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XII. CONTRIBUTIONS TO A KNOWLEDGE
OF THE TERRESTRIAL ISOPODA
OF INDIA.

Part II.—SOME NEW SPECIES OF *PARAPERISCYPHIS*,
CUBARIS, etc.

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(Plates IX—XIX.)

The present contribution deals mainly with new species of the genus *Cubaris*, Brandt, amongst which is an interesting one from caves near Cherrapunji, Assam. Two new species of *Paraperiscyphis*, Stebbing, are described from single specimens from Ceylon, but their characters are so distinct from any known forms, that I offer no excuse for departing from a rule not to describe from single examples. It is interesting to be able to record a new species of *Burmoniscus*, Cllge., also from a cave near Cherrapunji. The complete list is as follows:

- Paraperiscyphis stebbingi*, Cllge.
- „ *pulcher*, n. sp.
- „ *scabrus*, n. sp.
- Cubaris gravelii*, n. sp.
- „ *expansus*, n. sp.
- „ *dilectum*, n. sp.
- „ *pusillus*, n. sp.
- „ *brunneocaudatus*, n. sp.
- „ *chiltoni*, n. sp.
- „ *cavernosus*, n. sp.
- „ *lobatus*, n. sp.
- „ *albolateralis*, n. sp.
- Burmoniscus kempi*, n. sp.

Genus **Paraperiscyphis**, Stebbing.

1911. *Paraperiscyphis* Stebbing, *Rec. Ind. Mus.*, vol. VI, p. 184.

Paraperiscyphis stebbingi, Cllge.

1914. *Paraperiscyphis stebbingi*, Collinge, *Rec. Ind. Mus.*, vol. X, p. 207,
pl. xxiv, figs. 1-10.

Habitat.—Kavalai, 1300-3000 ft., Cochin State, 24—27-ix-1914.
No. $\frac{8928}{10}$ (*F. H. Gravelly*).

This is an additional record for this interesting species.

I find that in describing this species I made a most unfortunate slip in the diagnosis wherein it was stated (p. 207) "2-jointed flagellum, the first joint longer than the second," and again on p. 208 the error was repeated. In *P. stebbingi* the first joint of the flagellum is not longer than the second, but as correctly figured (*cf.* pl. xxiv, figs. 1 and 2).

Paraperiscyphis gigas (Cllege.).

1915. *Periscyphis gigas*, Collinge, *Rec. Ind. Mus.*, vol. XI, p. 148, pl. ix, figs. 1-10.

The form of the uropoda, which is a character of the very greatest importance in the classification of this and allied genera, will necessitate the removal of this species to the genus *Paraperiscyphis*.

Paraperiscyphis pulcher, n. sp.

(Pl. ix, figs. 1-5).

Body oblong oval, dorsal face strongly convex, surface irregular but smooth. Cephalon (fig. 1) small, flanked by the lateral plates of the first segment of the mesosome, lateral lobes well developed, median lobe represented by slight median expansion of the anterior margin; epistoma carinate. Eyes subdorsal. Antennulae (fig. 2) small, 3-jointed, distal joint with terminal style and indented on the inner side. Antennae (fig. 3) moderately stout, joints 2-4 subequal, 5th joint the longest; flagellum 2-jointed, with the first joint shorter than the second which has a fine terminal style. Uropoda (fig. 4) extending beyond the telson, basal plate short and stout with antero-dorsal surface expanded, convex dorsally, concave ventrally; exopodite and endopodite extending beyond the basal plate, both articulating on the inner margin, exopodite flat and blade-like, endopodite three-sided. Telson (fig. 5) obtusely triangular, dorsal surface convex, irregular and smooth. Length 14.5 mm. × 7 mm. Colour (in alcohol) greyish-green ground colour with small irregular blackish spots on the posterior border of each mesosomatic segment, in the median line on each mesosomatic and metasomatic segment is a yellowish spot, lateral to this an irregular yellowish marking, and still more laterally another spot, which together give the appearance of five broken lines.

Habitat.—Peradeniya, Ceylon, 28-v-1910. No. $\frac{8603}{10}$ (*F. H. Gravely*).

Type.—In the collection of the Indian Museum.

The form of the cephalon, antennae and uropoda separate this handsome species from any other member of the genus. There being only a single example, I have not attempted any examination of the mouth-parts.

Paraperiscyphis scabrus, n. sp.

(Pl. ix, figs. 6—10).

Body oblong oval, dorsal face strongly convex, richly tuberculated. Cephalon (fig. 6) small, flanked by the 1st segment of the mesosome, lateral lobes well developed, median lobe small and confluent with carina of epistoma. Eyes subdorsal. Antennulae (fig. 7) small, 3-jointed, distal joint terminating as a cone. Antennae (fig. 8) with joints 2 and 3 subequal, 4th joint nearly twice as long and 5th nearly three times as long; flagellum 2-jointed, with the first joint shorter than the second which has a fine terminal style. Whole of appendage sparsely covered with short bluntly ending setae. Uropoda (fig. 9) extending beyond the telson, basal plate short and stout, with antero-dorsal surface expanded, convex dorsally with thickened antero dorsal margin bounding the antero-dorsal surface, concave ventrally with groove; exopodite and endopodite both extending beyond the basal plate and articulating on the inner margin. Telson (fig. 10) obtusely triangular, dorsal surface convex, tuberculated. Length 11.5×6 mm. Colour (in alcohol) greenish-brown with yellowish mottling.

Habitat.—Peradeniya, Ceylon. No. $\frac{8585}{10}$ (F. H. Gravely).

Type.—In the collection of the Indian Museum.

In the form of the telson and uropoda this species shows a relationship to *P. pulcher*, but is separated by the striking difference in the shape and development of the lateral and median lobes of the cephalon, there are also well-marked differences in the form of the antennulae and antennae.

Genus Cubaris, Brandt.

The widely conflicting opinions held as to the position of this genus afford a typical instance of the very unsatisfactory state of the classification of the Terrestrial Isopoda.

Brandt's description¹, though brief, is quite clear, and the slight modifications suggested by Miers² in 1877 scarcely affect it. Budde-Lund³ in his 'Revision' p. 36, under the Family Oniscidae, subfamily 7 Oniscinae, Tribe 1 Armadilloidea, cites the genus *Armadillo*, Dum., and under Tribe 2 Oniscoidea, the genus *Armadillidium*, Brandt, and from the later text we gather that the genus *Cubaris* is sunk as a synonym of *Armadillo*. In 1910⁴ (p. 9) the genus is recognized and appears between *Armadillo*, Dum., and *Pericephalus*, B.-L., whilst in 1912⁵ it is regarded by him as a subgenus only, in the subfamily Oniscinae.

¹ *Bull. Nat. Hist. Soc. Moscow*, 1833.

² *Proc. Zool. Soc. Lond.*, 1877.

³ *Rev. Crust. Isop. Terr.*, 1904.

⁴ Sjöstedts *Kilimandjaro-Meru Exped.* 21 Crust. 2 Isop., 1910.

⁵ *Trans. Linn. Soc. Lond. (Zool.)*, 1912.

This author's attempts at classification were frequently unfortunate, as in the present instance. He approached more closely to a sound classification perhaps in 1910 than in any of his previous or later writings, but did not seem able to decide upon any system or parts, other than the oral appendages, which frequently misled him.

I hope at a later date, when more of the Indian and Asiatic species have been worked out, to submit a revision of the Family Armadillidiidae founded upon structural characters, in the meantime I am provisionally placing all the Indian forms in the one genus.

Cubaris gravelii, n. sp.

(Pl. x, figs. 1—11).

Body oblong oval, slightly convex, smooth. Cephalon (figs. 1 and 2) small, strongly marginate anteriorly and posteriorly, lateral lobes small, median lobes absent; epistoma vertical with triangular-shaped depression in the medio-anterior line. Antennulae (fig. 3) small, 3-jointed, terminal joint pointed with number of fine setae laterally, proximal joints globose, distal joint attenuated. Antennae (fig. 4) short, sparsely setaceous, joints 3—5 slightly grooved on their outer side; flagellum 2-jointed, the distal joint being the longer. First maxillae (fig. 5), outer lobe terminating in four stout incurved spines and four smaller inner ones. Second maxillae (fig. 6) thin and plate-like, terminating distally in a bilobed manner, the outer lobe is fringed with setae, and those on the inner one form a brush-like lobe. Segments of the mesosome convex, lateral plates of 2nd to 4th segments slightly excavate, remainder truncate, posterior angles only slightly produced backwards. Segments 1 and 2 with notch and groove on their lower inner margins for reception of succeeding segments (fig. 7). Maxillipedes (fig. 8), outer palp terminates in a multispinous process on the outer side, with a very small spine and then two larger ones below it, from the base of the outer palp are three large spines, the inner palp is very broad and has two spines with wide bases, and one short, blunt, tooth-like one on the innermost border and a longer pointed one on the lower margin. Uropoda (figs. 9 and 10) not extending beyond the telson, basal plate narrow posteriorly, thickened and convex dorsally, antero-dorsal surface prominent; exopodite articulating in deep groove on the inner border of the basal plate, which here is slightly excavate, endopodite setaceous, with two long whip-like setae terminally. Telson (fig. 11) longer than the breadth at the posterior margin which is slightly curved, expanded anteriorly, somewhat flattened. Length 12 mm. Colour (in alcohol) dark horny-brown with few lighter lateral flecks on the mesosomatic segments.

Habitat.—Pass between Chaibassa and Chakardharpur, Chota Nagpur, 24-iii-13. No. $\frac{8604}{10}$ (*F. H. Gravelly*).

Type.—In the collection of the Indian Museum.

The species is named in compliment to Mr. F. H. Gravely.

The antennules here differ strikingly from any other species of *Cubaris* I know of. The mouth-parts are typical of the genus. The tooth on the underside of the lateral plate of the first mesosomatic segment is small, being just large enough to overlap the anterior wall of the groove on the second segment. The uropoda have a prominent antero-dorsal surface on the basal plate and the postero-dorsal portion is strongly convex, ventrally the plate is almost flat. Below the point of articulation of the exopodite is a small groove, and the inner border of the basal plate is slightly excavate. The length of the telson is greater than the breadth of the posterior margin.

***Cubaris expansus*, n. sp.**

(Pl. xi, figs. 1—10).

Body broadly oval, strongly convex, almost smooth. Cephalon (figs 1 and 2) small, marginate anteriorly, lateral lobes very small, median lobes absent; epistoma almost vertical. Eyes situated dorso-laterally. Antennulae (fig. 3) small, 3-jointed, terminal joint pointed with eight blunt setae, proximal joint the smallest. Antennae (fig. 4) short, covered with fine setae, 2nd to 4th joints grooved on their outer side; flagellum 2-jointed, distal joint nearly twice as long as the proximal one. First maxillae (fig. 5), outer lobe terminates in four stout incurved spines and six smaller ones; inner lobe terminally rounded, with two setose spines. Segments of the mesosome strongly convex, lateral plates of 2nd and 3rd segments slightly excavate, remainder truncate, posterior angles very slightly produced backwards. Segments 1 and 2 with notch and groove on their lower inner margins for reception of succeeding segments (fig. 6). Maxillipedes (fig. 7), the outer palp terminates in a multispinous process on the outer side, with two prominent spines below it, the inner palp possesses two spines with wide bases, then a fine marginal spine and one short blunt tooth-like one on the innermost border. Uropoda (figs. 8 and 9) not extending beyond the telson, basal plate narrower posteriorly than anteriorly, posterior margin almost straight, dorso-antero-lateral surface prominent; exopodite small, articulating on the inner border of the basal plate, which is here raised in a boss, endopodite setaceous, two and a half times the length of the exopodite, articulating at the top of the inner border of the basal plate. Telson (fig. 10) longer than the breadth at posterior margin which is almost straight, expanded anteriorly with slight concavity in the median line. Length 13.5 × 6.5 mm. Colour (in alcohol) horny-brown with lighter lateral flecks on the mesosomatic segments.

Habitat.—Barkuda I., Chilka L., Ganjam Dist., Madras Pres., 16-vii-14. No. $\frac{8921}{10}$.

Type.—In the collection of the Indian Museum.

C. expansus is characterized by the broadly oval body, the series of eight blunt setae on the inner border of the distal joint of

the antennulae and the form of the uropoda. The tooth on the underside of the lateral plate of the first mesosomatic segment is fairly long and pointed and overlaps the anterior wall of the somewhat flattened groove of the second segment.

Cubaris dilectum, n. sp.

(Pl. xii, figs. 1—9).

Body oblong oval, convex, finely tuberculate. Cephalon (figs. 1 and 2) small, strongly marginate anteriorly and posteriorly, lateral lobes small, median lobes absent; epistoma almost vertical, slightly depressed laterally. Antennae (fig. 3) situated rather low on the epistome, sparsely setaceous, somewhat attenuate; flagellum 2-jointed, the distal joint being the longer. First maxillae (fig. 4), outer lobe terminating in four stout incurved spines and six smaller inner ones. Segments of the mesosome convex, lateral plates of 2nd to 5th segments slightly excavate, remainder truncate, posterior angles only slightly produced backwards. Segments 1 and 2 with notch and groove on their inner margins for reception of succeeding segments (fig. 5). Maxillipedes (fig. 6), outer palp terminates in a broad multispinous process on the outer side and a single large pointed one below it, from the base of the outer palp are two large spines, the inner palp is broad and has three pointed marginal spines and one short, blunt, tooth-like spine on the innermost border. Uropoda (figs. 7 and 8) extend very slightly beyond the telson, basal plate narrow posteriorly, thickened and strongly raised, convex dorso-laterally, antero-dorsal surface expanded, strongly marginate; exopodite large and extends slightly beyond the basal plate, endopodite setaceous, broad and slightly flattened, with three long whip-like setae terminally. Telson (fig. 9) longer than the breadth at the posterior margin which is slightly curved, sides only very slightly incurved, expanded anteriorly. Length 8 mm. Colour (in alcohol) fawn with irregular light and dark brown mottling.

Habitat.—Kalimpong, Darjiling District, E. Himalayas, 600—4500 ft. No. $\frac{9147}{10}$ (*F. H. Gravely*).

Type.—In the collection of the Indian Museum.

This beautifully marked species differs from any other described form in a number of important characters. The tooth on the underside of the lateral plate of the first mesosomatic segment is large and truncate, and works in a slight groove in the anterior wall of the groove of the second segment. The exopodites of the uropoda extend beyond the telson and the antero-dorsal surface is unusually deep.

Cubaris pusillus, n. sp.

(Pl. xiii, figs. 1—10).

Body oblong oval, strongly convex, smooth. Cephalon (figs. 1 and 2) small, but rather long, strongly marginate, lateral lobes

small, median lobes absent; epistoma vertical. Eyes prominent, situated dorso-laterally. Antennae (fig. 3) sparsely setaceous, 2nd to 5th joints deeply grooved on their outer sides; flagellum 2-jointed, the distal joint being twice the length of the proximal one. First maxillae (fig. 4), outer lobe terminating in four stout incurved spines and five smaller ones; inner lobe terminally rounded with two large setose spines. Second maxillae (fig. 5) thin and plate-like, terminating distally in an inner setaceous lobe and an outer tooth-like plate with three ridges of setae. Segments of the mesosome convex, with posterior margins prominent, lateral plates of 2nd to 5th segments slightly excavate, remainder truncate, posterior angles very faintly developed. Segments 1 and 2 with notch and groove on their inner margins for reception of succeeding segments (fig. 6). Maxillipedes (fig. 7), outer palp elongated, terminating in a multispinous process with three longer spines on the outer side and three on the inner side, inner palp also elongated, with three marginal spines and one blunt tooth-like spine on the innermost border. Uropoda (figs. 8 and 9) not extending beyond the telson, basal plate narrow posteriorly, thickened, convex dorso-laterally, antero-dorsal surface expanded, concave, strongly marginate; exopodite small and bluntly pointed, endopodite setaceous, also bluntly pointed. Telson (fig. 10) longer than broad at the posterior margin which is very slightly curved, sides faintly incurved, expanded anteriorly. Length 5.5 mm. Colour (in alcohol) variable, bluish-black to a horny-brown.

Habitat.—Kas, Satara Dist., Bombay Pres., 3700 ft., 23—24-iv-1912. No. $\frac{8620}{10}$ (*F. H. Gravely*).

Type.—In the collection of the Indian Museum.

This is a very distinct species and the type of an interesting group. The head is longer than in most species. The antennae are characterized by the unusually deep grooves on the inner sides of joints 2, 3 and 4. The second maxillae are quite unlike those of any other described member of the genus. The tooth on the underside of the lateral plate of the first mesosomatic segment is small, but stands out some little distance, overlapping the groove of the second segment. The uropoda have a deep antero-dorsal surface and small exopodite.

Cubaris brunneocaudatus, n. sp.

(Pl. xiv, figs. 1—10).

Body oblong oval, strongly convex. Cephalon (figs. 1 and 2) small with posterior margin slightly raised, lateral lobes small, median lobe absent; epistoma vertical. Eyes fairly large, situated dorso-laterally. Antennulae (fig. 3) small, 3-jointed, with few stout setae on the terminal joint. Antennae (fig. 4) deeply grooved on the outer side of joints 3—5; flagellum 2-jointed, distal joint two and a half times as long as the proximal one. First maxillae (fig. 5), outer lobe terminates in four stout incurved spines

and six smaller ones. Segments of the mesosome strongly arched, lateral plates of 2nd to 5th segments slightly excavate, remainder truncate, posterior angles only slightly developed. Segments 1 and 2 with notch and groove on their inner margins for reception of succeeding segments (fig. 6). Maxillipedes (fig. 7), the outer palp terminates in a multispinous process on the outer side with two large spines at its base, internal to the process are three pointed spines, the inner palp appears to be thrown into three folds with a marginal tooth-like spine on the outer border of each and a longer spine on the inner border of the most dorsal fold. Uropoda (figs. 8 and 9) not extending beyond the telson, basal plate narrow posteriorly, thickened, convex dorso-laterally, antero-dorsal surface expanded, concave with raised margin ventrally, the anterior margin forms a deep fold which is continued laterally on the outer border; exopodite small, not more than half the length of the endopodite, terminating in a finely pointed style, endopodite bluntly pointed, with three whip-like setae terminally. Telson (fig. 10), posterior margin broader than the length, sides faintly curved, expanded anteriorly. Length 10.5 mm. Colour (in alcohol) dark grey with the telson and uropoda a reddish-brown.

Habitat.—Tatkon, Burma, 6-ix-1914. No. $\frac{9151}{10}$ (*T. B. Fletcher*).

Type.—In the collection of the Indian Museum.

This species in the form of the cephalon and uropoda exhibits a slight relationship with *C. solidulus*, Cllge., but differs from that species in the form of the antennulae, antennae, and maxillipedes and the strongly arched body. There are also well marked differences in the shape of the tooth and groove on the under side of segments 1 and 2.

Cubaris chiltoni, n. sp.

(Pl. xv, figs. 1—11).

Body oblong oval, slightly convex, finely punctulated. Cephalon (figs. 1 and 2) small with posterior margin slightly raised, lateral lobes distinct, median lobe absent; epistoma medianally convex. Antennae (figs. 3 and 4) with the outer side of the joints 2—5 almost flat; flagellum 2-jointed, distal joint two and a half times as long as the proximal one. First maxillae (fig. 5), outer lobe terminates in four stout incurved spines and six rather long thin ones; inner lobe short, rounded terminally, with two setaceous spines. Second maxillae (fig. 6) thin, plate-like, terminating distally in an inner lobe with short stout setae on the inner side and long fine setae on the outer side, and an outer tooth-like plate. Segments of the mesosome slightly convex, lateral plates of 2nd to 5th segments slightly excavate, remainder truncate, posterior angles produced backwards. Segments 1 and 2 with notch and groove on their inner margins for reception of succeeding segments (fig. 7). Maxillipedes (fig. 8), the outer palp terminates in a multispinous process on the outer side external to which is a small spine and two internal to it and a further two at the inner border, the inner

palp shows three folds with two curved spines on the outer border of the ventral one and a longer spine on the margin of the most dorsal fold. Uropoda (figs. 9 and 10) not extending beyond the telson, basal plate narrow posteriorly, thickened and slightly convex dorso-laterally, antero-dorsal surface expanded, ventrally almost flat; exopodite small, half the length of the endopodite, terminating bluntly, no style, endopodite bluntly pointed with whip-like setae. Telson (fig. 11), posterior margin almost straight and shorter than the length, sides curved, anterior portion expanded, and convex dorsally. Length 9 mm. Colour (in alcohol) blackish-brown with lighter irregular markings laterally and as a broken median line on the mesosome.

Habitat.—Puenjikara I., nr. Ernakulam, Cochin State, ix-1914. No. $\frac{8908}{10}$ (F. H. Gravely).

Type.—In the collection of the Indian Museum.

C. chiltoni is allied to *C. brunneocaudatus*, agreeing with this last mentioned species in the form of the mouth-parts and in a lesser degree the uropoda. It differs, however, in the shape of the cephalon, antennae, maxillipedes, uropoda, and telson, as also in the more depressed form of the body and in the form of the notch and groove on the underside of segments 1 and 2. Most species of *Cubaris* show the peduncular joints of the antennae grooved on the outer side, but in *C. chiltoni* these grooves have become widely expanded, so that the outer side of the joints 2—5 are almost flat, in section exhibiting a form as shown in figure 4 (pl. xv).

I have much pleasure in associating with this interesting species the name of Professor Charles Chilton, to whom we are indebted for his valuable work on the Isopoda and other Crustacea of New Zealand.

Cubaris cavernosus, n. sp.

(Pl. xvi, figs. 1—9).

Body oblong oval, convex dorsally with faintly rugose lateral patches on the mesosomatic segments. Cephalon (figs. 1 and 2) small, lateral lobes fairly well developed, median lobe absent; epistoma depressed laterally and in the medio-dorsal portion. Eyes very small, occasionally one or both imperfect. Antennules (fig. 3) 3-jointed, with lateral setae on the distal joint. Antennae (fig. 4) rather slender, joints 2—5 slightly grooved, setae small and fine; flagellum 2-jointed. First maxillae (fig. 5), outer lobe terminates in five stout curved spines and four smaller ones, inner lobe truncate terminally with two short setose spines. Segments of the mesosome convex, lateral plates of 2nd to 5th segments excavate, 6th and 7th very slightly so, posterior angles of 2nd—5th segments only very faintly developed. Segments 1 and 2 with notch and groove on their inner margins for reception of succeeding segments (fig. 6). Maxillipedes (fig. 7), the outer palp terminates in a multispinous process on the outer side, at its base is a small upright

spine and three directed outwards, still more internally there are three fine spines; the inner palp has a single long marginal spine and two blunt tooth-like ones. Uropoda (fig. 8) not extending beyond the telson, basal plate narrow posteriorly, thickened and slightly convex dorso-laterally, antero-dorsal surface expanded obliquely; exopodite extending to the end of the basal plate, terminally truncate with short style, endopodite large, with two long whip-like setae terminally and numerous long setae elsewhere. Telson (fig. 9) slightly longer than the breadth of the posterior margin, which is almost straight, sides faintly curved. Length 10.5×5.5 . Colour (in alcohol) tawny-yellow.

Habitat.—Caves near Cherrapunji, Assam, *ca.* 4000 ft., 31-x-1914. No. $\frac{8929}{10}$ (*R. Friel*).

Type.—In the collection of the Indian Museum.

The eyes in this species are present in varying degrees of complexity. Sometimes they are represented by two or three pigmented facets with others in which there is no pigment, in other cases the facets are imperfect, the eye being represented by irregular-shaped pigment spots.

Cubaris lobatus, n. sp.

(Pl. xvii, figs. 1—11).

Body oblong oval, strongly convex, anterior margin deflected backwards. Cephalon (figs. 1 and 2) small, lateral lobes well developed, median lobe absent; epistoma sunken laterally with raised medium portion. Eyes large, situated dorso-laterally. Antennulae (fig. 3) longer than usual, 3-jointed, the terminal joint has a number of lateral setae and the 2nd joint a short spine on the inner side. Antennae (fig. 4) rather longer than usual, joints 2—5 grooved on their outer sides; flagellum 2-jointed, distal joint nearly three times as long as the proximal one, terminally there is a style. First maxillae (fig. 5), outer lobe terminates in four stout incurved spines and six smaller ones, inner lobe terminally rounded, with two setose spines. Second maxillae (fig. 6) thin and plate-like, outer lobe tooth-like, inner lobe terminating in a dense mass of fine setae. Segments of the mesosome strongly convex, lateral plates of 2nd to 5th segments excavate, remainder truncate, posterior angles very faintly developed. Segments 1 and 2 with notch and groove on their lower inner margins for reception of succeeding segments (fig. 7). Maxillipedes (fig. 8), outer lobe terminating in a multispinous process, external to this is a small curved spine and one large one and four short ones internally, on the ventral side a very large spine arises from the base of the lobe, the inner lobe has two stout curved tooth-like spines and a single fine one; arising from the basal segment are two long stout spines. Uropoda (figs. 9 and 10) not extending beyond the telson, basal plate narrow posteriorly, thickened, convex dorso-laterally, antero-dorsal surface expanded, oblique, with raised margin ven-

trally; exopodite small, articulating slightly away from the inner margin, endopodite stout, setose, terminating in three stout whip-like setae, which exhibit a series of spiral markings. Telson (fig. 11), posterior margin slightly broader than the length, sides faintly curved, expanded anteriorly, slightly raised in the median line. Length 9 mm. Colour (in alcohol) brown with light broken median line and yellowish mottling laterally

Habitat.—Parambikulam, 1700—3200 ft., Cochin State, 16—24-ix-1914. No. $\frac{8912}{10}$ (F. H. Gravely).

Type.—In the collection of the Indian Museum.

Cubaris lobatus exhibits a number of features not found in the majority of known species of the genus, thus the lateral lobes of the cephalon are well developed, the antennulae and antennae are longer than usual, and the maxillipedes differ markedly in detail.

Cubaris albolateralis, n. sp.

(Pl. xviii, figs. 1—12).

Body oblong oval, strongly convex, smooth, with a small lateral indentation on each side of all of the mesosomatic segments. Cephalon (figs. 1 and 2) small, with posterior margin raised, lateral lobes feebly developed, median lobe absent, dorsal surface with raised lateral lines; epistoma dorsally sloping backwardly, otherwise almost vertical. Eyes dorsal. Antennulae (fig. 3) 3-jointed, proximal joint attenuated at its base, distal joint with number of lateral setae on the inner border. Antennae (fig. 4) short and stout, 2nd to 5th joints deeply grooved on their outer sides; flagellum 2-jointed, distal joint three times the length of the proximal one, terminally there is a short style. First maxillae (fig. 5), outer lobe terminates in four stout curved spines and six smaller ones, inner lobe rounded terminally with two long curved setose spines. Second maxillae (fig. 6) thin and plate-like, terminating distally in an inner setaceous lobe and an outer tooth-like plate. Segments of the mesosome strongly convex, each has laterally a small indentation (fig. 7), lateral plates of 2nd to 4th segments slightly excavate, remainder truncate or almost so, posterior angles only slightly produced backwards. Segments 1 and 2 with notch and groove on their inner margins for reception of succeeding segments (fig. 8). Maxillipedes (fig. 9), outer lobe terminates in a multispinous process and four inner fine pointed spines, the inner lobe has a tooth-shaped spine on its outer and inner border and two longer pointed spines. Uropoda (figs. 10 and 11) not extending beyond the telson, basal plate narrow posteriorly, terminally blade-like, thickened and slightly convex dorso-laterally, anterodorsal surface expanded, ventrally the outer border shows a flattened rim and blade-like posterior margin; exopodite small with terminal style, situated on the inner lateral margin of the basal plate, which is obliquely flattened, endopodite large, with two long whip-like setae terminally, setose elsewhere, in section triangular.

Telson (fig. 12), posterior margin almost straight and broader than the length, sides curved, anterior portion expanded, convex dorsally. Length 8 mm. Colour (in alcohol) greyish-green, dorsally with few lateral irregular yellowish markings, yellowish below the indentations.

Habitat.—Under stones, Kamalapuram, S. India, 6-ix-1912. No. $\frac{8911}{10}$ (*T. B. Fletcher*).

Type.—In the collection of the Indian Museum.

There are a number of important characters in this species by which it differs from any other members of the genus, amongst these may be mentioned the dorsal position of the eyes and the very feeble development of the lateral lobes of the cephalon, the short, thick-jointed antennae, the broad maxillipedes, the truncate lateral plates of the 5th—7th mesosomatic segments, and the form of the uropoda.

Genus **Burmoniscus**, Cllege.

Hitherto this genus has been known only from the two examples of *B. moulmein*, Cllege,¹ obtained by Mr. F. H. Gravely, from the Farm Caves, near Moulmein.

With so limited a supply of material the description of the genus was perforce somewhat imperfect, and I am now able to give a fuller diagnosis, and at the same time add an additional species to the genus.

B. moulmein, and *Philoscia coeca*, Budde-Lund², have hitherto been the only cavernicolous species of Terrestrial Isopoda known from India, indeed only very few have been described from Asia. Ridley³ mentions *Armadillo intermixtus*, Budde-Lund, as being common on the walls of caves in the Malay Peninsula, and Budde-Lund⁴ describes with that species *A. nigromarginatus* from the same locality. He has also described⁵ an *Armadillo infuscatus* from the same source.

In all probability there are a considerable number of species awaiting discovery, especially belonging to the genus *Cubaris*. Just as in Europe we have a large Isopodean cave fauna⁶ belonging to the Trichoniscidae, so, I think, we shall find a similar one in India referable to the Cubaridae.

Burmoniscus, Cllege.

1914. *Burmoniscus*, Collinge, *Rec. Ind. Mus.*, vol. VIII, p. 466, pl. xxxi.

Body oblong oval, dorsal surface strongly convex, perfectly smooth and shiny. Cephalon small, emarginate, median and lateral lobes absent. Eyes absent, may be represented by pigmented

¹ *Rec. Ind. Mus.*, 1914, vol. VIII, p. 466.

² *Ann. Mus. Civ. Stor. Nat. Genova*, 1894, s. 2, vol. XIV, p. 612.

³ *Brit. Assocn. Rpt.*, 1898, p. 581.

⁴ *Rev. Crust. Terr. Isop.*, 1899, pp. 126, 127.

⁵ *Proc. Zool. Soc. Lond.*, 1902, p. 380.

⁶ Racovitza, *Arch. Zool. exp. e. gén.*, 1907, t. 7 and 1909, t. 9.

areas. Antennae slender, elongated, joints grooved on their outer sides, with 3-jointed flagellum. First maxillae, outer lobe terminates in four stout curved spines and four finer inner ones which latter have bifurcated ends. Second maxillae thin and plate-like, the inner one terminating in a brush of fine setose spines. Segments of the mesosome strongly convex, the lateral plates of 1 to 4 slightly overlap one another posteriorly, whilst those of 5 and 7 are produced backwardly, especially the 7th. Maxillipedes poorly developed, with the inner lobe the larger. Metasome narrow, lateral plates small and slightly incurved. Uropoda with elongated, somewhat flattened basal plate, which extends beyond the telson; exopodite long and pointed, endopodite elongated. Telson very short and broad, terminally rounded or pointed.

Although I have carefully examined a number of specimens I have not so far been able to find any antennules. Apart from the maxillae, the mouth parts are of little value here for purposes of generic distinction.

Respecting the affinities of this genus it is not possible to say much, as our knowledge of the Indian and Asiatic Terrestrial Isopoda is, as yet, so fragmentary. In the form of the cephalon, the mesosome, and metasome and the uropoda, *Burmoniscus* undoubtedly shows a remote relationship with *Philoscia*, at least the Asiatic *Philoscias*, although these also are, as yet only imperfectly understood.

***Burmoniscus kempi*, n. sp.**

(Pl. xix, figs. 1—8).

