

TAXONOMIC NOTES ON *EPILACHNA INDICA* MULSANT AND  
DESCRIPTION OF A NEW SPECIES RELATED TO IT  
(COLEOPTERA : COCCINELLIDAE)

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I. INTRODUCTION

*Epilachna indica* Mulsant was first described in 1850 by Mulsant from material from India in the collections of Reiche and Dejean. Crotch (1874) examined the type specimen belonging to Reiche's collection and recorded his observations on it. The specimen bearing the label "TYPE. *indica* Reiche", since deposited in Crotch's collection at the University Museum of Zoology, Cambridge, England, may reasonably be regarded as the lectotype, according to our present-day conception of the status of such material. The present author had examined this example at Cambridge some years ago and has lately borrowed it for further study through the courtesy of Rev. C. E. Tottenham of Cambridge. In order, however, to avoid any doubt about the type status of this specimen, I have given it the "lectotype" label, as it is one of the two specimens from which Mulsant described the species. Examples in the collection of the Zoological Survey of India were compared with the above-mentioned specimen and found to be identical with it, inclusive of the structure of the male genitalia. It was thus possible not only to identify these correctly but to give an additional description of the species that included the structure of the female genitalia and to point out reliable distinguishing characters of the species.

Subsequent to Mulsant (1850) and Crotch (1874) mentioned above, a number of other authors have referred to the name *E. indica* but it seems from their writings that the correct identity of *E. indica* was perhaps not known to them. Weise (1900) recorded what he called *E. indica* from Ceylon, and described the new variety *ceylonica* Weise, in which two or more of the six spots were joined as follows: 5 + 3, 3 + 4, 5 + 3 + 4, 4 + 3 + 5 + 6. He further stated that the male genitalia of his material of *E. indica*, though somewhat shorter and slightly different in details, were similarly shaped to those of *Epilachna 28-punctata* (F.). An examination of the male genitalia of the lectotype of *E. indica*, referred to above, showed these to be robustly built and quite distinct from those of *E. 28-punctata*, which are less robust and have a distinct blade along the two-thirds of the upper ridge of the aedeagus; the parameres and siphon are also very distinct in the two species. Besides, out of some 24 examples before me from India (all from N.E. India, *i.e.* Darjeeling, Assam and Sikkim), none showed confluence of the elytral spots, a character which appeared to be quite common in the material examined by Weise. Very probably he was referring to some other species. It may be mentioned here that, according to the more recent studies by Dieke (1947), *E. gangetica* Weise var. *connecta* Dieke, which is quite common in southern India, often shows such confluences of elytral spots as had been described by Weise.

Arrow (1900) was the next to record *E. indica*, this time from the Christmas Islands (Indian Ocean) but a subsequent examination of his material, deposited in the British Museum (Nat. Hist.), showed this to belong to a different species, more closely allied to *E. 28-punctata* than to *E. indica*, and probably new. Subramaniam

(1924) recorded what he called *E. indica* from Taliparamba in Malabar, S. India. I do not have access to his material but from a study of extensive material of *Epilachna* from southern India, I am doubtful of its occurrence in the south. At any rate, I have not come across this species from the south. Korschefsky (1931) recorded this species from Burma, from which country we also have an example in our collection. Korschefsky's (1934) record of this species from Annamalai Hills and other parts of the Madras district, as well as the record by Chatterji and Bose (1934) from the same localities based on an identification by Korschefsky, are incorrect, as an examination

