). It does not, however, seem to extend beyond the straits between the Danish isles, as it has not yet been found anywhere either in the Kattegat, or the Skagerak. This peculiar restriction in its occurrence has led to the supposition, that it must have immigrated to the Baltic from the north-east, at a time, when this basin was in direct connection with the White Sea, and the results geological investigations fully tend to support the probability of such a hypothesis. As is well known, the species has also, in recent times, been found as a true relict form in some of the larger lakes of Sweden and Russia, for instance in Vettern, Mälaren, Ladoga, Peissen, having here adapted itself to life in quite fresh water.

As to the occurrence of this species in the Arctic Ocean, some doubt may be adduced about the correctness of the several statements given, since the form recorded under this name by Dr. Stuxberg from the glacial Sea of Siberia has turned out to be a different, though very nearly allied species. Meanwhile it is highly probable, that in point of fact both these species came under Dr. Stuxberg's notice, but were at that time confounded by him; for of 3 specimens kindly presented to our Museum by that distinguished zoologist, and stated to have been taken in the glacial Sea of Siberia, 2 undoubtedly belong to the present species, whereas the 3rd is a well-marked specimen of *C. sibirica* Birula. In our University Museum, moreover, a well-marked specimen of *C. entomon* is preserved, taken at Kostin Shar, Novaja Semlja, and this species is also stated by Mr. Birula to occur in other places of the Kara Sea. It would thus seem that in all probability the present species is generally distributed over the whole glacial sea between the Behring Strait and Novaja Semlja;

but it does not extend west of the latter island, never having been observed either off Spitsbergen or off Greenland, and it is also absolutely non-existent along the whole Norwegian coast. Though it must evidently be regarded as a true arctic form, yet its distribution is not circumpolar, but limited to a restricted area of the glacial Sea.

Fam.: *ASELLIDÆ.*

Gen. **Asellus,** Geoffroy St. Hillaire.

Asellus aquaticus Lin.

A single, somewhat defective specimen of an *Asellus*, undistinguishable from the common fresh-water species, was found in a bottle belonging to the collection of Dr. Grimm, also containing some of the usual Caspian Amphipoda. The bottle was labelled Lencoran.

Fam.: *IANIRIDÆ.*

Gen. **Iaera**, Leach.

Iaera nordmanni (Rathke).

(Pl. XVI, figs. 2—6.)

Ianira Nordmanni, H. Rathke, Beitrag zur Fauna der Krym. Mém. des Sav. Étrang. de St. Pétersbourg T. III, p. 388, Pl. 6, figs. 1—5.

Remarks. This form was first described by H. Rathke from Cape Parthenion in the Crimea, as a species of the genus *Ianira* of Leach. It was subsequently removed by M. Edwards from that genus, and a new genus, *Iaeridina*, established for its reception. This genus, however, is now rejected by all carcinologists, as Rathke's species undoubtedly belongs to the genus *Iaera* as defined by Leach. The specific differences between this species and the common *Iaera marina* Fabr. are, indeed, rather slight, and have not been sufficiently made out by subsequent authors. I therefore consider it advisable to give here some figures drawn from a Caspian specimen, and to point out more exactly the differences between the 2 species.

Description. The length of a fully adult male specimen scarcely exceeds 2 mm., and female specimens, unlike what is the case with *Iaera marina*, seem to be still smaller.

The general form of the body (see Pl. XVI, fig. 2) is much the same as in the type species, being very much depressed, and in the female rather regularly elliptical in outline, with the greatest width in the middle, whereas in the male (see fig. 2), the body appears more uniform in width throughout.

The cephalon is very broad, and projects in front in an obtuse prominence. Its lateral parts are greatly expanded, more so even than in the type species, forming thin lamellar lobes of a rounded shape, and somewhat projecting in front. The lateral parts of the segments composing the mesosome, are likewise laminarly expanded, and in the male considerably narrower than in the female, especially those of the 4th and 5th segment. The caudal segment is semicircular in outline, and considerably broader in the male than in the female, exhibiting in both sexes the usual apical sinus, which is comparatively deeper than in the type species. The very thin lateral edges of all the segments, including the cephalon and caudal segment, are clothed with a dense and regular row of very delicate, somewhat flattened setæ, forming together a dense fringe around the body (conf. fig. 5), and this is one of the characters by which the present species at once distinguishes itself from *I. marina*, in which this fringe is replaced by scattered bristles of the usual kind.