Body oblong oval, dorsal surface convex, smooth and shiny. Cephalon (figs. 1 and 2) larger than in *B. moulmeinensis*, Collge., and partly flanked by the lateral plates of the 1st segment of the mesosome, emarginate, median and lateral lobes absent; epistoma almost vertical. Eyes absent. Antennae (fig. 3) slender and elongated, especially the 4th and 5th joints, peduncular and flagellar joints grooved on their outer sides, flagellum 3-jointed, terminal joint with long fine style. First maxillae (fig. 4), outer lobe terminates in four stout curved spines and four inner ones deeply bifurcated, inner lobe rounded terminally with two setose spines. Second maxillae (fig. 5) thin and flexible, somewhat thicker on the inner side, on the outer side it is produced into a thin plate with radiating thickened arms, anteriorly terminating as a flattened tooth, and a smaller one on the inner side, between the two the inner lobe forms a brush-like mass of setae. Maxillipedes (fig. 6) poorly developed, the inner lobe the larger. Uropoda (fig. 7) with elongated, somewhat flattened basal plate which extends beyond the telson, grooved dorsally between points of articulation of exopodite and endopodite; exopodite long, stout, and slightly ridged dorsally on the outer side, endopodite elongated, and comparatively not so stout. Telson (fig. 8) short with the posterior

margin rounded. Length 7.5 mm. Colour (in alcohol) light brown with darker pigmented network.

Habitat.—Maosmai Cave, Cherrapunji, Assam, *ca.* 4000 ft., x-1914. No. $\frac{8918}{10}$ (S. W. Kemp). Living in total darkness.

Type.—In the collection of the Indian Museum.

*B. kemp*i differs from *B. moulmein*us in having a larger cephalon, in the more elongated form of the spines of the outer lobe of the 1st maxillae and in the form of the inner lobe also. The 2nd maxilla is quite unlike that in *B. moulmein*us, and the basal plate of the uropoda is narrower and more elongated, there is also a lateral ridge on the outside of the exopodite. The telson is very different, being shorter and rounded posteriorly.

This species is named in compliment to Mr. S. W. Kemp, by whom it was discovered, and whose work has added so largely to our knowledge of the Decapod and other Crustacea of India.

ERRATA.

In the previous "Contribution", *Rec. Ind. Mus.*, 1915, Vol. XI, Pt. II, No. 6, on pages 144, 149 and 151 under the descriptions of the antennae, the word *inner* should read *outer*.

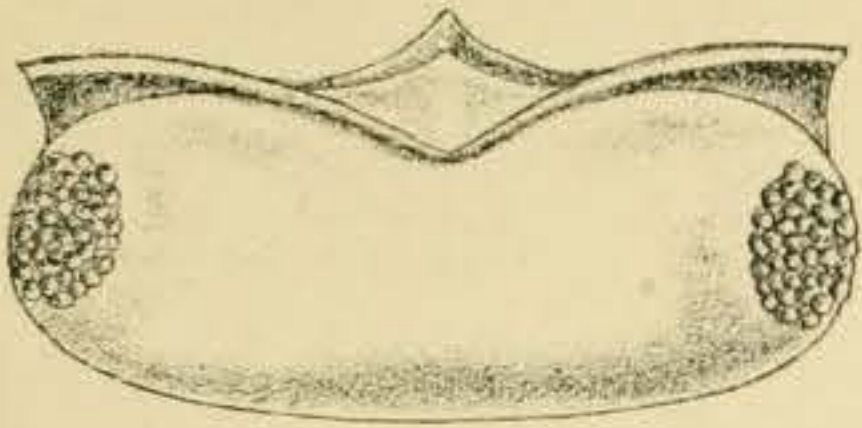
EXPLANATION OF PLATE IX.

Paraperiscyphis pulcher, n. sp.

- FIG. 1.—Dorsal view of the cephalon.
,, 2.—Right antennule.
,, 3.—Right antenna.
,, 4.—Right uropod, dorsal view.
,, 5.—Telson and uropoda.

Paraperscyphis scabrus, n. sp.

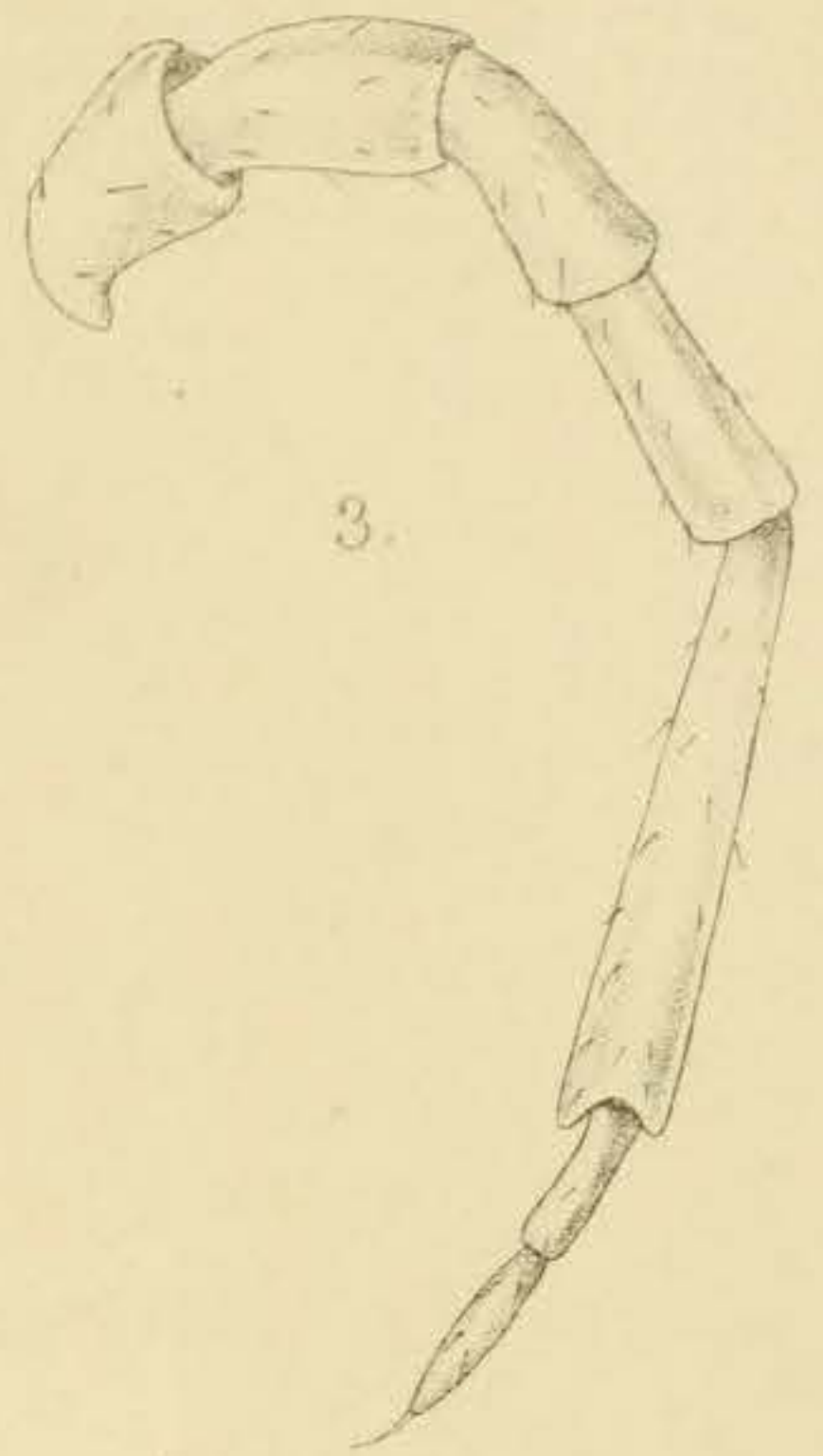
- FIG. 6.—Dorsal view of the cephalon.
,, 7.—Left antennule.
,, 8.—Right antenna.
,, 9.—Right uropod, dorsal view.
,, 10.—Telson and uropoda.



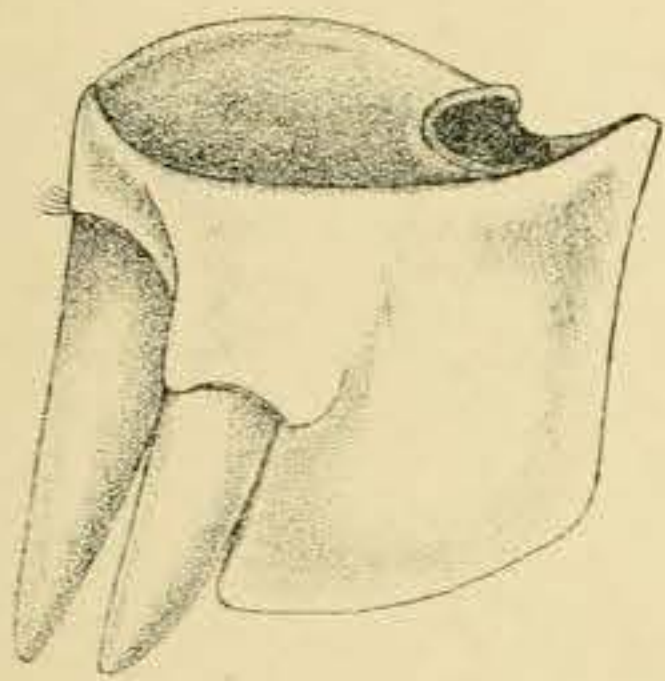
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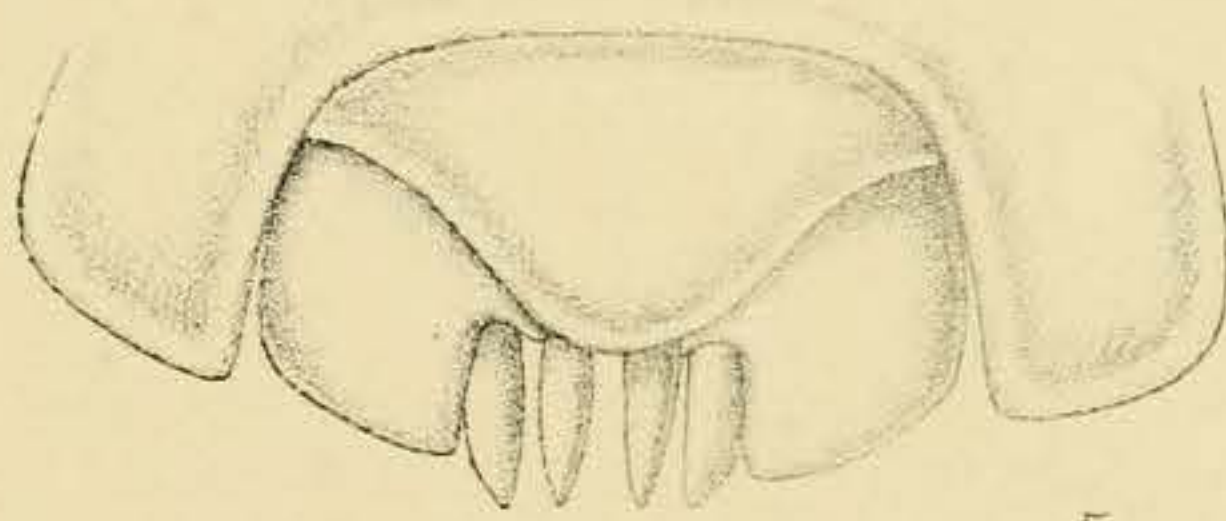
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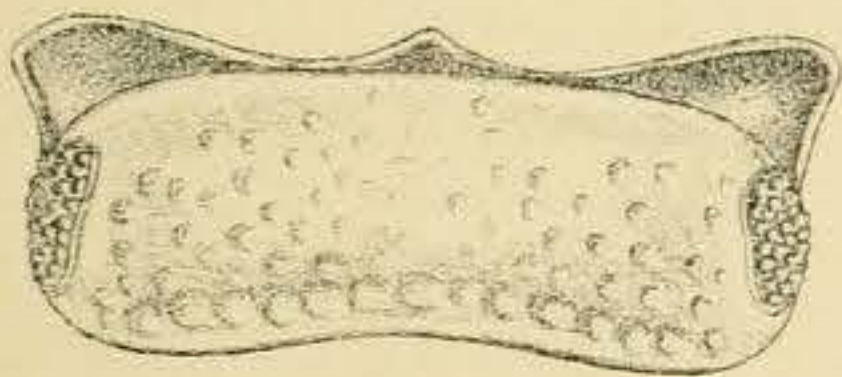
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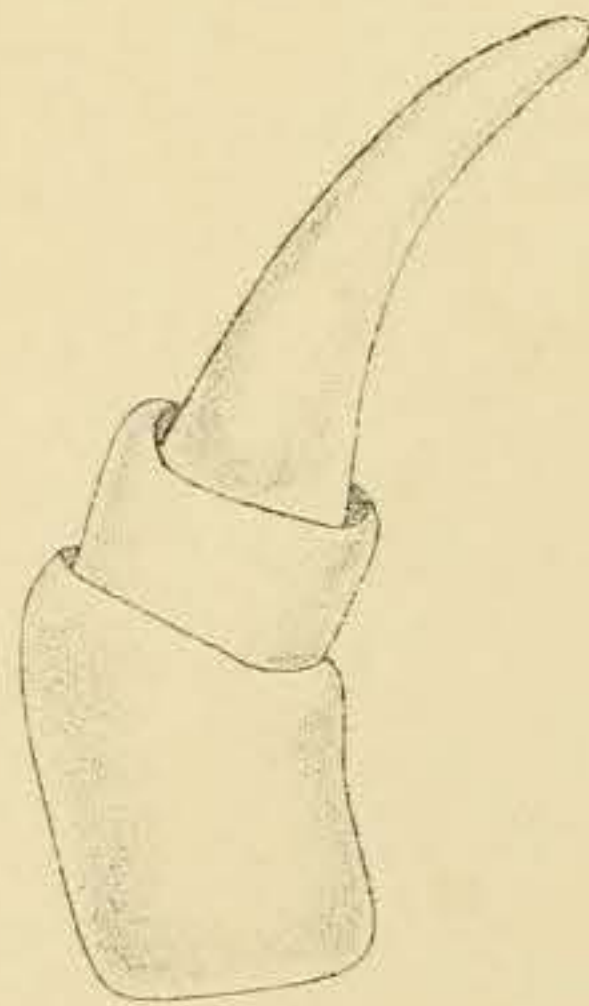
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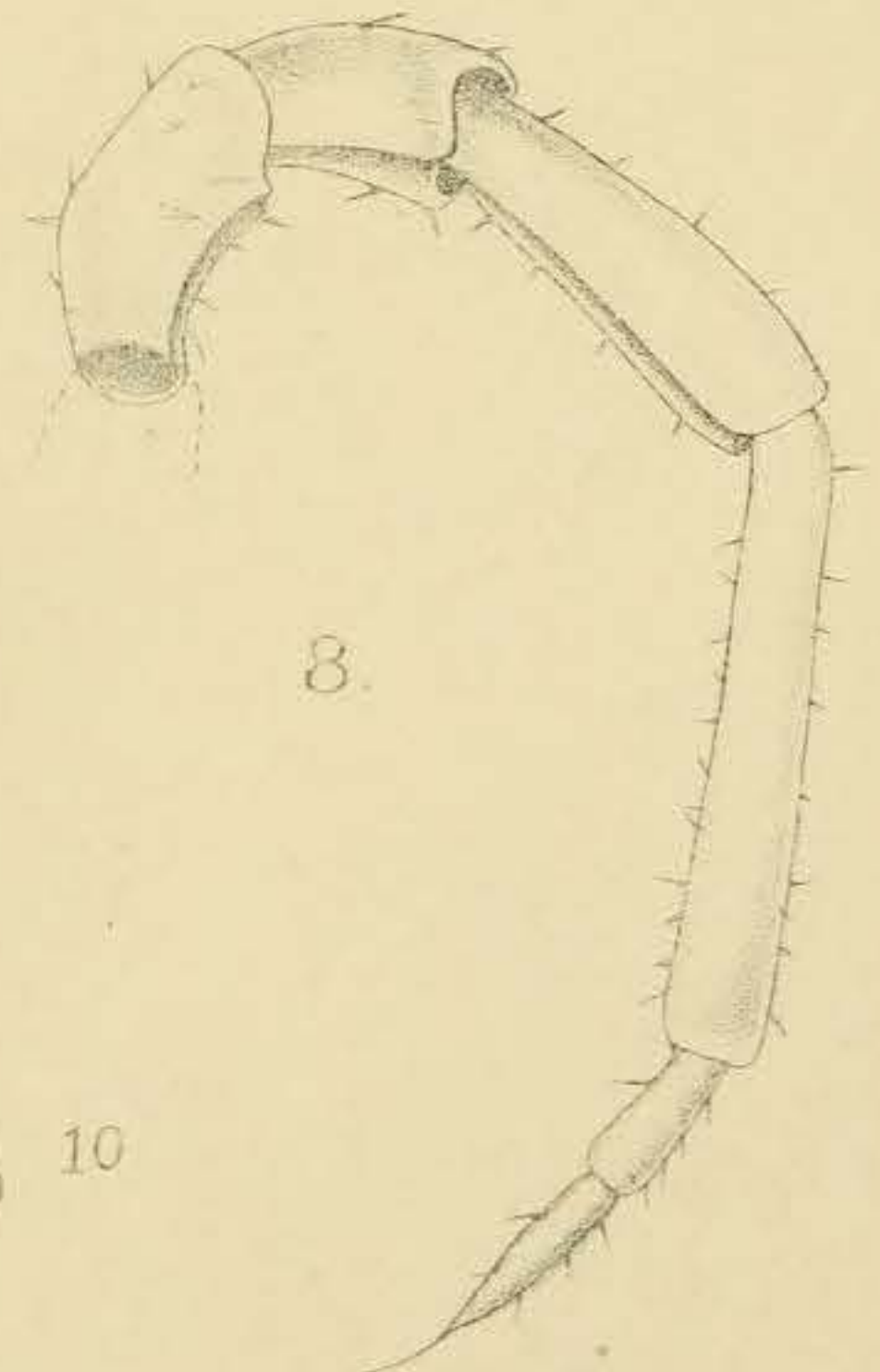
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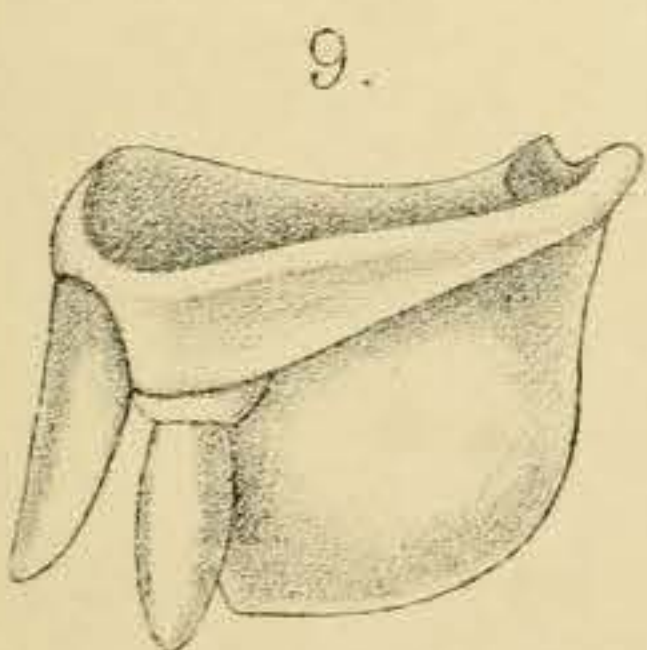
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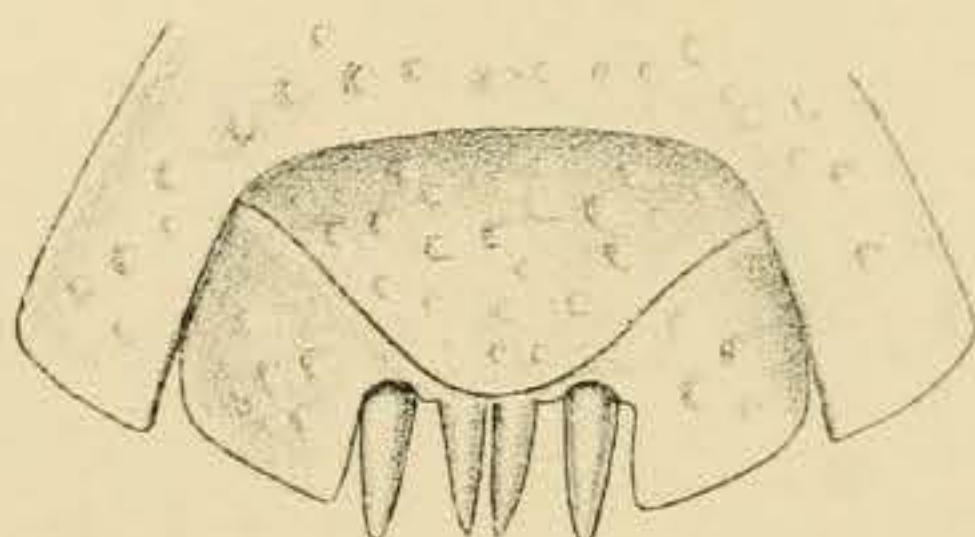
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H.G.K. del.

A. Chowdhary, lith.

1- 5. PARAPERISCYPHIS PULCHER, n. sp.
6-10. PARAPERISCYPHIS SCABRUS, n. sp.

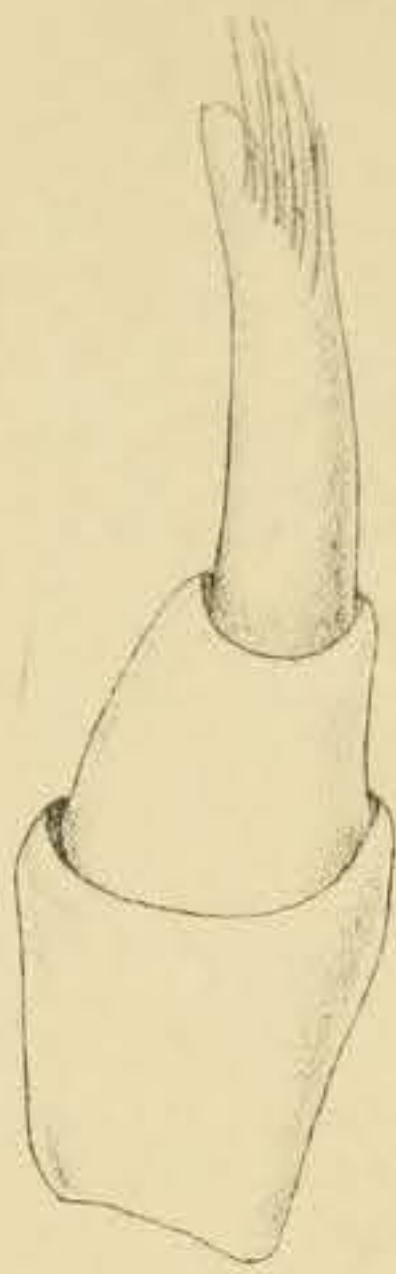
EXPLANATION OF PLATE X.

Cubaris gravelii, n. sp.

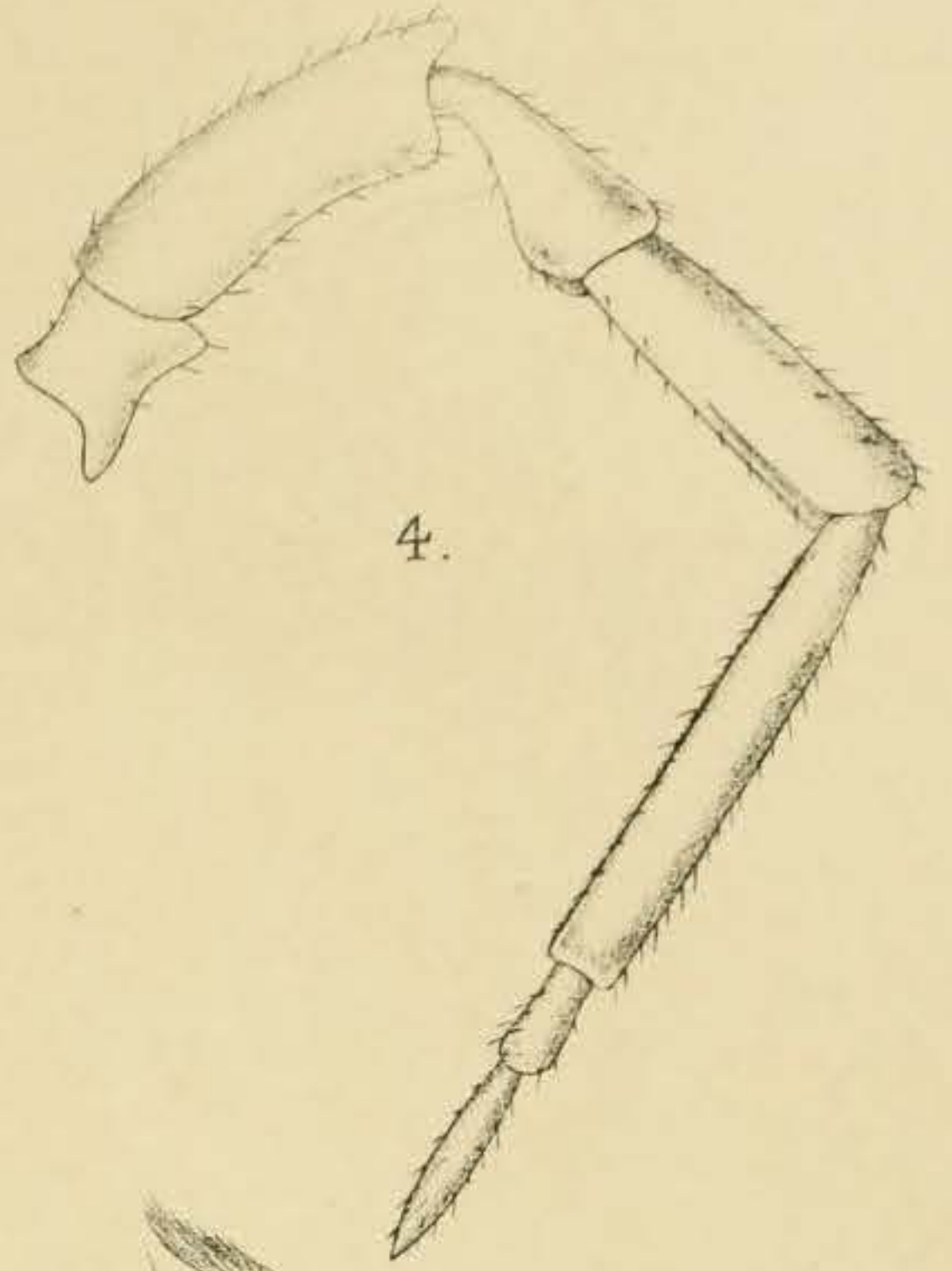
- FIG. 1.—Dorsal view of the cephalon.
,, 2.—Anterior view of the cephalon.
,, 3.—Antennule.
,, 4.—Right antenna.
,, 5.—First maxilla, outer lobe.
,, 6.—Second maxilla.
,, 7.—Lateral portions of 1st and 2nd mesosomatic segments,
showing notch and groove on the inner border of the
under side.
,, 8.—Maxillipede, terminal portion.
,, 9.—Right uropod, dorsal view.
,, 10.—Right uropod, ventral view.
,, 11.—Last metasomatic segment, uropoda, and telson.



