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REVISION OF THE GENUS CHELONOCORIS MILLER (HEMIPTERA, ARADIDAE)

by

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Apterous Aradidae were first brought to the attention of Hemipterists by N. C. E. Miller (Ann. Mag. Nat. Hist. [11] 1:498-510, 1938). In fact it can be said that this paper with its excellent illustrations was the stimulus for the striking discoveries that have been made in this group in the past decade.

The genus *Chelonocoris* Miller was proposed for a group of seven (actually 8 as is shown below) very large species from Malaya, Borneo, and (as it now appears) India. The present paper was prompted by the discovery in various European museums of several additional species which extend the known range of the genus to Java and Sumatra. In order to place these new species a key was prepared. The first key was based on Miller's types and was written while studying at the British Museum (Natural History) in 1949. A drastic revision of the key was necessitated when the species from Java and Sumatra were added. With the addition of the Sunda Island material certain inconsistencies became evident in the recorded distribution of the previously described species. I am indebted to N. C. E. Miller and W. E. China for their generous aid in straightening out these matters and for checking the revised key. It now appears that two species were included under the name *Chelonocoris peregrinus* Miller. The type is from Aring which is not in North Borneo but in India. The Malayan specimens represent a new species which is described below and dedicated to N. C. E. Miller in recognition of his pioneer work on apterous Aradidae. Another error which was detected by Miller and China is the drawing of the apex of the mesonotum in *Chelonocoris malayensis* (fig. 5c). Actually the mesonotum forms a continuous ridge in the female as in the male.

In addition to Mr. Miller and Dr. China I am indebted to Drs. H. C. Blöte of the Rijksmuseum van Natuurlijke Historie, Leiden, Cesare Mancini of the Museo Civico di Storia Naturale, Genova, and the late G. D. Hale Carpenter of the Hope Department, Oxford University, each of whom assisted me during visits to their respective museums and loaned the material on which the present paper is based. More recently N. A. Kormilev of Buenos Aires kindly sent specimens of a new species which he encountered while studying a shipment of material on loan from the Naturhistorisches Museum in Basle.

Taxonomic Characters in *Chelonocoris*

As a result of the present comparative study and a doubling of the number of described species it has become clear which characters are of taxonomic significance. The most fundamental character is, unfortunately, the most difficult to describe. The mesonotum is produced backward as a simple, subflattened lobe in one group of species whereas in the other group the mesonotum has a prominent longitudinal carina which is more or less fused with the metanotal and abdominal carinae into a single long carina. In the latter group the length of the mesonotum, to the ill-defined depression in the carina which is assumed to mark the end of the segment, is shorter than half the width whereas in the former group (with the possible exception of *acuminatus*) the mesonotum is longer than half its width, extending almost or quite onto the base of the abdominal disk. The width of the mesonotum is measured across the postero-lateral angles close to the openings of the metasternal scent glands.

Antennal pubescence is an important character but again is difficult to describe. A magnification of 27 diameters was used to observe antennal pubescence. At this magnification the small hairs appear to be stiff and the erect hairs are stiff and unevenly curved.

The anterior process of the head provides useful characters. The entire process may be long, as in *milleri,* or short as in *mancinii,* and its apex may be shallowly cleft in the form of a V or deeply, narrowly cleft, depending upon the degree of development of the genal lobes. The length of the head is measured from the apex of the genal lobes to the hind margin of the thickened upper surface, thus excluding the constricted, glabrous neck region. The length of the pronotum is measured on the mid-line from the base of the concavity of anterior margin to the usually convex hind margin and the width is measured across the thickened hind margin at the level of the rounded postero-lateral angles.

The degree of inflation of thoracic and abdominal disks is measured in side view, the height above the level of the upper side margins of the body being compared with the thickness of the body below this level.

Abdominal segments are counted as is customary in the Hemiptera beginning with the second (first visible) segment, as seen from below or on the connexivum. Thus the posterior lobes of the abdomen ("abdominal lobes") are projections of the connexivum of the seventh segment and the broad discal area in front of the genital segment is the seventh tergite. The short, transverse tergite just behind the metanotum which is not always clearly distinguishable may be a part of the true first abdominal segment. The lobes of the seventh abdominal segment provide the most conspicuous specific characters. An arbitrary method was established for measuring these. The length is taken from the outer angle of the suture between sixth and seventh connexival segment to the apex of the lobe. The width is measured at about the middle of the lobe and therefore is not a very precise measurement, especially in species with lobes which taper continuously to their apices.