The eyes are easily distinguishable, though rather small and of a rounded form, being placed dorsally inside the lateral expansions of the head.

The superior antennæ (fig. 3), as in the type species, are very small, with the flagellum only composed of 2 articulations.

The inferior antennæ (see fig. 2) somewhat exceed half the length of the body, and exhibit the usual structure.

The legs likewise do not exhibit any essential difference from those in the type species, except that the inner of the 2 terminal claws is considerably shorter and much more curved than the outer (see fig. 4).

The uropoda (see figs. 5 & 6) are extremely small, scarcely projecting at all beyond the apical sinus of the caudal segment, and they differ conspicuously from those in the type species in the very rudimentary character of the rami, and by the formation

of a rounded expansion at the end of the basal part, inside, which projects as far as the tip of the rami.

Occurrence. Of this form, a single male specimen was found in a bottle belonging to the collection of Dr. Grimm, containing, also several *Corophia* and other small *Amphipoda*, which, according to the label, were taken among algæ on a sunken ship, at Schachoway Kossa. Another somewhat defective female specimen is likewise in the collection of Dr. Grimm, having been taken in the Bay of Baku.

The occurrence of this form in the Caspian Sea evidently leads to the supposition, that this basin must also have been in direct communication with the Black Sea or the Mediterranean. It is not probable, however, that this connection was simultaneous with that of the glacial sea, and biological conditions would seem to corroborate the assumption that it might have taken place at a much later period.

Distribution. South coast of England (Sp. Bate), coast of France (Bonnier), Mediterranean, Black Sea (Rathke).

Fam.: *DESMOSOMIDÆ.*

Gen. **Nannoniscus**, G. O. Sars.

Nannoniscus caspius, G. O. Sars, n. sp.

(Pl. XVI, figs. 7—12.)

Specific Characters. ♂. In outward appearance very like the female of the marine species, *N. oblongus*, but of smaller size and somewhat narrower in form. Cephalon, as in that species, deeply emarginated on each side for the insertion of the antennæ, frontal part considerably produced, exhibiting on each side an elevated ridge, tip minutely incised. The 3 anterior segments of mesosome sharply defined from the 4 posterior, and having the lateral parts produced in front. The 4 posterior segments successively decreasing in length, with the lateral parts laminar and quite contiguous. Caudal segment large and broad, terminating in an obtuse point. Eyes wanting. Superior antennæ of exactly the same structure as in the type species. Inferior antennæ with the spine of the 3rd peduncular joint very large and pointed, flagellum 8-articulate, with the 1st articulation remarkably large and tume-

fied, fusiform in shape. Legs of uniform structure, resembling those in the female of the type species. Male operculum of quite normal structure. Uropoda scarcely differing in structure from those in *N. oblongus*. Length of adult male 1.30 mm.

Remarks. The present form, of which only a solitary male specimen has come under my notice, looks so very like the female of the marine species, *N. oblongus* G. O. Sars, that I should have been much inclined to refer it to that species, if I had not been acquainted with its male, which is totally different and very anomalous. The present form, on the other hand, exhibits the male sexual characters in full accordance with those found in the allied genera of the group *Asellota*.

Description. The specimen examined, which, as above stated was of the male sex, and apparently fully grown, scarcely exceeds a length of 1.30 mm., and accordingly belongs to the smallest known Isopoda.

The body (see Pl. XVI, fig. 7) is rather depressed, and is oblong linear in form, being more than 3 times as long as it is broad; and it exhibits a very pronounced constriction between the 3rd and 4th segments of the mesosome.

The cephalon is very large, fully as long as the first 3 segments of the mesosome combined, and but little narrower. It exhibits on each side a deep emargination for the insertion of the antennæ, and is produced, outside the latter, to an acute, anteriorly-pointing corner. The frontal part is greatly produced, and is encircled by an elevated ridge which, however, is interrupted at the tip, so as to cause a small apical incision (see also fig. 8).