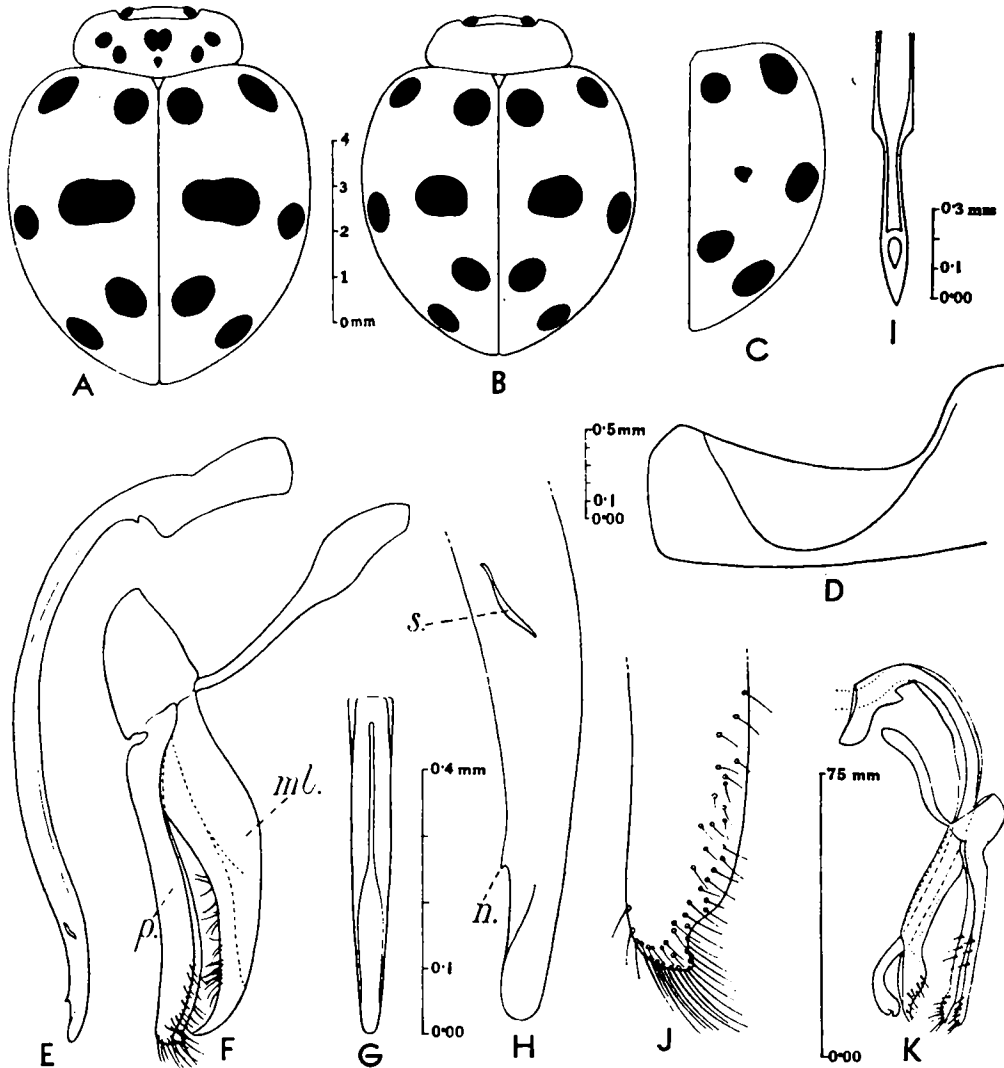


FIG. 1.—*Epilachna indica* Muls.: (A–B) outlines of the beetles showing variation in pattern in Indian examples; (C) the same in an example from Perak (Malaya); (D) abdominal line; (E) siphus; (F) other parts of male genitalia (*p*, parameres; *ml*, median lobe); (G) median lobe viewed from the front; (H) side view of apical part of siphus, much enlarged to show notch (*n*) and sigmoid mark (*s*); (I) front view of the same; (J) apex of paramere, much enlarged to show subapical emargination on the side; (K) male genitalia of *Epilachna chrysolina orientalis* Zimm., figured by Pradhan (1935) as those of *E. indica*. (4.0 mm. scale for figures A–C; 0.5 mm. scale for figs. D–G; 0.4 mm. scale for figs. H and J; 0.3 mm scale for fig. I; 0.75 mm. scale for fig. K).

of the material at the Forest Research Institute, Dehra Dun, showed that these, too, did not belong to *E. indica* but to *E. gangetica* var. *connecta*.

