ON THE DISTRIBUTION OF THE GENUS *AMEMBOA* ESAKI (HEMIPTERA: HETEROPTERA), WITH THE DESCRIPTION OF A NEW SPECIES.

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(Plate V.)

Esaki[1] erected the genus *Amemboa* and described the species *A. fumi* on the specimens collected from northern Formosa. One year later, the species was reported by him as common in mountainous streams throughout Formosa, and its distribution was extended to northern Mindanao, Philippine, and Sumatra. He described one more new species, *viz.*, *Amemboa horvathi*[2] on two female specimens from Annam and pointed out that the genus *Amemboa* belongs to the Halobatinae and has some resemblances with *Onychotrechus* Kirk. Two years later, he[3] tabulated the structural characters which could be successfully employed for separating the genera *Onychotrechus* and *Amemboa* from each other and rightly suggested that *Onychotrechus kumari* Distant[4] and *Onychotrechus lyra* Paiva[5] are the species actually belonging to the genus *Amemboa*, although the judgment about the latter species was based only on the figure and not on the examination of the type-specimen. *Amemboa kumari* (Distant) was recorded from Travancore ; Maddathoray, Western base of Western Ghats, and *Amemboa lyra* (Paiva) from Taunggya valley, Yawnghwe State *ca.* 3500 ft., Southern Shan States, Burma. The type and cotype specimens of *Onychotrechus lyra* Paiva [=*Amemboa lyra* (Paiva)] present in the Zoological Survey of India have now been examined and the structural characters evidently indicate that the specimens definitely belong to the genus *Amemboa*. The antennae and the intermediate legs of the type (Reg. No. 7124/H_1) are mutilated but other structural characters, *viz.*, rostrum, posterior legs, etc. are exactly as in *Amemboa*. The cotype specimens preserved in spirit are, however, intact and fully conform to the structural characters of the genus *Amemboa*. Lundblad[6] described *Amemboa javanica* from Java, raising the number of known species of *Amemboa* to five as follows :

Amemboa fumi Esaki.—Formosa, Philippine, Mindanao and Sumatra.

Amemboa horvathi Esaki.—Annam, Indo-China.

Amemboa kumari (Distant).—W base of the Western Ghats, Travancore.

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[1] Esaki, T., *Philipp. Jour. Sci.* XXVI, pp. 62-64, pl. II, figs. 22-29 (1925).
[2] Esaki, T., *Ann. Hist.-Nat. Mus. Hung.* XXIII, pp. 120-122, fig. 2 (1926)
[3] Esaki, T., *Ann. Mag. Nat. Hist.* (10) II, p. 508 (1928).
[4] Distant, W. L., *Faun. Brit. Ind. Rhyn.* V, pp. 147, 148 (1910).
[5] Paiva, C. A., *Rec. Ind. Mus.* XIV, pp. 24, 25 (1918).
[6] Lundblad, O., *Arch. Hydrobiol. Plankt.* XII (Supplement), pp. 405-408, tat. xii, fig. 130 (1934).

Amemboa lyra (Paiva).—Southern Shan States, Burma.

Amemboa javanica Lund.—Java.

Distribution.—It will be seen from the foregoing account that the genus *Amemboa* has been recorded in the east from Formosa, Mindanao, Philippine, Java, Sumatra, Indo-China and Southern Shan States, Burma (Text-fig. 1). In India it was first recorded by Distant under the name *Onychotrechus* from Travancore; Maddathoray, Western base of Western Ghats. It is now recorded from the Gandh Mardan Pervat, Orissa.

The discontinuous distribution of the Malayan fauna and flora into the Peninsular India and Ceylon has long attracted the attention of biologists. The close affinities of a number of Malayan forms with those inhabiting Ceylon and the Western Ghats in south India, and their absence in the northern part of India or in the intervening tracts have been, for a long time, puzzling zoologists interested in the science of Zoogeography. They are, however, agreed that this far-flung discontinuous distribution of closely allied forms can be accounted for only on the presumption that the distant areas were directly connected at some time in the earth's history, and the uniform physiography afforded continuity and facilitated migration. A number of theories have been advanced to explain the probable path of migration, and, of the possibilities suggested, the Satpura Trend hypothesis suggested by Dr. S. L. Hora provides a possible solution to this puzzling problem. According to this hypothesis the animals and plants spread over the continuous stretch of mountain ranges of the Tenasserim, Arakan, Assam Himalayas and Eastern Himalayas; and over the Garo-Rajmahal hills gap, which is of recent origin, into the Peninsular India over the ranges of the Vindhya-Satpura mountains, which some time back in the earth's history stretched continuously across the Peninsula and were higher than what they are now; and southwards over the Western Ghats down to Cape Comorin and Ceylon.

The present-day knowledge of the distribution of the genus *Amemboa* lends support to the Satpura Trend hypothesis as it strongly suggests the continuity of the Assam Himalayas with the Vindhya-Satpura chain of mountains at a time when this genus was widely distributed.