Total length is measured from the apices of genal lobes on anterior process of head to apices of lobes of seventh abdominal segment.

Pubescence is described in general terms for each species because it is the type of pubescence and its extent and density rather than its pattern that we are concerned with. The pattern of ridges, depressions, and bare areas is common to all members of the genus and is not described separately for each species.

Distribution and Phylogeny

The known distribution of *Chelonocoris* from India to Borneo and on the two largest Sunda Islands suggests that many more species will be found when the area is more thoroughly collected. Both the lobate and the carinate mesonotal types have been found in Malaya and Java.

In general it appears that there is a close relationship between such species as *macilentus, dyak, malayensis,* and *bufo,* all of which are from Malaya and Borneo whereas two other groups, *bloetei-depressus* and *ferrugineus-mancinii* from Sumatra, are quite distinct from the Malayan and Bornean species but are closely related to each other. Dr. China (*in litt.*) called attention to the fact that "the Borneo fauna is closely allied to that of Malaya" and expressed the opinion that "one could get the same species of *Chelonocoris* occurring there and in Malaya." However, no species of *Chelonocoris* has yet been found common to Malaya and Borneo and it may very well be that their apterous condition has led to the formation of species with very restricted ranges.

Key to the Species of *Chelonocoris* Miller

1. Mesonotum produced posteriorly as a discrete lobe with rounded apex, not or only reaching hind margin of "metanotum" and not joining a continuous longitudinal ridge extending onto abdomen 2
—. Mesonotum apparently fused posteriorly with metanotum into a continuous longitudinal ridge which extends onto abdominal disk; sometimes with an obscure suture or depression at apex of mesonotum 6
2. Mesonotum distinctly less than half as long as broad. Abdominal disk strongly, convexly elevated at middle of basal half, the elevation above connexival margin greater than thickness of abdomen below level of connexival margin. Borneo . . *acuminatus* Miller
—. Mesonotum half or more than half as long as broad. Abdominal disk feebly elevated, less than thickness of abdomen below level of connexival margin 3
3. First antennal segment slightly shorter than length of head. Abdominal lobes less than twice as long as wide. Antennae without erect setae. Malaya . . . . . *truncatus* Miller
—. First antennal segment distinctly longer than head. Abdominal lobes more than twice as long as wide. First antennal segment, at least, with some erect setae . 4
4. Genal processes convergent apically, the apex of head forming a narrow, parallel-sided cleft (often obscured by dirt) in front of clypeus. Aring, India . . . . . *peregrinus* Miller
—. Genal processes subparallel apically, the apex of head forming an open V cleft in front of clypeus. Java and Malaya 5
5. Abdominal lobes three times as long as wide across middle. Malaya *milleri* n. sp.
—. Abdominal lobes two and one-half times as long as wide across middle. Java . . *javensis,* n. sp.
6. Second and third antennal segments practically naked or with very fine erect or curved hairs. Sumatra and Java 7
—. Second and third antennal segments with relatively coarse erect or curved setae. Malaya and Borneo 11
7. Genal processes convergent apically. Lobes of seventh abdominal segment broadly rounded at apices. Java . . . . . *kormilevi,* n. sp.
—. Genal processes not convergent with a distinct cleft between them. Abdominal lobes tapering to subacute or only briefly rounded apices. Sumatra 8
8. Second and third antennal segments practically naked with only the finest appressed pubescence 9
—. Second and third antennal segments with fine but distinct erect or curved hairs 10
9. Body densely clothed with ferrugineous pubescence. Inflated portion of abdominal disk with a distinct, relatively deep depression. Male with a distinct tubercle near postero-lateral angle of sixth connexival segment. The two lobes at middle of sixth tergite just in front of genital segments subcontiguous. Sumatra . *depressus,* n. sp.
—. Body sparsely clothed with fulvous pubescence, with numerous bare areas. Inflated portion of abdominal disk with a very shallow depression. Male without postero-lateral tubercles on sixth connexival segments, the median lobes distinctly separated. Sumatra . . . . . *bloetei,* n. sp.
10. Inflated portion of abdominal disk as high as thickness of body measured in side view from venter to connexival margin. Mesonotal and metanotal carinae strongly inflated, separated by a relatively broad depression. Sumatra *ferrugineus* n. sp.
—. Inflated portion of abdominal disk less than half as high as thickness of body measured as above. Mesonotal and metanotal carinae about equally inflated, separated only by a narrow suture. Sumatra . . . . . *mancinii,* n. sp.

