ON A COLLECTION OF AQUATIC RHYNCHOTA FROM THE RIHAND DAM SITE, MIRZAPUR DISTRICT (U. P.), WITH THE DESCRIPTION OF A NEW WATER STRIDER (INSECTA : HEMIPTERA, GERRIDAE).

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In April 1947, a party of the Zoological Survey of India was sent out to Mirzapur district (Uttar Pradesh) in connection with the survey of the waters connected with the proposed Rihand reservoir, especially with a view to ascertaining what quantity of edible fish could be obtained if the fisheries were developed in the reservoir[1]. The party made extensive collections of various groups of animals from the Rihand river round about the Dam Site at Pipri[2], about 100 miles from Mirzapur. At the time the survey was undertaken all tributaries of the Rihand river had almost dried up and the Rihand river itself was reduced to a very shallow stream about two to three feet deep, except at certain places on the sides where the depth varied from about six to seven feet. Some more parties were subsequently sent to carry out the survey in December 1947, early March 1948 and later in April 1948. Hora[3] has given a detailed account of the topography and also of the fish fauna of the Rihand river and its Zoogeographical significance.

I had the opportunity to examine the collection of Aquatic Rhynchota made by the Survey parties and while examining the collection came across four interesting apterous female specimens of water striders belonging to the faimly Gerridae, sub-family Ptilomerinae. The specimens doubtless seemed to be new to science and are described in the present paper as a new species of *Teratobates* under the name *Teratobates rihandi*. One of the specimens was sent to Dr. W E. China of the British Museum, London, for favour of comparison with the named material and opinion. I am highly grateful to Dr. W E. China for the courtesy in sending me his opinion on the new insect sent to him for comparison with the named material in the British Museum. My sincere thanks are also due to Dr. S. L. Hora for certain valuable suggestions.

The collection made from time to time by the Survey parties from the areas surveyed by them comprises fifteen species belonging to twelve different genera of the following seven families :

Family NEPIDAE.

1. *Laccotrephes ruber* (Linn.).
2. *Ranatra elongata* Fabricius.
3. *Cercotmetus fumosus* Distant.

[1] For an article on the construction of dams and their effects on fisheries of rivers *vide* Hora, S. L., *Central Board of Irrigation Journal* IV (2), pp. 113-118 (1947).

[2] Pipri is a village in Pargana Singrauli, Tehsil Dudhi, District Mirzapur.

[3] Hora, S. L., *Journ. Zool. Soc. India* I (I), pp. 1-7 (1949).

Family NAUCORIDAE.
4. *Heleocoris bengalensis* Montandon.
Family NOTONECTIDAE.
5. *Anisops nasuta* Fieber.
6. *Anisops nivea* (Fabr.).
7. *Anisops (Anisops) varius* Fieb.
Family CORIXIDAE.
8. *Corixa (Tropocorixa) distorta* Distant.
9. *Micronecta (Dichaetonecta) prashadana* Hutchinson.
Family HYDROMETRIDAE.
10. *Hydrometra vittata* Stål.
Family VELIIDAE.
11. *Rhagovelia nigricans* (Burm.).
Family GERRIDAE.
12. *Limnogonus nitidus* (Mayr).
13. *Limnogonus parvulus* (Stål).
14. *Metrocoris stali* (Dohrn).
15. *Teratobates rihandi*, sp. nov.

With the exception of the new species described below, the other insects listed above call for no comments, being widely distributed and well known taxonomically.

The genus *Teratobates* Esaki[1] has hitherto been known only by a single species *T bilobatus* recorded from Katmandu, Nepal and Naini Tal District (Plains), U. P.

Teratobates rihandi, sp. nov.

