

NEONIPHARGUS INDICUS (CHILTON), AN INDIAN FRESH-WATER AMPHIPOD.

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Some time ago Mrs. E. W. Sexton of the Marine Laboratory, Plymouth, sent me some Indian fresh-water Amphipods, collected by Mr. R. Senior White, F.R.S.E., Malariologist to the Bengal Nagpur Railway, India, and begged me to examine them.

They turned out to belong to the genus *Neoniphargus*. The species is, however, not new to science, as it has been described by Chilton under the name of *Niphargus indicus* (see below). Nevertheless the find is very interesting, as the present specimens were found in a seepage spring skeletonizing leaf debris, whilst the type-specimens were secured in a coal mine. Probably all the other *Neoniphargus* species live in surface-waters, not (—like most of the *Niphargus* species—), in subterranean waters.

Genus *Neoniphargus* Stebbing.

- Neoniphargus*, Stebbing, *Trans. Linn. Soc. London*, (2) VII, p. 424 (1899).
Niphargus, G. M. Thomson, *Proc. Royal Soc. Tasmania*, 1892 (1893), p. 67.
Unamelita, Sayce, *Proc. Royal Soc. Victoria*, XIII, p. 238 (1901).
Neoniphargus, Stebbing, *Gammaridea*; *Das Tierreich*, 1906, p. 404.
Neoniphargus, Geoff. Smith, *Trans. Linn. Soc. London*, (2) XI, p. 73 (1909).

The genus *Neoniphargus* was established by Stebbing (*l. c.* 1899) in order to accommodate *Niphargus montanus* Thomson (*l. c.* 1892, p. 70, pl. vi, figs. 1-13)¹, as the only species.

Type-species.—*N. thomsoni* Stebbing 1906, p. 404 (= *Niphargus montanus* Thomson, *l. c.* 1892). “Agrees very closely with *N. yuli*” (Smith, *l. c.* 1909, p. 76). Found in Tasmania, swampy ground near top of Mount Wellington, about 1,200 m. (Thomson, 1892; Smith 1909, p. 76).

Later on the following additional species were established. *Neoniphargus (Unamelita) spenceri* (Sayce); Sayce (*l. c.* 1901, p. 238, figs.). “Agrees most closely with *N. tasmanicus*” (Smith, 1909, p. 76). Found amongst spongy moss at the source of a spring running into Wallaby Creek, Plenty Ranges, Victoria, about 600 m., and Lake Petrarch, Tasmania, about 900 m., (Sayce, *l. c.*)—Lake Petrarch, Tasmania (Smith, 1909, p. 76).

N. fultoni Sayce, *Proc. Royal Soc. Victoria*, Vol. 14, 1902, p. 57, figs. Found in a spring at Collin's Coach stage, near to Wood's Point, Victoria, about 930 m.

N. yuli Smith (*l. c.* 1909, p. 73, figs.). Yule's Lake on the top of Ben Lomond, Tasmania, about 1,200 m.

N. exiguus Smith (*l. c.* 1909, p. 74, figs.). In weed and mud in small stream near Huntingfield, Tasmania.

¹ I have not had access to Thomson, *l. c.*, and know it only from the review in Stebbing, *l. c.*, 1906, p. 404.

N. tasmanicus Smith (*l.c.* 1909, p. 74, figs.). In the littoral zone of the Great Lake, Tasmania.

N. wellingtoni Smith (*l.c.* 1909, p. 75, figs.). Under stones and in small streams on the eastern face of Mount Wellington, Tasmania, about 900 m.

N. alpinus Smith (*l.c.* 1909, p. 75, figs.). In mountain tarns on the West Coast (Mt. Read), Tasmania, about 900 m.

N. niger Smith (*l.c.* 1909, p. 76, figs.). Under stones in Lake Perry, Harz Mountains, Tasmania.

N. ripensis (n. sp. ?) Smith, *Naturalist in Tasmania*,¹ 1909, p. 82, fig. 20.

N. indicus (Chilton), see below.

N. branchialis Nicholls, *Journ. Royal Soc. W Austral.*,¹ Vol. 10, 1924, pp. 105-111, figs. (W Australia).

N. westralis Chilton, *ibid.* Vol. 11, 1925, pp. 81-84, figs. (Darlington, W Australia).

N. obrieni Nicholls, *ibid.*² Vol. 12, 1926, p. 79 seq., figs. (W. Australia).

Thus the genus comprises 13 (14 ?) species, all except one (*N. indicus*, from India) found in fresh-water in Australia or Tasmania.