11. First antennal segment subequal in length to head. Abdominal disk strongly inflated, as high as thickness of body measured in side view from venter to connexival margins. Malaya . . . . . *malayensis* Miller
—. First antennal segment much longer than head. Abdominal disk only moderately inflated, not so high as thickness of body between venter and connexival margins 12
12. Abdominal lobes not tapering gradually, of uniform width or even apparently slightly widened until broadly rounded apex. Body relatively slender, over three times as long as broad across middle of abdomen (♂). Genal processes convergent, the cleft closed except for short, triangular emargination at tip. Malaya . . . . *macilentus* Miller
—. Abdominal lobes tapering gradually and then narrowly or broadly rounded at apex. Body wider, less than three times as broad across middle of abdomen as long. Genal processes subparallel, distinctly separated, the cleft deep and "U" or "V"-shaped 13
13. Femora without erect setae or with only a few scattered setae. Size relatively small, 14½ to 16 mm. Borneo . . . . . *dyak* Miller
—. Femora with numerous long erect setae. (Sometimes obscured in rubbed specimens). Size larger (♀♀ 17.5 mm). Malaya . . . . . *bufo* Miller

Chelonocoris milleri Usinger, new species

(figure 1, A and B)

Body clothed with a dense ferrugineous pubescence except for the usual naked areas, mesonotum produced backward as a prominent, subflattened median lobe with subrounded apex reaching almost to abdominal disk. Lobes of seventh abdominal segment long, narrow but not tapering, slightly bent inward with apices more broadly rounded on outer side than on inner. Second, third, and fourth antennal segments and legs with very short, appressed pubescence, the first antennal segment with the short hairs curved but suberect and with some longer erect hairs on basal half.

Male over half again as long as wide across eyes, 75::45; the greatest width at antenniferous tubercles almost equal to width across eyes, 44::45; eyes about one-fifth as wide as interocular space, 6::30; anterior process of head one-fifth as long beyond level of apices of antenniferous tubercles as total length of head; genal lobes long, cylindrical, parallel, the cleft between them deep but very narrow, open and V-shaped at apex. First antennal segment one-third longer than head, 97::75; proportion of segments one to four as 97:27:69:17.

Pronotum a little less than three-fourths as long on median line as wide across postero-lateral angles, 47::65, the anterior margin deeply concave, the lateral margins convexly arched.

Mesonotum more than half as long as greatest width, 55::85, the surface only moderately elevated (not at all elevated as seen from the side) without a prominent longitudinal carina at middle, the posterior margin strongly produced backward as a lobe with subrounded apex, the lobe reaching past the metanotum proper and onto the short first discal tergite of the abdomen.