The first 3 segments of the mesosome are closely crowded together, rather convex above, and of about equal size, with the lateral parts produced in front to acute, anteriorly pointing lappets. Between these segments and the 4 succeeding ones there is a very conspicuous constriction, whereby the mesosome appears, as it were, divided into 2 sections. The segments of the posterior section are much less convex above, and have the lateral parts lamellar and quite contiguous. They successively decrease in length, but are all of about the same width. The lateral parts of the 1st segment have the anterior corner acutely produced, whereas in the succeeding segments, both corners are evenly rounded off.

The caudal segment is very large, being fully half as long as the mesosome, and at the base is of about the same width as that section. It is slightly vaulted above, and exhibits a somewhat triangular form, being broadest at the base and gradually tapering to an obtuse point. The lateral edges are gently curved and perfectly smooth throughout.

In the male of the marine species, the posterior part of the body, comprising the last 3 segments of the mesosome and the caudal segment, is abruptly much narrower than the anterior, and in both sexes the caudal segment is evenly rounded at the tip.

The eyes, as in the marine species, are wholly absent.

The superior antennæ (see figs. 8 & 9) are rather small, and exhibit a structure closely agreeing with that in the type species. As there, the peduncle apparently consists of only 2 joints, the 1st being rather large and almost circular in outline, whereas the 2nd is much narrower, slightly widening distally, and exhibiting at the end on each side a very delicate, finely ciliated auditory seta. The flagellum is poorly developed and consists of 2 imperfectly defined articulations, the 1st very short, the 2nd conically tapered. At their juncture a remarkable pyriform appendage issues in front, constituting an excessively developed olfactory papilla, which also occurs at the same place in the marine species.

The inferior antennæ (see fig. 8) are about half as long as the body, and are, on the whole, constructed in a similar manner to that in the marine species, though some well-marked differences may be found to exist. The peduncle is composed of 6 well defined joints, the 3 first of which, however, are very short, whereas the last 2 are well developed, and form together a geniculate bend. The 3rd peduncular joint is produced outside to a remarkably strong, anteriorly-pointing spiniform projection, apparently answering to the scale-like appendage found in some of the *Asellota* in this place. In the marine species also, a similar projection occurs, but of somewhat smaller size. The flagellum is a little shorter than the peduncle, and is composed of 8 articulations, the outer 7 of which are of normal appearance, whereas the 1st is remarkably large and tumid, and oval fusiform in shape. The extraordinary development of this articulation, however, will probably turn out to be a sexual peculiarity, though in the male

of the marine form no trace of a similar development is to be observed.

The legs (figs. 10, 11) are all of uniform appearance and ambulatory in character, slightly increasing in length, posteriorly, the dactylar joint in all being bi-unguiculate (see fig. 12). In the female of the marine species the legs exhibit a very similar structure; but in the male of that species, the 1st pair are peculiarly modified, being very strongly built and prehensile in character.

The pleopoda could of course not be examined in the solitary specimen found; but, on viewing the specimen from the ventral face (see fig. 13), it could be easily demonstrated, that the operculum covering these apendages is transformed in the manner usually found in male *Asellota*. In the male of *N. oblongus*, on the other hand, no such transformation has taken place, the operculum forming, as in the female, an undivided rounded plate, a case which is quite unique in the extensive group of the *Asellota*. As in the male of *N. oblongus*, a large curved projection, containing at the tip the orifices of the vasa deferentia, is seen projecting immediately in front of the operculum, more properly issuing from the ventral face of the last segment of the mesosome.

The uropoda (see fig. 13) are rather small, and, as in *N. oblongus*, originate from the lower face of the caudal segment at some distance from the tip, so as only slightly to project beyond the edges of that segment. They are biramous, with the basal part very small, and the rami sublinear in form, the outer one somewhat smaller than the inner, and both tipped with a few small bristles.

Occurrence. The above-described specimen I found on examining with the aid of the microscope the residue of a small bottle belonging to the collection of Dr. Grimm, which had contained some small Amphipoda taken in the Bay of Baku from a depth of 2 or 3 fathoms.