The best description of the genus is no doubt that given by Smith (1909, p. 73).

Neoniphargus is very closely allied to *Niphargus* (for *Niphargus* see Stebbing, *l.c.* 1906, p. 405, or Chevreux and Fage, *Amphipodes (Faune de France, No. 9, 1925, p. 208)*; the most important differences are the following :—

	<i>Neoniphargus.</i>	<i>Niphargus</i> (according to Chevreux and Fage, 1925, p. 208).
Lower lip, inner lobes	Not distinct.	Distinct.
Mandibles, 3rd joint of palp	Shorter than 2nd joint.	Longer than 2nd joint.
Maxilla 1, the right and the left palp.	Different.	Alike.
Maxillipedes, inner margin of outer plates.	Not spiny.	.. Spiny.
Pereiopods 1-2, 6th joint	Not broader than 5th joint.	Broader than 5th joint. ²
Uropod 3, 2nd joint of outer ramus.	Minute or quite missing, never long.	Long (♂) or short (♀), always present.

Pereiopods 1-2 have the dactylus unguiculate in both genera.

¹ I have not had access to these papers.

² The 5th and 6th joints are equally broad (at all events in pereiopod 1) in some species.

N. philippensis Chilton, *Philippine Journ. Sci.*, Vol. XVII, 1920, p. 515-521, figs. (Philippine Islands).

N. chilkenis Chilton, *Mem. Ind. Mus.*, Vol. V, 1921, pp. 531-535, figs. (Chilka Lake, India; "one of the commonest species.")

N. australiensis Chilton, *Rec. Austral. Mus., Sydney*, Vol. XIV, 1923, pp. 79-81, figs. (New South Wales).

The morphological differences are frequently accompanied by a difference in habitat ; the species of *Neoniphargus* live nearly always in surface waters (lakes, streams, tarns), the *Niphargus* species in subterranean waters or in springs.

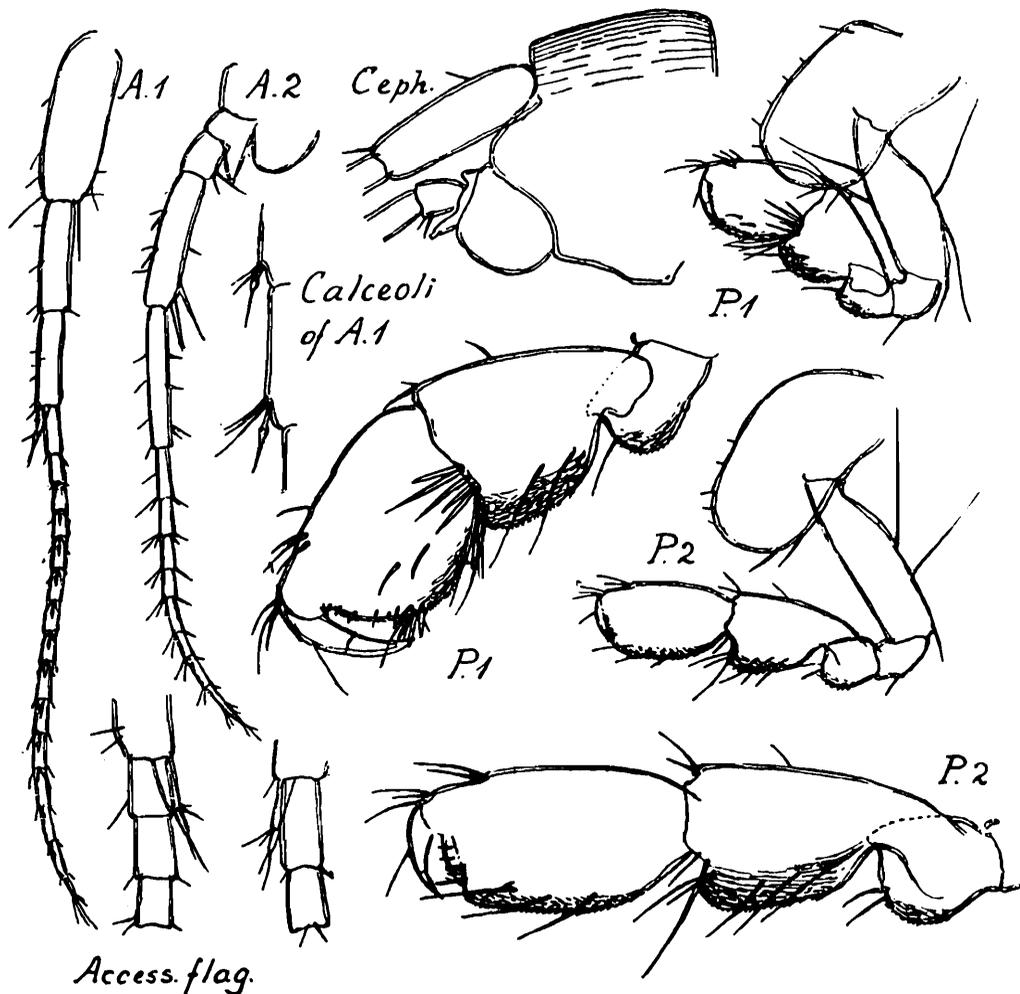
The present species differs in several details from the diagnosis of the genus, but these differences are probably partly due to the fact that the characters in question are only with difficulty ascertained, and no doubt minor details have been overlooked.