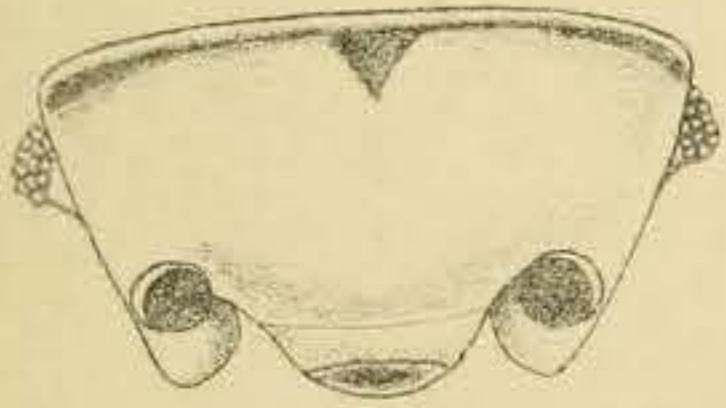
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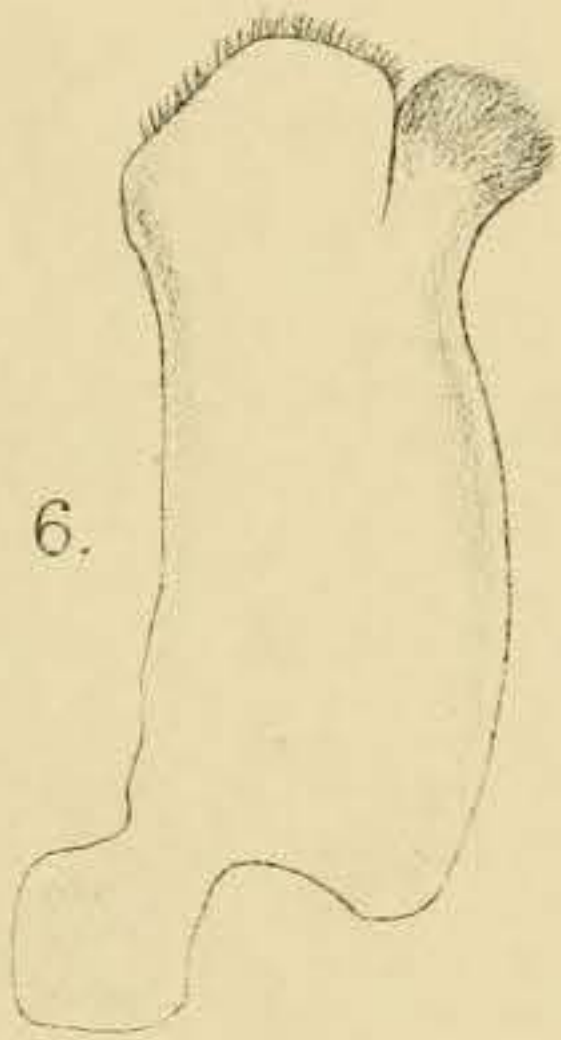
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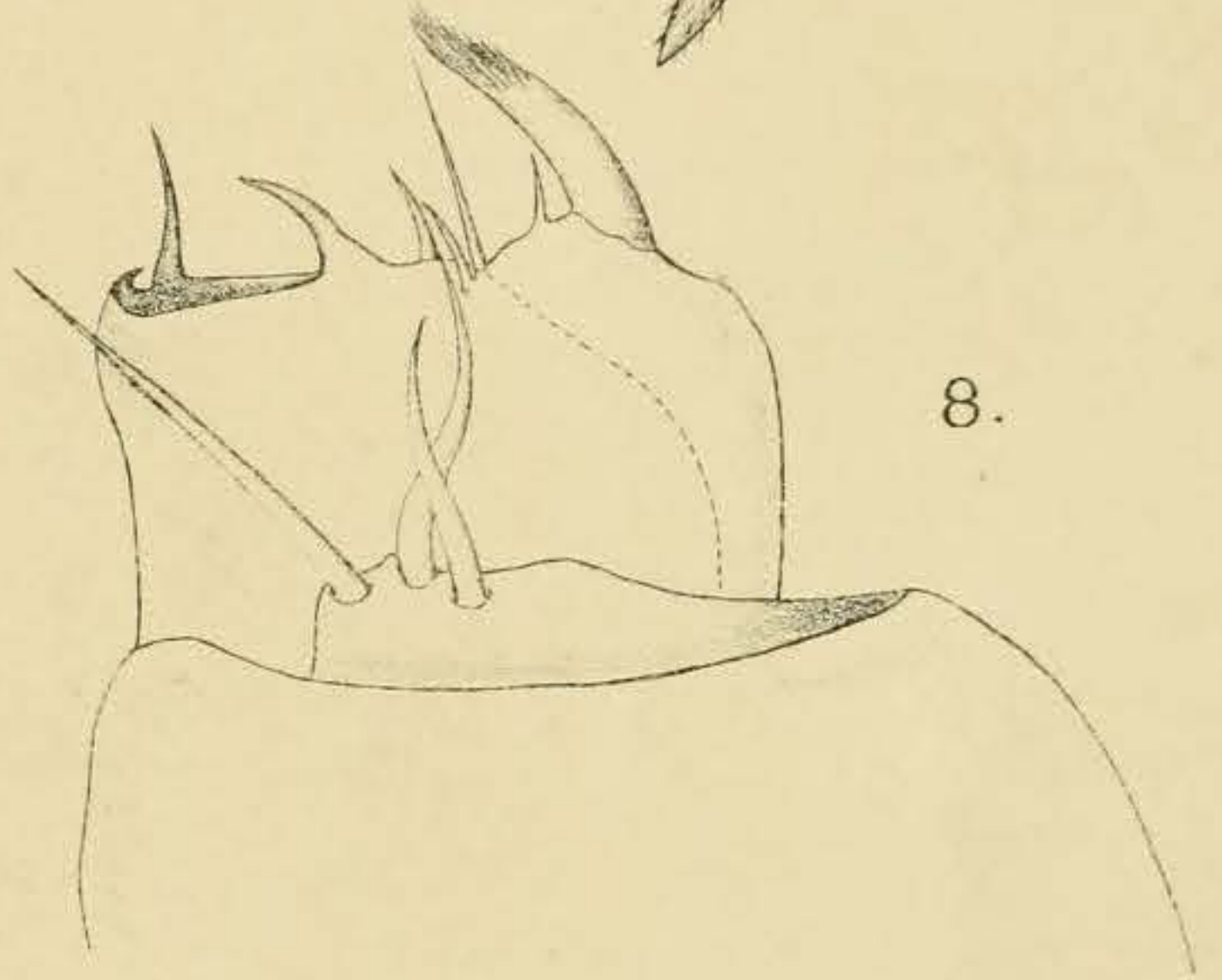
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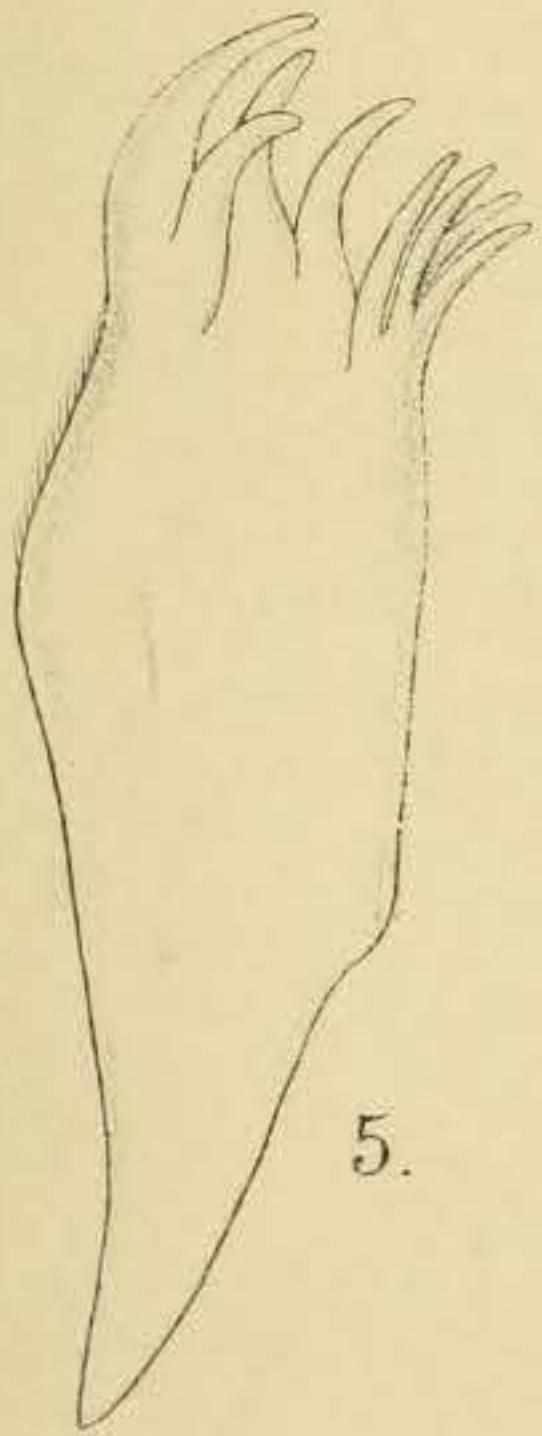
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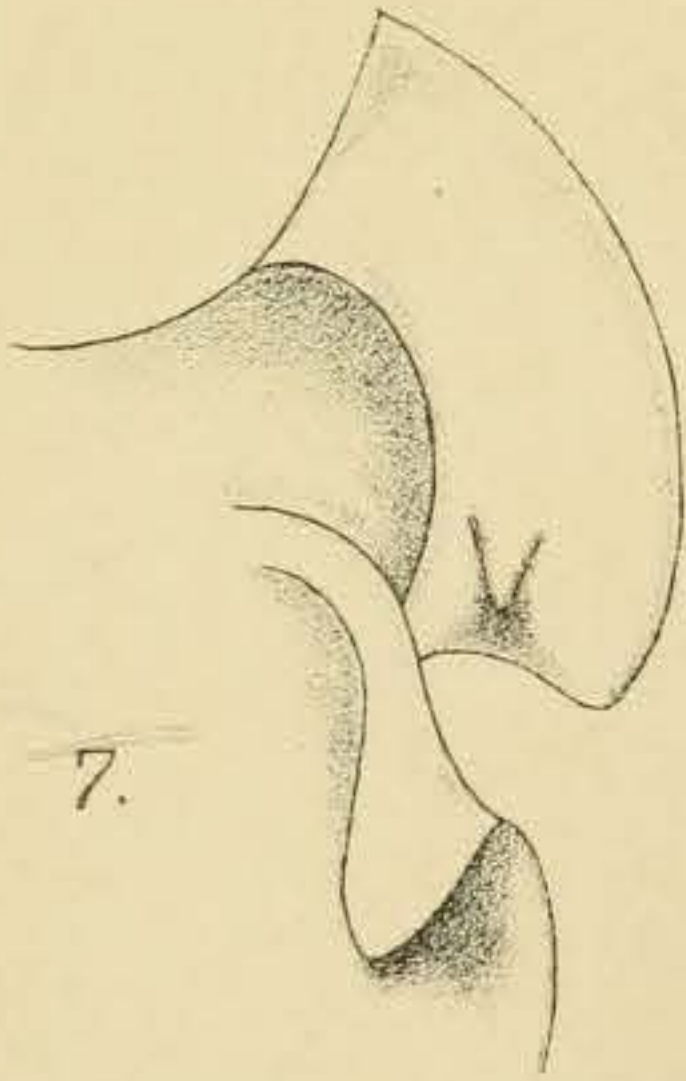
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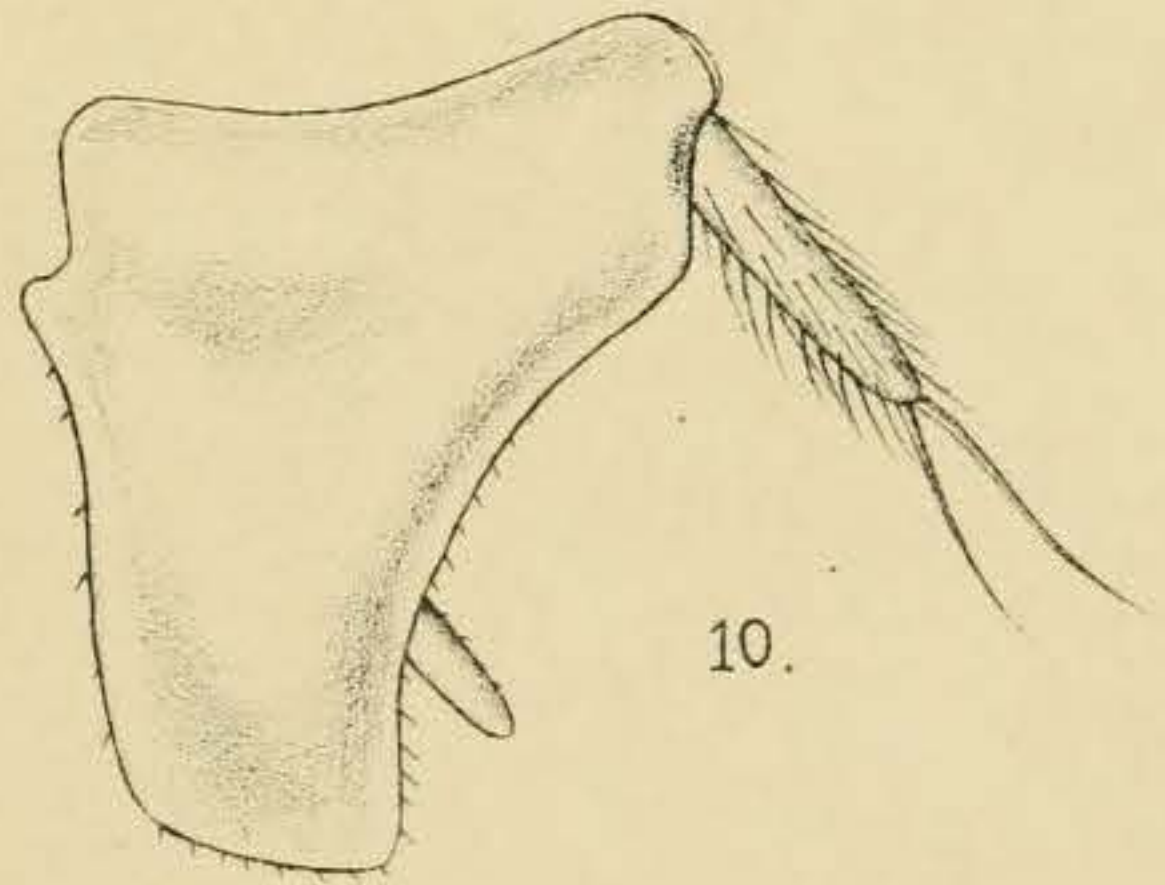
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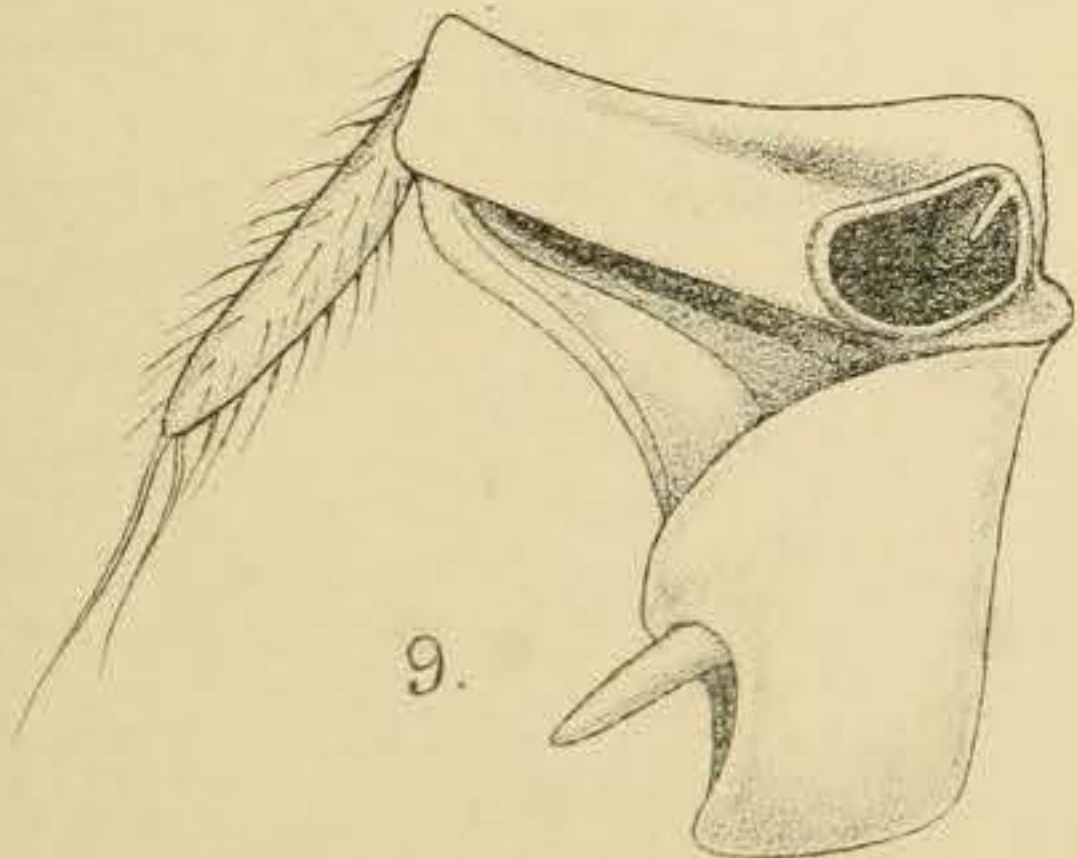
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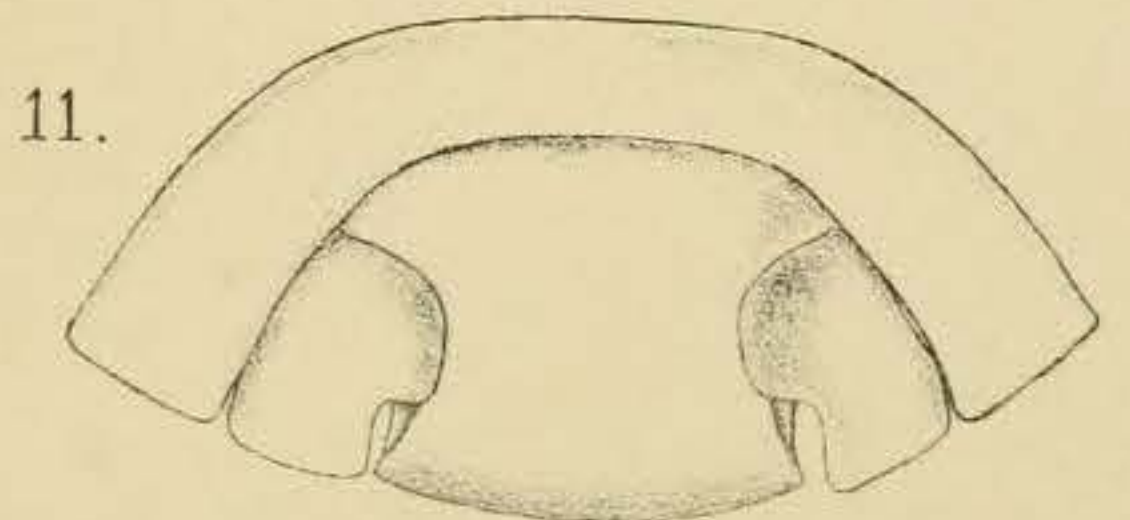
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H.G.K. del.

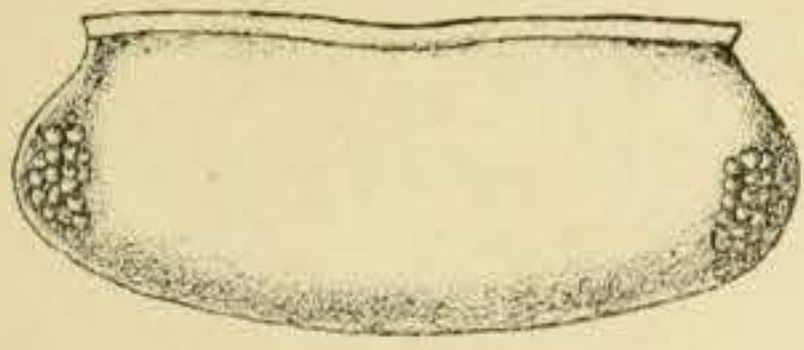
A. Chowdhary, lith.

CUBARIS GRAVELII, n. sp.

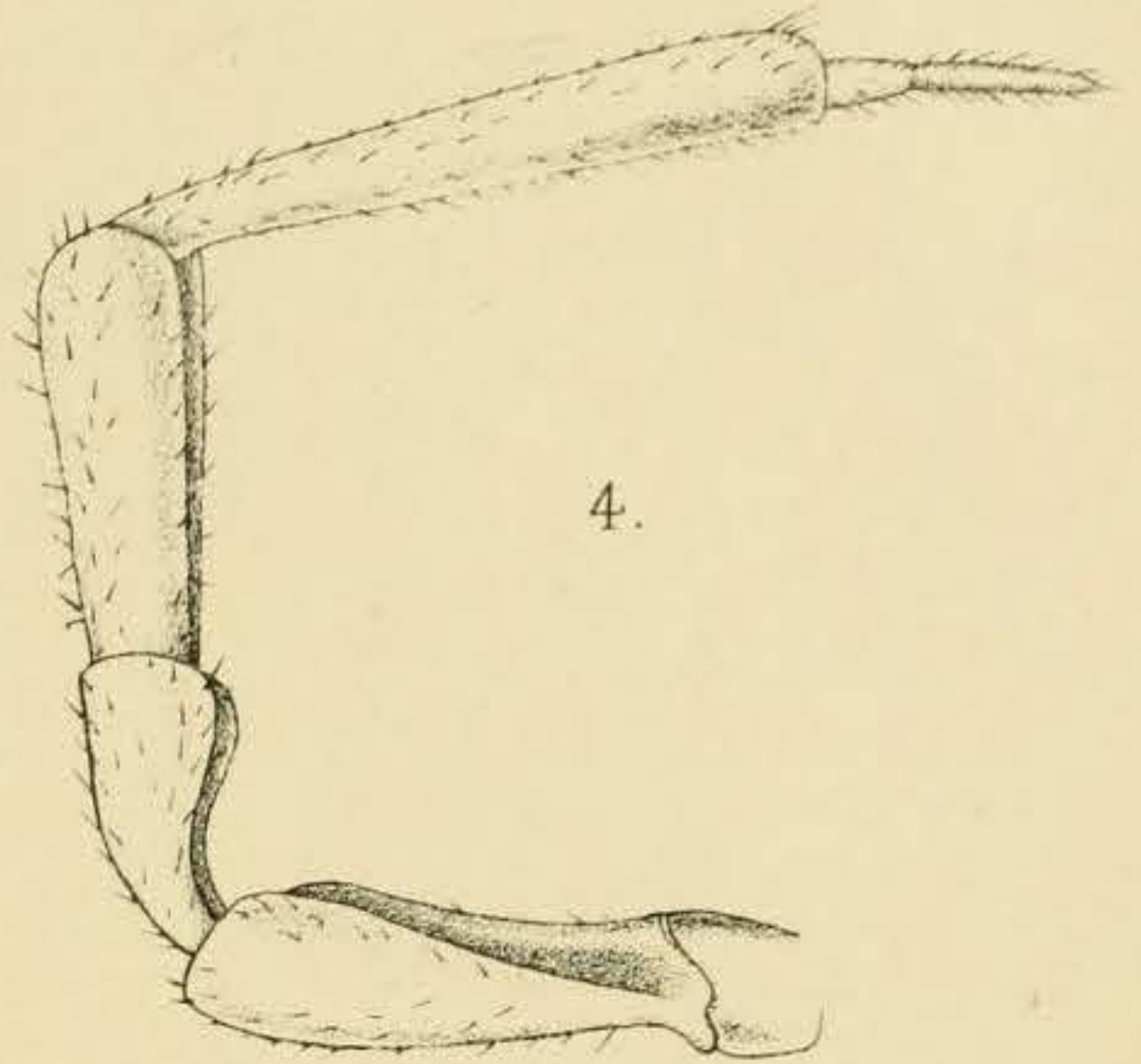
EXPLANATION OF PLATE XI.

Cubaris expansus, n. sp.

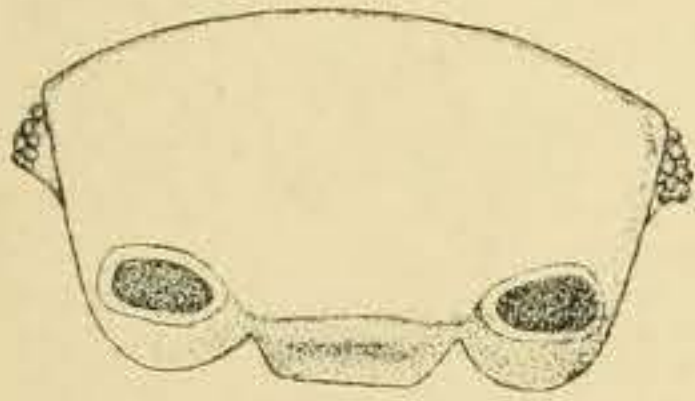
- FIG. 1.—Dorsal view of the cephalon.
,, 2.—Anterior view of the cephalon.
,, 3.—Antennule.
,, 4.—Right-antenna.
,, 5.—First-maxilla, terminal portion of outer lobe.
,, 6.—Lateral portions of 1st and 2nd mesosomatic segments,
showing notch and groove on the inner border of the
under side.
,, 7.—Maxillipede, terminal portion.
,, 8.—Right uropod, dorsal view.
,, 9.—Right uropod, ventral view.
,, 10.—Last metasomatic segment, uropoda, and telson.



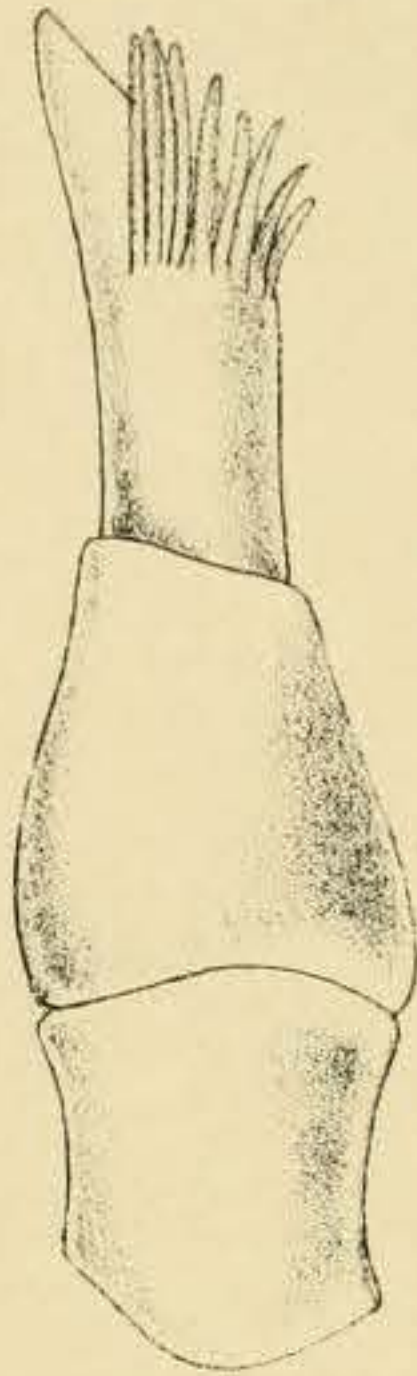
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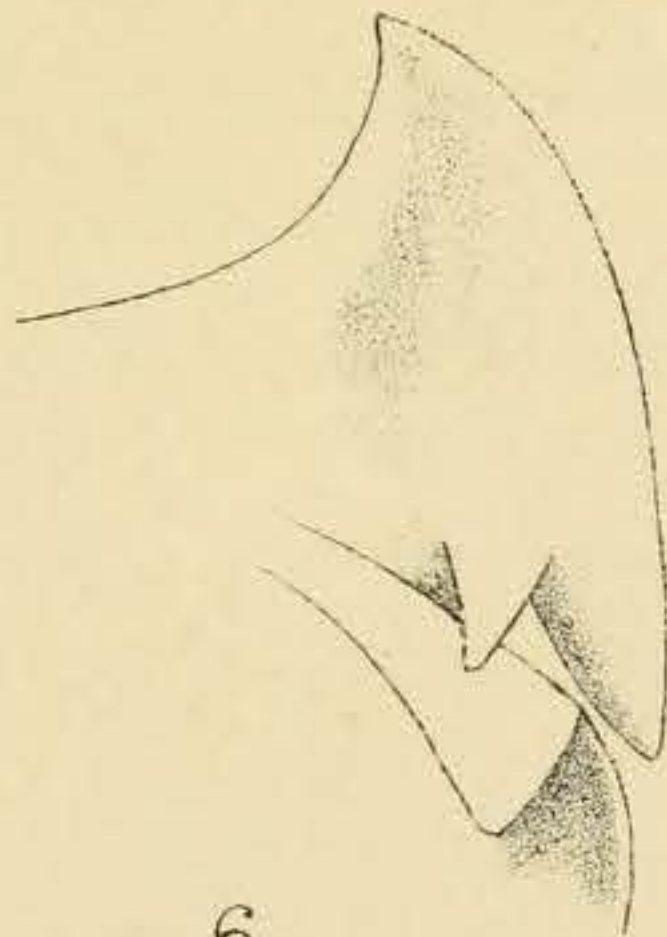
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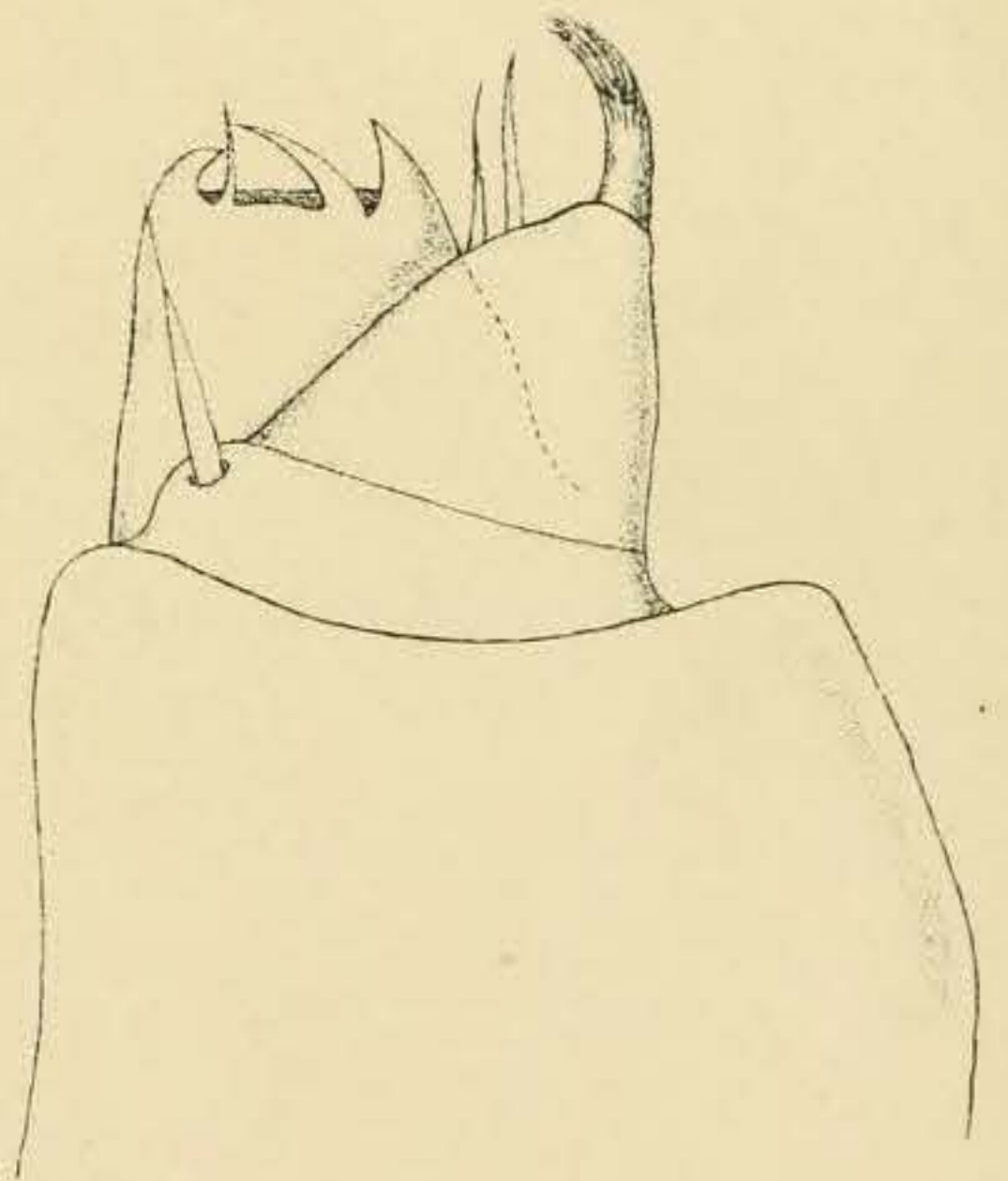
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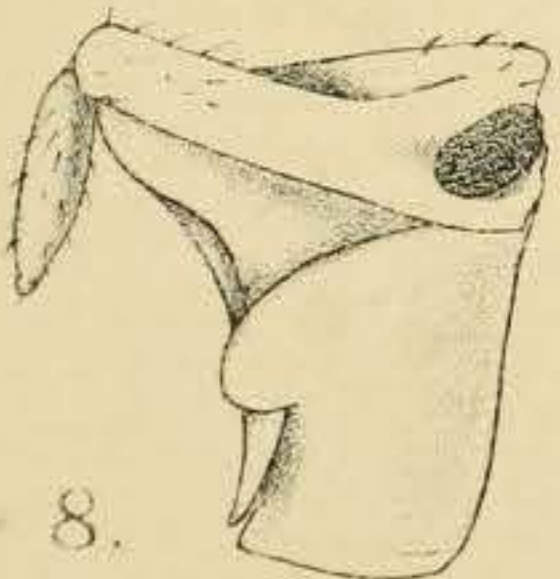
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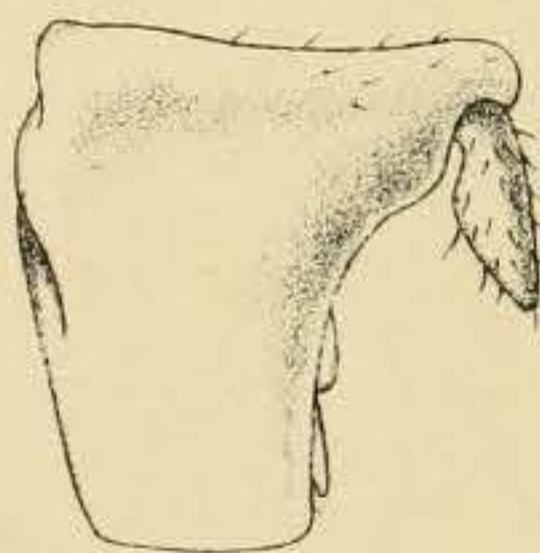
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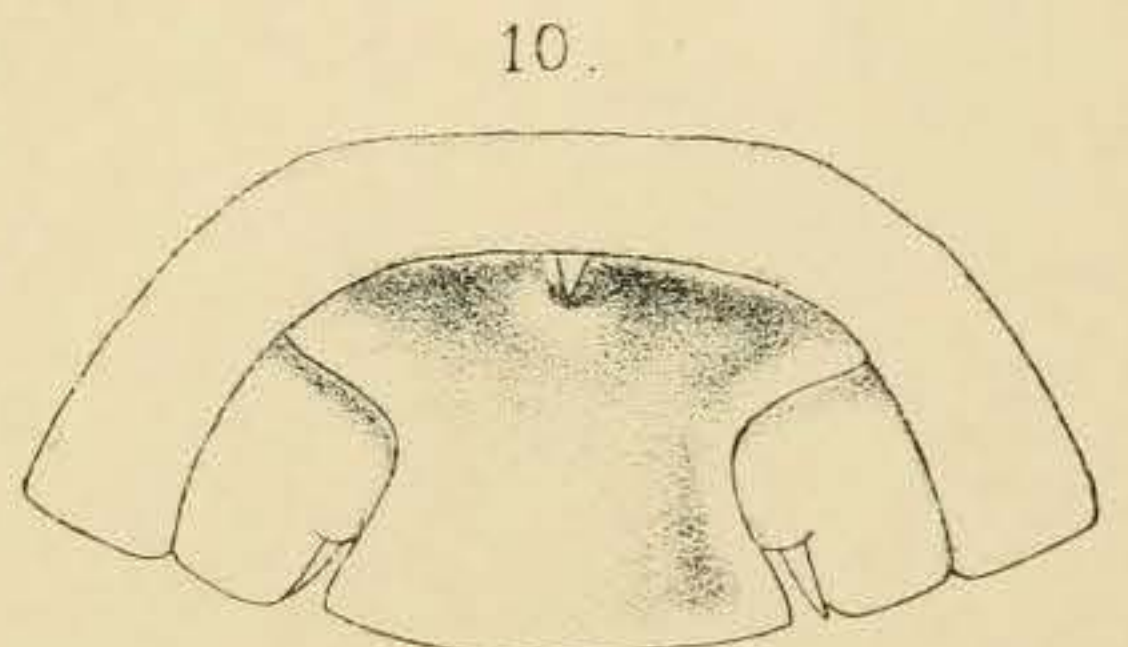
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H.G.K. del.