It may be observed, that of the 2 hitherto known species of the genus *Nannoniscus*, the one *(N. oblongus)* has only been found in great depths off the Lofoten Islands, the other *(N. bicuspis)* in still greater depths, off the west Norwegian coast. The occurrence of a species of this genus in the Caspian Sea, and in comparatively shallow water, is therefore highly remarkable.

Explanatation of the Plates.

Pl. XIII.

Metamysis Strauchi, (Czern.)

Fig. 1. Adult female, viewed from the dorsal side.
Fig. 2. Anterior extremity of body of a male specimen, showing the eyes and antennæ; dorsal view.
Fig. 3. Basal part of right inferior antenna, with the scale (marginal setæ omitted) and the base of the flagellum.
Fig. 4. Anterior maxilla.
Fig. 5. Posterior maxilla.
Fig. 6. Leg of penultimate pair from a male specimen.
Fig. 7. Penultimate male pleopod.
Fig. 8. Inner plate of right uropod (without the marginal setæ); ventral view.
Fig. 9. Telson viewed from above.
Fig. 10. Extremity of same, more highly magnified.

Pl. XIV.

Pseudocuma diastyloides, G. O. Sars.

Fig. 1. Adult female, dorsal view.
Fig. 2. Same, viewed from left side.
Fig. 3. Left superior antenna.
Fig. 4. Leg of 1st pair.
Fig. 5. Leg of 2nd pair.
Fig. 6. Leg of 4th pair.
Fig. 7. Leg of last pair.
Fig. 8. Last segment of metasome, with telson and right uropod; dorsal view.

Pseudocuma abbreviata, G. O. Sars.

Fig. 9. Female, seen from above.
Fig. 10. Same, viewed from left side.
Fig. 11. Anterior part of carapace, with left superior antenna, lateral view.
Fig. 12. Last segment of metasome, with telson and right uropod; dorsal view.

Pl. XV.

Pseudocuma campylaspoides, G. O. Sars.

Fig. 1. Female, dorsal view.
Fip. 2. Same, viewed from left side.
Fig. 3. Extremity of tail, with telson and uropoda; dorsal view.

Niphargoides borodini, G. O. Sars.

Fig. 4. Adult, ovigerous female, viewed from right side.
Fig. 5. Superior antenna.
Fig. 6. Inferior antenna.
Fig. 7. First gnathopod.
Fig. 8. Second gnathopod.
Fig. 9. Last segment of urosome, with telson and last pair of uropoda; dorsal view.

Pl. XVI.

Chiridothea entomon Lin., *(forma caspia)*.