***Neoniphargus indicus* (Chilton).**

Niphargus indicus, Chilton, *Rec. Ind. Mus.*, XXV, pp. 195-96, 3 figs. (1923).

Description of ♂(?), about 5 mm.

The sex of the specimens could not be ascertained with certainty ; there are no ♀ with marsupium in the material. Head (fig. 1, *Ceph.*) longer than segment 1, ocular lobe rounded. Eyes could not be traced. Back evenly vaulted, with a few setae, especially near hind margin of the segments ; on the urosome segments there are both spines and setae (fig. 4. *Uros.*)

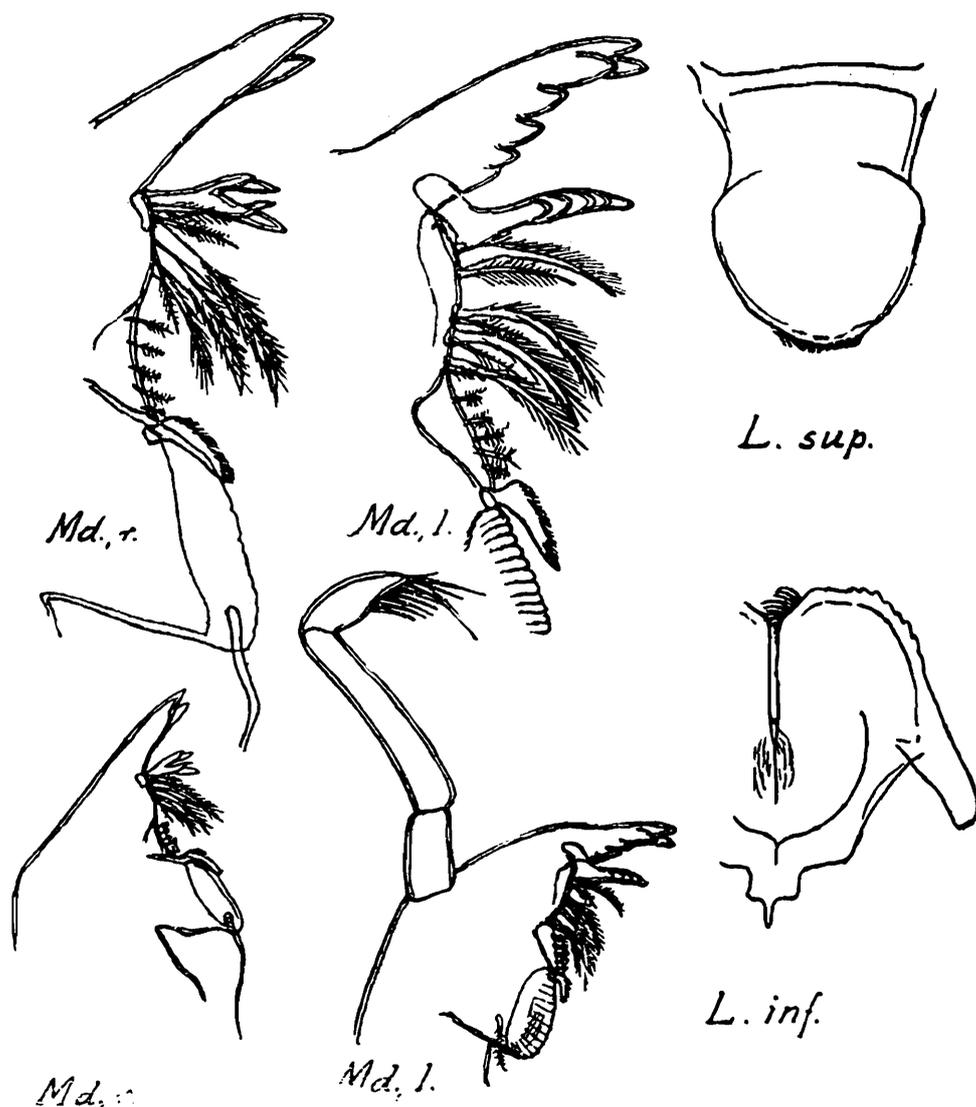


TEXT-FIG. 1.—*Neoniphargus indicus*. Head (*Ceph.*). Antenna 1-2 (*A. 1-2*) and pereiopods 1-2 (*P. 1-2*). *Access. flag.* = Accessory flagellum of antenna 1.

Antenna (fig. 1, *A. 1*) about half as long as mesosome, not very setose ; 1st joint of peduncle heavier and not much shorter than the two next

joints combined. Accessory flagellum short, 2-articulate, 1st joint about twice as long as 2nd joint. Flagellum about $1\frac{1}{2}$ time as long as peduncle, 15-20-articulate. In a few cases 1st and 2nd joints of flagellum are not separated from one another, and then these 1st and 2nd joints combined are twice as long as the next joint. The joints of flagellum have sensory organs (calceoli?), each ending in a long narrow apex.