CUBARIS EXPANSUS, n. sp.

A. Chowdhary, lith.

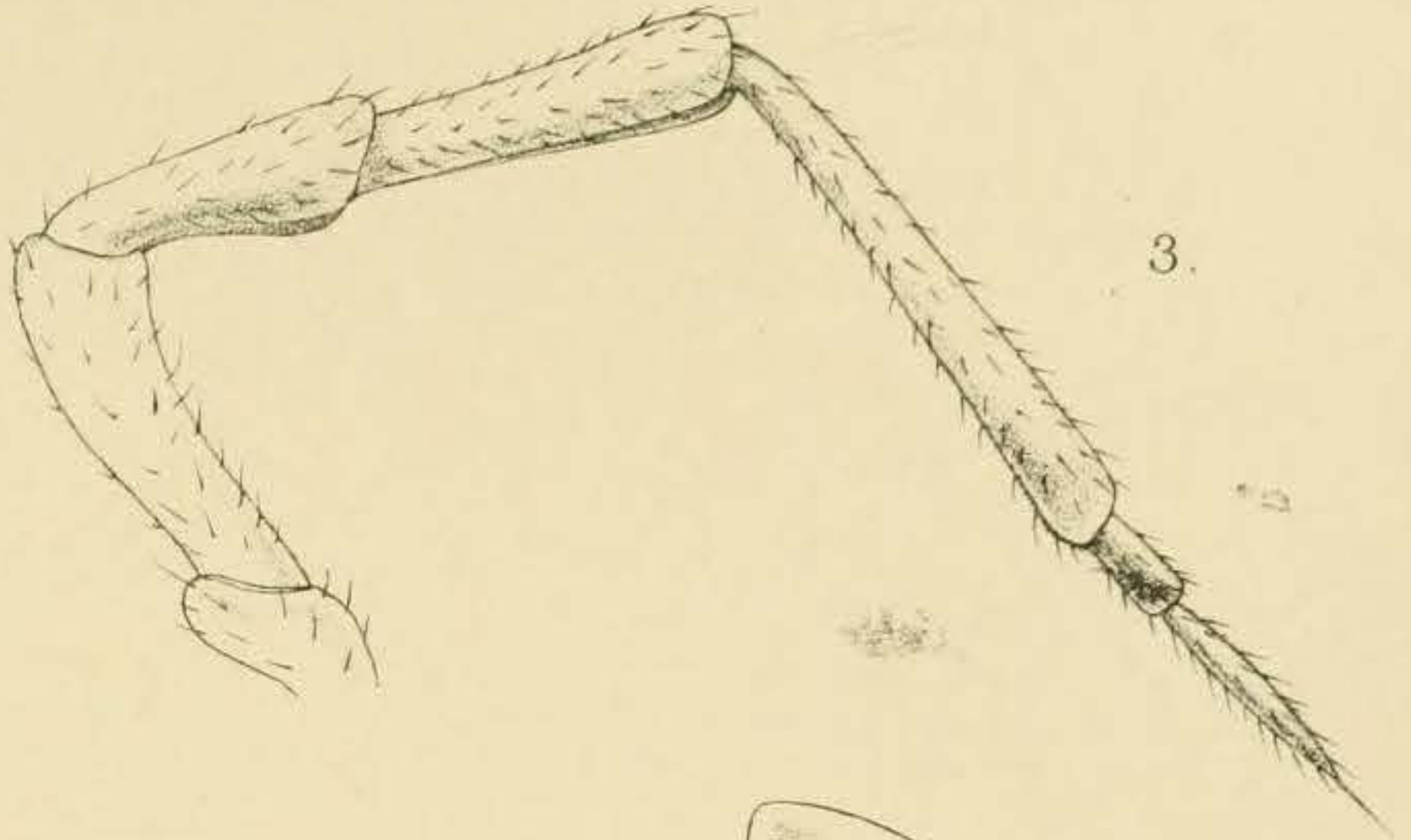
EXPLANATION OF PLATE XII.

Cubaris dilectum, n. sp.

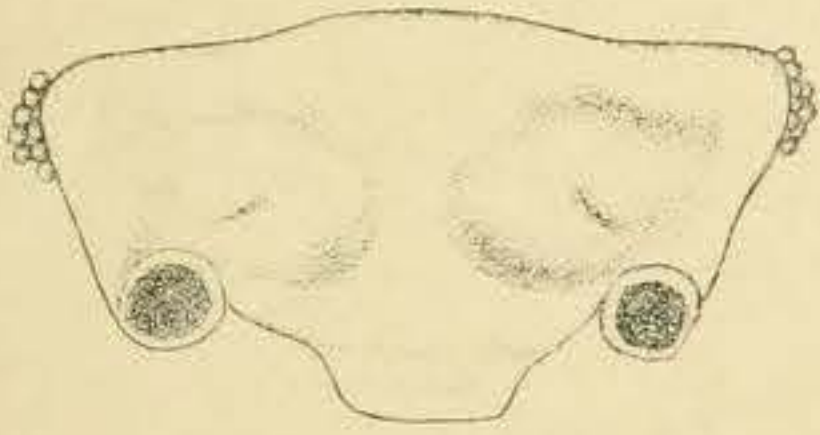
- FIG. 1.—Dorsal view of the cephalon.
,, 2.—Anterior view of the cephalon.
,, 3.—Right antenna.
,, 4.—First maxilla, terminal portion of outer lobe.
,, 5.—Lateral portions of 1st and 2nd mesosomatic segments,
showing notch and groove on the inner border of the
under side.
,, 6.—Maxillipede, terminal portion.
,, 7.—Right uropod, dorsal view.
,, 8.—Right uropod, ventral view.
,, 9.—Last metasomatic segment, uropod and telson.



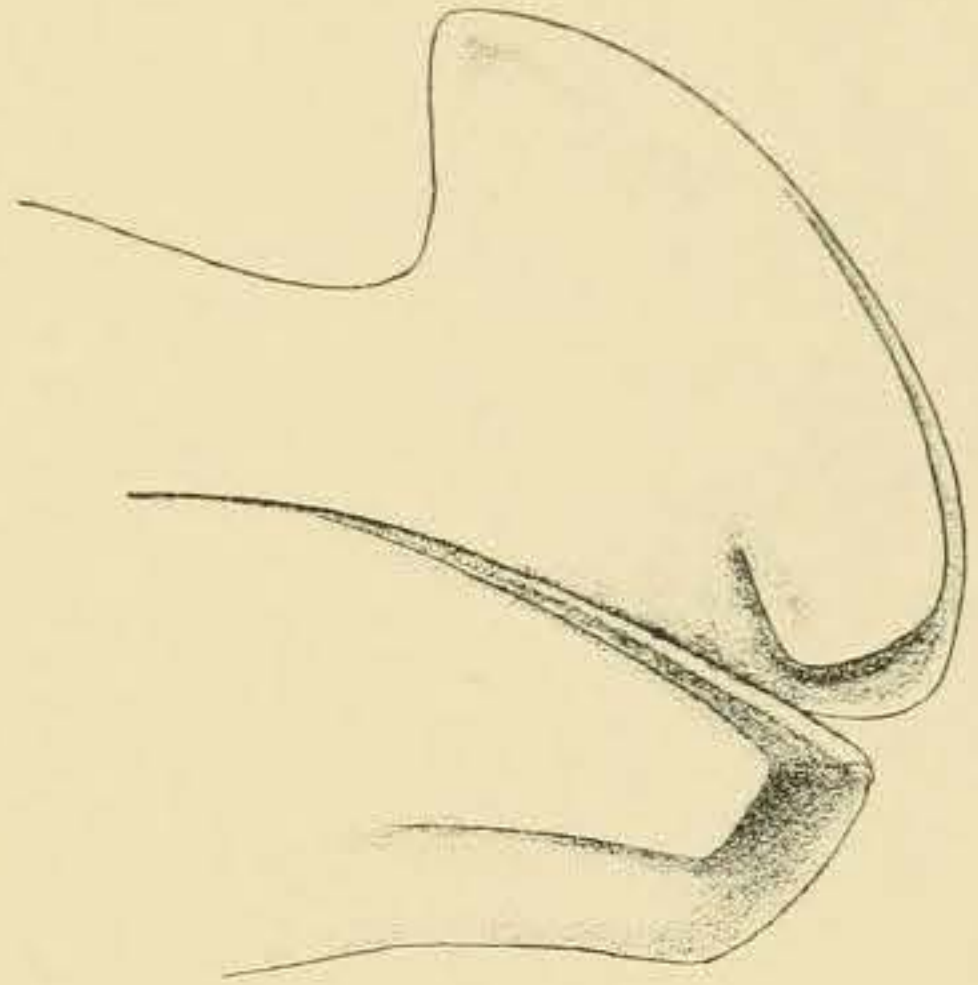
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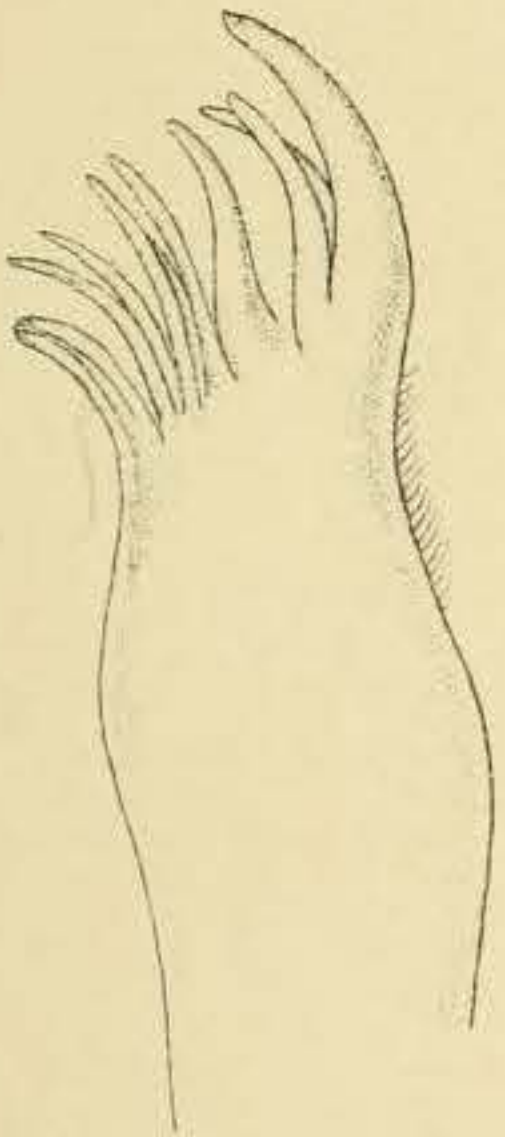
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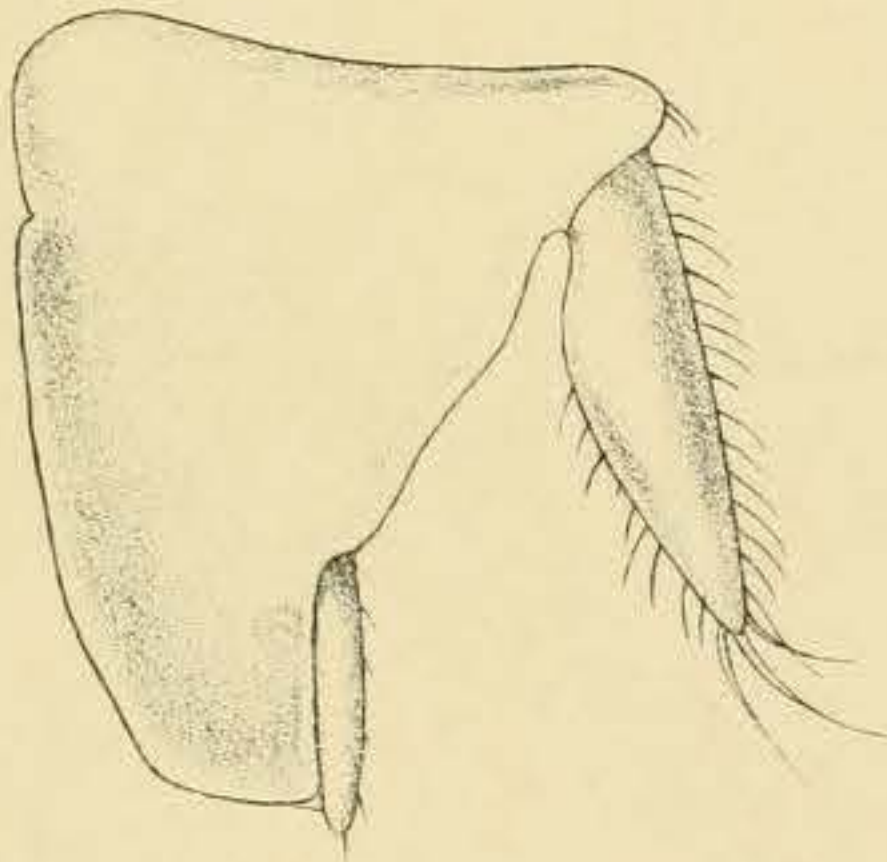
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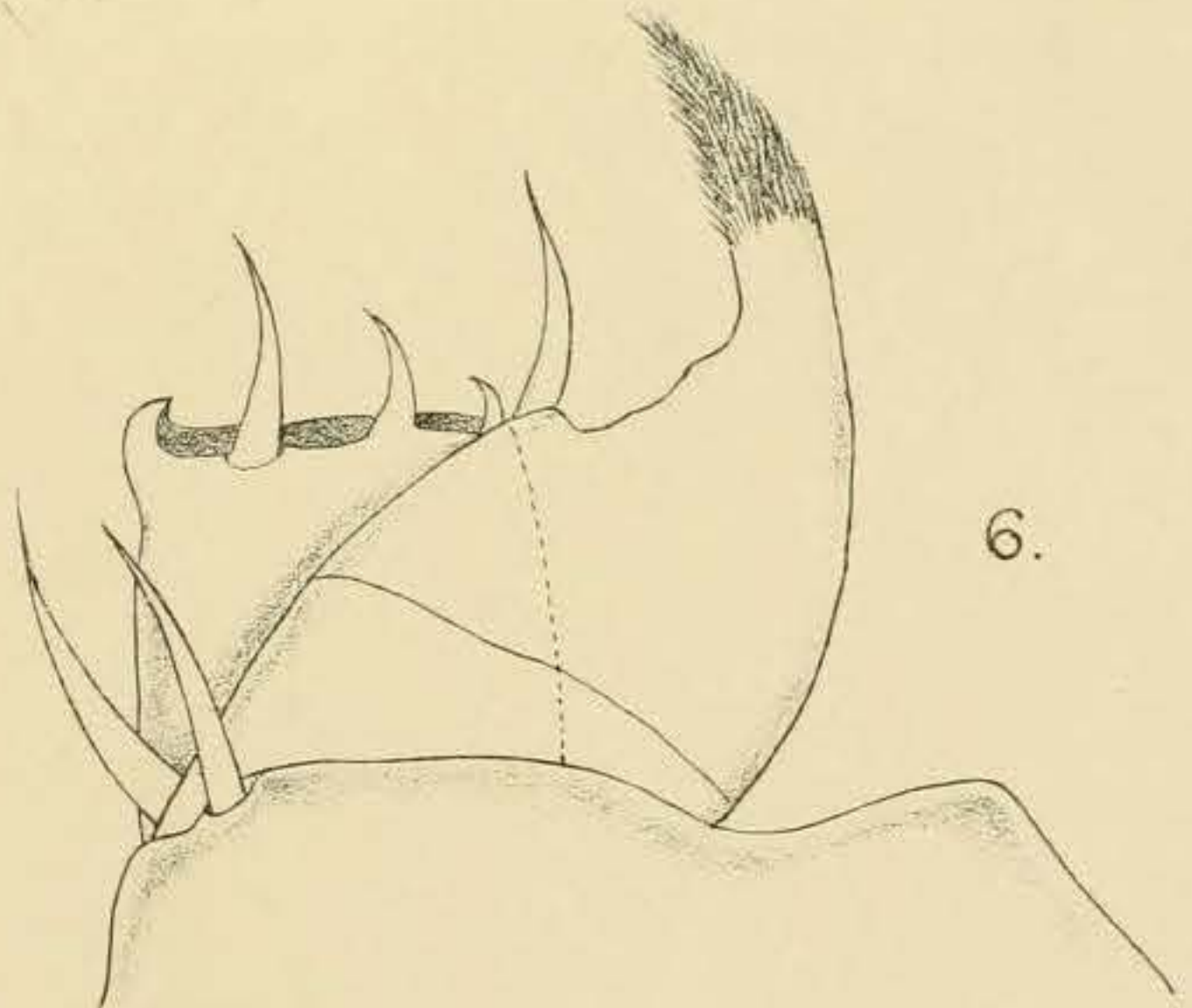
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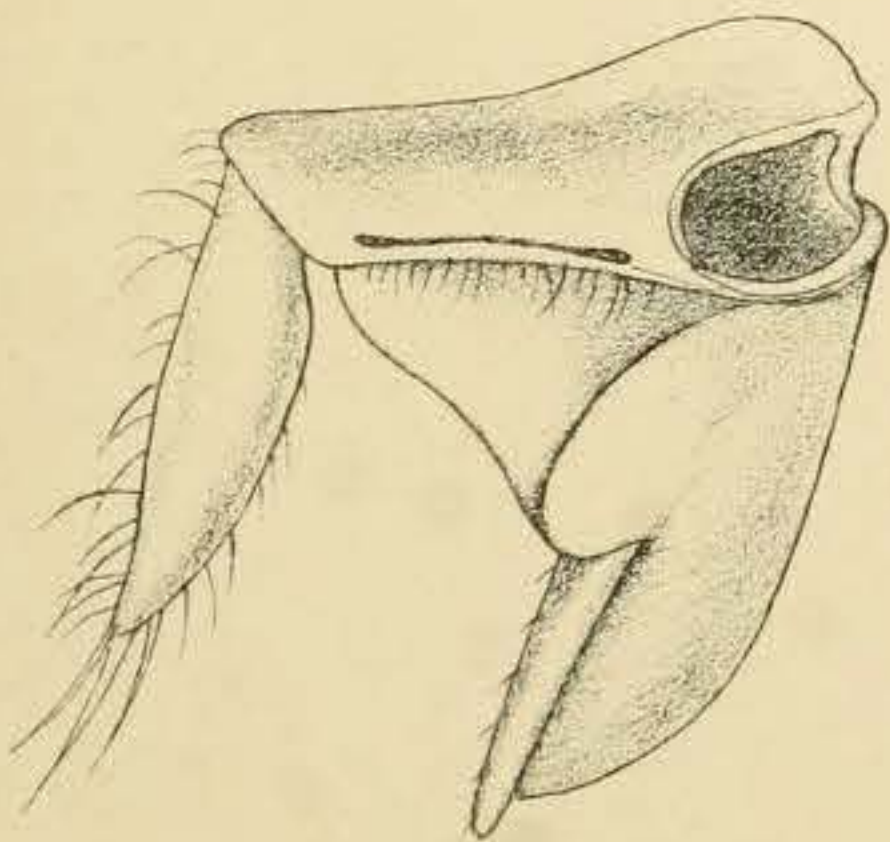
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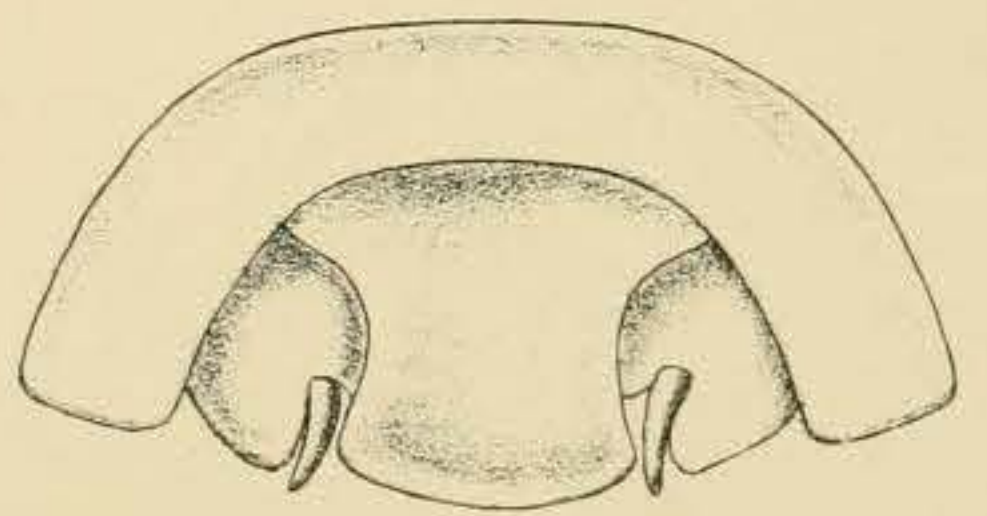
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H.G.K. del.

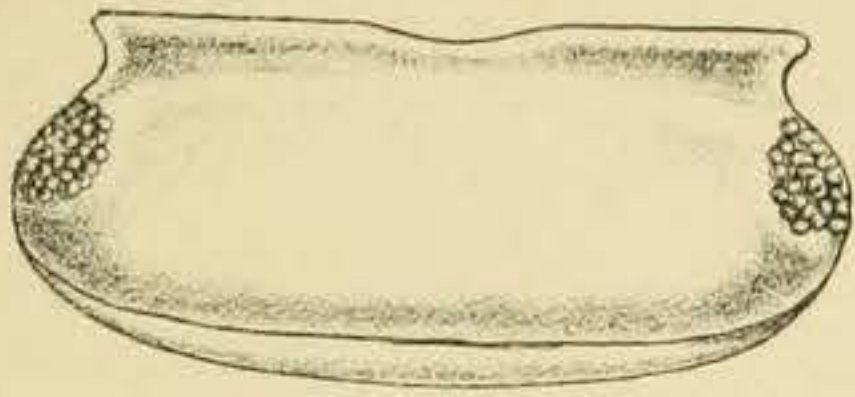
A.Chowdhary, lith.

CUBARIS DILECTUM, n. sp.

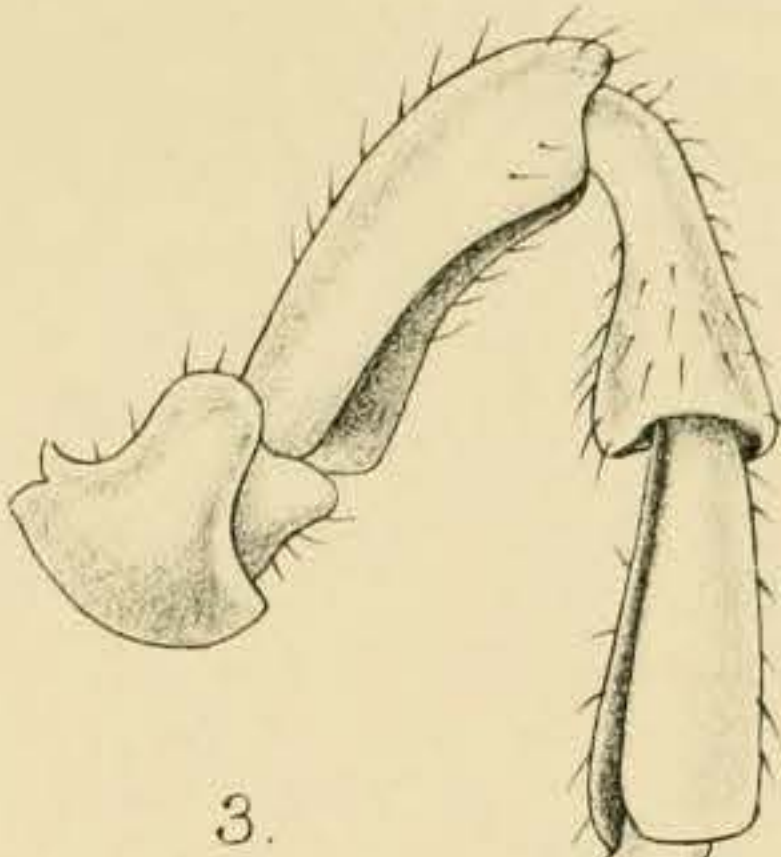
EXPLANATION OF PLATE XIII.

Cubaris pusillus, n. sp.

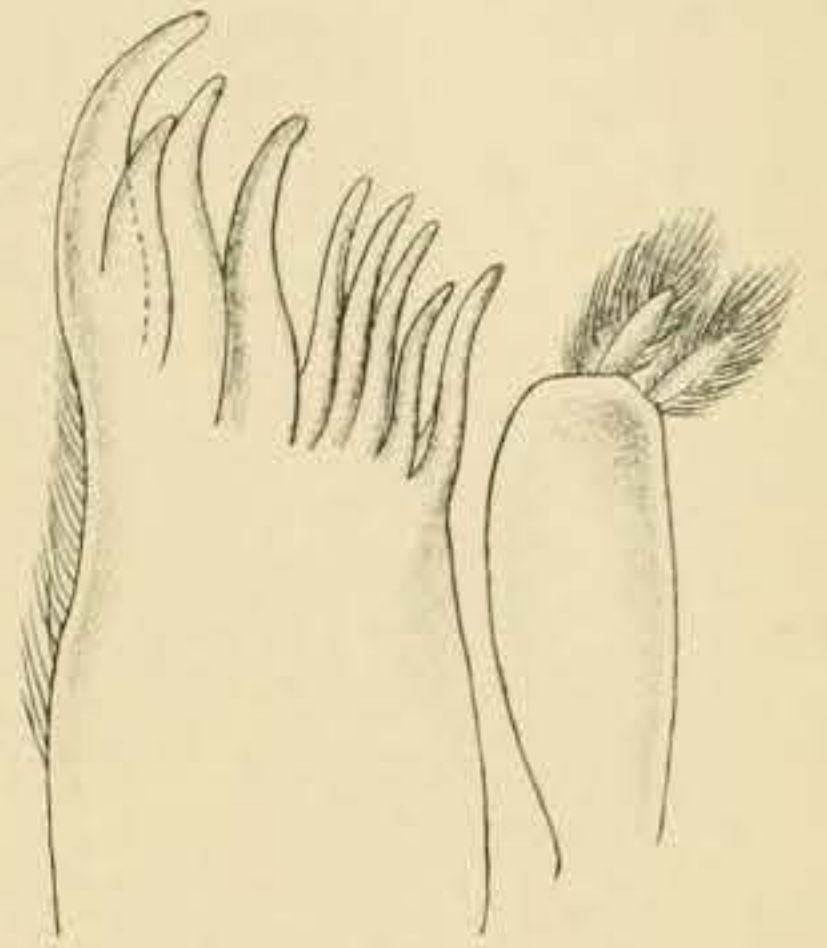
- FIG. 1.—Dorsal view of the cephalon.
,, 2.—Anterior view of the cephalon.
,, 3.—Right antenna.
,, 4.—First maxilla, terminal portions of inner and outer lobes.
,, 5.—Second maxilla, terminal portion.
,, 6.—Lateral portions of 1st and 2nd mesosomatic segments,
showing notch and groove on the inner border of the
under side.
,, 7.—Maxillipede, terminal portion.
,, 8.—Right uropod, dorsal view.
,, 9.—Right uropod, ventral view.
,, 10.—Last metasomatic segment, uropod and telson.