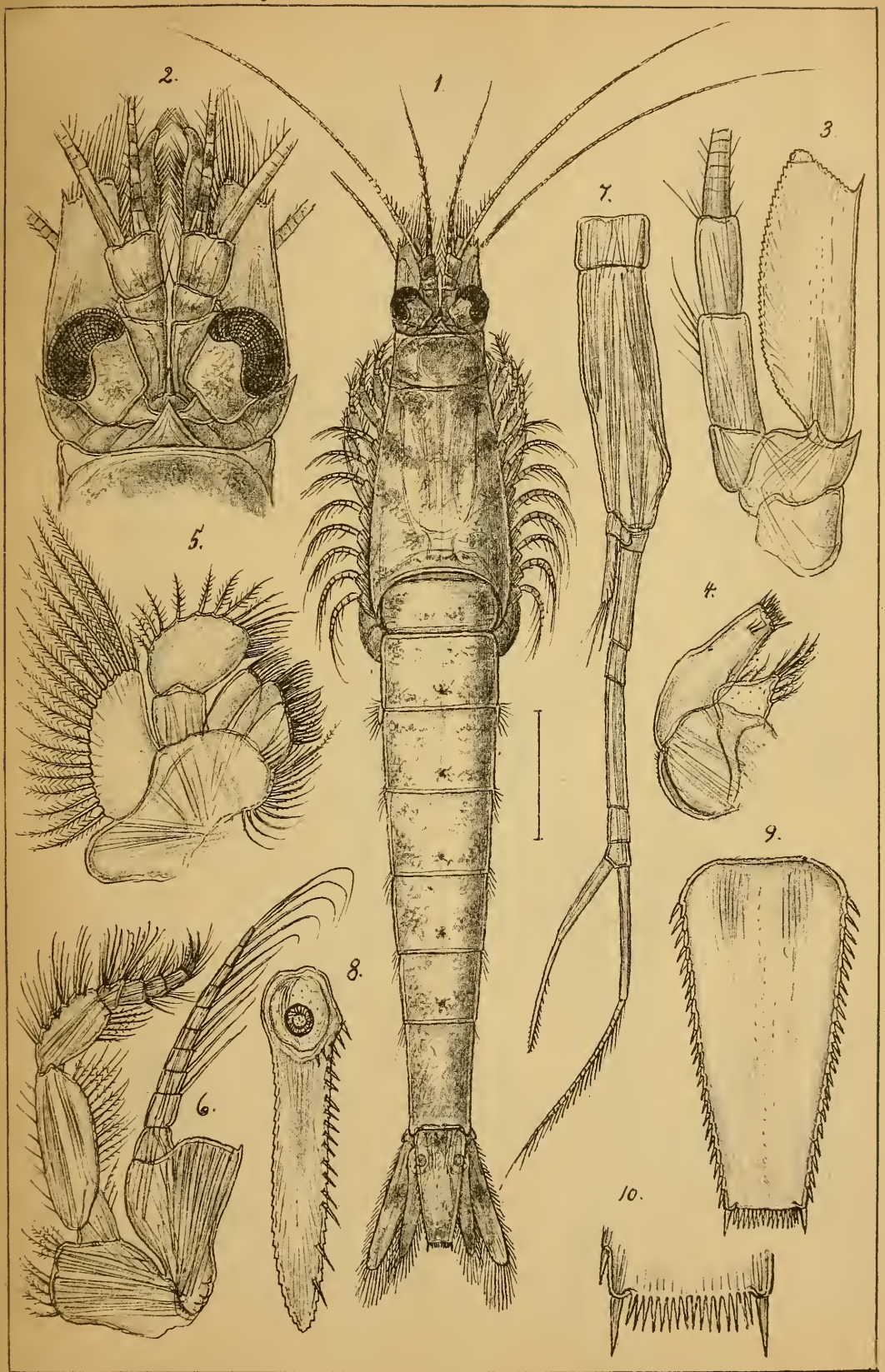
Fig. 1. Adult male; dorsal view.

Jaera nordmanni (Rathke).

Fig. 2. Adult male; dorsal view.
Fig. 3. Superior antenna.
Fig. 4. Extremity of a leg.
Fig. 5. Posterior part of caudal segm., with the uropoda; dorsal view.
Fig. 6. One of the uropoda, more highly magnified.

Nannoniscus caspius, G. O. Sars.

Fig. 7. Adult male; dorsal view.
Fig. 8. Extremity of head, with the antennæ on left side; dorsal view.
Fig. 9. Superior antenna.
Fig. 10. Leg of 1st pair.
Fig. 11. Leg of last pair.
Fig. 12. Extremity of same, more highly magnified.
Fig. 13. Caudal segment, together with the genital prominence, viewed from the ventral side, showing the transformed male operculum and the uropoda.