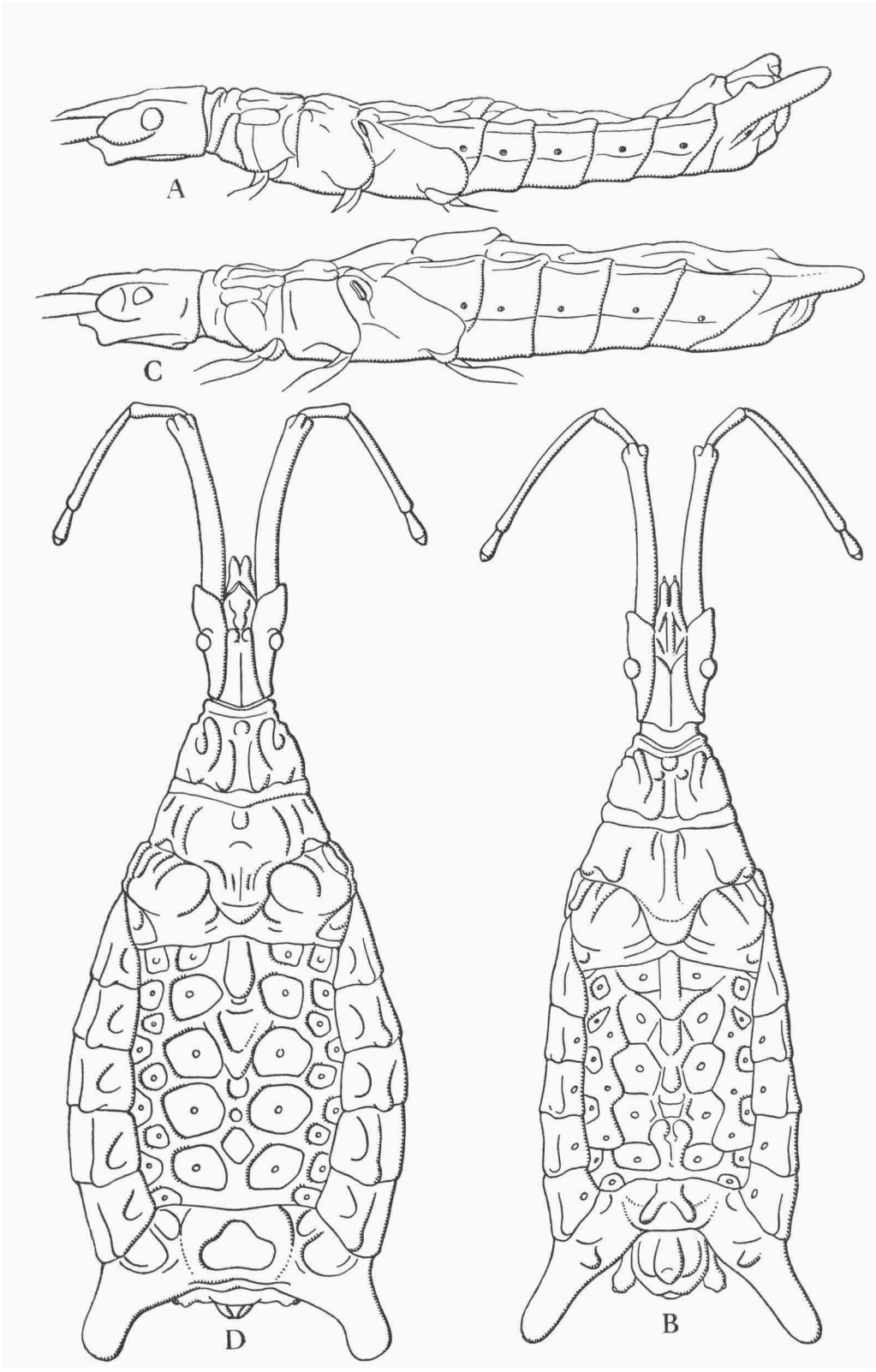

Figure 1. *Chelonocoris milleri* Usinger, n. sp. A, lateral view of male; B, dorsal view of male. *Chelonocoris javensis* Usinger, n. sp. C, lateral view of female; D, dorsal view of female.

Abdominal disk without a distinct median carina but with a moderately elevated area at middle of basal half, the elevation about one-third the thickness of abdomen (as seen from the side). Sublateral elevations at posterior margins of connexival segments prominent. Disk of sixth abdominal tergite strongly elevated in front of genital capsule, with a pair of flap-like lobes extending backward at middle of segment. Genital segment (ninth) deeply, arcuately grooved on either side of middle with a prominent, apically-rounded posterior lobe. Lobes of seventh abdominal segment strongly divergent posteriorly, three times as long as wide across middle, 55::18½, with a prominent elevated tubercle at inner base.

Ground color dark brown with fulvous to ferrugineous pubescence except on the usual naked areas.

Size: length 18½ mm, width (middle of abdomen) 6½ mm, (across abdominal lobes) 7¼ mm.

Holotype, male, and one male paratype, Malacca, Fry Collection, 1905. 100, British Museum (Natural History). These specimens bear paratype labels of *C. peregrinus* Miller. An additional specimen seems to agree with the types in every way but is not included in the paratype series because it is not one of the original series. It bears the label Malay States: Bukit Kutu, 3,300 ft., A. R. Sanderson.

According to China and Miller, who had both *peregrinus* and *milleri* before them for comparison, *milleri* differs from *peregrinus* in its "larger size, broader and laterally more convex body margins" and "abdominal lobes wider, broadly, symmetrically rounded at apex."

China and Miller write that the specimen on which Miller's figure 4c was based was probably returned to the Selangor Museum and destroyed by bombing in 1945. Presumably it was the specimen from Gombak Valley, F.M.S. and, judging by the shape of the abdominal lobes, it was different from *peregrinus* and *milleri*.