A systematic and extensive investigation of the insect fauna especially from the hill streams of the Vindhya, Satpura, and Aravalli mountains will further throw considerable light on the distribution of the genus and bridge the gap that exists at the present moment.

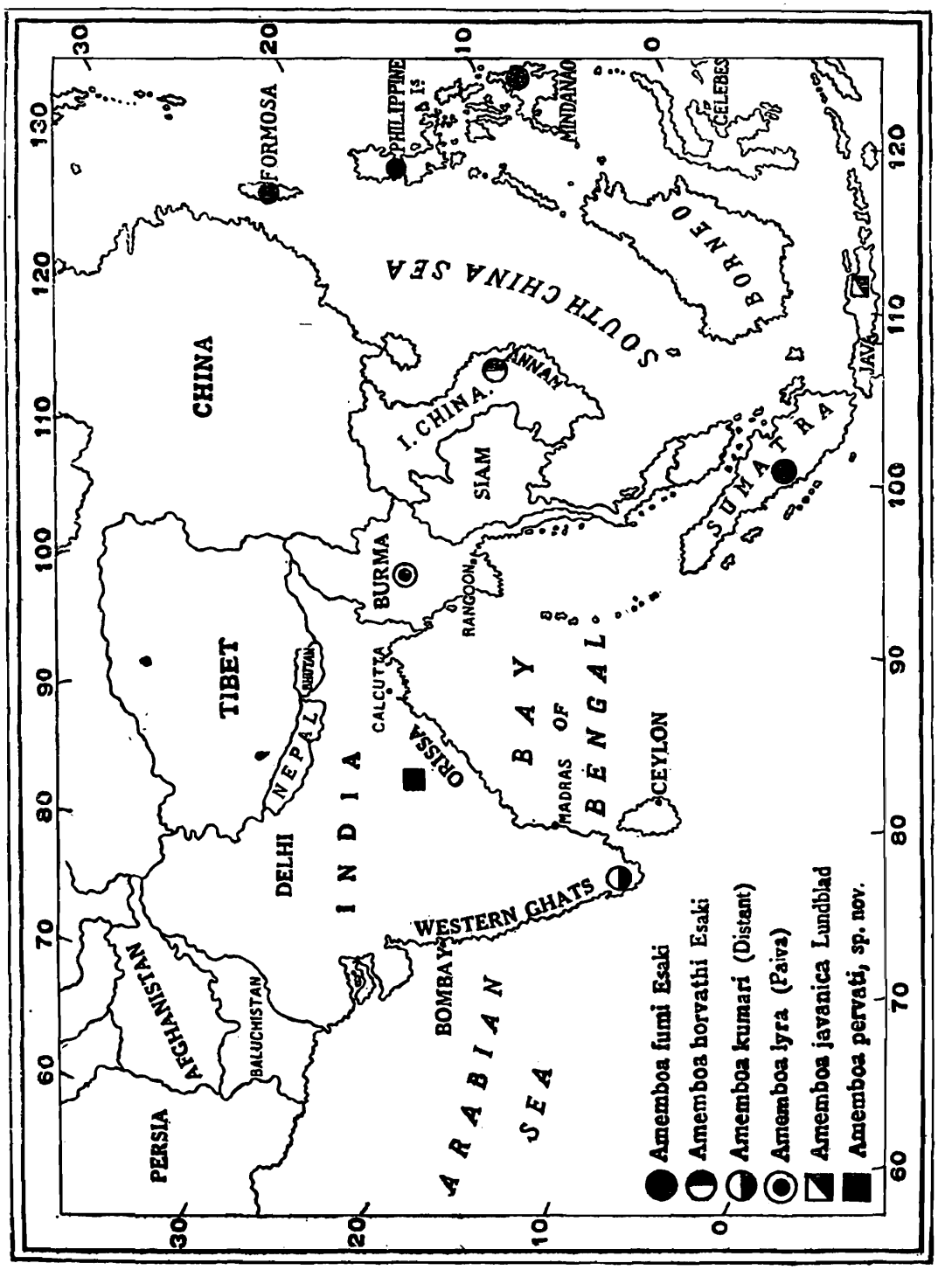
The new species dealt with in this paper is based on one male and two female specimens collected from Gandh Mardan Pervat, Orissa.

Amemboa pervati, sp. nov.

(Plate V, figs. 1-6.)