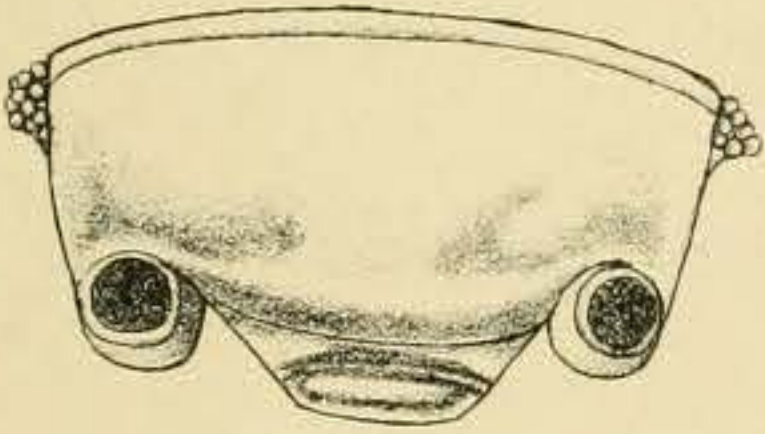
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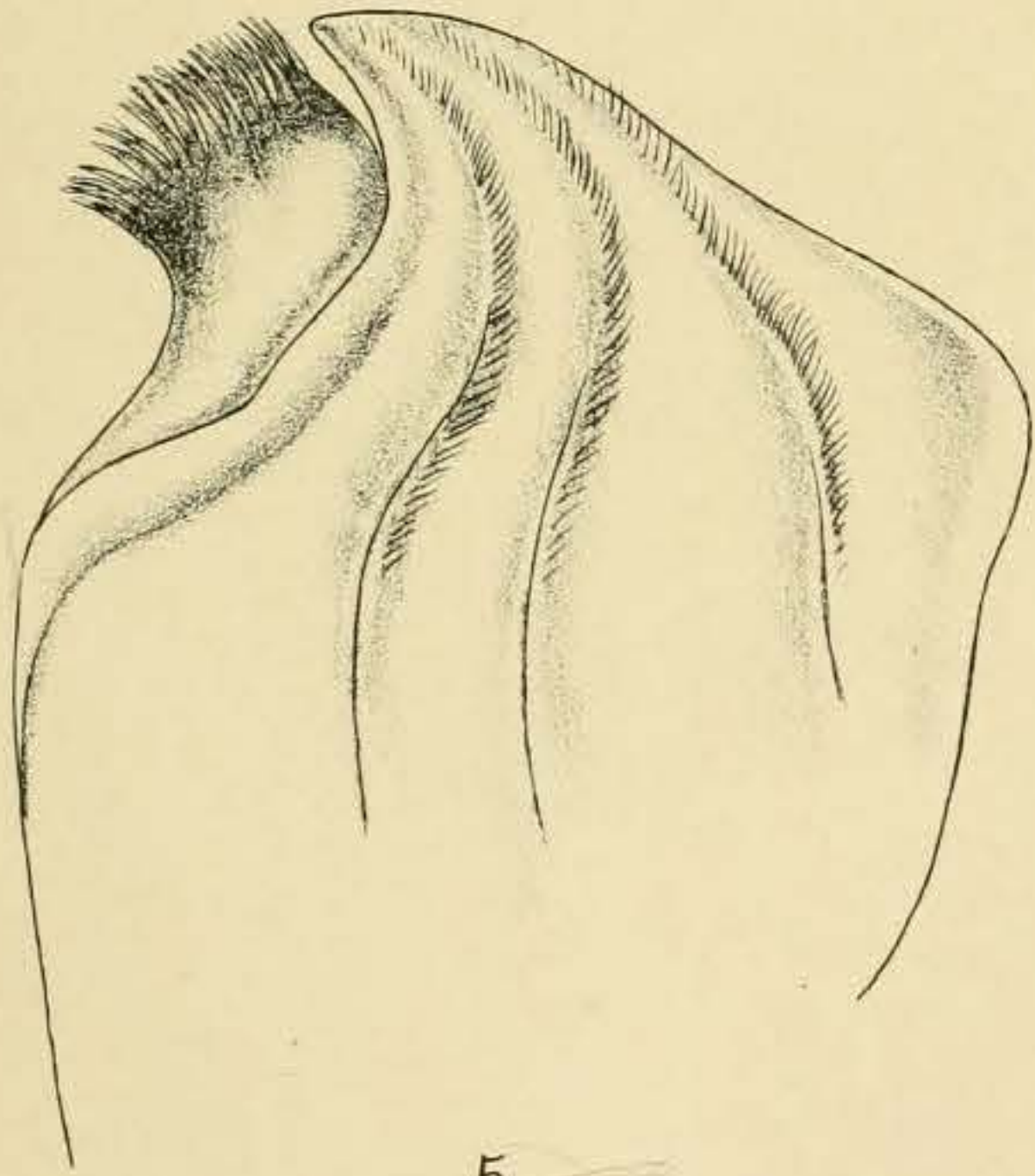
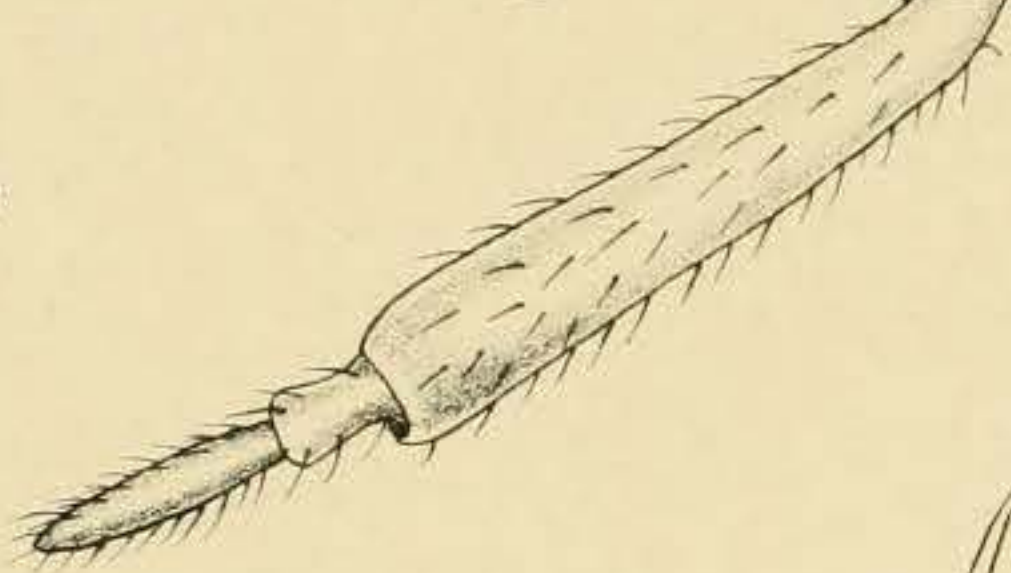
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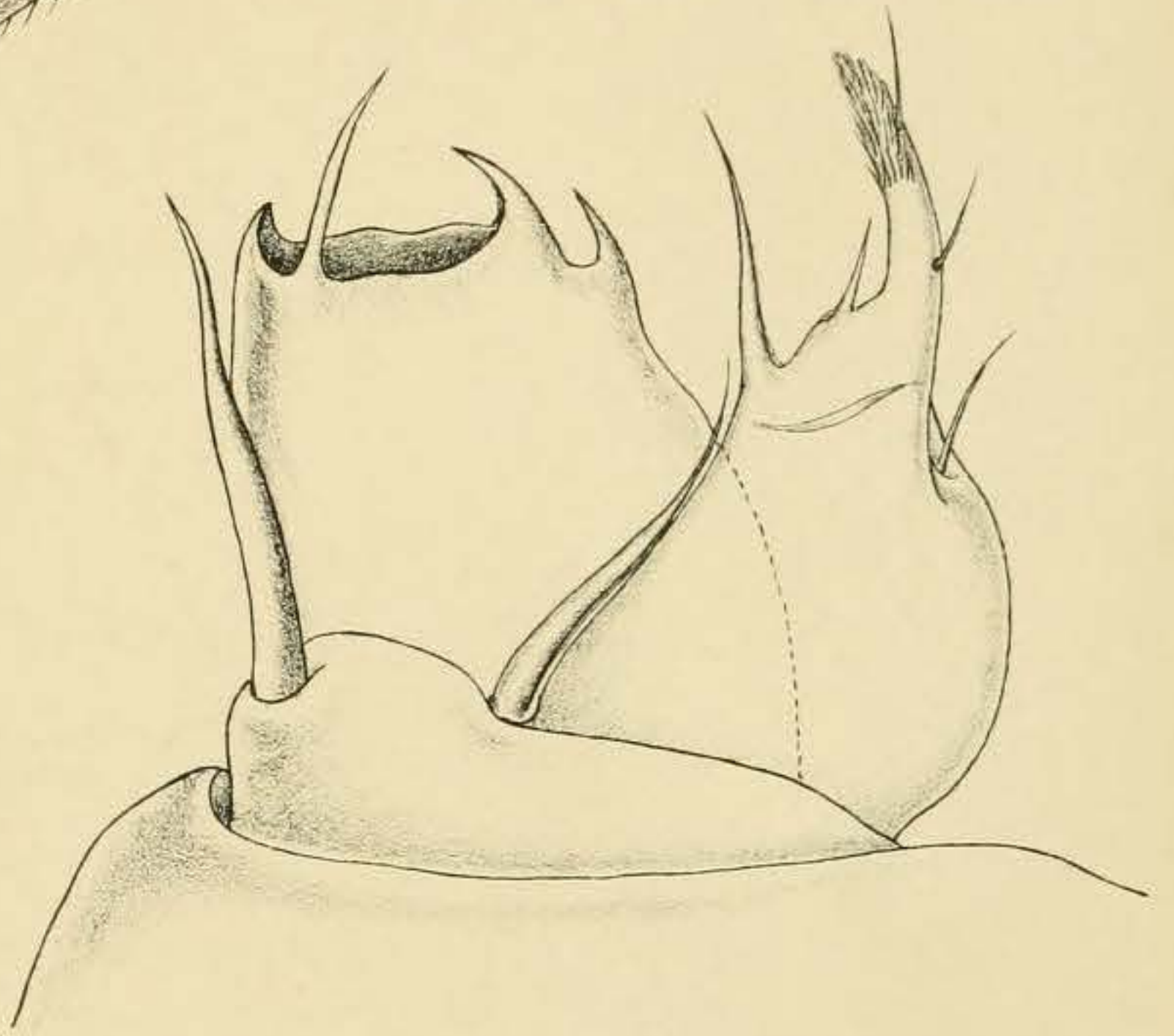
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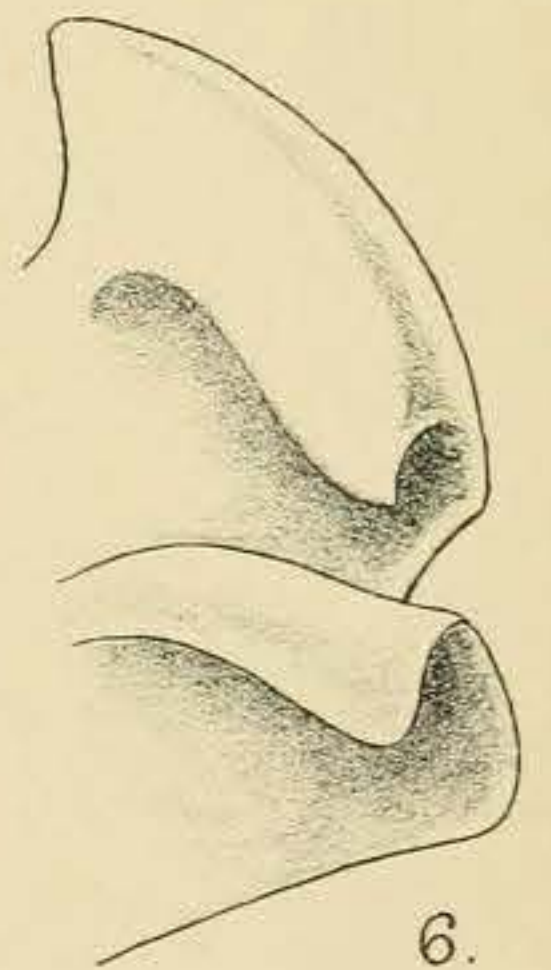
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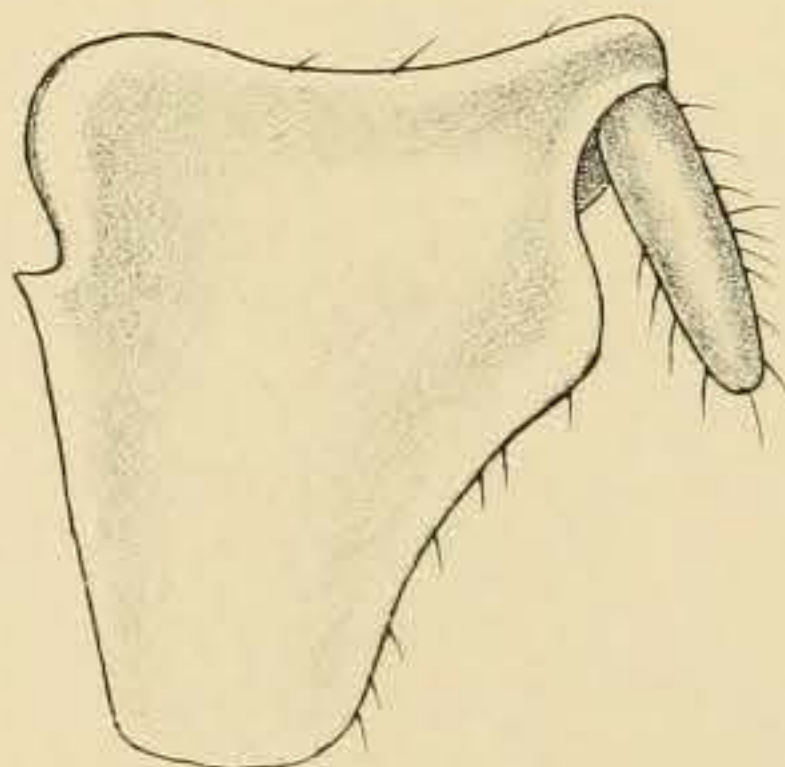
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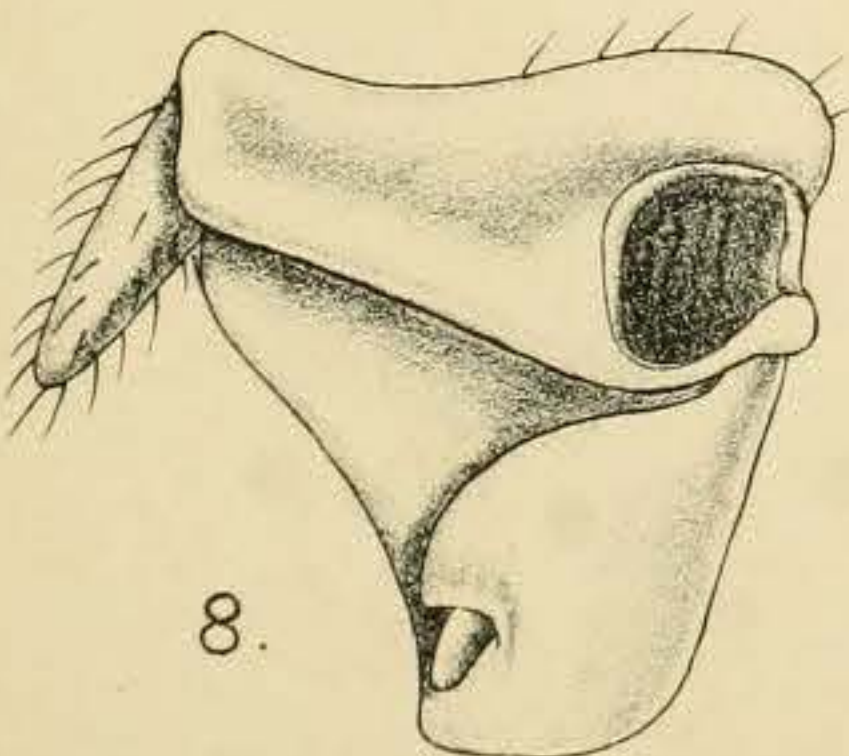
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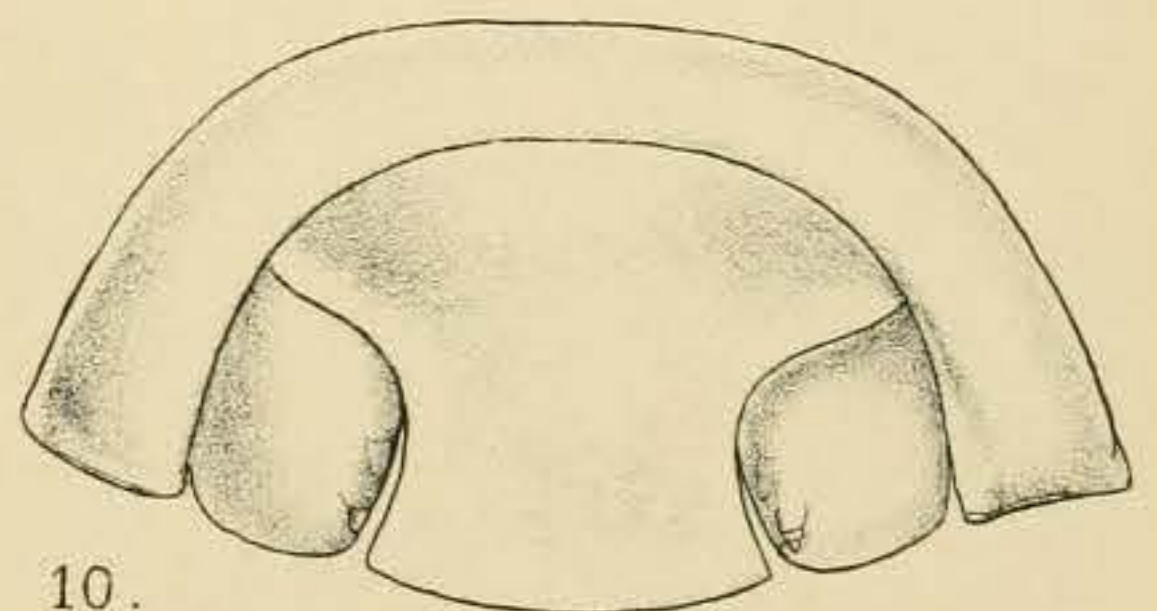
6.



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10.

H.G.K. del.

CUBARIS PUSILLUS, n. sp.

A. Chowdhary, lith.

EXPLANATION OF PLATE XIV.

Cubaris brunneocaudatus, n. sp.

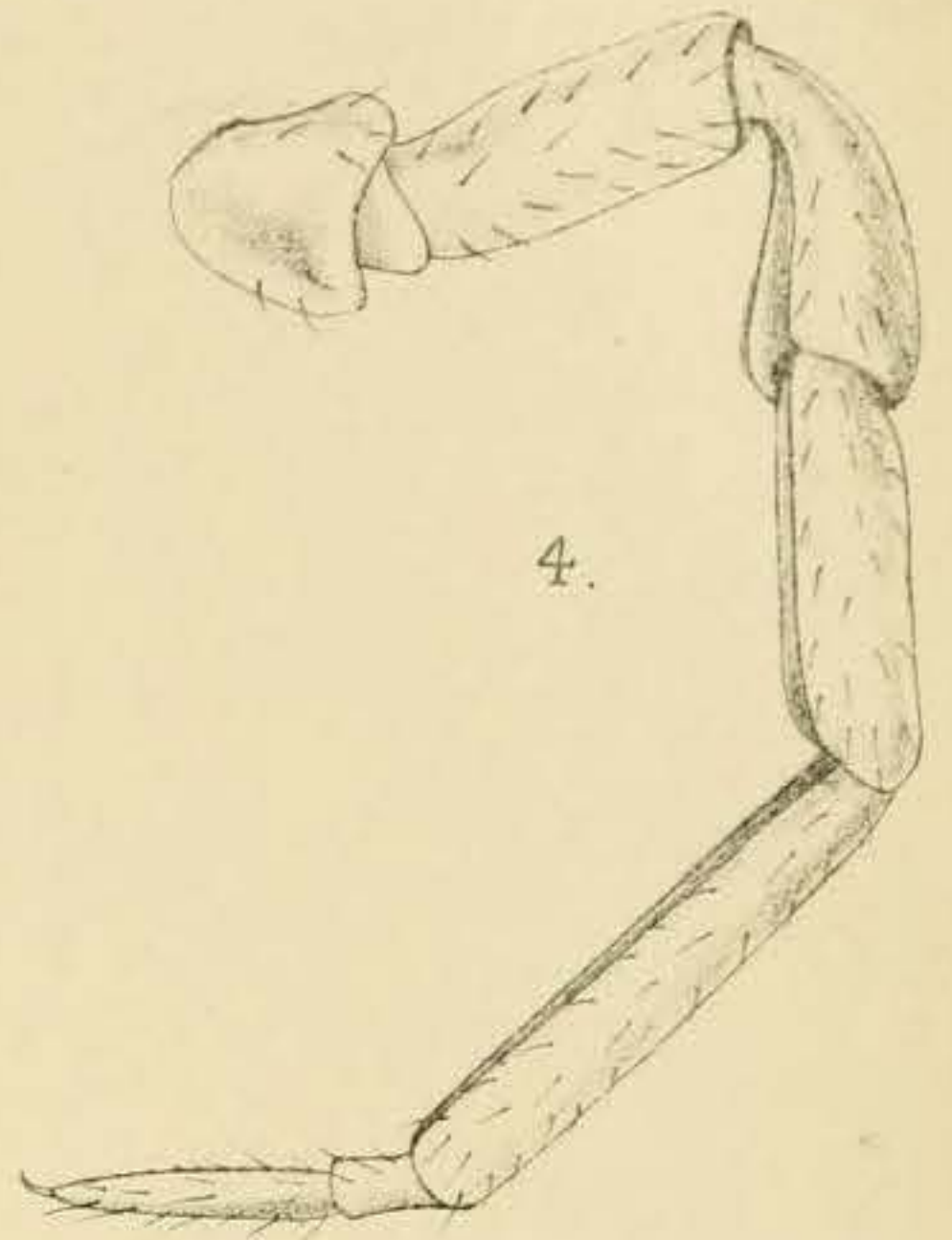
- FIG. 1.—Dorsal view of the cephalon.
,, 2.—Anterior view of the cephalon.
,, 3.—Right antennule.
,, 4.—Right antenna.
,, 5.—First maxilla, terminal portion of outer lobe.
,, 6.—Lateral portions of 1st and 2nd mesosomatic segments,
showing notch and groove on the inner border of the
under side.
,, 7.—Maxillipede, terminal portion.
,, 8.—Right uropod, dorsal view.
,, 9.—Right uropod, ventral view.
,, 10.—Last metasomatic segment, uropoda and telson.



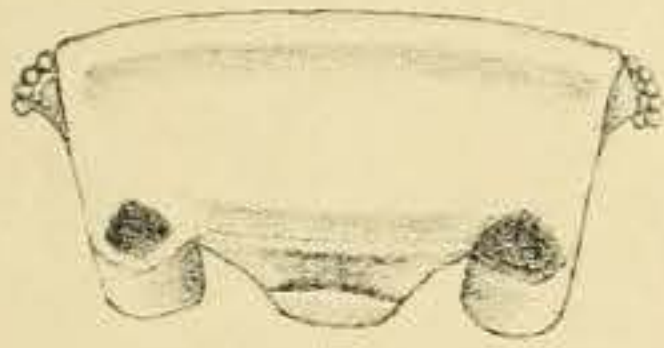
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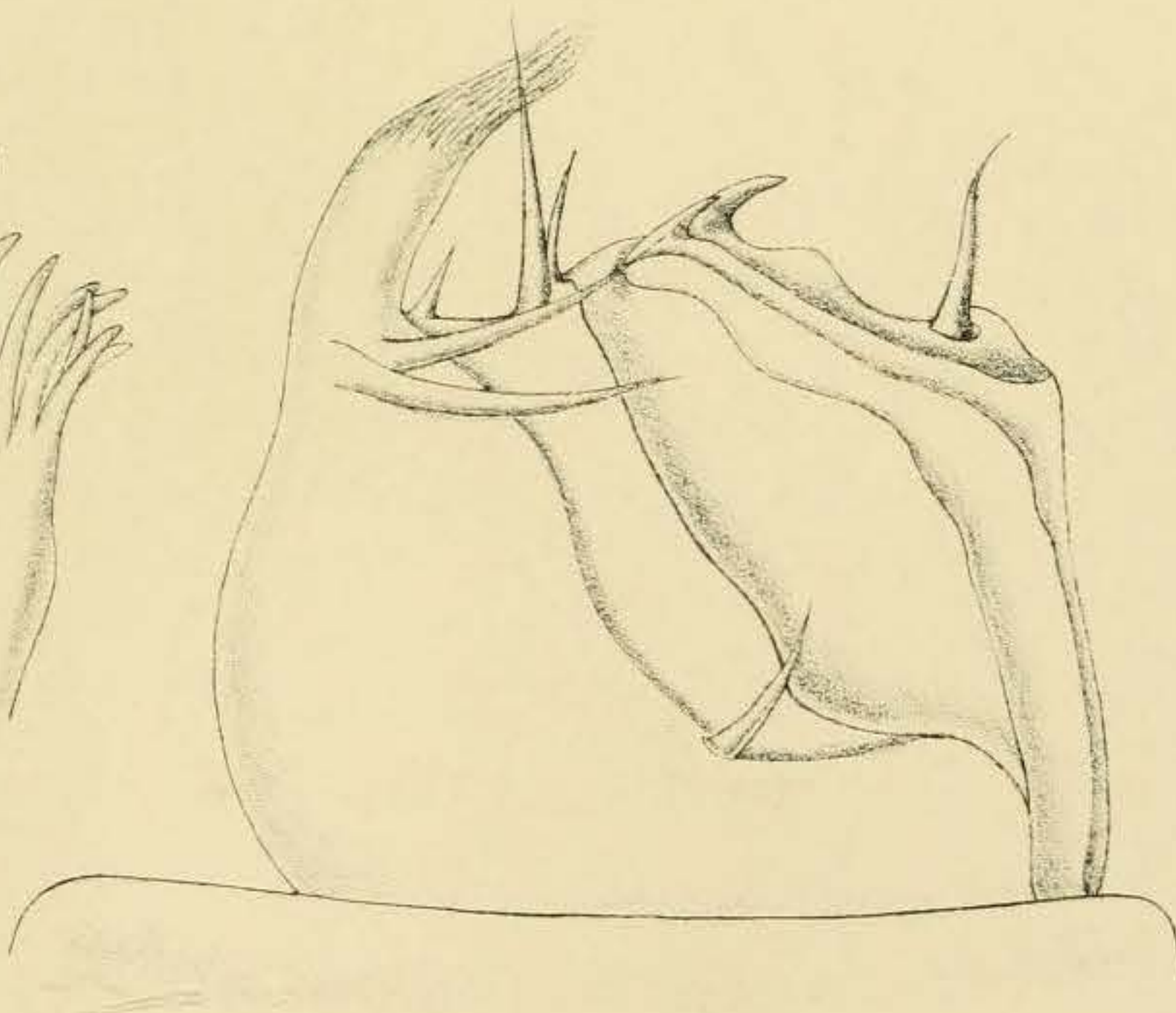
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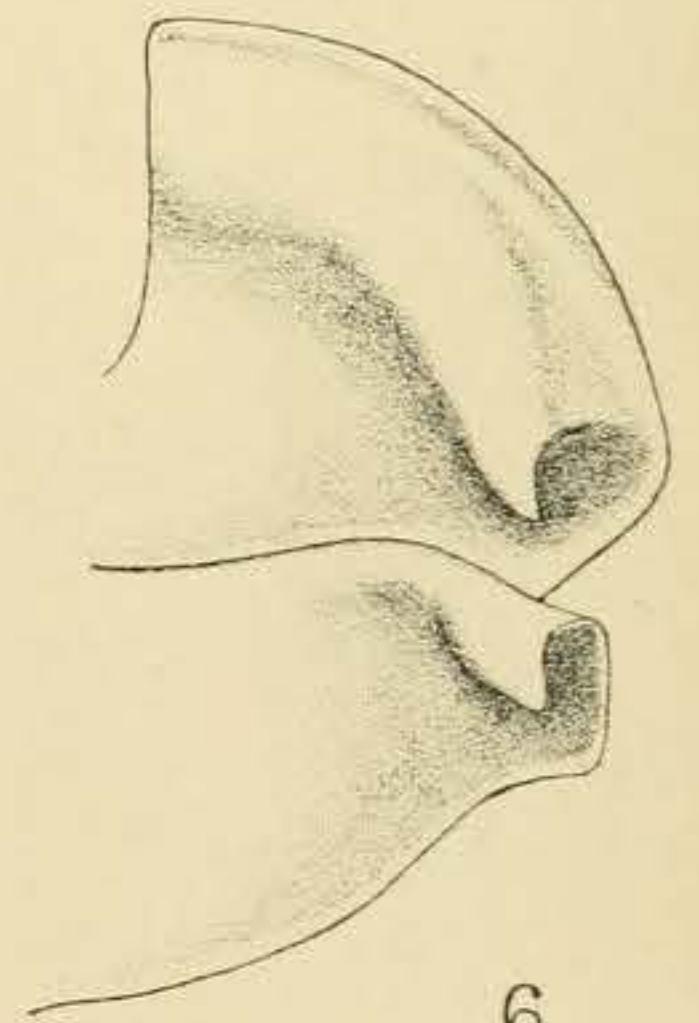
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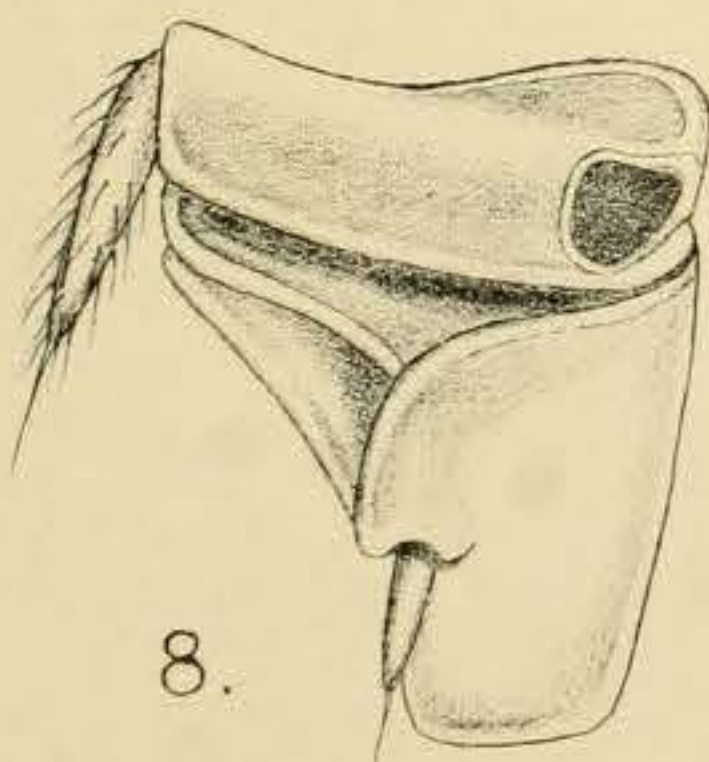
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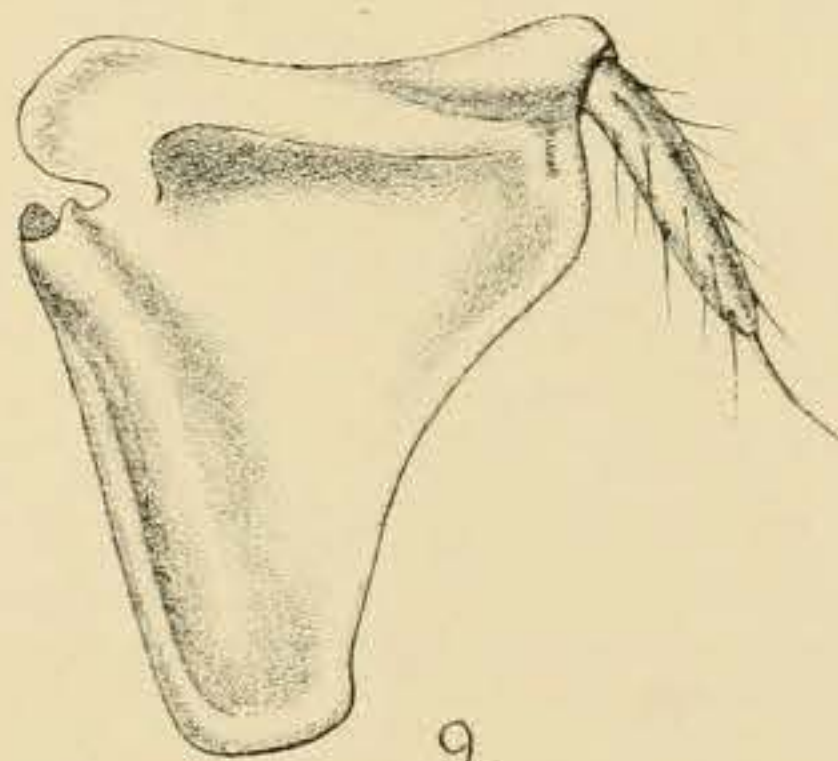
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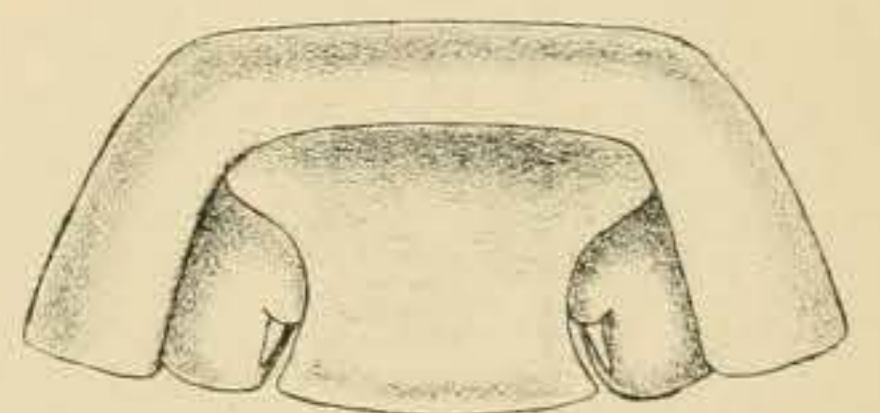
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H. G. K. del.

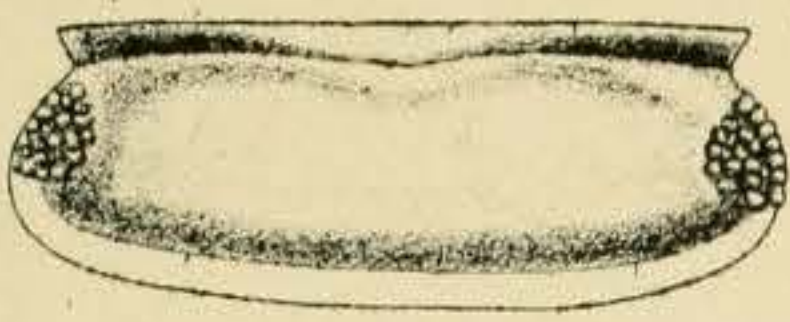
A. Chowdhary, lith.

CUBARIS BRUNNEOCAUDATUS, n.sp.

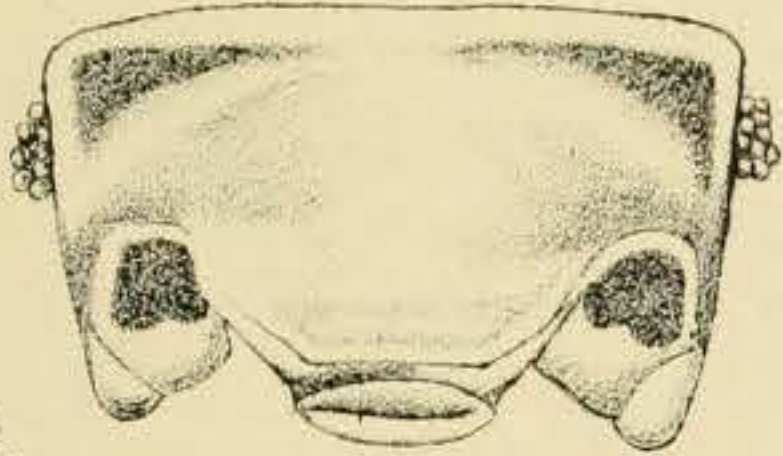
EXPLANATION OF PLATE XV

Cubaris chiltoni, n. sp.