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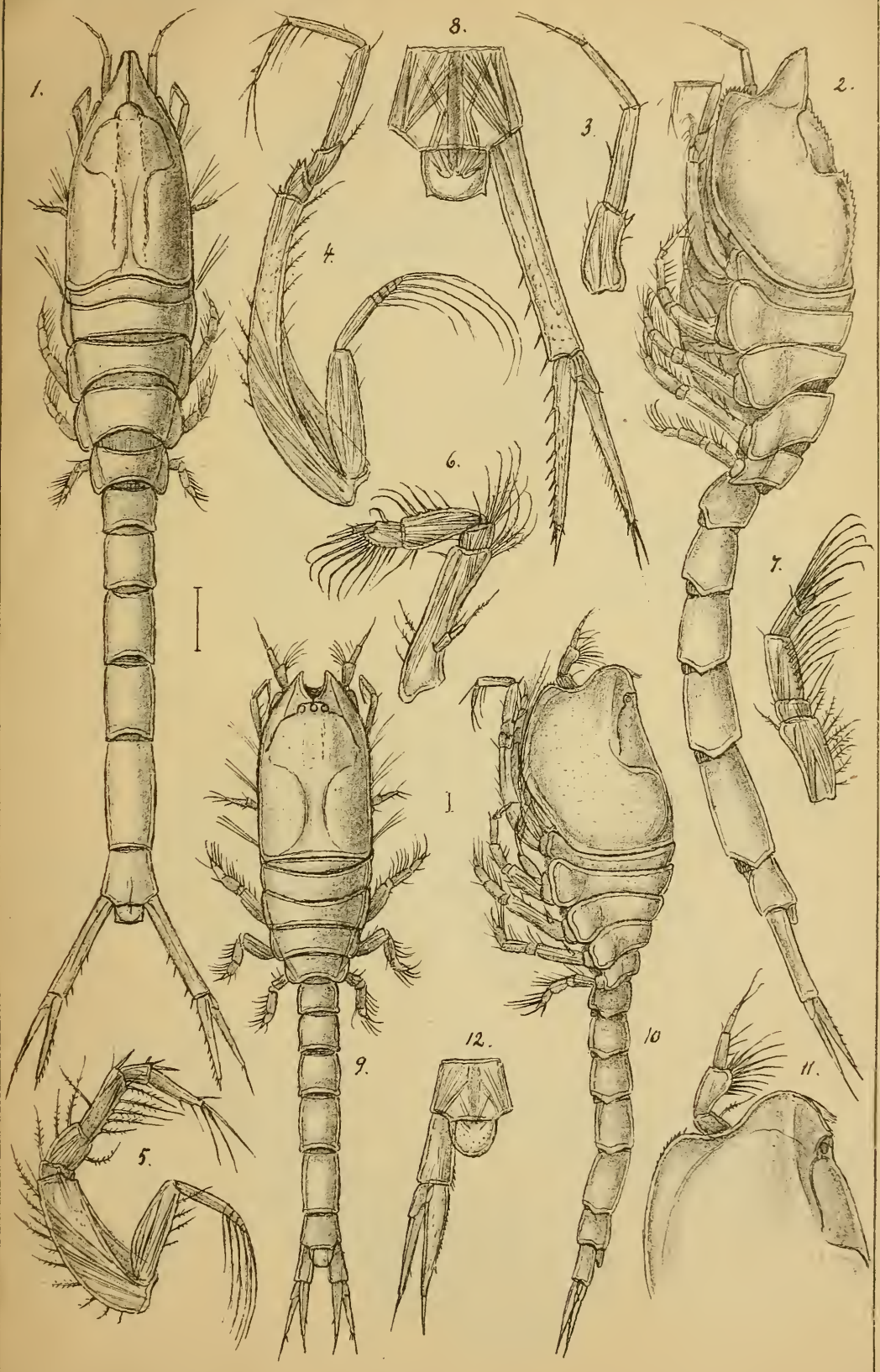