Antenna 2 (fig. 1, *A. 2*) somewhat shorter than antenna 1. 1st joint of peduncle very large, globular; 2nd joint has a rather long projection, containing the opening of the antennal gland; 3rd joint short; 4th and 5th joints rather long, subequal. Flagellum a little shorter than peduncle, has about 9 joints.



TEXT-FIG. 2.—*Neoniphargus indicus*. Mandibles (*Md., r*=right mandible, *Md. l.*=left mandible, upper lip (*L. sup.*) and lower lip (*L. inf.*).

Upper lip (fig. 2, *L. sup.*) large, apically rounded. Posterior lip (fig. 2, *L. inf.*) with the two halves very little gaping, apically rounded, with spines on median margin and with about 8 minute protuberances on lateral margin. No distinct inner lobes.

Mandibles (fig. 2, *Md.*) very heavy and strong. The left mandible (fig. 2, *Md. l.*) has, the cutting edge divided into 6-7 strong teeth; lacinia mobilis long, with 5 teeth. Spine row consists of 4 pairs of strong dentate spines (each pair consisting of 1 larger and 1 smaller spine), and about 5 small plumose hairs. Molar process heavy, at upper distal corner has

a strong, curved, pectinate spine, and at lower distal corner a plumose seta. The right mandible (fig. 2, *Md. r.*) has the cutting edge cleft into two strong teeth; lacinia mobilis has apically 4 teeth. Spine row consists of 3 small and 3 longer pectinate spines, 2 of them very strong. The rest of the mandible not different from left mandible. Palp long, 1st joint short, 2nd joint three times as long as 1st. 3rd joint much shorter than 2nd joint, apically narrower.