Head pale brown and longer than the greatest width between eyes; a central longitudinal spot extending from its anterior end to the vertex and a transverse fascia present at its posterior margin, slightly emarginate in the middle, black; the central spot at its posterior margin deeply emarginate; antennal tubercles tipped with black; eyes large and prominent, dark reddish brown (when examined in spirit), moderately emarginate interiorly; portion of head in front of eyes longer than the rest of head; antennae shorter than the body, dark fuscous except for an elongate ochraceous spot on the underside of the fourth segment near the tip, the first segment much longer than the three other segments together, third and fourth subequal, second longer than each of them (Text-fig. *1d*), measurements of the four segments and inter-segmental joints between second, third and fourth as given below:—

I Antennal segment ..	3·53 mm.
II Antennal segment	0·88 mm.
Inter-segmental joint between II and III.	0·058 mm.
III Antennal segment ..	0·70 mm.
Inter-segmental joint between III and IV	0·044 mm.
IV Antennal segment	0·64 mm.

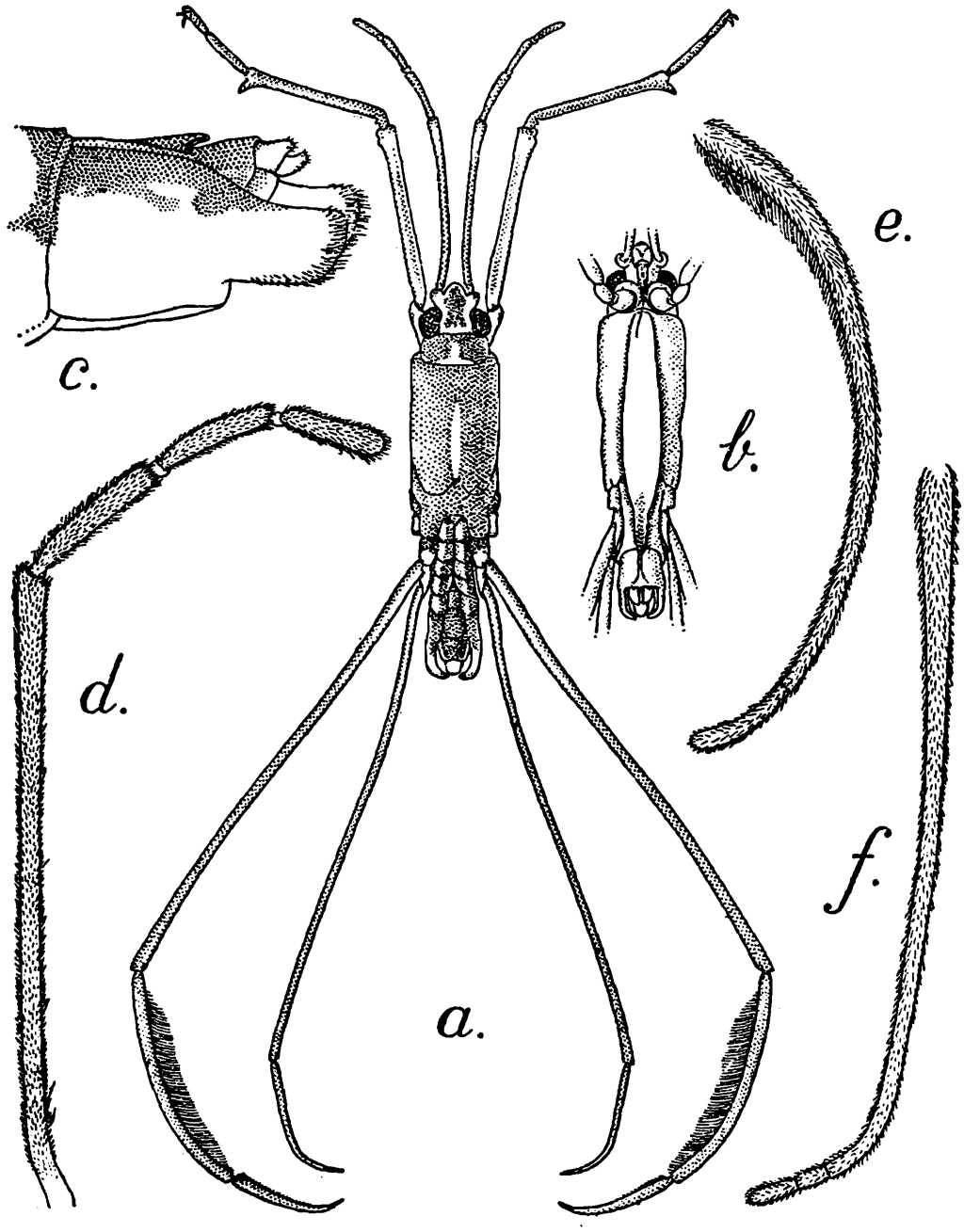
Rrostrum not passing beyond anterior coxae, third joint longest, distal one-third of the third and entire fourth joint, piceous.