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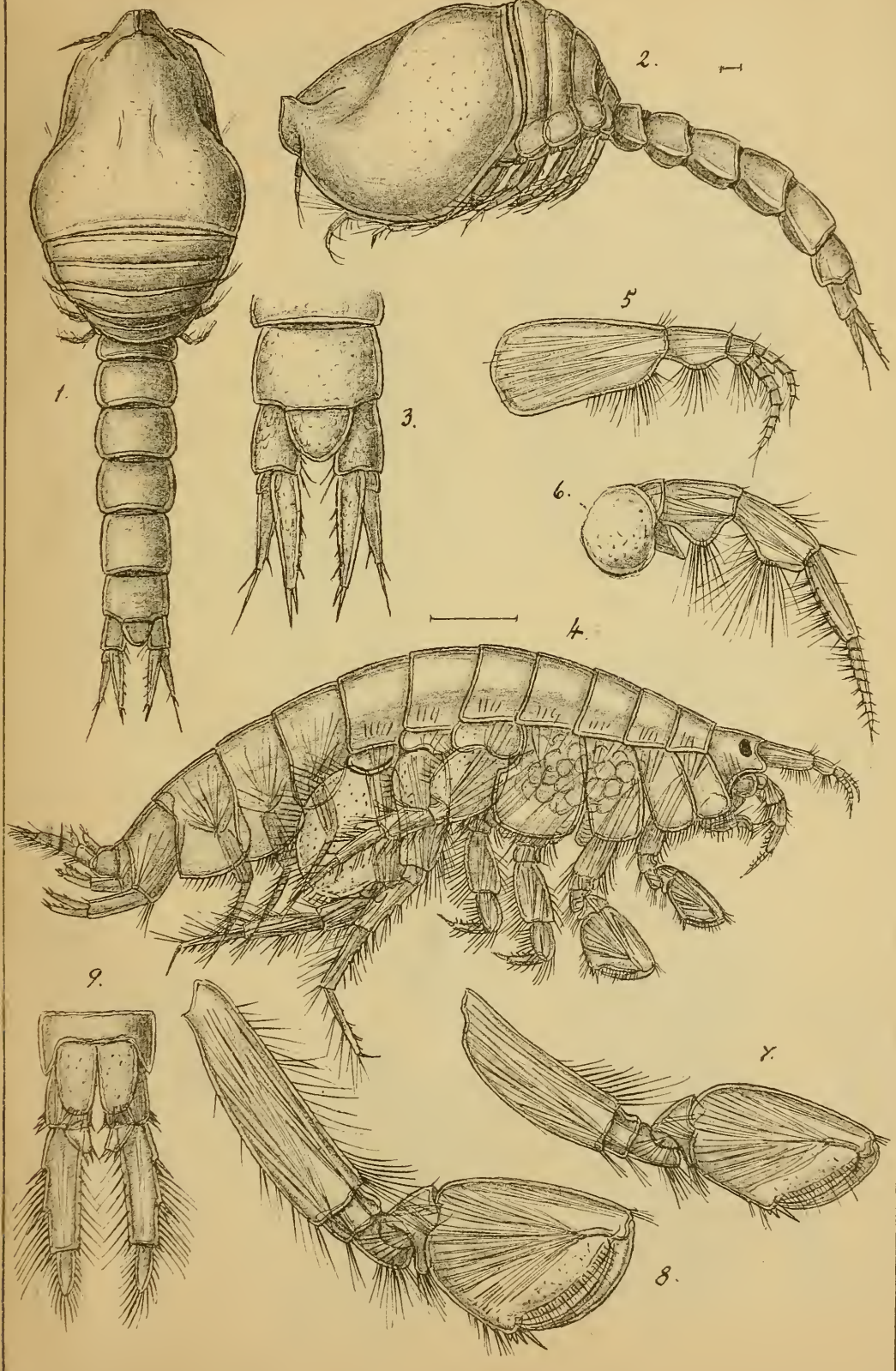
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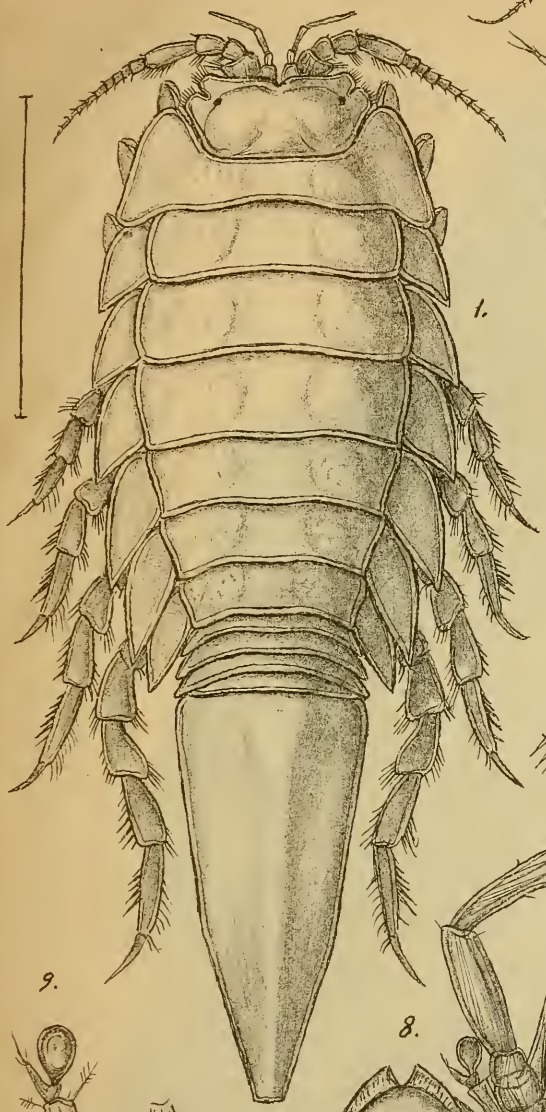
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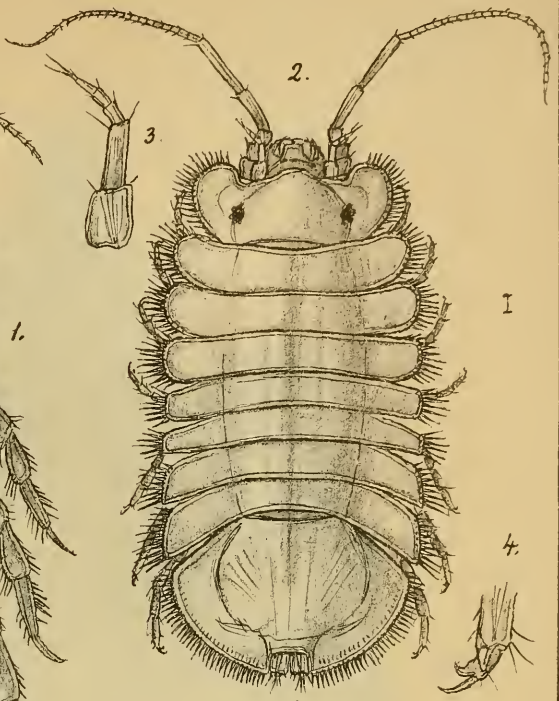
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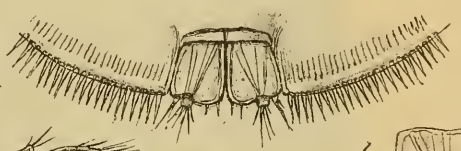
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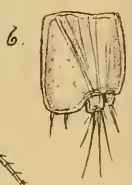