Chelonocoris javensis Usinger, new species

(figure 1, C and D; figure 6, I)

Elongate-oval, attenuated anteriorly, relatively flat above, the mesonotum produced posteriorly as a discrete flattened lobe, the lobes of seventh abdominal segment over twice as long as width at middle, broadly rounded at apices. Second and third antennal segments with very fine, appressed pubescence only, first segment, which is one-eighth longer than head, with a few scattered, erect bristles on basal half in addition to the appressed pubescence Body sparsely clothed with patches of appressed pubescence.

Head much more than half again as long as wide across eyes, 78::44, the eyes, seen from above, about one-fifth as wide as interocular space, 6::32. Head widened in front of eyes, the width about midway between eyes and apices of antennal "lobes" slightly greater than width across eyes; gradually narrowed behind eyes, the width subbasally only about three-fourths the width across eyes, 32::44. Apical process of head one-fifth as long beyond level of apices of antenniferous tubercles as total length of head. Pubescence appressed, sparse over most of head, dense on elevated area on middle of posterior half, the oblique depressions on either side of middle naked. Hind margin fringed with an encrustate pubescence above.

Antennae as long as distance from apex of head to hind margin of metanotum. First segment distinctly longer than head, 90::78. Proportion of segments one to four as 90:26:64:14. Basal segment thickest, outwardly curved, with erect bristles on basal half and appressed pubescence throughout, second and third segments with very fine appressed pubescence only, last segment pyriform, with tomentum at apex.

Pronotum half again as wide as long on median line, 75::50, the anterior margin concave, the lateral margins distinctly arcuate, the hind margin feebly, evenly convex, distinctly separated by a subbasal suture into a transverse carina.

Mesonotum two-thirds as long as greatest width, the lateral margins subrectilinear, diverging posteriorly, the median lobe broadly produced posteriorly over metanotum, not quite reaching hind margin of metanotum, only feebly elevated.

Metanotum depressed adjacent to mesonotal lobe, its hind margin sinuate at middle and sublaterally.

Abdominal disk with a lobe-like elevation at middle of base, the middle of disk slightly depressed, connexival segments with a sublateral longitudinal carina which is elevated to a small rounded lobe at the hind margin of each segment.

Lobes of seventh abdominal segment prominent, two-fifths as wide across middle as long, slightly dilated and broadly rounded at apex.

Color dark brown throughout with fulvous appressed pubescence.

Size: length 20 mm, width (abdomen) 8 mm.

Holotype, female, "Java", Hope Museum, Oxford University.

This species is closest to *milleri*, n. sp. but differs as indicated in the key. Thus far it is the only species from the Sunda Islands with a posteriorly produced mesonotal lobe, all others of this group being from India, Malaya and Borneo.

Chelonocoris kormilevi Usinger, new species

(figure 2, A-D; figure 6, A and B)

Elongate, attenuated anteriorly, the sides of abdomen subparallel in male, convex in female, upper surface depressed sublaterally, with a distinct median carina extending from mesonotum to middle of abdomen and terminating in a cordate elevation. Abdominal lobes slightly divergent, twice as long on outer margin as wide at middle (male), less than twice as long, 40::25 (female), broadly subrounded at apices. Antennae with very fine, curved, inconspicuous hairs except on basal half of first segment where they are erect and coarser. First antennal segment one-third longer than head. Genal processes convergent apically.

Male. Head three-fifths as wide across eyes as long, 37::60; eyes one-fourth as wide as interocular space, 6::25; genal lobes closely appressed, their outer margins curving to rounded, non-emarginate apex. Apical process of head one-sixth as long beyond level of apices of antenniferous tubercles as total length of head.

Antennae as long as distance from apex of head to, but not including, cordiform elevation on abdomen. First segment one-third longer than head, 80::60, the proportion of segments one to four as 80:25:56:18.

Pronotum half again as wide as long on median line, 64::42, the anterior margin concave, the lateral margins distinctly arcuate, the hind margin convex, the disk between anterior and posterior thickly elevated margins conspicuously sculptured. A rounded median elevation just behind anterior elevation, behind which is a deep median longitudinal impression, the posterior half of pronotal disk with three rounded longitudinal carinae on each side, the middle carina on each side small and all carinae oblique.

Mesonotum subcordate in outline, twice as wide to sublateral carinae as long, 60::30, two and two-thirds as wide to lateral margins as long, 78::30, disk depressed with a sharply elevated, rounded longitudinal ridge extending slightly over base of pronotum. Metanotum continuing the median carina, though separated by a distinct though scarcely depressed suture.