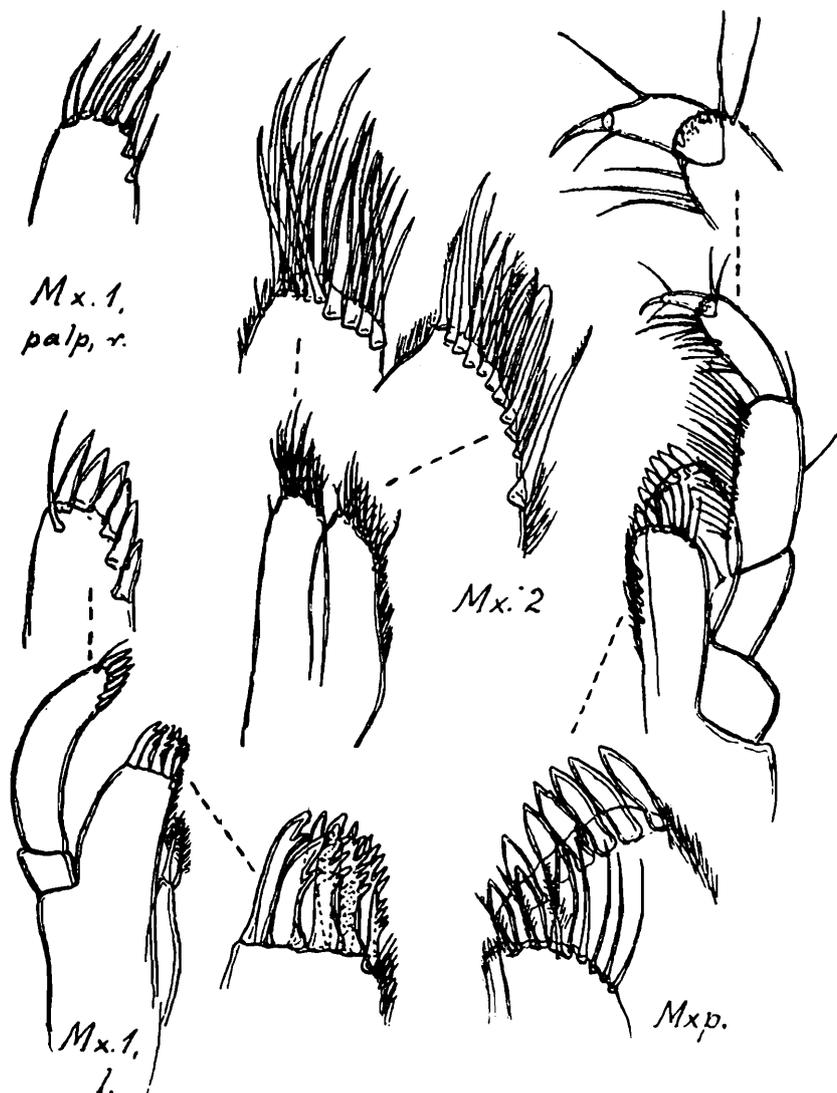


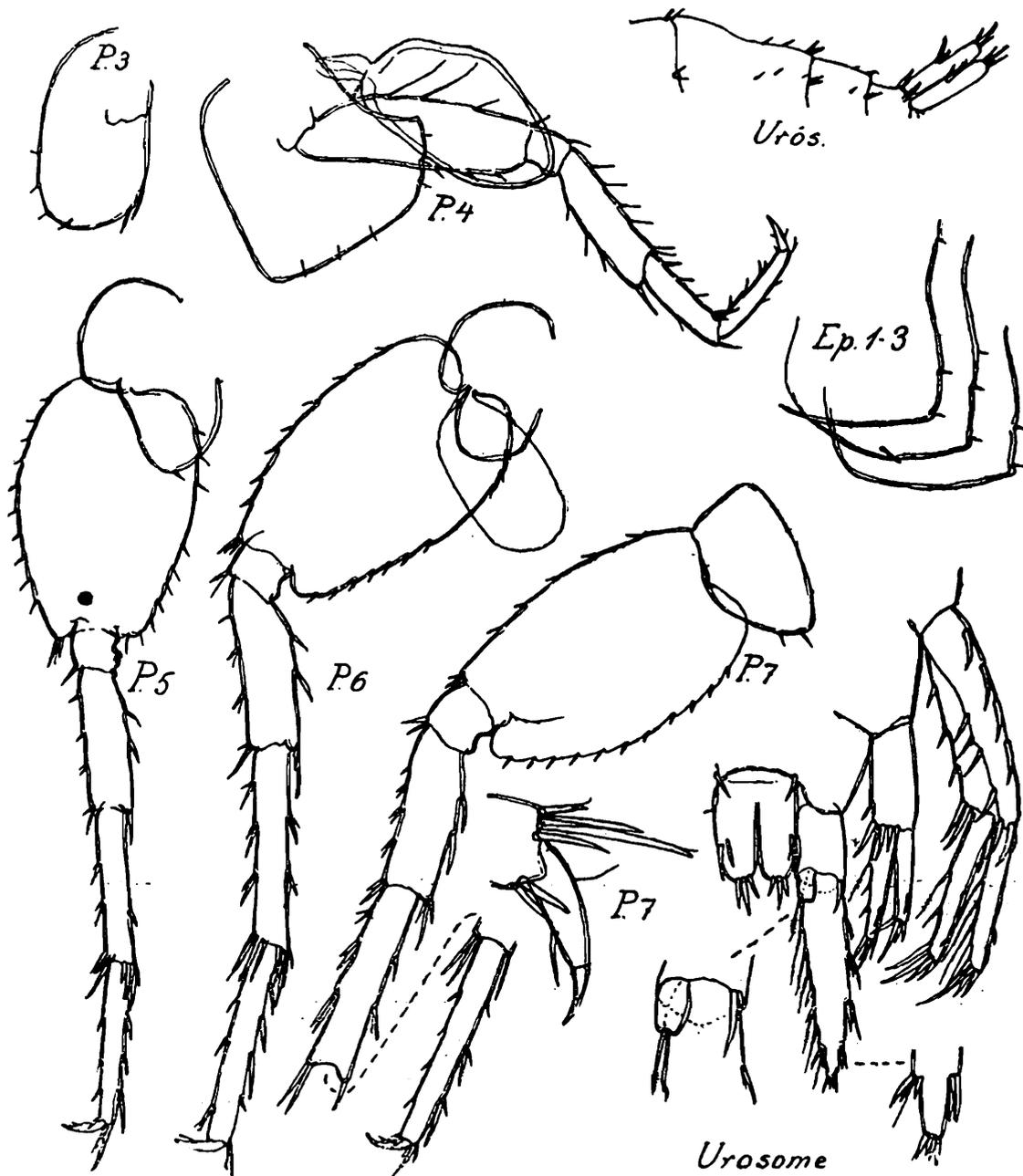
FIG. 3.—*Neoniphargus indicus*. Maxilla 1 (*Mx. 1*); the left Maxilla (*Mx. 1, l.*) and the apex of the palp of the right maxilla (*Mx. 1, palp, r.*), Maxilla 2 (*Mx. 2*) and Maxillipeds (*Mxp.*).

Maxilla 1 (fig. 3, *Mx. 1*). Inner lobe short, narrow, apically with two plumose setae. Outer lobe much broader, apically with 8 spines, viz., 2 strong bifid spines, 4 long and 2 shorter pectinate spines. Palp 2-articulate, 1st joint being very short; apically (left mandible, fig. 3, *Mx. 1, l.*) 1 rather fine spine and 6 spine-teeth, or (right mandible, fig. 3, *Mx. 1, r.*) 6 simple spines.

Maxilla 2 (fig. 3, *Mx. 2*). The lobes are of equal breadth. Inner lobe has about 10 strong and a similar number of finer spines; the proximal strong spine is longer and heavier than the others. Outer lobe has a similar armature, but all the spines are longer than the corresponding ones of inner lobe, and the proximal strong spine is not different from the others.