In more recent years Pradhan (1935; 1937) has published papers on "The genitalia and their role in copulation in *Epilachna indica* . . ." and on "The alimentary canal of *Epilachna indica* (Coccinellidae; Coleoptera) with a discussion on the activity of midgut epithelium." An examination of the description and figures of the male genitalia, published by Pradhan in his first-mentioned paper (1935: 250-253, figs. 1-6) clearly shows that the species studied was not *E. indica* but *Epilachna chrysomelina* (F.) subsp. *orientalis* Zimmerman, which is distributed from the Middle East to northern India. An outline of the male genitalia, as given in figure 1 of Pradhan's (1935) paper, is reproduced in figure 1, K of the present paper, to show that these are like the male genitalia of *E. chrysomelina*. Pradhan's account in this paper and presumably also in his subsequent paper (1937), where *E. indica* has been mentioned, apparently refers to *E. chrysomelina orientalis* Zimm.

Dieke (1947) described *Epilachna tertia* Dieke from two male specimens, one each from Doom Dooma, Assam, and from Kurseong, northern Bengal. He also sketched its male genitalia. The descriptions and figures given by him agree with those of *E. indica*, and I believe that *E. tertia* Dk. is synonymous with *E. indica* Mulsant.

## II. A REDESCRIPTION OF *Epilachna indica* MULSANT (figs. 1-2)

1850, *Epilachna indica* Mulsant, *Ann. Soc. Agric. Lyon* (2) 3: 776-777 (Type loc., India).

1874, *Epilachna indica* Mulsant, Crotch, *Revision of Coccinellidae*. London, p. 84.

1947, *Epilachna tertia* Dieke, *Smithson. misc. Coll.* 106 (15): 66, fig. 128, syn. nov.

Body distinctly larger, more rounded and convex than *Epilachna 28-punctata* (F.), generally testaceous to reddish-testaceous except the pale testaceous antero-lateral margins of pronotum, the black eyes, pronotal and elytral spots, and piceous to black metasternum. Pubescence greyish or dark brown, latter on black areas only. Pronotum with seven medium to small black spots, arranged as shown in figure 1, A or with reduced number of spots (6, 4 or 2) or without any spot, as in figure 1, B. Elytra with a total of 12 spots, the six spots on each elytron arranged as shown in figure 1, A, B. No. 1 spot, or the one near the scutellum, roundish, anterior margins almost level with or even slightly anterior to apex of scutellum; spot no. 2, or the shoulder spot, situated right on the shoulder, and not touching the antero-lateral margin, both these spots rounded; spot no. 3, or the median sutural spot, more distant from suture than either spot no. 1 or 5 and almost equidistant from both, usually larger (1.0-1.9 mm. wide, 0.6-1.2 mm. long) than the other spots, rectangular to moderately so, transverse; spot no. 4, or the median lateral spot, situated almost on lateral margin, sub-transverse, equal to or a little larger than spot no. 1 or 2; the post-median spot near the suture, or spot no. 5, usually round and nearly same size as spot no. 1 or slightly larger, distinctly away from suture; spot no. 6, or the subapical lateral spot, usually slightly larger than spot no. 5, a little transverse-oval in outline and not touching lateral margin. Size of spots variable but generally spot no. 3 the largest and transverse in position but in rare instances (2 examples from Perak, out of the 3 from Malaya) this spot is smaller than the others, as shown in figure 1, C. In the only example from Java the spots nos. 1 and 2 are larger and almost touch each other. It is not possible to say how far these are aberrant conditions in the species.

Underside testaceous excepting the dark brown to piceous median parts of metasternum and an irregular piceous patch at the middle of elytral epipleurae, level with spot no. 4 of the elytron.