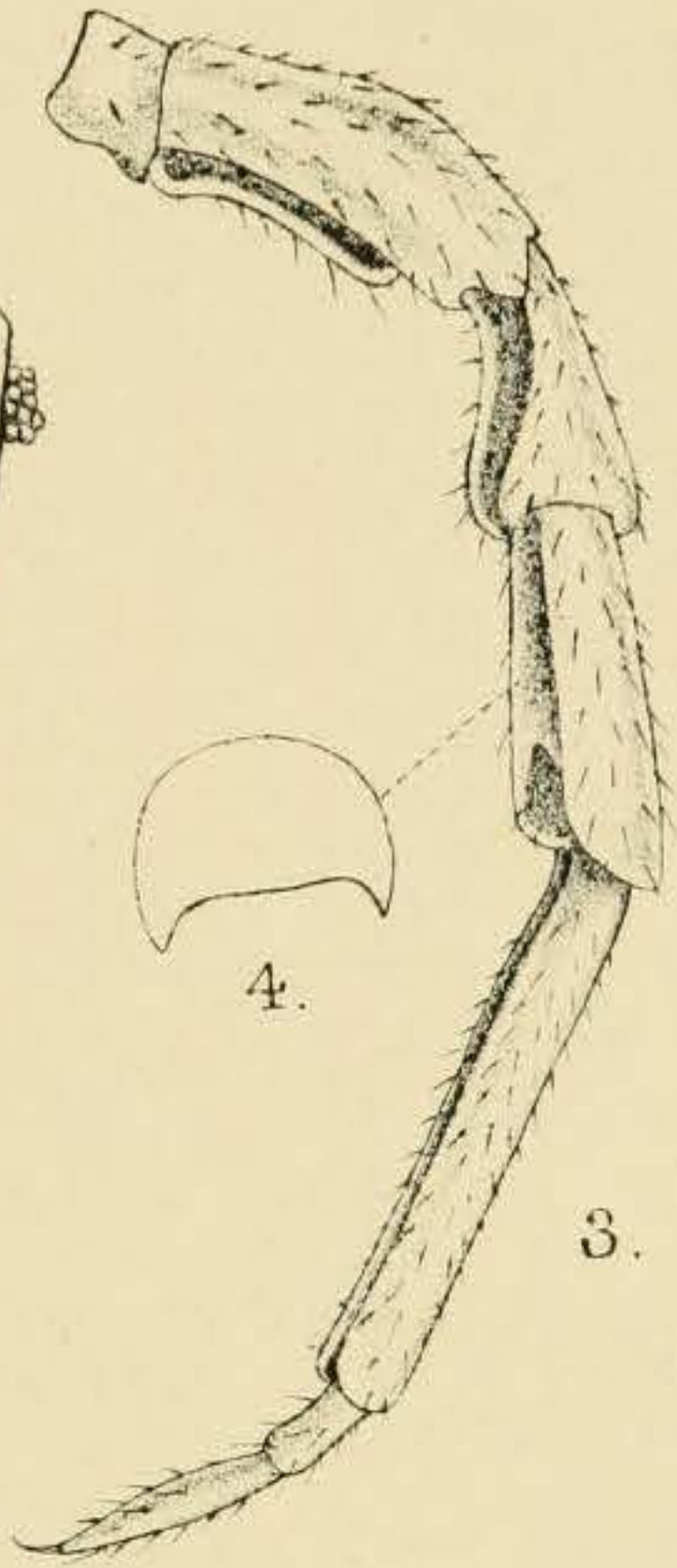
- FIG. 1.—Dorsal view of the cephalon.
,, 2.—Anterior view of the cephalon.
,, 3.—Right antenna.
,, 4.—Semi-diagrammatic section of the 4th joint of the antenna.
,, 5.—First maxilla, terminal portions of inner and outer lobes.
,, 6.—Second maxilla, terminal portion.
,, 7.—Lateral portions of 1st and 2nd mesosomatic segments, showing notch and groove on the inner border of the under side.
,, 8.—Maxillipede, terminal portion.
,, 9.—Right uropod, dorsal view.
,, 10.—Right uropod, ventral view.
,, 11.—Last metasomatic segment, uropoda and telson.



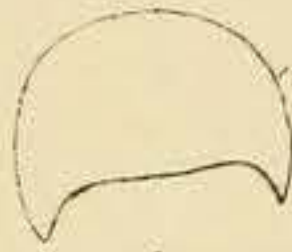
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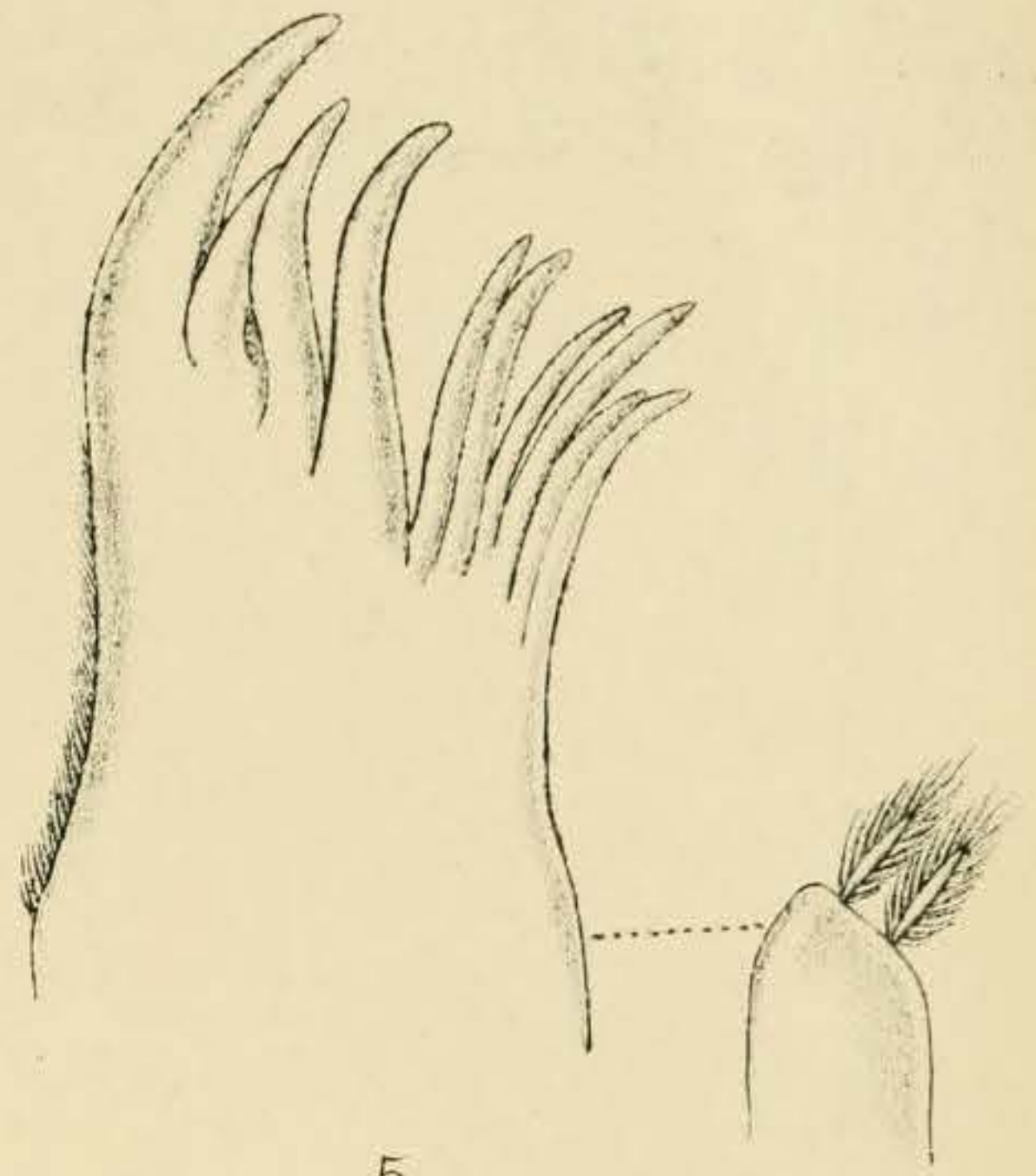
2.



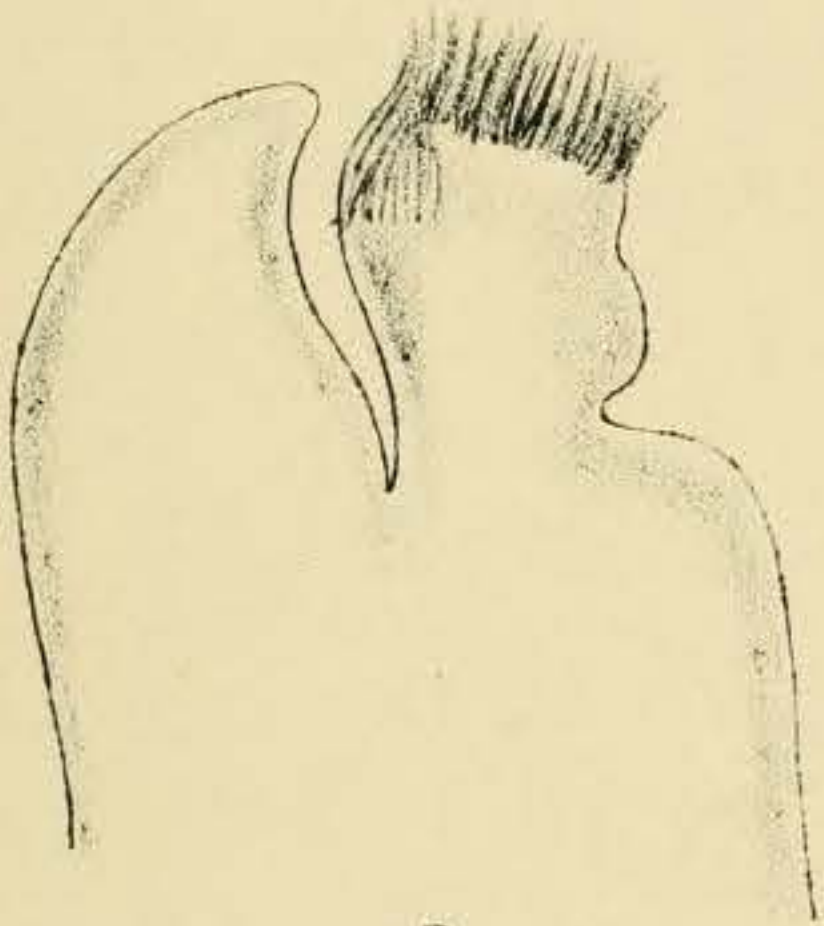
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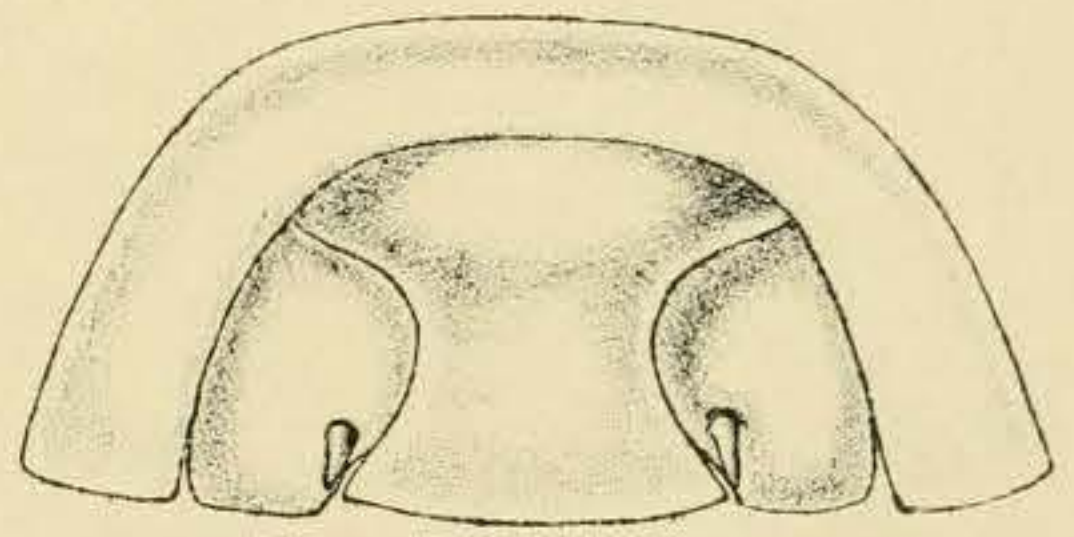
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5.



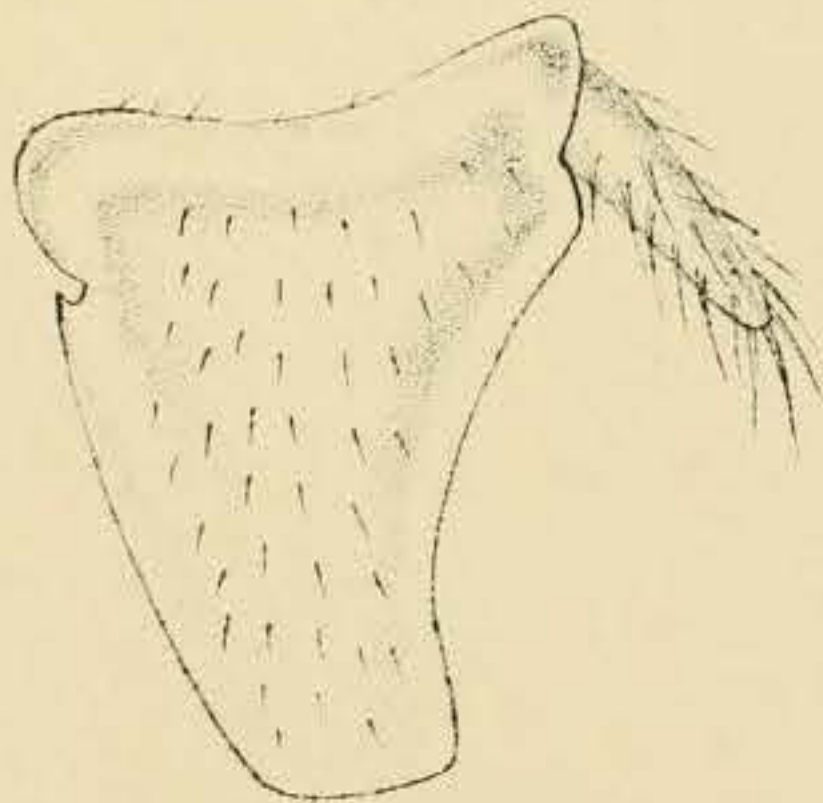
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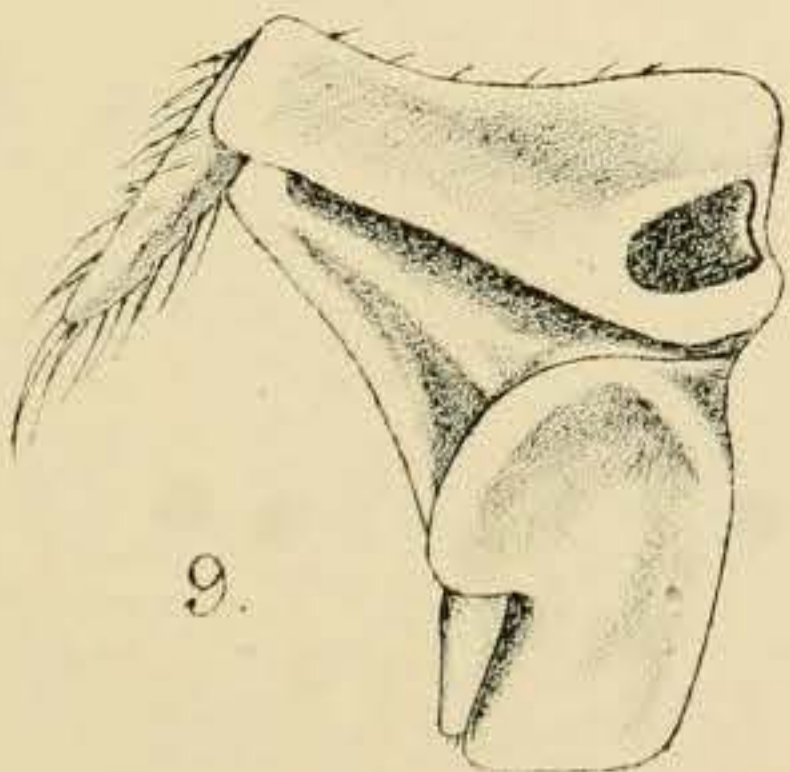
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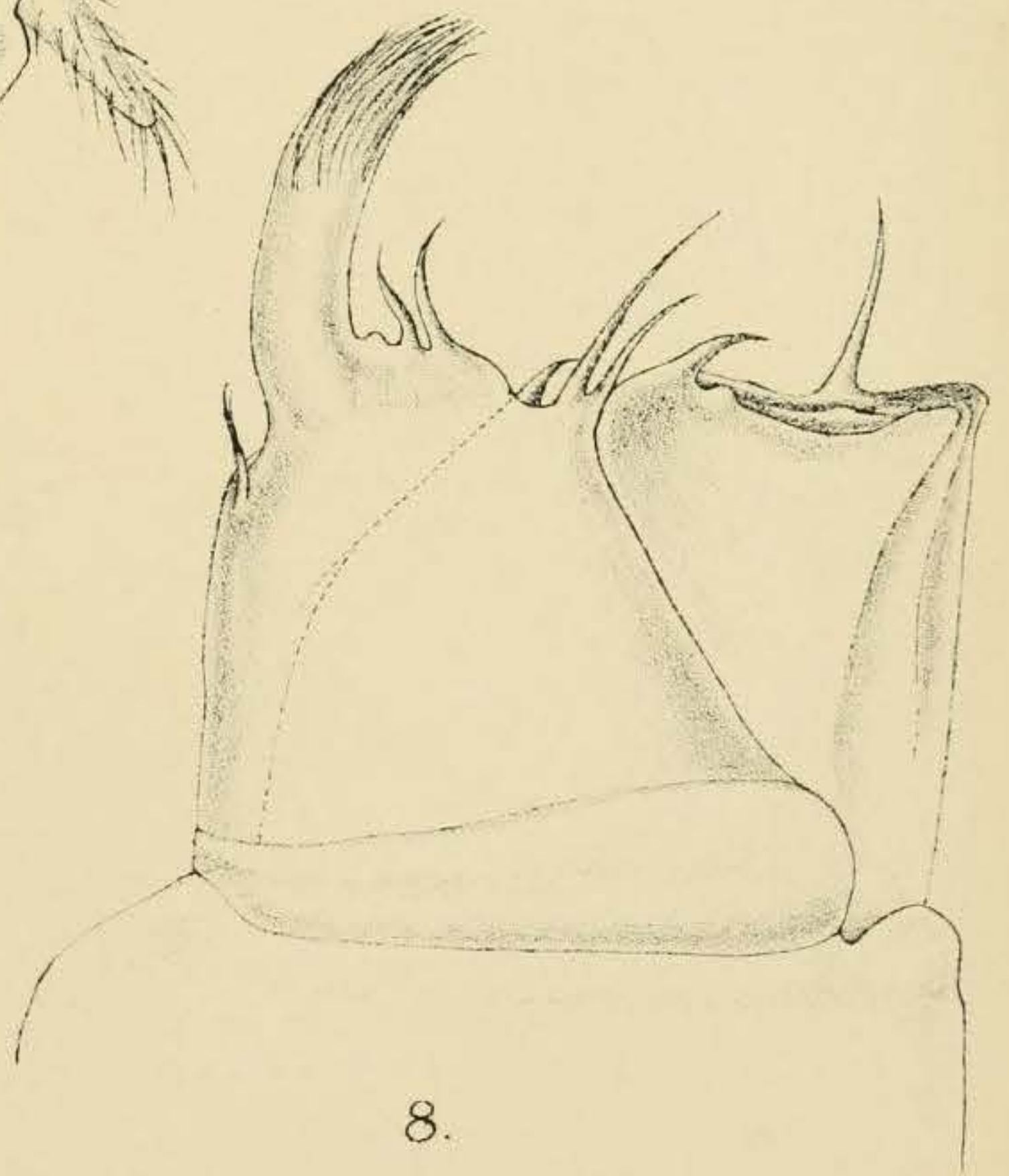
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10.



9.



8.

H. G. K. del.

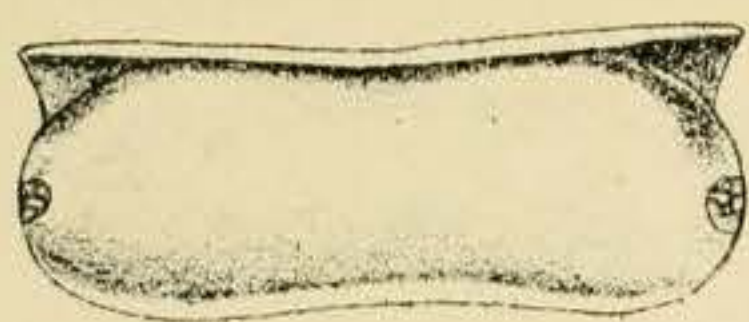
A. Chowdhary, lith.

CUBARIS CHILTONI, n. sp.

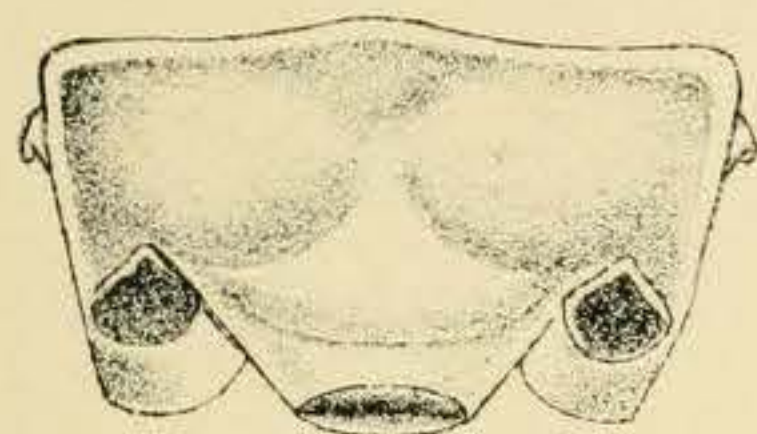
EXPLANATION OF PLATE XVI.

Cubaris cavernosus, n. sp.

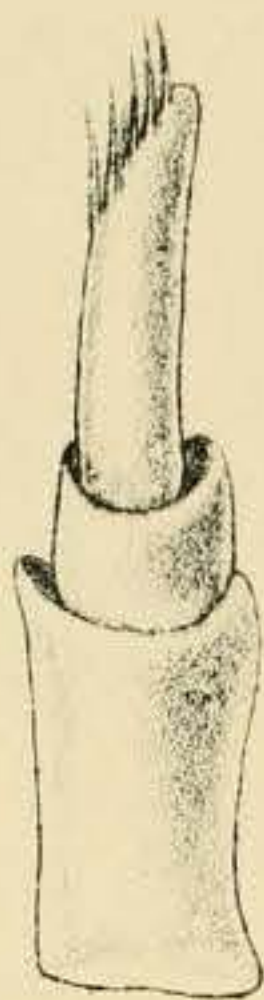
- FIG. 1.—Dorsal view of the cephalon.
,, 2.—Anterior view of the cephalon.
,, 3.—Antennule
,, 4.—Right antenna.
,, 5.—First maxilla, terminal portions of inner and outer lobes.
,, 6.—Lateral portions of 1st and 2nd mesosomatic segments,
showing notch and groove on the inner border of the
under side.
,, 7.—Maxillipede, terminal portion.
,, 8.—Right uropod, dorsal view.
,, 9.—Last metasomatic segment, uropoda and telson.



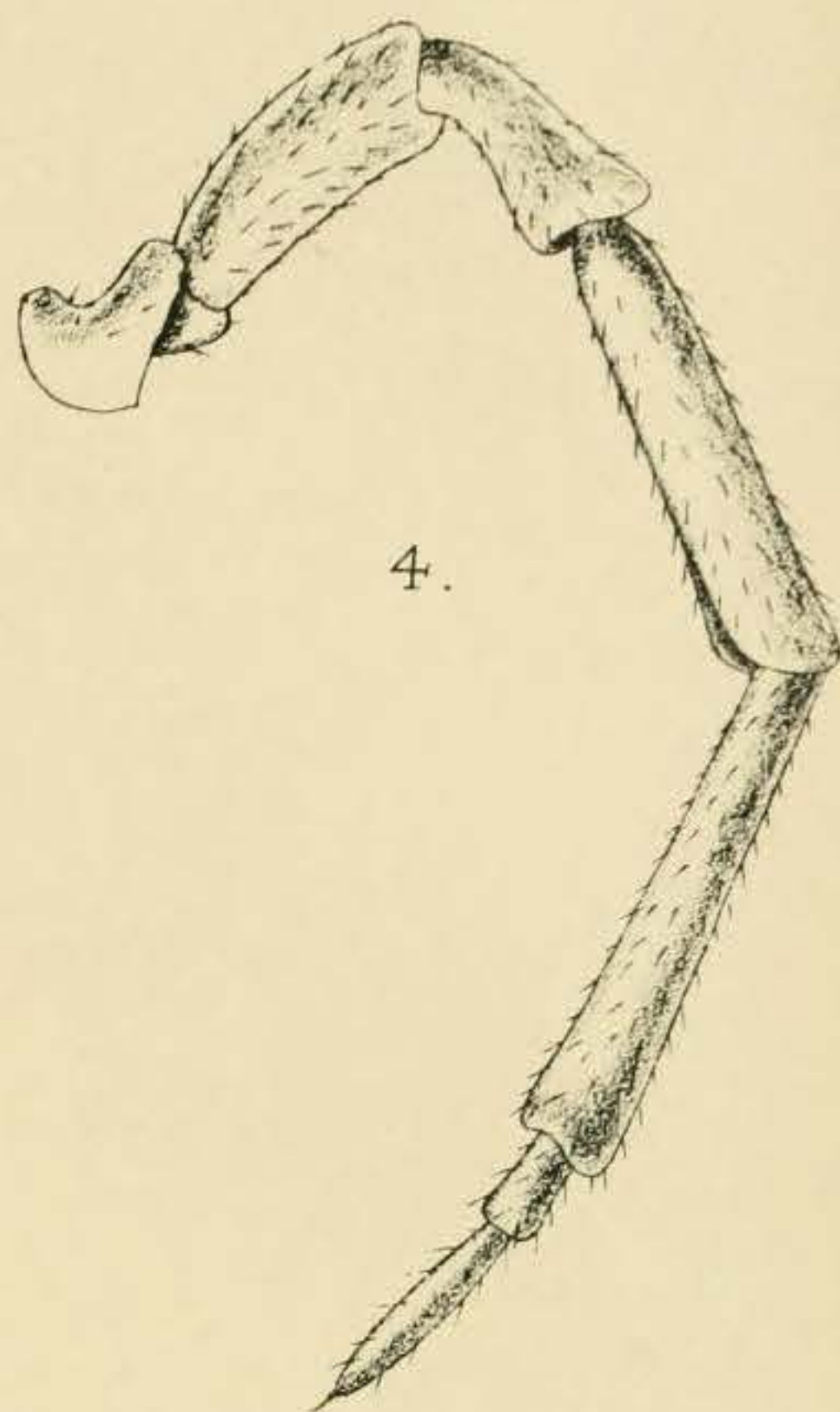
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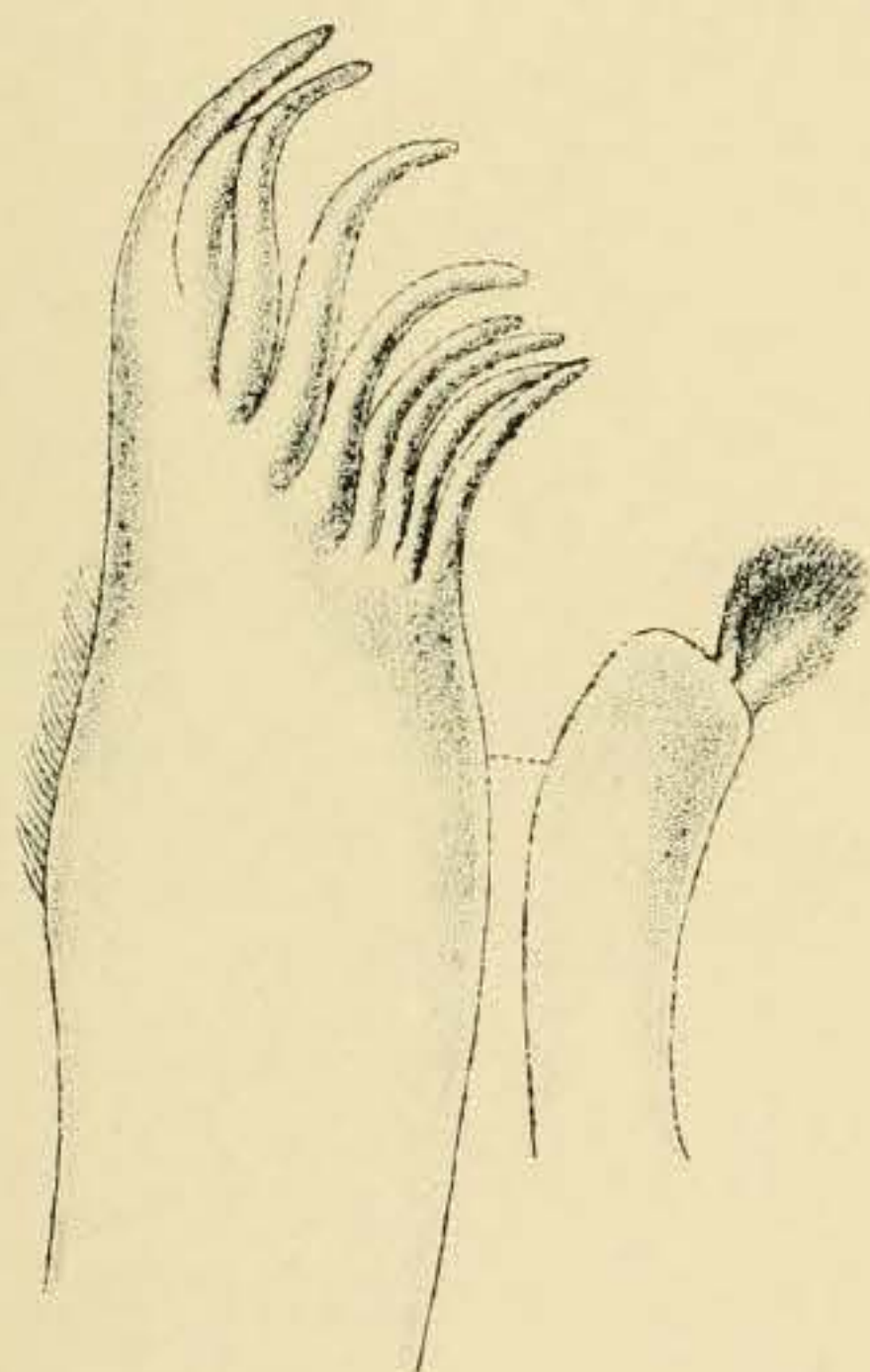
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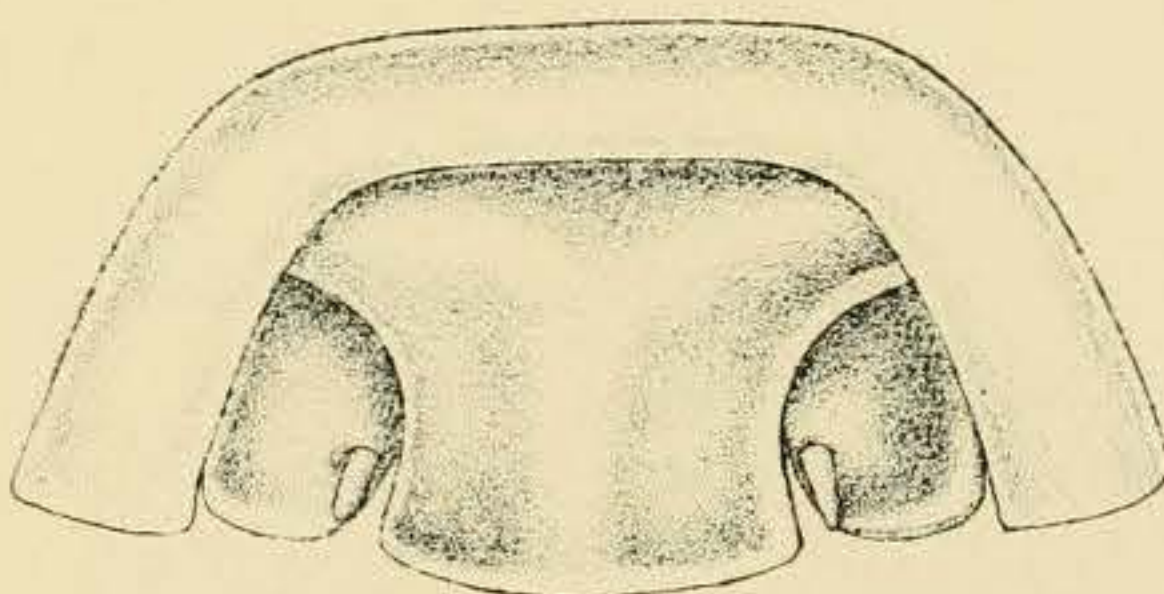
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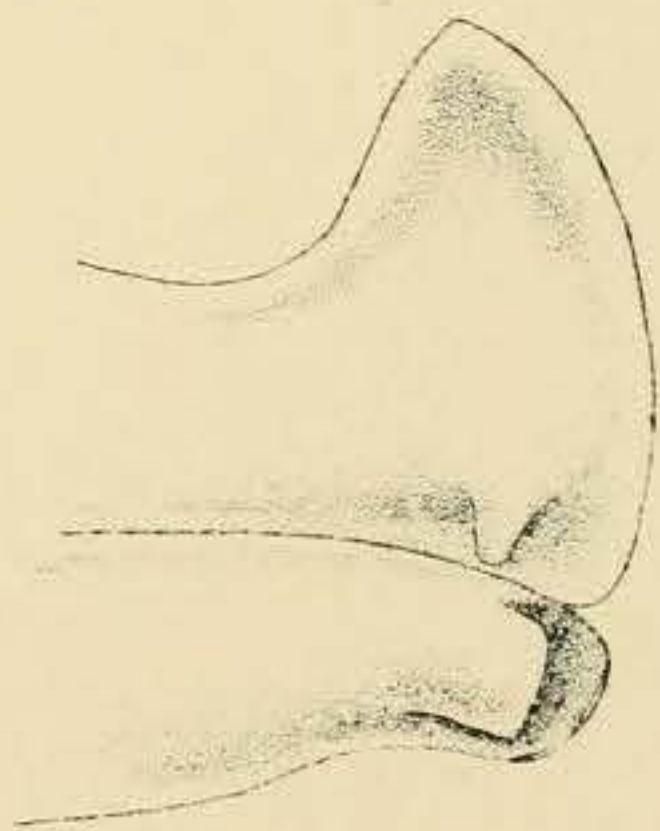
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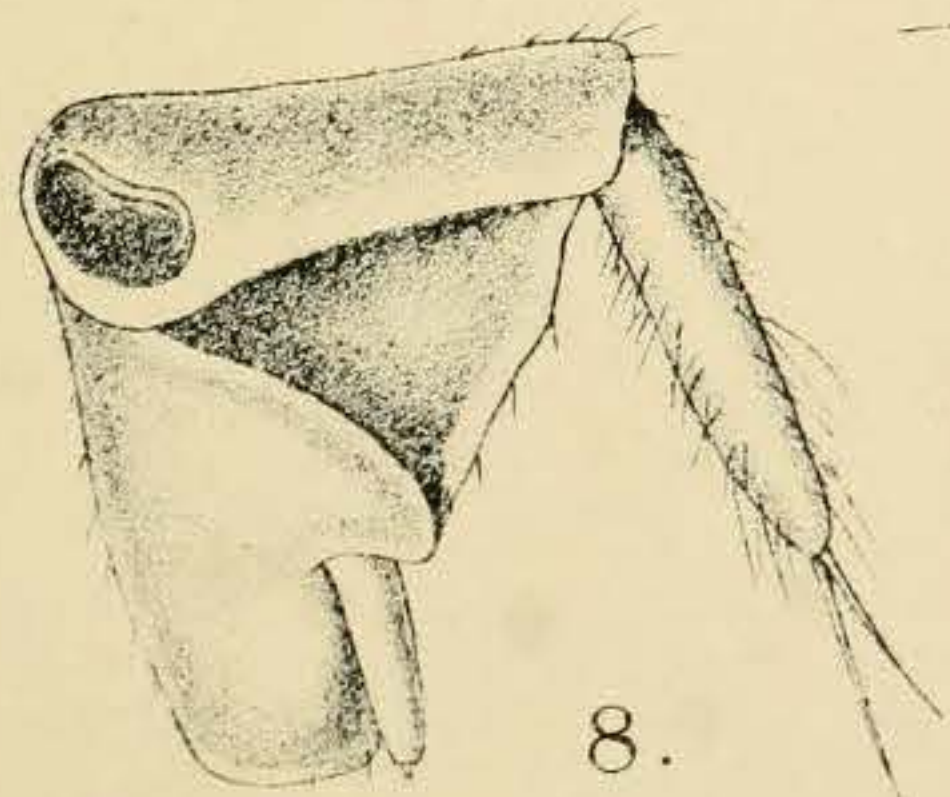
5.