Abdomen with cordiform median elevation long and narrow, roughly twice as long as wide, slightly concavely tapering posteriorly to apex, the disk depressed. Maximum elevation of carina at apex where it is as high above level of lateral margins of abdomen as thickness of abdomen below this level.

Color presumably dark brown but covered with dense, appressed ferrugineous pubescence except for the pattern of small glabrous spots.

Female like the male but with sides of abdomen widened posteriorly and

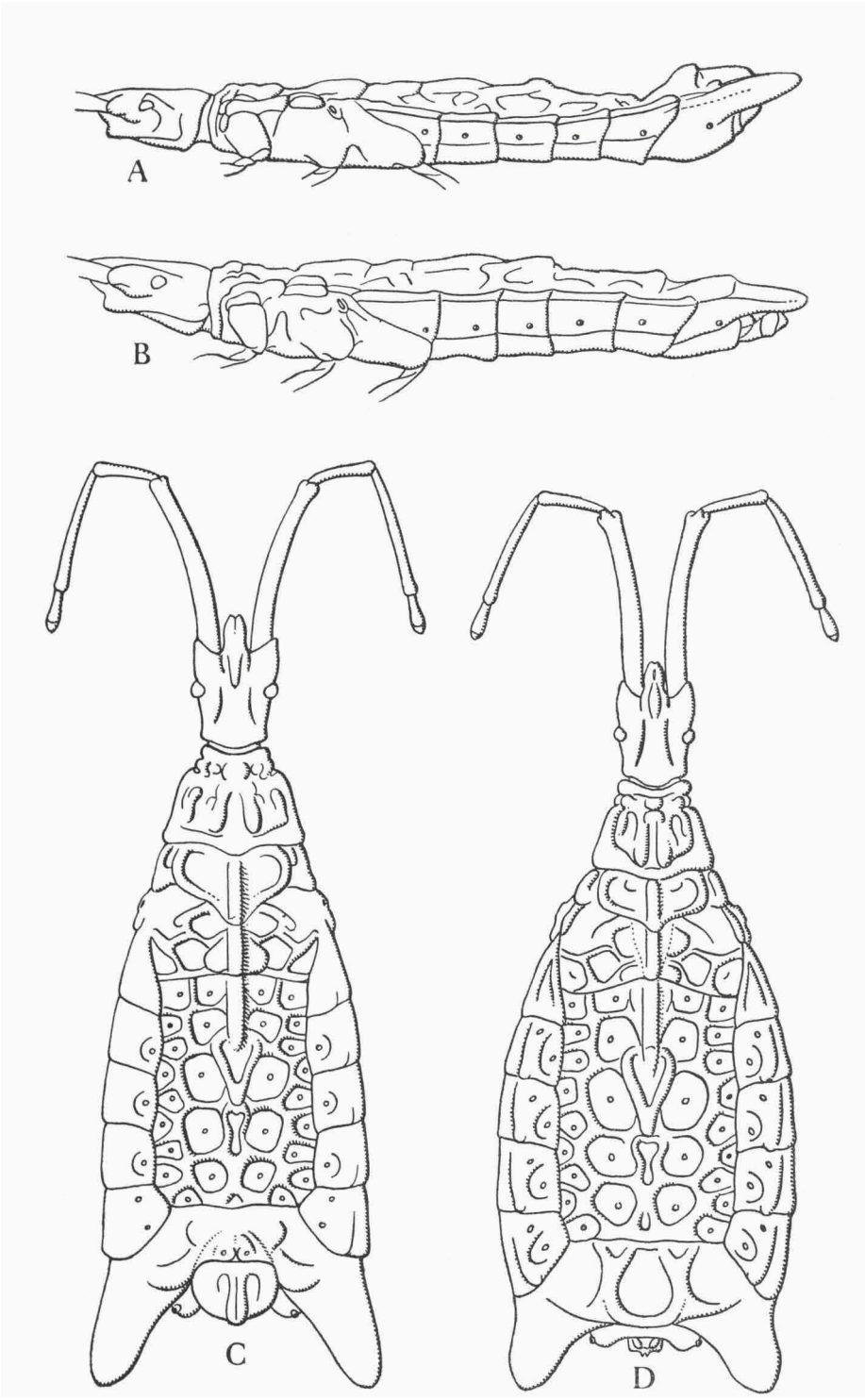

Figure 2. *Chelonocoris kormilevi* Usinger, n. sp. A, lateral view of male; B, lateral view of female; C, dorsal view of male; D, dorsal view of female.

distinctly arcuate, the lobes of seventh abdominal segment distinctly shorter and relatively broader than in the male.