Head distinctly transverse, with fine impressed and uniform punctation and thin, fairly close and greyish pubescence. Pronotum, when viewed flat from above, with anterior angles widely rounded, posterior angles obtuse and rounded, anterior margin nearly rectangularly emarginate in front, and lateral margins moderately rounded; punctation similar to that on head, perhaps a little finer; pubescence similar to that of head. Elytra distinctly convex, with anterior angle rounded and shoulder callus hardly distinct, lateral margins very narrowly, if at all, flattened, apical angle rounded and without any sharp angular point; punctation double as in the genus, but with the finer punctures smaller and less impressed than those on pronotum; pubescence grey except on the black spots where it is darker, otherwise similar to that on pronotum. Underside finely punctate, with thin and sparse pubescence, abdominal lines complete, reaching four-

fifths length of sternite (fig. 1, *D*); sixth abdominal sternite of male widely emarginate in the middle, while that of female, as usual for the genus (*sens. str.*), split longitudinally along the middle.

*Male genitalia* : sipho (fig. 1, *E*) moderately curved in basal three-fourths of length and from then on gradually curved in the opposite direction and gently narrowed to a rounded apex, provided with a sharp point or notch (fig. 1, *H, n*) a little distance before apex and a distinctive sigmoid mark (*s*) at about apical seven-eighths of length of the sipho, when seen from the side; viewed from the front it gives a lancet shaped appearance towards the apex (fig. 1, *I*), with a small oval orifice before apex. Parameres very slightly sigmoid in outline, each nearly uniformly wide along its length except very near apex where it is much narrowed, has its sharp point facing the median lobe, provided with short setae on inner side of apical one-third except near apex,

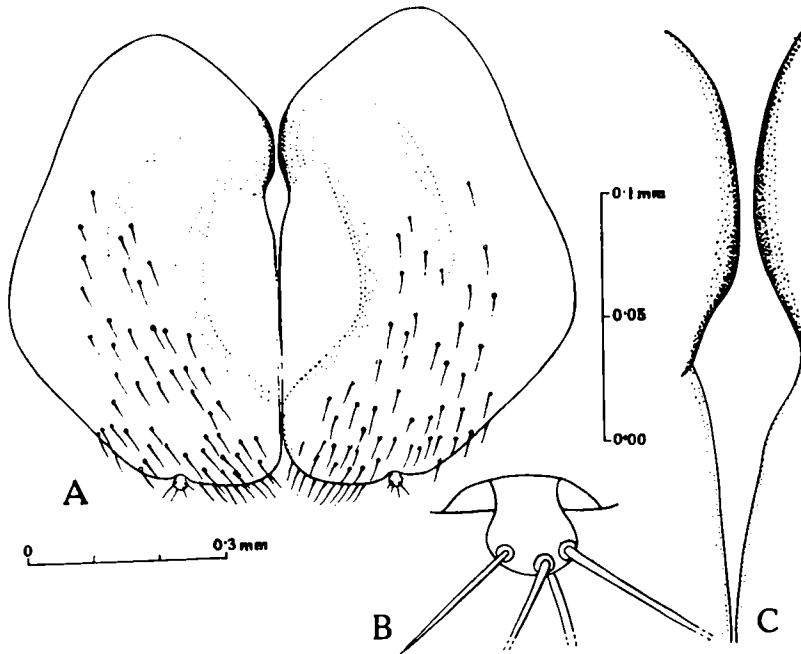


FIG. 2.—*Epilachna indica* Muls.; (A) female genital plates; (B) stylus; (C) emargination on inner margin of genital plates, much magnified. (0.3 mm. scale for fig. A; 0.1 mm. scale for figs. B and C.)

where setae increase both in number and length (fig. 1, *J*); median lobe when viewed from the side (fig. 1, *F, ml*) is also slightly sigmoid and nearly uniformly broad from base to about middle of its length, and gradually narrowed in the distal half to an almost pointed apex; provided with a number of short setae on surface facing the parameres; viewed from the front (fig. 1, *G*) it appears to be a relatively narrow tube, gradually narrowed further in distal half, also easily seen to be open along the middle, the opening being uniformly narrow in basal half and relatively widened in distal half.