Head ochraceous; antenniferous tubercles, a short longitudinal mark extending upwards, a central somewhat triangular or V-shaped mark having its apex directed towards the vertex, a slightly curved longitudinal narrow spot extending from near the anterior end of the

inner margin of each eye backward and inward towards the middle line, black, in the female examples basal line of the triangular mark absent with the result that the central mark appears V-shaped (Plate V, fig. 3); rostrum pale ochraceous, long, extending beyond anterior coxae but not reaching upto the middle of mesosternum (Plate V, fig. 4), labrum and



TEXT-FIG. 1.—Outline map of India, Burma, Siam and Malay Archipelago, showing the geographical distribution of *Amemboa fumi* Esaki, *Amemboa horvathi* Esaki, *Amemboa Kumari* (Distant), *Amemboa lyra* (Paiva), *Amemboa javanica* Lund. and *Amemboa pervati*, sp. nov.

fourth joint shining black, second joint and a central longitudinal fascia to the third joint dark brownish; antenna with its first joint slightly curved and ochraceous, second, third and fourth joints dark fuscous,

first joint of antenna slightly longer than the third but considerably shorter than the fourth, second joint shortest, while the fourth longest, relative measurements of the antennal joints taken by the help of oculometer are as follows :

	Antennal joints.			
Sex.	I	II	III	IV
Male ..	14	12	13	19
Female	14	11	13	19

Pronotum with its anterior margin black and with four discal and two lateral longitudinal black marks, of the four discal marks the central two broader than others ; mesonotum very large and ochraceous, its anterior margin, two central longitudinal spots wider in the anterior two-thirds of their length and narrower behind, another slightly curved narrow longitudinal stripe running on the outer side of each central longitudinal spot and connected with it approximately about the middle by a transverse somewhat curved fascia, rather inconspicuous in the male example (Plate V, fig. 1) but quite prominent in the female, a narrow more or less sigmoid fascia running from the outer end of the transverse fascia posteriorward, a lateral longitudinal stripe extending from the anterior end of mesonotum almost upto the broadly elongated spot a little above the intermediate coxae, a narrow transverse streak extending from the broadly elongate spot inward and meeting a somewhat irregular triangular spot, an elongated mark a little above the base of posterior coxae, black ; the space enclosed between the two central longitudinal spots of mesonotum testaceous in the anterior half and dark brownish in the posterior half.

Abdomen with a central or medial longitudinal series of ochraceous spots and a segmental series of transverse black spots on either side ; connexivum distinct and marked with a segmental series of black spots separated by ochraceous ones ; body beneath luteous, a transverse fascia at the posterior margin of prosternum between the anterior coxae, one lateral spot a little above the base of anterior legs, a central longitudinal mark on the prosternum in the posterior region (prominent in female but not in male), one broad central longitudinal spot extending approximately from the anterior end of mesothorax upto the tip of abdomen, one lateral stripe on either side in the thoracic region, one narrow longitudinal streak on the inner side at the base of intermediate coxae, black, the central longitudinal spot fuscous in the male and differs in shape from that of female in being conical in thoracic region with the apex of the cone directed anteriorward, the abdominal sternites light brownish-ochraceous.

Anterior femora and tibiae brownish-ochraceous, tarsi and apices of tibiae fuscous, femora of male not incrassate but distinctly notched (Plate V, fig. 6), a short pointed tooth-like structure composed of a number of short hair at the proximal and a short blunt tooth-like black elevation at the distal limit of the notch, a very short rounded dot-like subapical spot on the underside of the femur, black, tibiae in the basal region

narrower and appearing a little concave on the inner surface, anterior femora of female devoid of the notch and the tibiae of uniform thickness throughout, *i.e.*, not narrower in the basal region ; intermediate femur shorter than tibia and tarsus together, intermediate tarsus longer than a half of tibia, first tarsal segment longer than twice the second ; posterior tarsus about two-thirds of tibia and the first segment of posterior tarsus longer than the second ; intermediate and posterior legs brownish-ochraceous, apices of femora, tibiae and tarsi tinged with fuscous.

Three specimens, one male and two females, were collected from Sukhtel river, Gandh Mardan Pervat on 16th March 1946, and all the specimens are apterous.

Male specimen 3·2 mm. long and 1·1 mm. wide ; length and breadth of female specimen 3·7 mm. and 1·4 mm. respectively.

Type-specimens.—Holotype.—One male No. $\frac{6\,3\,6\,0}{H\,7}$, and *Paratypes :* two females No. $\frac{6\,3\,6\,1}{H\,7}$, *Zoological Survey of India.*

Locality.—Gandh Mardan Pervat, Harishanker, Patna State, Orissa.

Remarks.—The specimens of *A. pervati,* sp. nov. closely resemble those of *A. lyra* (Paiva) but can be easily distinguished thus :

Male anterior femur of *A. lyra* (Paiva) incrassate in the proximal region and provided with a comb of short, uniform, closely set brownish or blackish hairs on the inner side extending up to a little before the middle of its length ; the inner margin of femur between the distal end of the comb and the preapical process broadly concave.

Male anterior femur of *A. pervati* in the basal region not incrassate as in the former species and completely devoid of a comb of closely set hairs ; its inner margin only slightly and narrowly notched near the preapical process.