Size: male, length $13^1/_4$ mm, width (abdomen) $4^1/_5$ mm; female, length 13 mm, width (abdomen) $5^1/_2$ mm.

Holotype, male, and allotype, female, Museum Basel, West Java, Djiampang Koelon, M. E. Walsh. An additional male which is not made a paratype is darker and has the abdominal lobes directed backward with subparallel outer margins rather than slightly diverging. In other respects it appears to agree with the types. It is from West Java, Gg. Malang, 4,290 feet, M. E. Walsh.

This species is superficially similar to *depressus* and *bloetei* but differs as indicated in the key. I take pleasure in dedicating this new species to Nicolás A. Kormilev who kindly forwarded the specimens to me for study.

Chelonocoris depressus Usinger, new species

(figure 5, A and B; figure 6, H)

Body densely clothed with ferrugineous pubescence. Mesonotum distinctly carinate longitudinally, the carina fused with metanotal-abdominal carina. Lobes of seventh abdominal segment scarcely divergent only on apical two-thirds, the outer margins nearly parallel and continuous with subparallel sides of abdomen. Lobes gradually tapering with blunt apices. Second, third, and fourth antennal segments and legs with very short, appressed pubescence, the first segment with scattered erect hairs near the base.

Male. Head half again as long as wide across eyes, 58::38, the greatest width well before apices of antenniferous tubercles equal to width across eyes, eyes slightly more than one-fifth as wide as interocular space 5::26. Anterior process of head very short, only one-eighth as long beyond level of apices of antenniferous tubercles as total length of head. Genal lobes short, forming a relatively broad notch at apex. First antennal segment half again as long as head, 85::58, the proportion of segments one to four as 85:25:55:18.

Pronotum three-fourths as long as wide, 45::63, the anterior margin shallowly concave, the posterior margin prominently convex behind median lobes.

Mesonotum very short, only one-third as long (measured to a distinct break in pubescence of carina) as wide across postero-lateral angles, 25::77, the longitudinal carina slightly depressed at level of middle of metanotum and then raised again at first abdominal tergite which is separated from the remainder of the abdominal carinae by a small glabrous depression.