*Female genitalia* : viewed together, the pair of female genital plates (ninth sternite) are relatively narrowed at base, widest at about middle and gradually rounded towards apex, each plate nearly straight along inner margin, opposing each other and provided with a longish emargination a little distance below base (fig. 2, *C*); margin from base to emargination strongly chitinised; a small, pear-shaped stylus (fig. 2, *B*), bearing about four longish setae, is also present in middle of apical margin of each genital plate. Outlines of genital plates, and of emargination on inner margin and shape and position of stylus rather characteristic of female genitalia of the species, and greatly help in its identification.

*Length* : 6.6–8.2 mm.; *width* : 5.5–6.6 mm.

*Material examined* : Besides the lectotype mentioned above, 30 specimens were examined from the following localities : (British Museum (Nat. Hist.) material is indicated by the initials B.M.)

INDIA : Northern West Bengal, Singla, 1500 ft., Darjeeling district, v.1913, 2 ; vi.1913, 2 ; Darjeeling district (without exact locality), v.1913, 6 ; vi.1913, 6 ; Birch Hill (6000-7000 ft.) Darjeeling dist., 4.vii.1914, 1 (all *Lord Carmichael* coll., in Zoological Survey of India). Assam, Naga Hills, 1 ; Manipur, 1, B.M. (*Doherty* coll.).

SIKKIM : Mungphu, 2 (*E. T. Atkinson* col.) ; Sikkim (without exact locality), 1. (*Doherty* coll.) ; Dikchu, 542 m. 14.viii.1959, 1 (*A. G. K. Menon* coll.).

BURMA : Upper Burma, Sadon, 400 ft., iv.1911, 1 (*E. Colenso* coll.).

CHINA : (without exact locality) (*Dr. Cantor* coll., 1 ex. from the late Museum East India Co., in Z.S.I.).

FEDERATED MALAY STATES : Perak, 2, B.M. (*Doherty* coll.) ; F.M.S., 1909, 1, B.M. (*C. J. Brooks* coll.).

JAVA : (without exact loc.), 1, B.M. (*Bowring* coll.).

*Remarks* : In external appearance the species resembles certain other 12-spotted species of the genus *Epilachna*, such as *E. dodecastigma* (Wied.) (the 12-spotted variety), *E. pytho* Muls., etc., but is distinctly more orbicular and generally larger in size than any of them. Besides, its spot no. 3 is generally the largest and usually transversely placed ; exceptions to this character may, however, be noticed, as in the case of the material from Perak mentioned above. It is also easily distinguished from other 12-spotted species by the shape of the male and female genitalia, especially in the larger size of the median lobe of the male genitalia. In this character it bears a superficial resemblance to *E. ocellata* Redt., another 12-spotted species, which is, however, a little smaller and less convex and has light ocellations round each elytral spot. In details of the structure of both the male and female genitalia also, the two species are easily separated.

*E. indica* is closely related to the new species, *E. karenensis* from Burma, described below, but the two can be easily distinguished by the external characters as well as the structure of the genitalia (see remarks under *E. karenensis*).

Practically nothing is known with certainty of the feeding habits of *E. indica* and earlier records of its food plants, etc., may be accepted with reservation owing to doubtful determinations.