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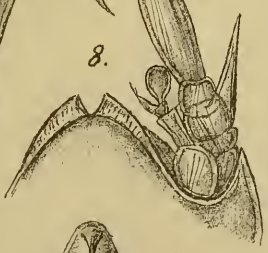
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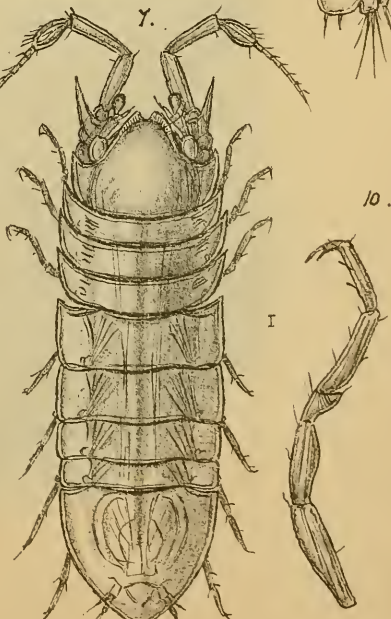
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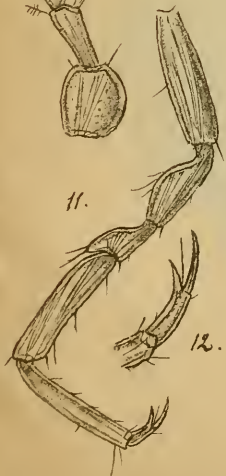
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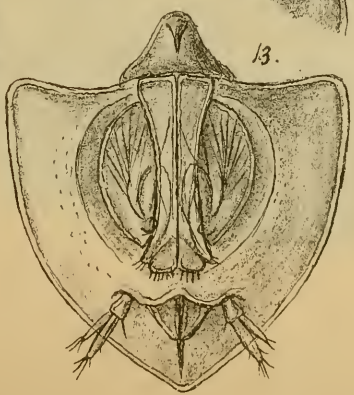
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