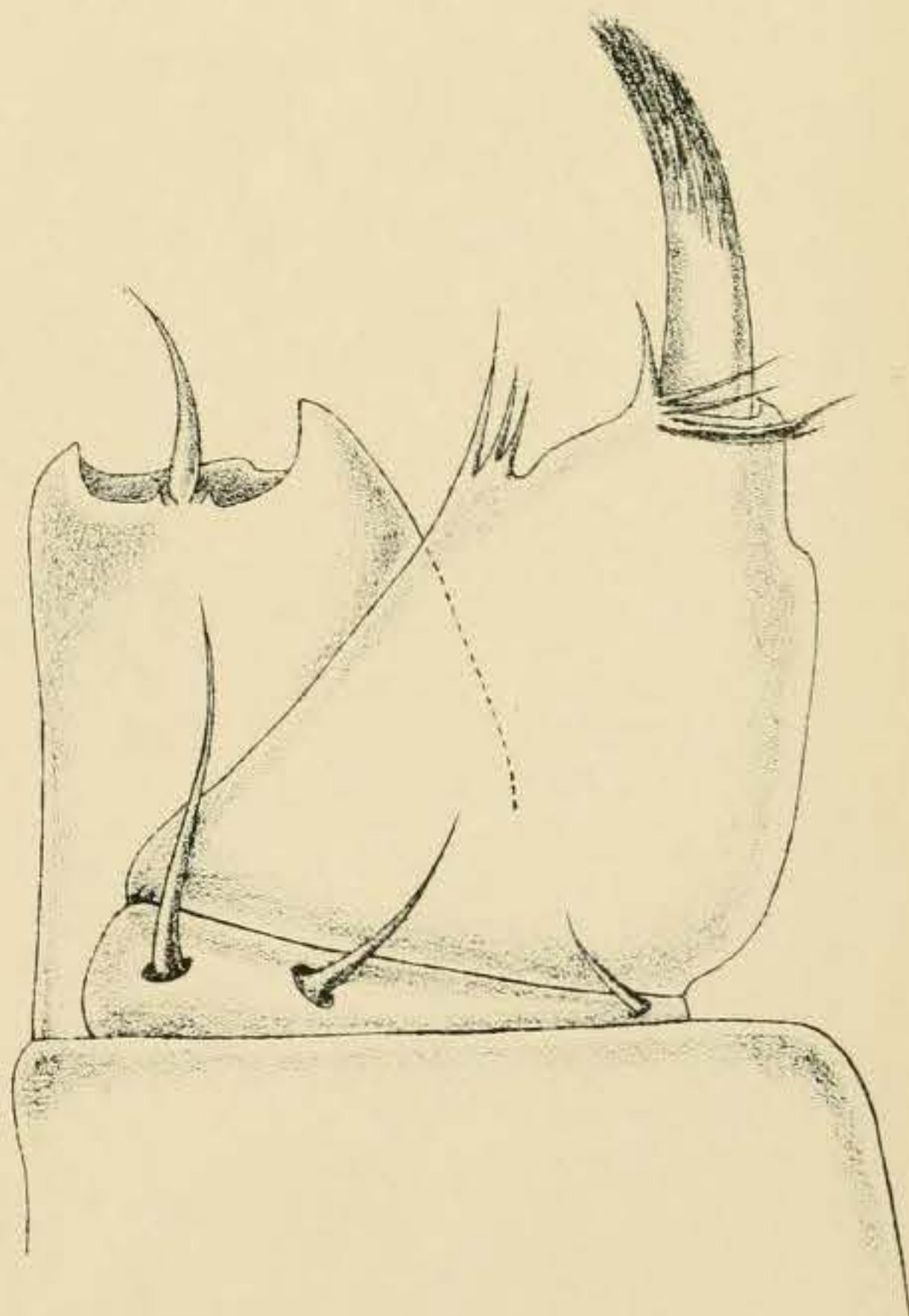
9.



6.



8.



7.

H.G.K. del.

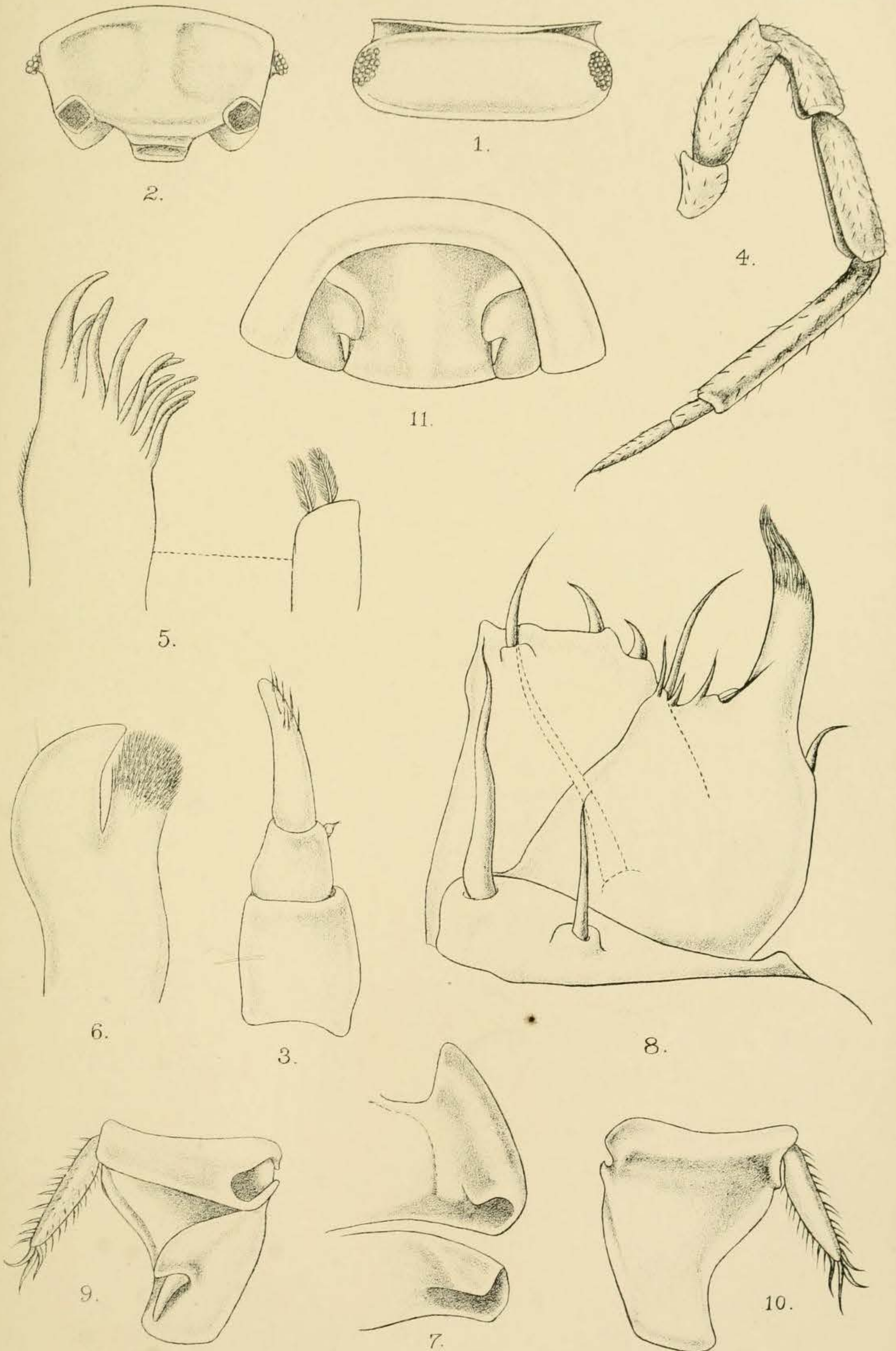
A. Chowdhary, lith.

CUBARIS CAVERNOSUS, n. sp.

EXPLANATION OF PLATE XVII.

Cubaris lobatus, n. sp.

- FIG. 1.—Dorsal view of the cephalon.
,, 2.—Anterior view of the cephalon.
,, 3.—Antennule.
,, 4.—Right antenna.
,, 5.—First maxilla, terminal portions of outer and inner lobes.
,, 6.—Second maxilla, terminal portion.
,, 7.—Lateral portions of 1st and 2nd mesosomatic segments,
 showing notch and groove on the inner border of the
 under side.
,, 8.—Maxillipede, terminal portion.
,, 9.—Right uropod, dorsal view.
,, 10.—Right uropod, ventral view.
,, 11.—Last metasomatic segment, uropoda and telson.



H.G.K. del.

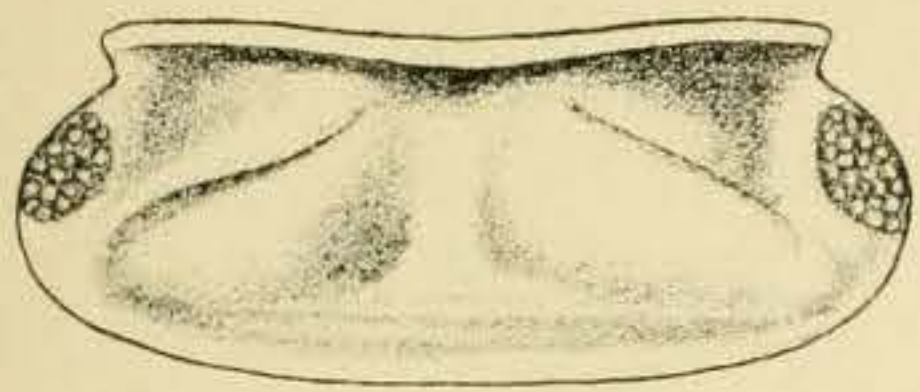
CUBARIS LOBATUS, n.sp.

A. Chowdhary, lith.

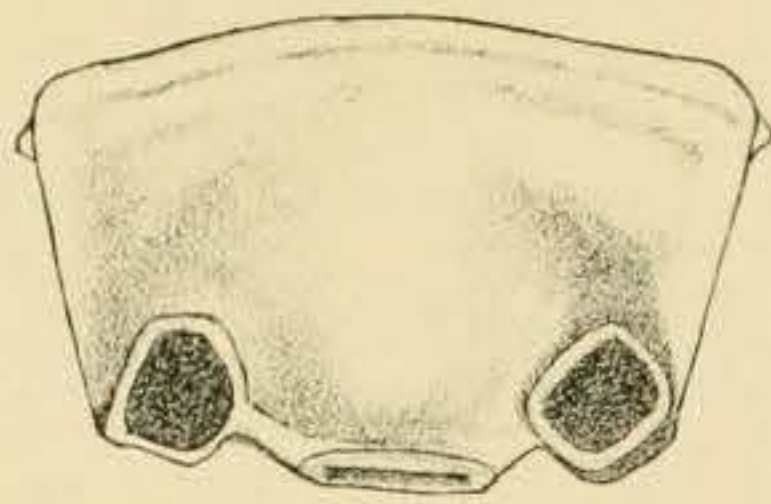
EXPLANATION OF PLATE XVIII

Cubaris albolateralis, n. sp.

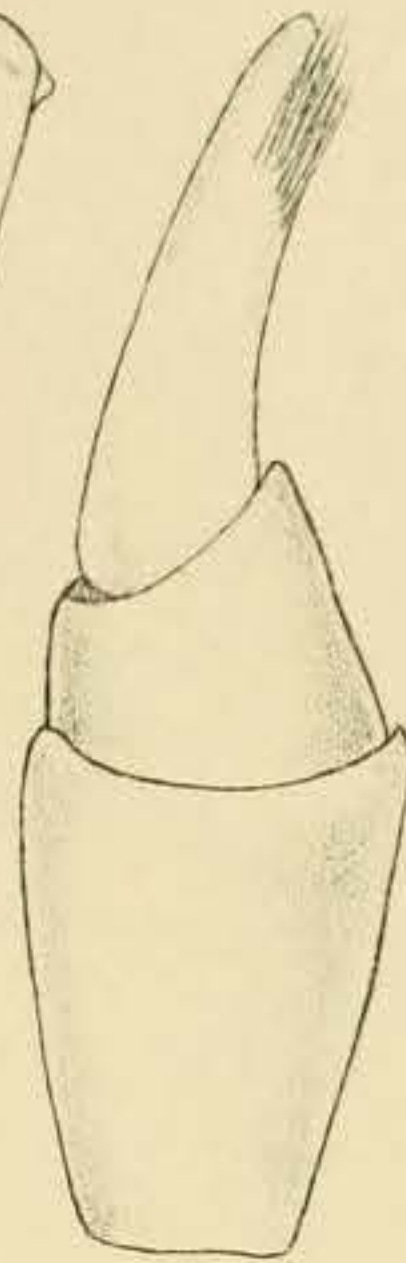
- FIG. 1.—Dorsal view of the cephalon.
,, 2.—Anterior view of the cephalon.
,, 3.—Antennule.
,, 4.—Right antenna.
,, 5.—First maxilla, terminal portion.
,, 6.—Second maxilla, terminal portion.
,, 7.—Lateral portions of mesosomatic segments, showing form of the lateral plates and indentations on the segments.
,, 8.—Lateral portions of 1st and 2nd mesosomatic segments, showing notch and groove on the inner border of the under side.
,, 9.—Maxillipede, terminal portion.
,, 10.—Right uropod, dorsal view.
,, 11.—Right uropod, ventral view.
,, 12.—Last metasomatic segment, uropoda and telson.



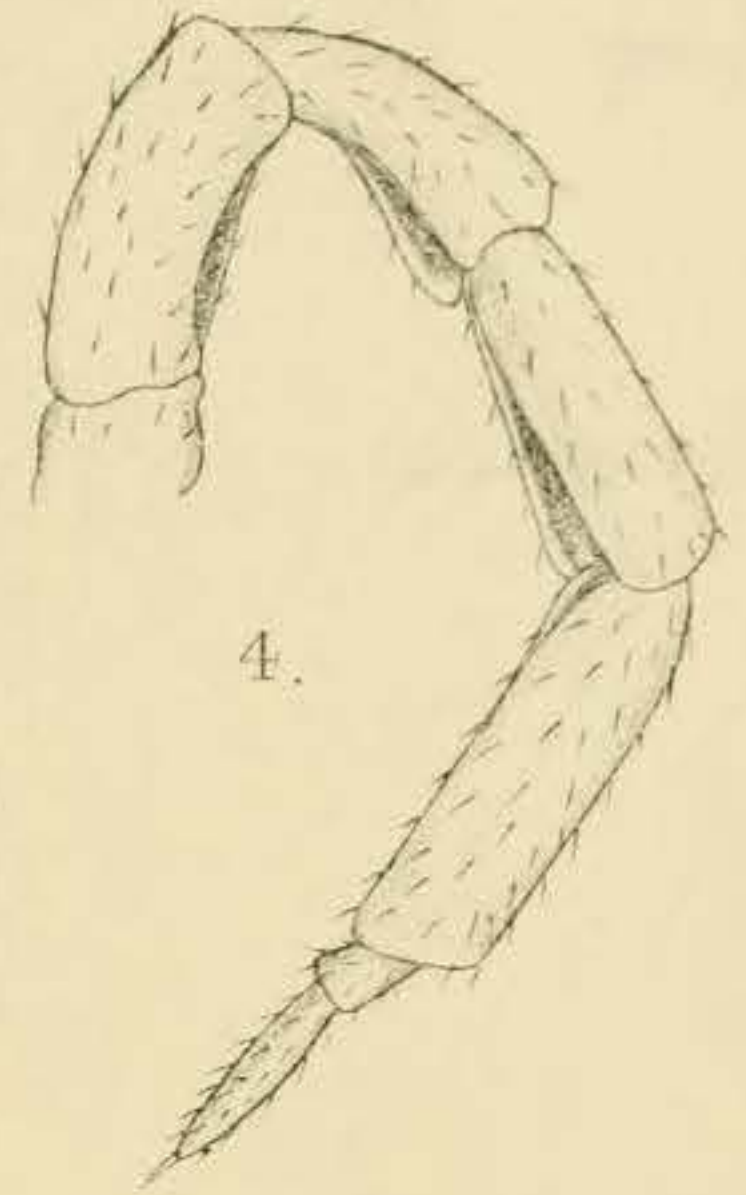
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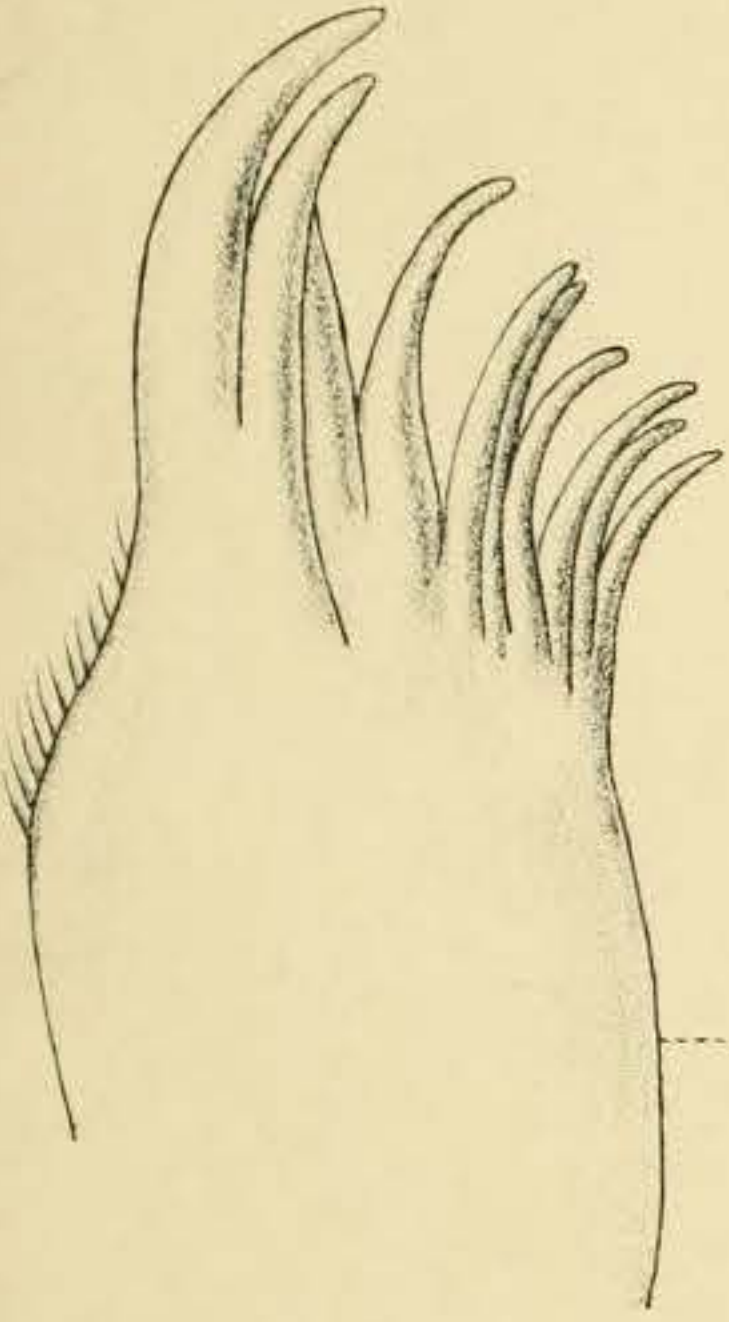
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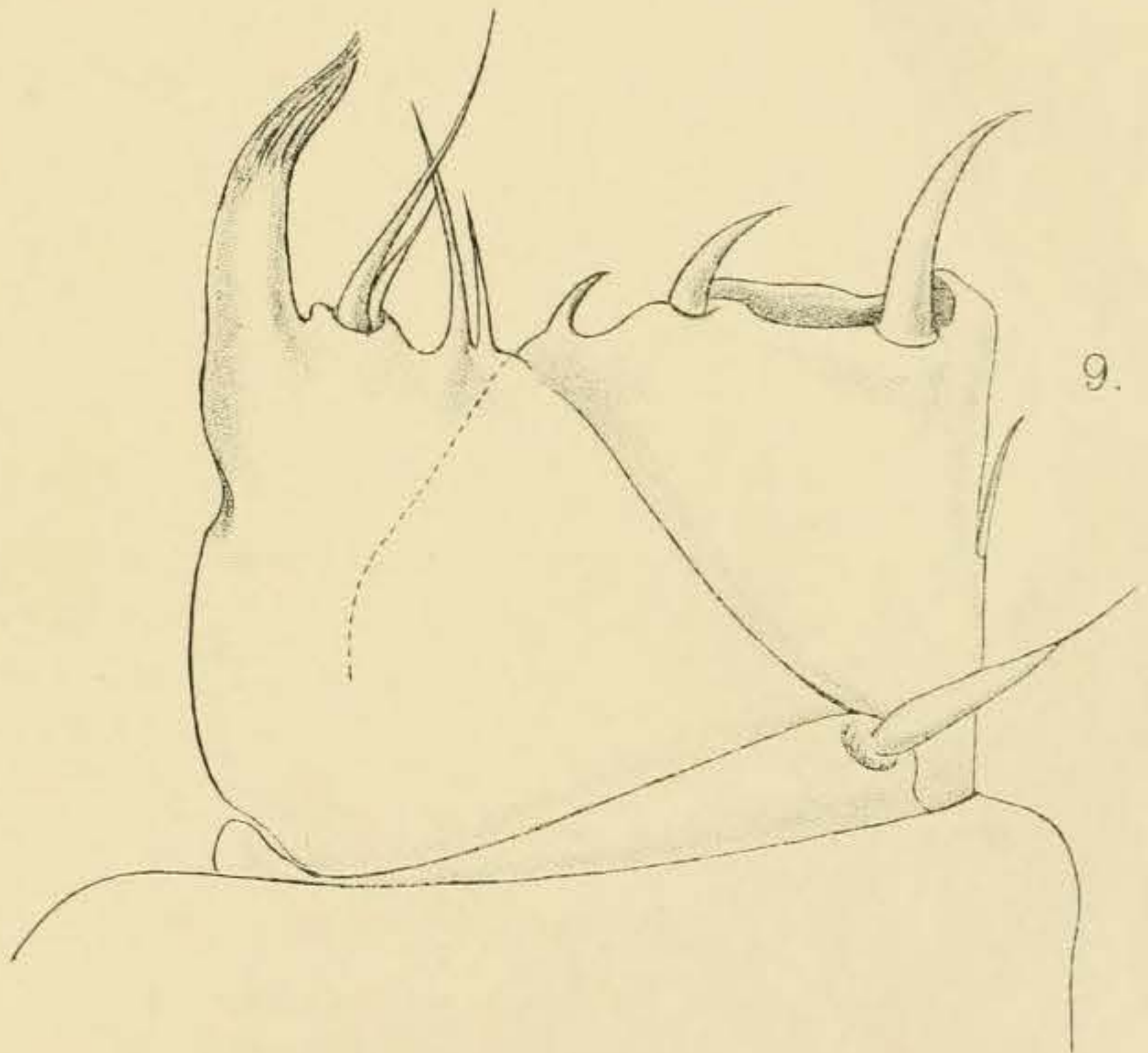
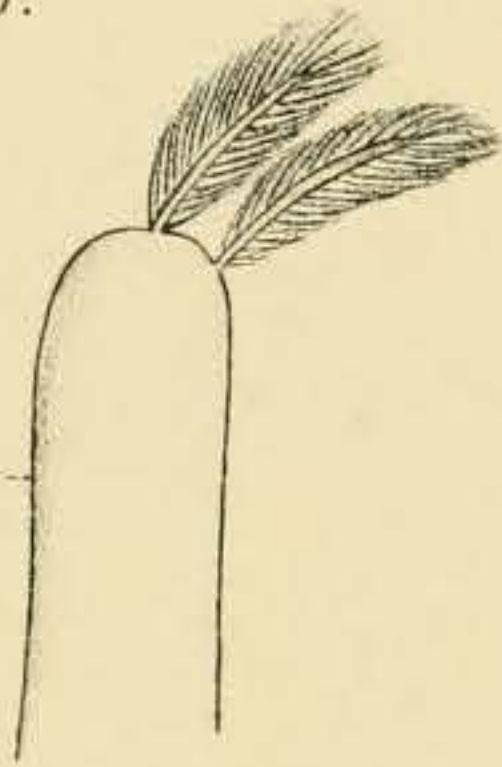
3.