Pronotum shining black except for an inverted T-shaped pale yellowish-brown mark touching the posterior margin, the vertical arm of the T, however, much reduced (Text-fig. 1*a*), anterior margin straight, posterior margin slightly sinuate, pronotum shorter than head and covered with silvery grey pubescence, prosternum pale-yellowish; meso- and metanotum shining black with silvery grey pubescence, the former provided with a central longitudinal yellowish-brown fascia in

[1] Esaki, T., *Eos* III, pp. 251-268 (1927).

the posterior three-fourths of its length, the fascia almost reaching the posterior margin of the mesonotum, a median longitudinal rather indistinct groove-like depression noticeable in the region of the fascia suture between meso- and metanotum not straight in the middle but sinuate and more or less W-shaped, meso-acetabula with a ventral longitudinal split, lateral region of meso- and metathorax black.

Abdomen above and on lateral sides black, narrower in the proximal third of its length, gradually widening from the fourth visible segment behind up to the penultimate segment, widest in the region of the sixth



TEXT-FIG. 1.—*Teratobates rihandi*, sp. nov.

a. Dorsal view of the apterous female : ×5½ ; *b*. Ventral view of a paratype female : ×5½ ; *c*. Lateral view of the terminal region of the abdomen, showing the drawn out lateral lobes of the sixth abdominal segment which are apically rounded : ×21½ ; *d*. Antenna : ×19½ ; *e*. Intermediate tarsus : ×34⅔ ; *f*. Posterior tibia and tarsus : ×34⅔.

visible segment, terminal segment pale ochraceous, short, and almost as long as broad with a few short fine bristles at its posterior margin, onnexivum in the region of the first to fifth abdominal segments very

conspicuous, fairly high or vertical, tergites of first three visible segments inconspicuous, the connexivum of either side in contact with each other along the median axis in this region, fourth tergite and the tergites of subsequent segments distinctly visible, the former appearing almost triangular in shape, sixth abdominal tergite longer than the fifth and extending over the penultimate segment for a short distance, posterior margin of the *sixth* tergite slightly sinuate or emarginate in the middle, sixth visible segment drawn out into two long, flattened, plate-like and apically rounded lateral lobes extending almost upto the posterior limit of the abdomen (exact shape of the lobes as seen in the Text-fig. *1c*); in the paratype specimens sixth abdominal tergite appears to be the longest and extends over the penultimate segment for a considerable distance leaving only a small portion of the latter visible from the dorsal side, the posterior margin of sixth tergite distinctly emarginate in the middle and the apically rounded lateral lobes of the sixth visible segment extend almost as far beyond the posterior limit of the abdomen as the length of the terminal abdominal segment; body beneath pale ochraceous and covered with silvery-grey pubescence.