Maxillipeds (fig. 3, *Mxp.*). Inner plate about as broad as outer plate, reaches a little beyond 1st joint of palp, apically rounded truncate, with 3 spine-teeth and 7 spines at apex, and hairs and 4 spines on median margin. Outer plate reaches to middle of 2nd joint of palp; apically there are 6 spine-teeth, but probably no other armature. Palp has 2 first joints rather broad, 2nd joint about twice as long 1st joint; 1st joint has only one, 2nd joint numerous setae on median margin, 3rd joint about $\frac{2}{3}$ as long as 2nd joint and somewhat narrower; apically there is a blunt, rounded, finely-haired process or, rather, plate, much shorter than that of *N* (*Unamelita*) *spenceri* Sayce (*l. c.* 1900, p. 241, pl. 40); a similar process has not been recorded in any of the other species. 4th joint curved, strong.

Branchiae are simple sacs.



TEXT-FIG. 4.—*Neoniphargus indicus*. Pereiopods 3-7 (*P. 3*=side-plate of pereopod 3), epimeral parts of the metasome segments (*Ep. 1-3*), urosome in dorsal view with the uropods and telson (*Urosome*) and in lateral view (*Uros.*).

Pereopod 1 (fig. 1, *P. 1*) has side-plate rounded rectangular, like those of pereopods 2-3. 4th joint has inferior corner produced into a rounded lobe provided with fine setae. 5th joint rounded triangular, rather

broad, with hind margin produced into a hairy lobe like that of 4th joint. 6th joint rounded quadrangular, subchelate, with palm somewhat oblique and not defined from the curved hind margin, except that 4 strong spines are placed opposite the apex of dactylus. Dactylus strong, feebly curved.

Not only in pereopod 1 but also in pereopod 2 the hinder surface of 3rd or 4th to 6th joints is densely beset with fine hairs.

Pereopod 2 (fig. 1, *P.* 2) not very different from pereopod 1, but more elongate, especially in 5th and 6th joints and palm more transverse and distinctly marked off from the rounded lobe at the end of dactylus.

Pereopods 3-4 alike (fig. 4, *P.* 3-4), longer than pereopod 2. Sideplate of pereopod 4 as broad as deep, with a moderately deep excavation in hind-margin; inferior fore-corner rectangular, inferior hind-corner rounded, inferior angle of the excavation rectangular. Dactylus moderately strong, with one spine on hind-margin.

Pereopods 5-7 (fig. 4, *P.* 5-7) slightly increase in length from pereopod 5 to pereopod 7; pereopod 5 longer than pereopod 3-4. Sideplate of pereopod 5-6 slightly bilobate. 2nd joint in all 3 pairs oval; 4th to 6th joints subequal in length.

Inferior hind-corners of metasome segments 1-3 (fig. 4, *Ep.* 1-3) rectangular.

Uropod 1 (fig. 4, *urosome*) has rami subequal in length, a trifle shorter than peduncle. Uropod 2 much shorter than uropod 1, with inner ramus a little longer than outer ramus, which is as long as peduncle. Both these two pairs of uropods strongly spinose. Uropod 3 (fig. 4, *uros.*) about as long as uropod; outer ramus more than twice as long as peduncle, with spines on outer margin and spines and plumose setae on inner margin. There is no apical joint; the single joint of outer ramus terminates in 4 spines. Inner ramus very short, suboval, apically with 1 or 2 spines.

Telson (fig. 4, *urosome*) has the sides almost parallel, deeply cleft; each of the two lobes has 2 dorsal spines and 3 apical spines.

Occurrence.—The specimens described above were secured at Badampahar, Morbhang State, Orissa (India), in a seepage spring at *ca.* 400 m. The finder, Mr. R. Senior White writes, that “they were skeletonizing leaf debris—mainly *Shorea robusta*. I have examined hundreds of similar springs in various parts of India without noticing Amphipods before.”

The type-specimens of Chilton were found in a pit (depth about 100 m.) in the Januria Colliery in the Thana of Januria in the Asansol Sub-Division (Bengal).