### III. DESCRIPTION OF THE NEW SPECIES

#### *Epilachna karenensis* sp. n.

Body almost similar in appearance and size to *Epilachna indica* Mulsant, but slightly narrower posteriorly. In coloration also similar, except for the following noteworthy differences : lateral pair of black spots on pronotum larger and subquadrate ; median two spots in one example and median three in the other example, confluent ; elytral spots occupying the same positions as in *E. indica* but distinctly larger and mostly subquadrate in outline (fig. 3, A). Front tangent of spot no. 1 distinctly below apex of scutellum, spot extended to suture, appearing to be confluent with spot opposite, on other elytron, placed rather obliquely in the direction of spot no. 4 ; spot no. 2 slightly larger, not rounded, rather subtriangular, and not touching the anterolateral margin ; spot no. 3 larger (1.8-2.0 mm. wide) than the preceding two, subquadrate, transverse and distinctly away from the suture ; spot no. 4 a little larger in area than spot no. 3, nearly as wide but longer and touching lateral margin of the elytron ; spot no. 5 subcircular, larger than spots 1 and 2, almost touching the suture ; spot no. 6 nearly as large as spot no. 5, subquadrate and not touching the lateral margin. Underside testaceous as in *E. indica* but with median sclerites of both meso- and metasternum black.

Head and pronotum similar to those of *E. indica*. Abdominal lines complete, similar to those in *E. indica*.

*Male genitalia* : Sipho (fig. 3, *E*, *H*) almost like that of *E. indica* but more pointed at apex and devoid of the sigmoid mark, so characteristic of the latter species. Paramere (fig. 3, *F*, *p* ; *G*) distinctly narrowed in apical one-third, each with pointed apex directed towards median lobe and with a few short setae in distal one-third, except near apex where setae increase both in number and size. The outline of the parameres affords a reliable distinguishing character by which the two species can be easily separated. Median lobe (fig. 3, *F*, *ml*) almost similar to that of