Anterior acetabulae, coxae, trochanters and femora pale ochraceous, the latter with three black longitudinal lines, *viz.*, a dorsal, an outer lateral and a ventro-lateral, tibia and tarsus dark fuscous, femur distinctly longer than tibia, the latter with a distinct apical spine-like protuberance, tarsus with anteapical claws, first tarsal segment longer than the second but *not twice as long as the latter*; meso- and meta-acetabula black above, mesoacetabula with a ventral longitudinal split; intermediate and posterior coxae, trochanters and approximately basal one-third of femora, pale yellowish, distal two-thirds of femora, entire tibiae and tarsi dark fuscous, intermediate and posterior femora almost equal in length; middle femur more than twice as long as the middle tibia, the latter a little less than twice as long as the tarsus, first joint of intermediate tarsus almost six times the length of the second, intermediate tibiae with a fine fringe of long conspicuous hairs, tarsi thin and slender, tapering towards the apex and without claws, first tarsal joint with a fine fringe of short hairs in basal one-fourth, the fringe distinctly visible in the specimens preserved in spirit; posterior femur more than four times as long as the tibia and thinner than the intermediate femur, posterior tarsus very short, without claws, first segment slightly shorter than the second; measurements of the various joints of fore-, mid- and hind legs as given below :—

Leg	Femur	Tibia	Tarsus	
			First joint	Second joint
Anterior	3·5 mm.	2·9 mm.	1·14 mm.	0·73 mm.
Middle	9·7 mm.	4·41 mm.	2·05 mm.	0·35 mm.
Hind	9·9 mm.	2·24 mm.	0·11 mm.	0·17 mm.

Body widest in the anterior region of mesonotum and more than three times as long as the greatest width.

Length of body : 7·2 mm.

Greatest width : 1·67 mm.

Type-specimens.—Holotype: one female No. $6358/_{H7}$ and *Paratypes:* three females No.$6359/_{H7}$, Zoological Survey of India, Calcutta.

Locality.—Rihand river, near Dam site at an altitude *ca.* 750 ft., about one hundred miles away from Mirzapur (27-4-1947).

Remarks.—The new species is distinguished from *T bilobatus* Esaki by its characteristic apically rounded lobes of the sixth visible abdominal segment.

The four female specimens were found on a stone partly submerged in water, and an examination of the underside of the body revealed that they possess a distinctly demarcated flattened area which probably helps them in adhering to the stones and partly submerged rocky boulders lying at the edge of water or in the bed of the fast running hill streams. The modification is definitely in relation to the adaptation and probably helps the insects to climb up a stone or rocky boulder and protects them from being washed away by the rapid currents of water. This is in conformity with the observations made by Hora (1930)[1] as he writes that " In all the hill-stream animals there is a strong tendency to apply their ventral surfaces to the substratum as closely as possible, and this would necessitate the perfect smoothness of the parts of the body that come in contact with the rocks." The considerable length of the first joint of antenna and of intermediate and posterior femora has been acquired by the insect as an adaptation to the habitat. The fringe of long hairs on the intermediate tibiae is admirably suited for swimming purposes. The absence of claws in the middle and hind pair of legs, and the slender, tapering form of these appendages is an adaptation for offering minimum resistance to swift current in the hill stream. The long appendages can be used by these insects to balance the body while swaying from side to side and to adjust themselves to the changes in the velocity of the current; they also enable them to raise their body above the surface of water while making quick movements in the swift current in order to minimise the resistance due to the friction of the ventral surface of the body against the surface of the swift flowing water, the almost cylindrical body-form appears to be equally well adapted to present a stream-line to the fast flowing water.

The elongated, cylindrical body, and long, thin, tapering legs are useful adaptations for the insects living in and moving about on the surface of the swift running water. The majority of insects, nymphs or larvae which live in narrow crevices among stones on the bed of the swift flowing streams usually have their body greatly flattened or depressed and it is so modified as to present a stream-line form to the current and offer as little resistance as possible; the depressed body form is further helpful to them in their movement through narrow crevices among stones. Besides, they are generally provided with a number of spines arranged on the body to facilitate easy anchoring to the substratum as a measure of protection from being washed away by the tearing away force of the swift flowing streams. For a discussion and detailed account of the adaptive modifications of the larval and nymphal stages of various orders of insects inhabiting swift flowing hill streams of India a reference may be made to Hora (1930).

[1] Hora, S. L., *Phil. Trans. Roy. Soc. London* (B) CCXVIII, pp. 171-282 (1930).