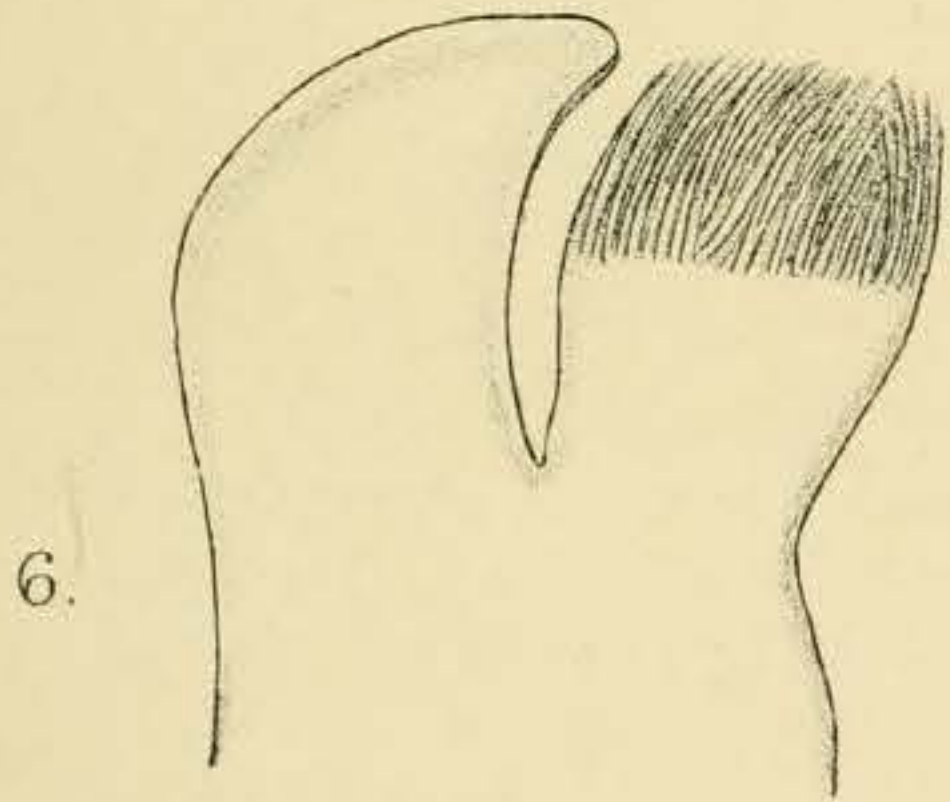
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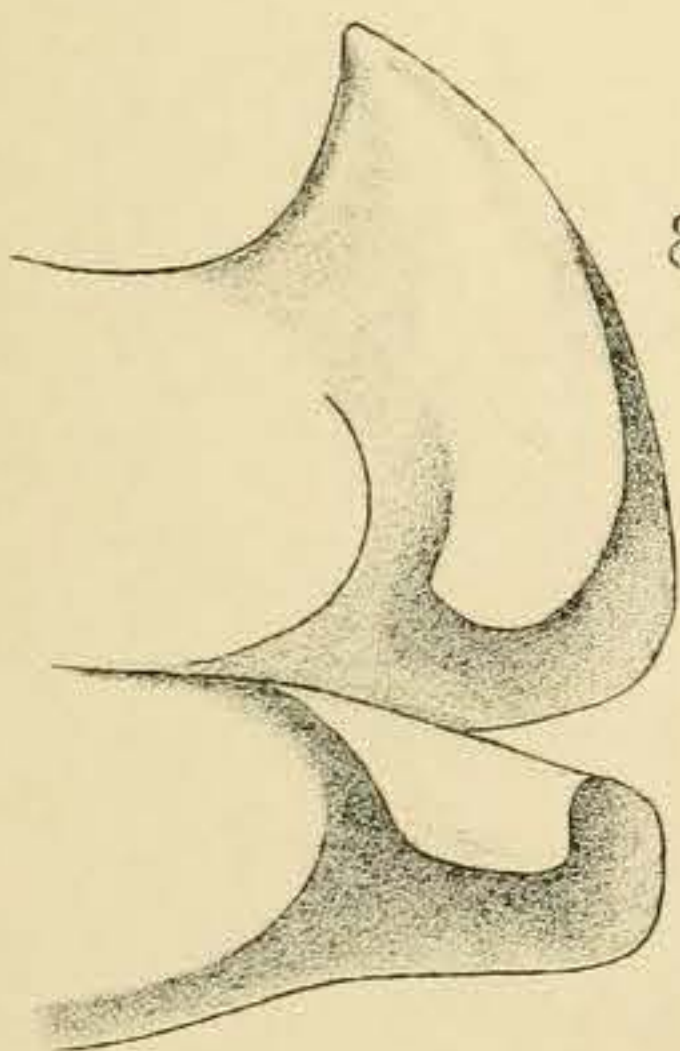
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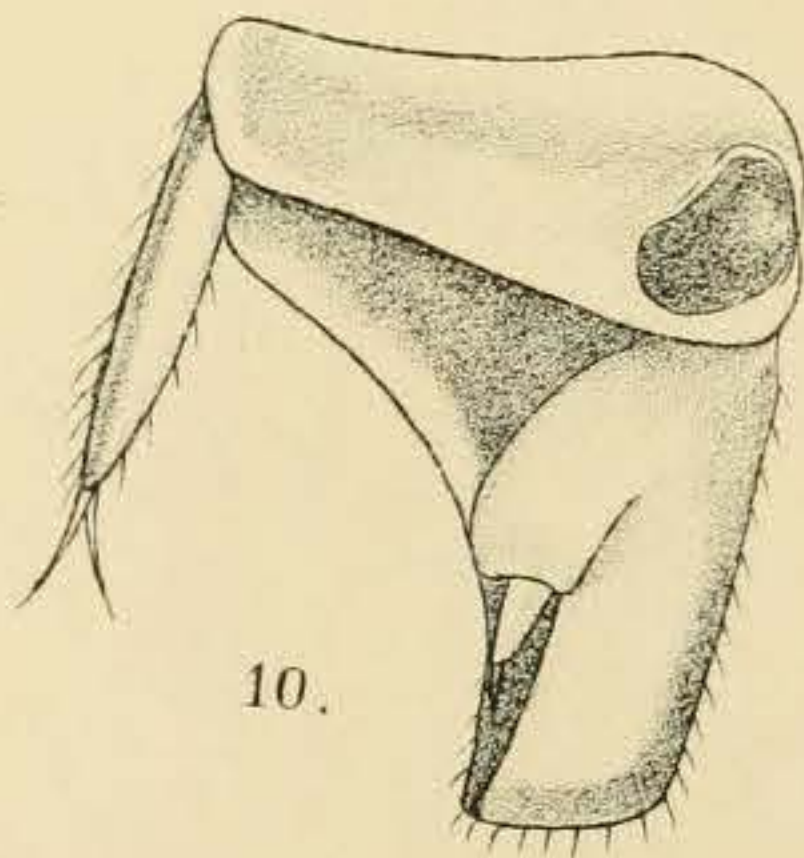
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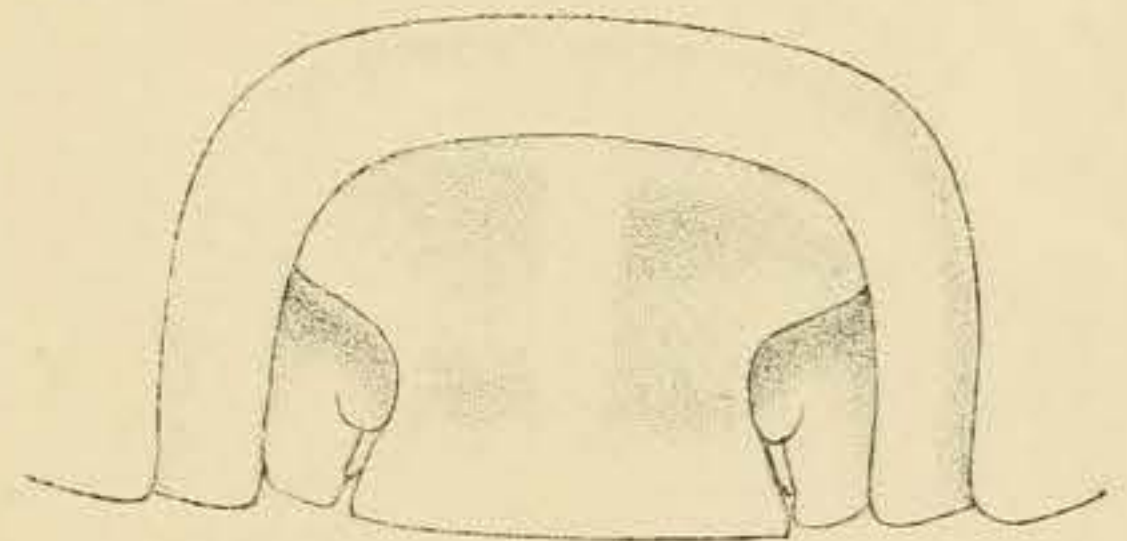
6.



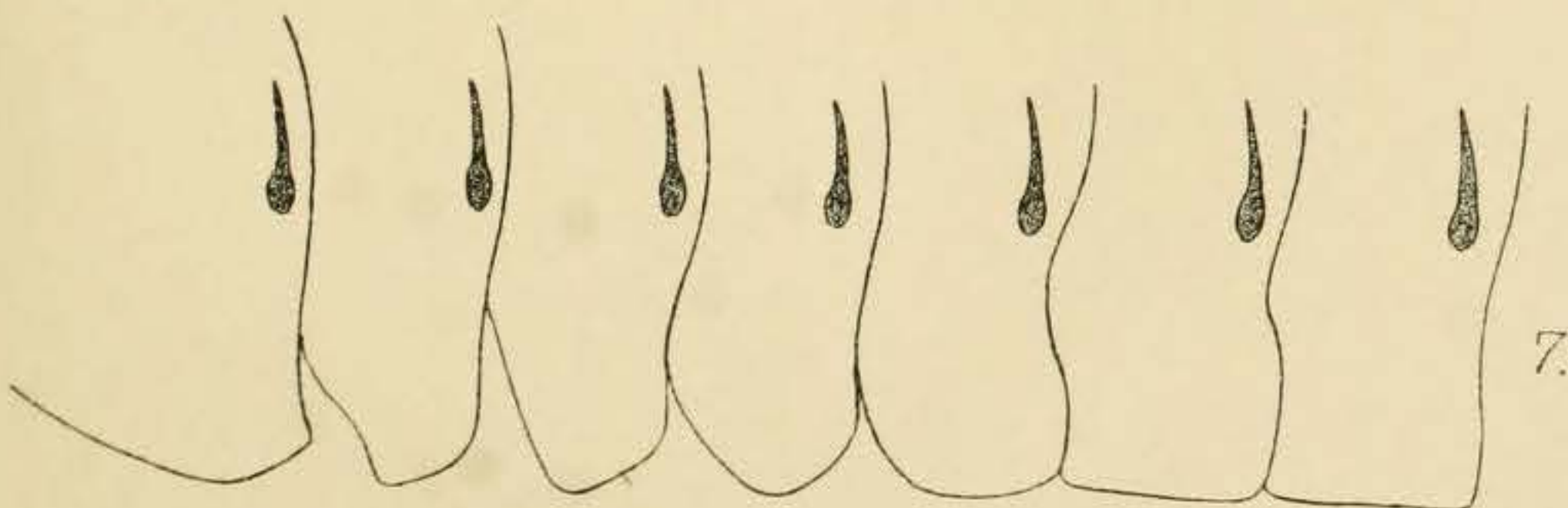
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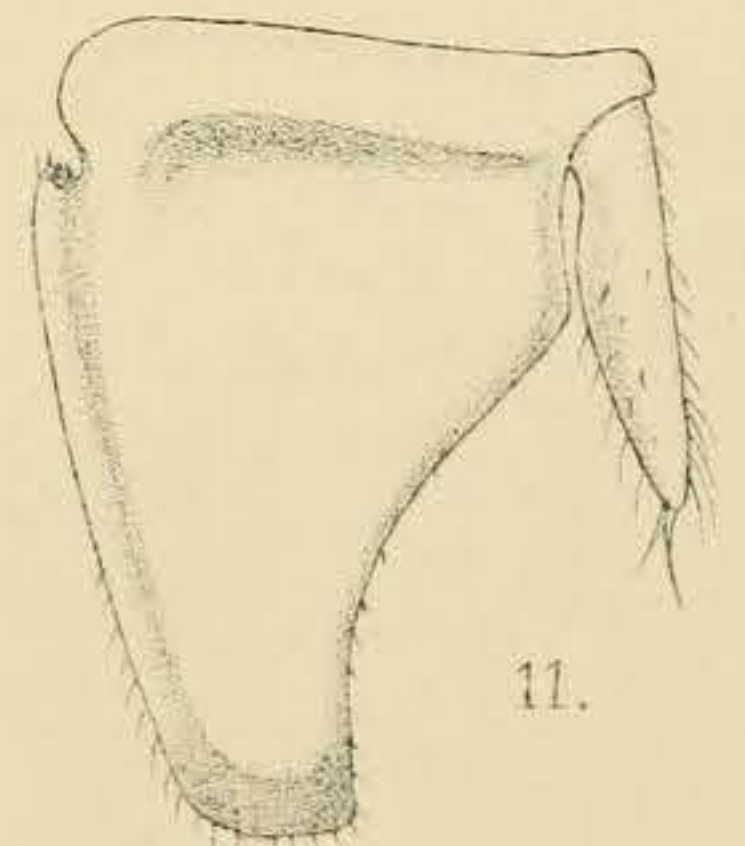
10.



12.



7.



11.

W.E.C. & H.G.K. del.

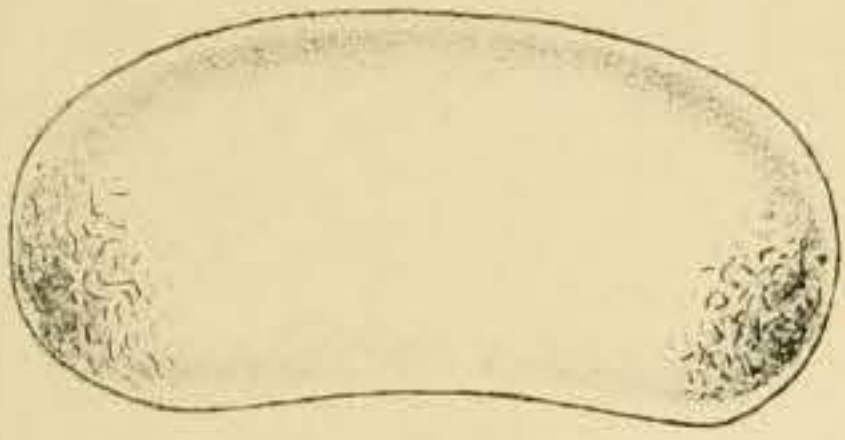
A. Chowdhary, lith.

CUBARIS ALBOLATERALIS, n. sp.

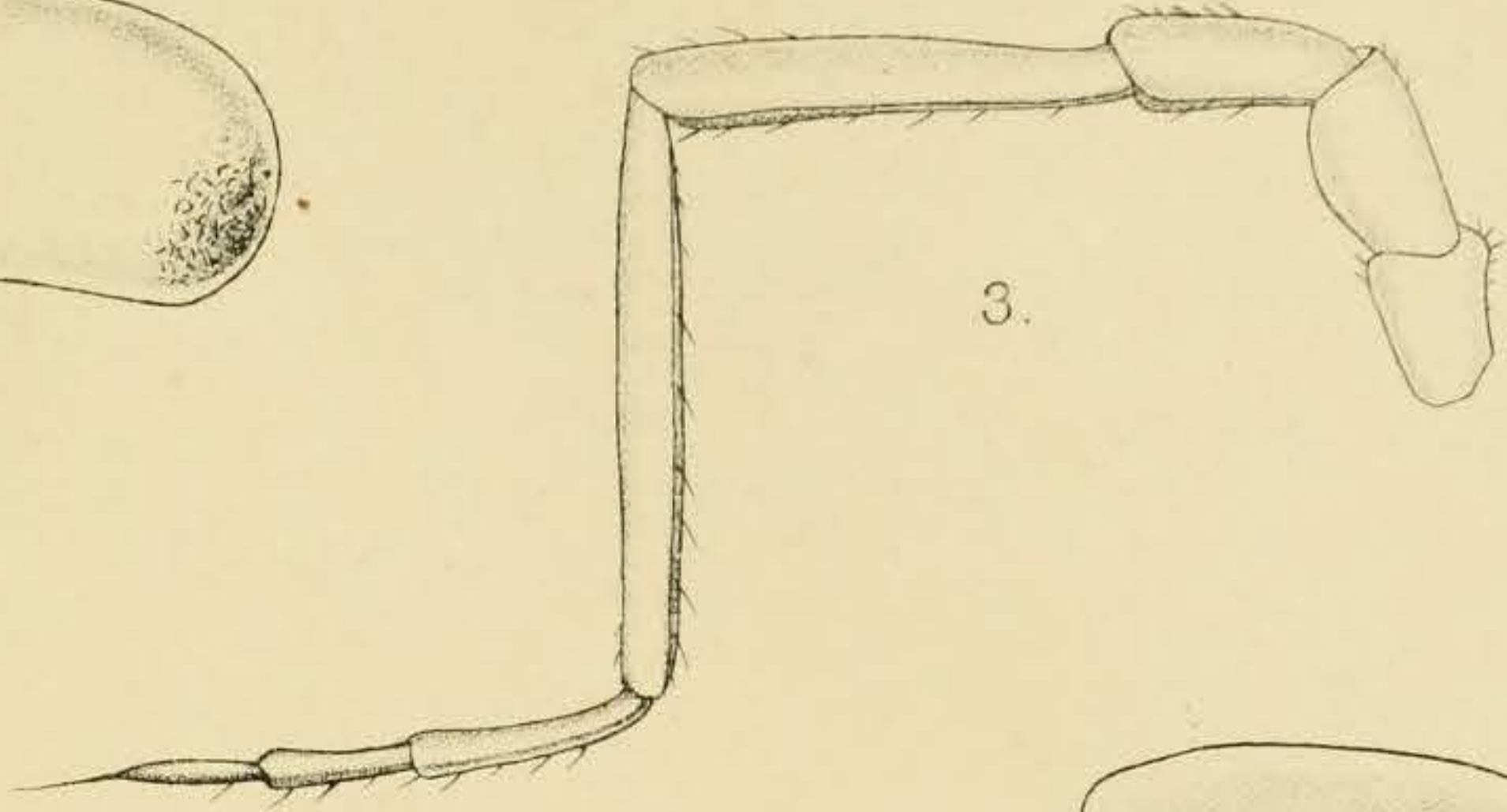
EXPLANATION OF PLATE XIX.

Burmoniscus kempi, n. sp.

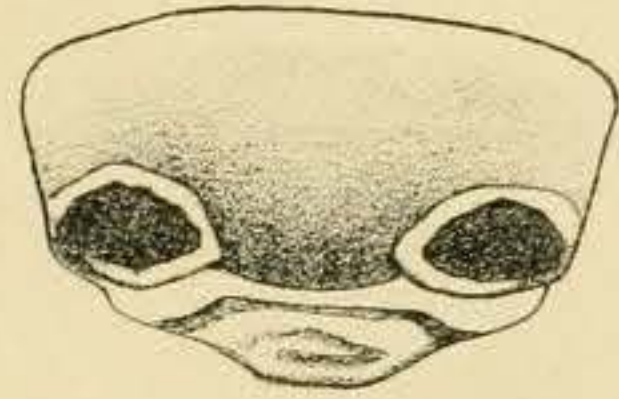
- FIG. 1.—Dorsal view of the cephalon.
,, 2.—Anterior view of the cephalon.
,, 3.—Left antenna.
,, 4.—First maxilla, terminal portions of outer and inner lobes.
,, 5.—Second maxilla, terminal portion.
,, 6.—Maxillipede, terminal portion.
,, 7.—Right uropod, dorsal view.
,, 8.—Last metasomatic segment, telson and basal plates of
the uropoda.



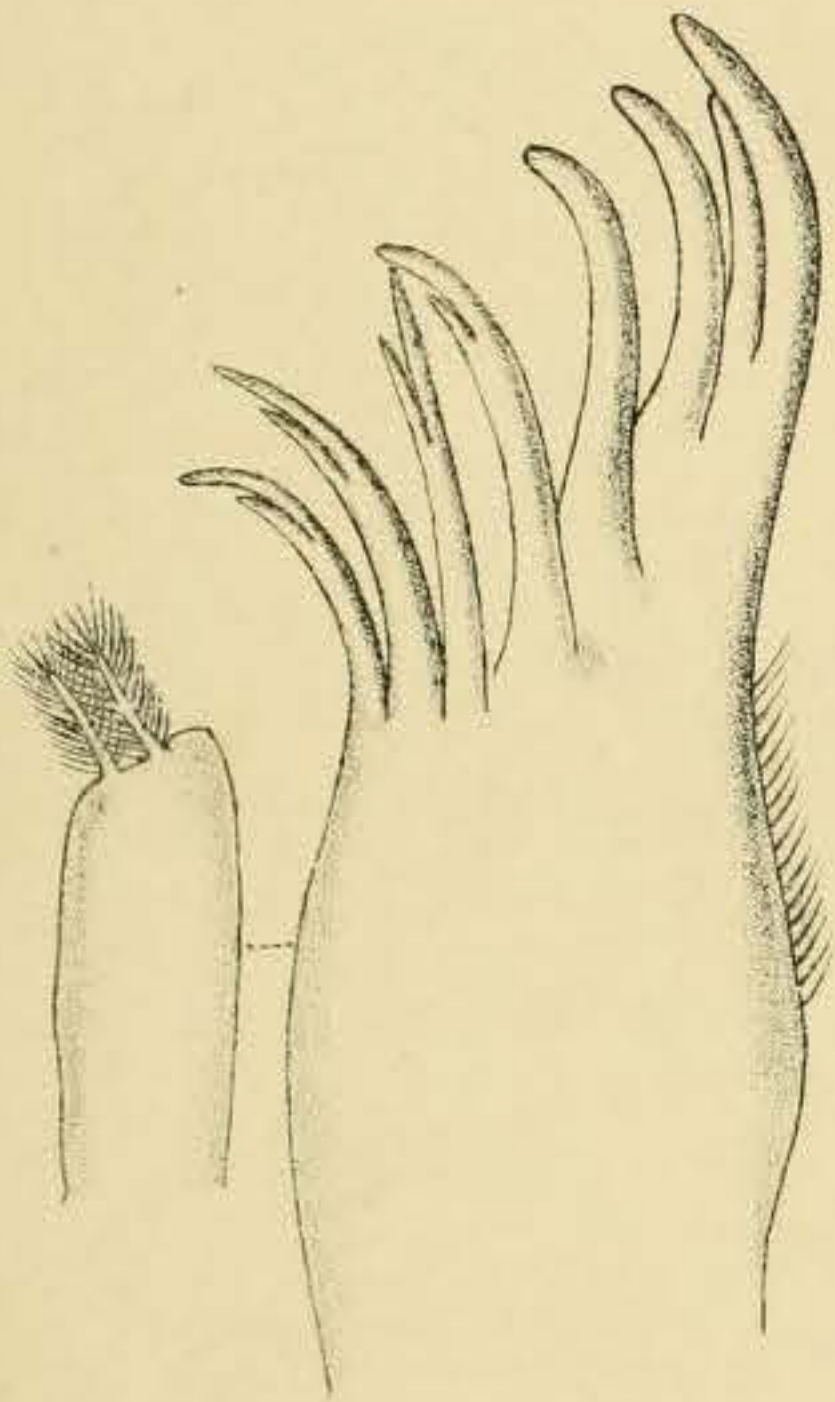
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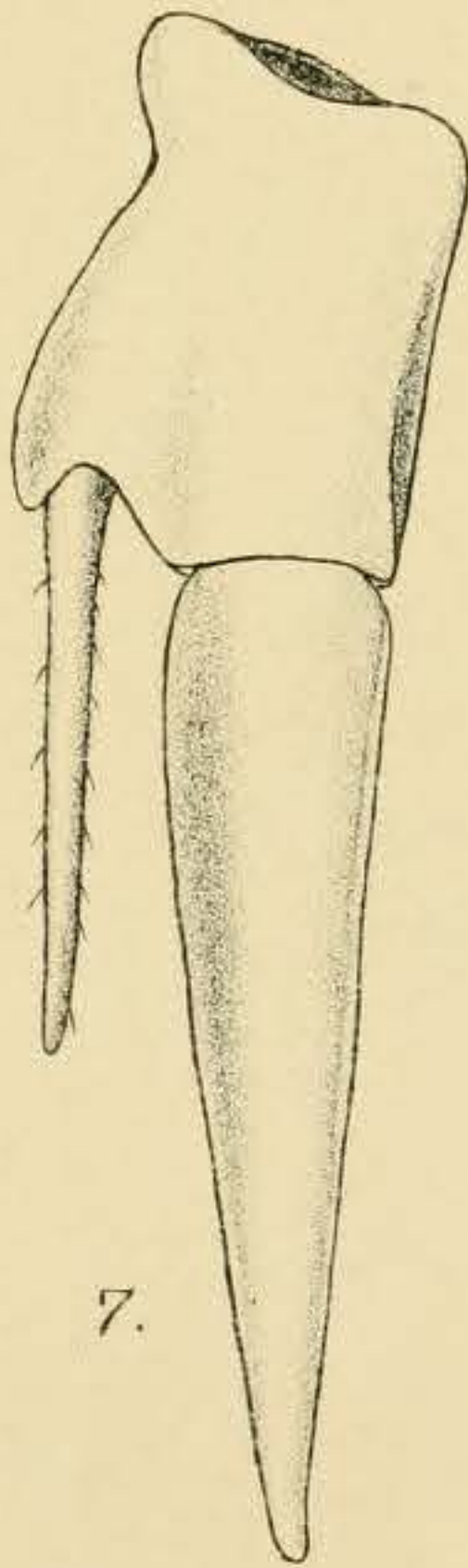
3.



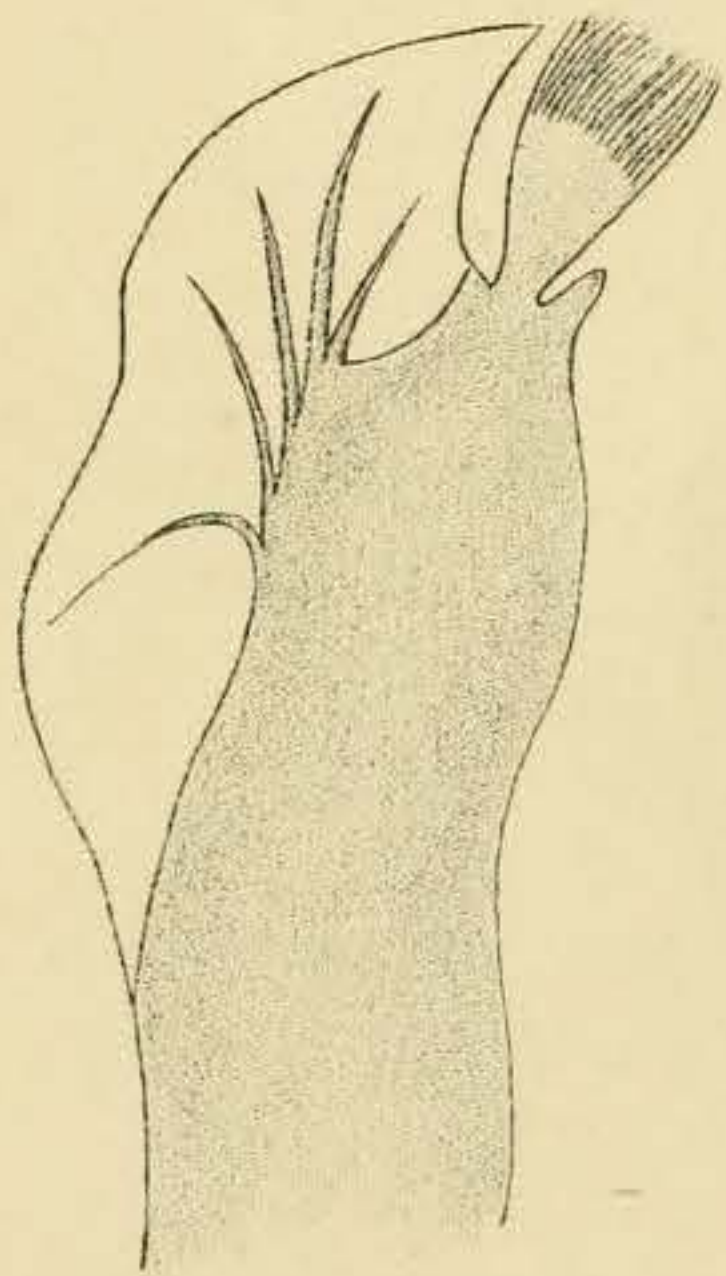
2.



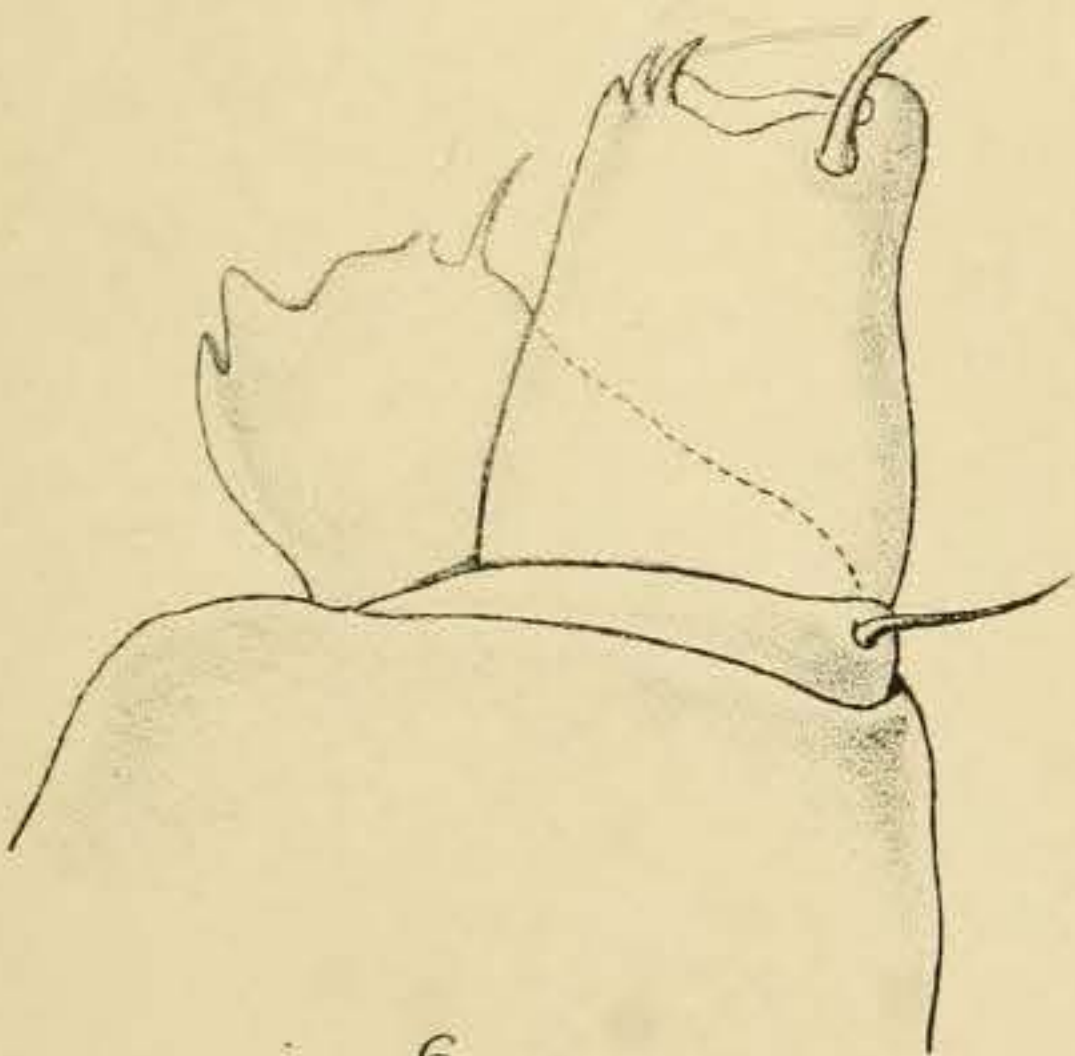
4.



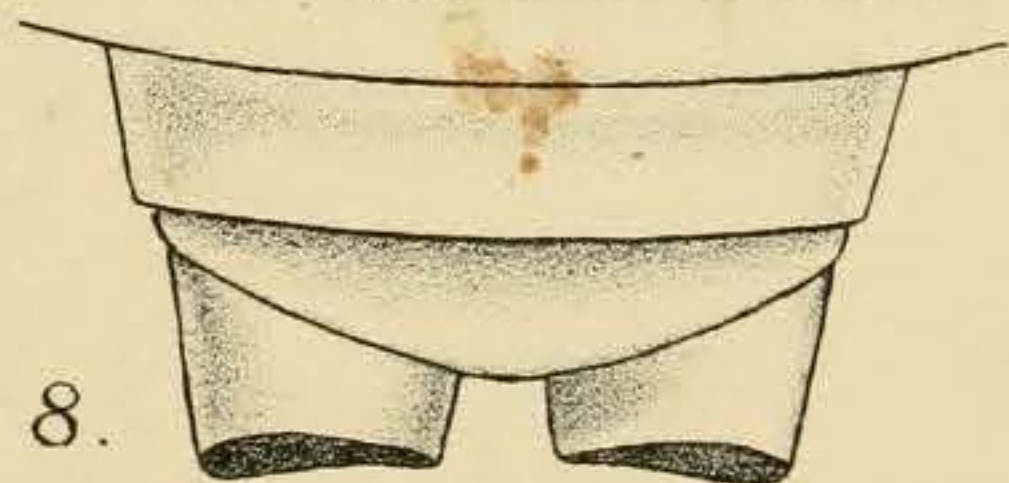
7.



5.



6.



8.