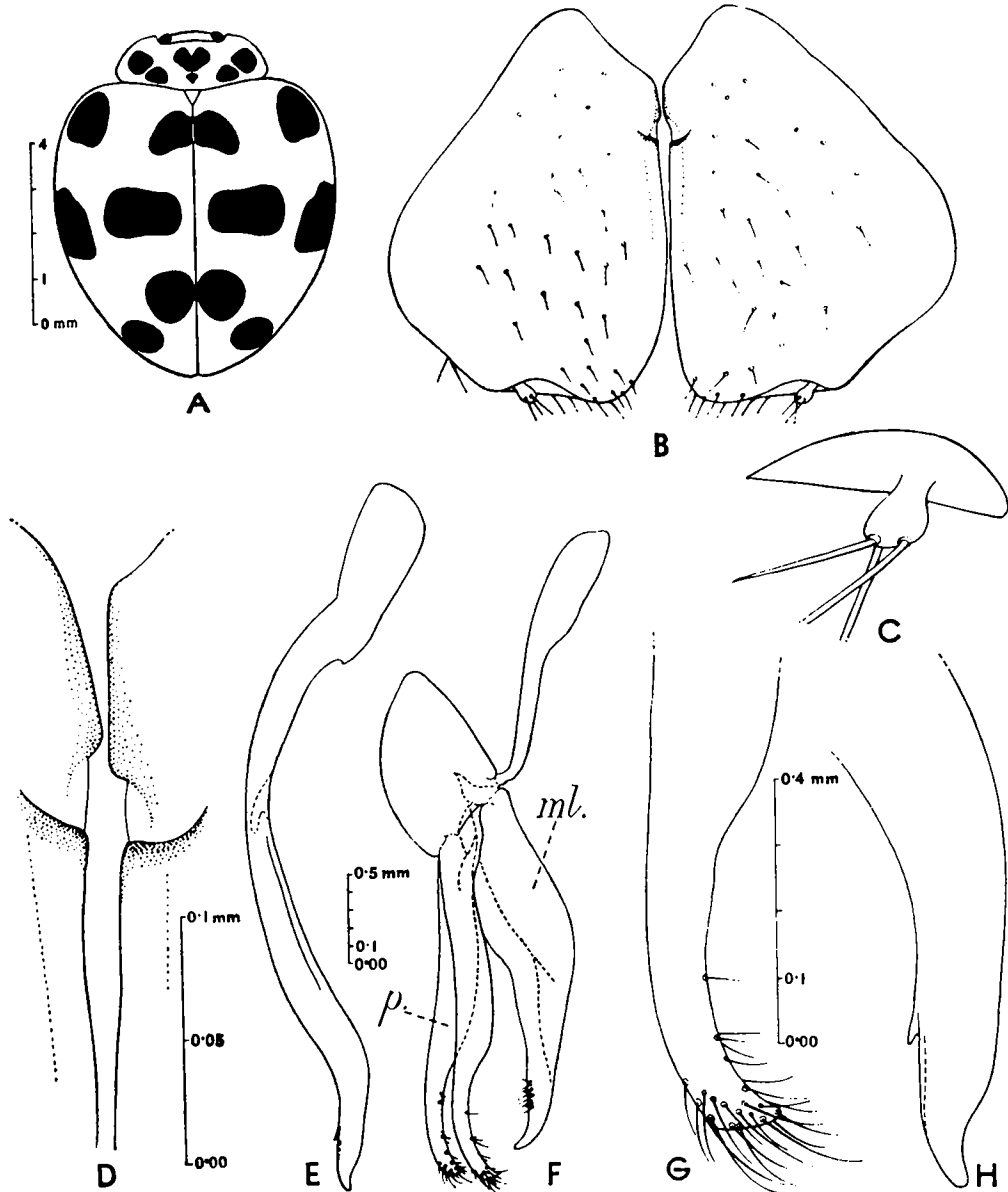


FIG. 3.—*Epilachna karenensis*, sp. n. ; (A) body outline and colour pattern ; (B) female genital plates ; (C) stylus ; (D) oblique emargination on inner margin of genital plates, much enlarged ; (E) siphus of male genitalia ; (F) other parts of male genitalia (*p*, parameres ; *ml*, median lobe) ; (G) apical half of paramere, much enlarged ; (H) apex of siphus, much enlarged. (4.0 mm. scale for fig. A ; 0.4 mm. scale for figs. B, G and H ; 0.1 mm. scale for figs. C and D ; 0.5 mm. scale for figs. E and F).

*E. indica* but distinctly narrower apically and with only a small group of short setae at a little distance before the apex.

*Female genitalia* : The female genital plates (ninth sternite) narrower at base (fig. 3, B) than those of *E. indica*, plates widest at about two-thirds of their length, with an elongate but oblique emargination on inner margin, near the base (fig. 3, D); the styli (fig. 3, C) also relatively narrower than those in *E. indica*.

*Length* : 7.3 mm. (holotype); 7.6 mm. (allotype). *Width* : 6.5 mm. (holotype); 6.5 mm. (allotype).

Holotype ♂, BURMA : Karen Mountains (*Doherty* coll.), in the British Museum (Nat. Hist.) London.

Allotype ♀, BURMA, with the same data as the holotype; in the Zoological Survey of India.

The genitalia in both cases are mounted in Canada Balsam between two coverslips and pinned with the respective specimen.

*Remarks* : As is evident from the general shape, the number and position of markings, and the structure of the genitalia, *E. karenensis* is closely allied to *E. indica* Mulsant, which also occurs in Burma. The two can, however, be easily distinguished by the size and shape of the elytral spots, by the rounded (*E. indica*) or pointed (*E. karenensis*) apex of each elytron, and the shape of the male genitalia and of the female genital plates, as already described and compared in the two species.

#### IV. SUMMARY

The identity of *Epilachna indica* Mulsant, which seemed to have been confused with certain other species of the genus in some of the earlier literature on the subject has been established on the basis of a detailed examination of the lectotype. A redescription of the species, based on a longer series of examples of the species, from north-eastern India, Sikkim and Burma, etc., is given. It appears that the geographical distribution of the species extends from north-eastern India to Burma, China, Malaya and Java.

A new species, *Epilachna karenensis* Kapur, is described from the Karen mountains in Burma. It is allied to *E. indica* in general shape and size, but can be distinguished from the latter in details of coloration and other structures, including those of the male and female genitalia, which are described and compared in the two species.

#### V. ACKNOWLEDGMENTS

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