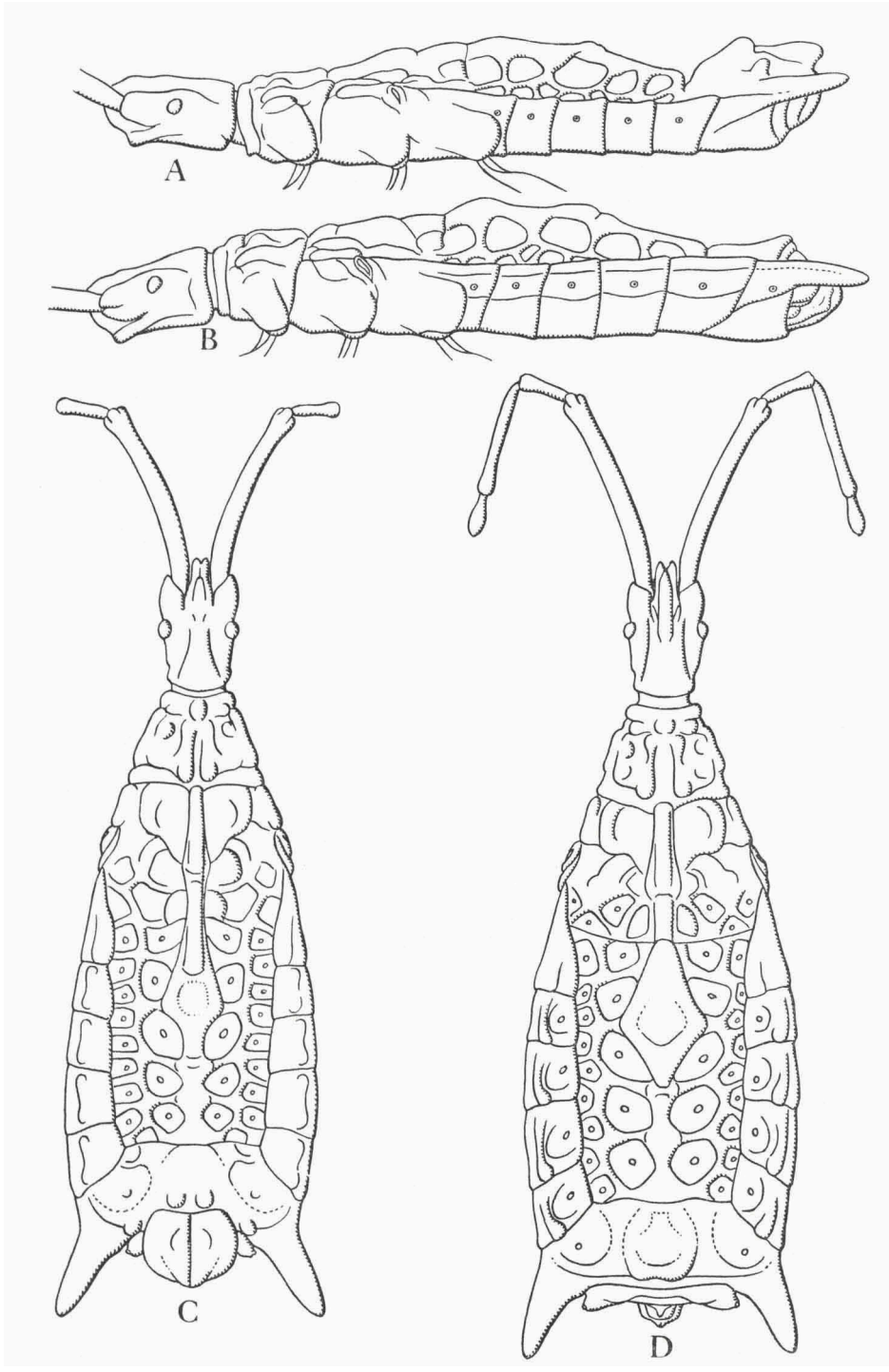

Figure 3. *Chelonocoris bloetei* Usinger, n. sp. A, lateral view of male; B, lateral view of female; C, dorsal view of male; D, dorsal view of female.

Abdominal disk about as strongly elevated above level of connexival margins as thickness of abdomen below that level, the inflated portion distinctly depressed at middle. Connexivum with prominent sublateral elevations at hind margins above and with a small but distinct lateral tubercle near posterior angles of sixth segment. Disk of sixth tergite strongly elevated posteriorly with two closely approximated lobes at middle of hind margin. Lobes of seventh segment scarcely divergent, over three times as long as wide at middle, 47::15, with a prominent, rounded tubercle at inner base. Lobes gradually tapering, blunt at apices.

Ground color dark brown with ferrugineous pubescence.

Size: length 15 mm, width (abdomen) 5 mm.

Holotype, male, Sarolangoen, 2. vii. Dr. O. Posthumus, Djambi Exp. 1925, Leiden Museum.

Chelonocoris bloetei Usinger, new species

(figure 3, A-D; figure 6, E and F)

Body only sparsely clothed with pale, appressed pubescence, the greater part of upper surface naked. Mesonotum distinctly, longitudinally carinate, the carina produced backward and partially fused with metanotal and abdominal carinae. Lobes of seventh abdominal segment divergent, tapering to blunt apices. Second, third, and fourth antennal segments and legs with very short, appressed pubescence, the first antennal segment with more erect hairs including a few longer ones near base.

Male. Head over half again as long as wide across eyes, 62::38½, the greatest width well before apices of antenniferous tubercles equal to width across eyes, eyes about one-fifth as wide as interocular space 5½::27. Anterior process short, one-sixth as long beyond level of apices of antenniferous tubercles as total length of head (excluding neck region); genal lobes relatively short, tapering, forming a V-shaped notch. First antennal segment half again as long as head, 90::62, the proportion of segments one to four as 90:25:57:18.

Pronotum two-thirds as long as wide across postero-lateral angles, 41::62, the anterior margin shallowly concave, posterior margin interrupted at middle by a pair of prominently raised lobes.

Mesonotum less than half as long (measured to ill-defined depression in longitudinal carina) as wide across postero-lateral angles, 37::80, fused with metanotal carina which is about half the length of mesonotal carina and which, in turn, is fused to abdominal carina.

Abdominal disk slightly more elevated above level of connexival margins than thickness of body below this level, the inflated portion very shallowly

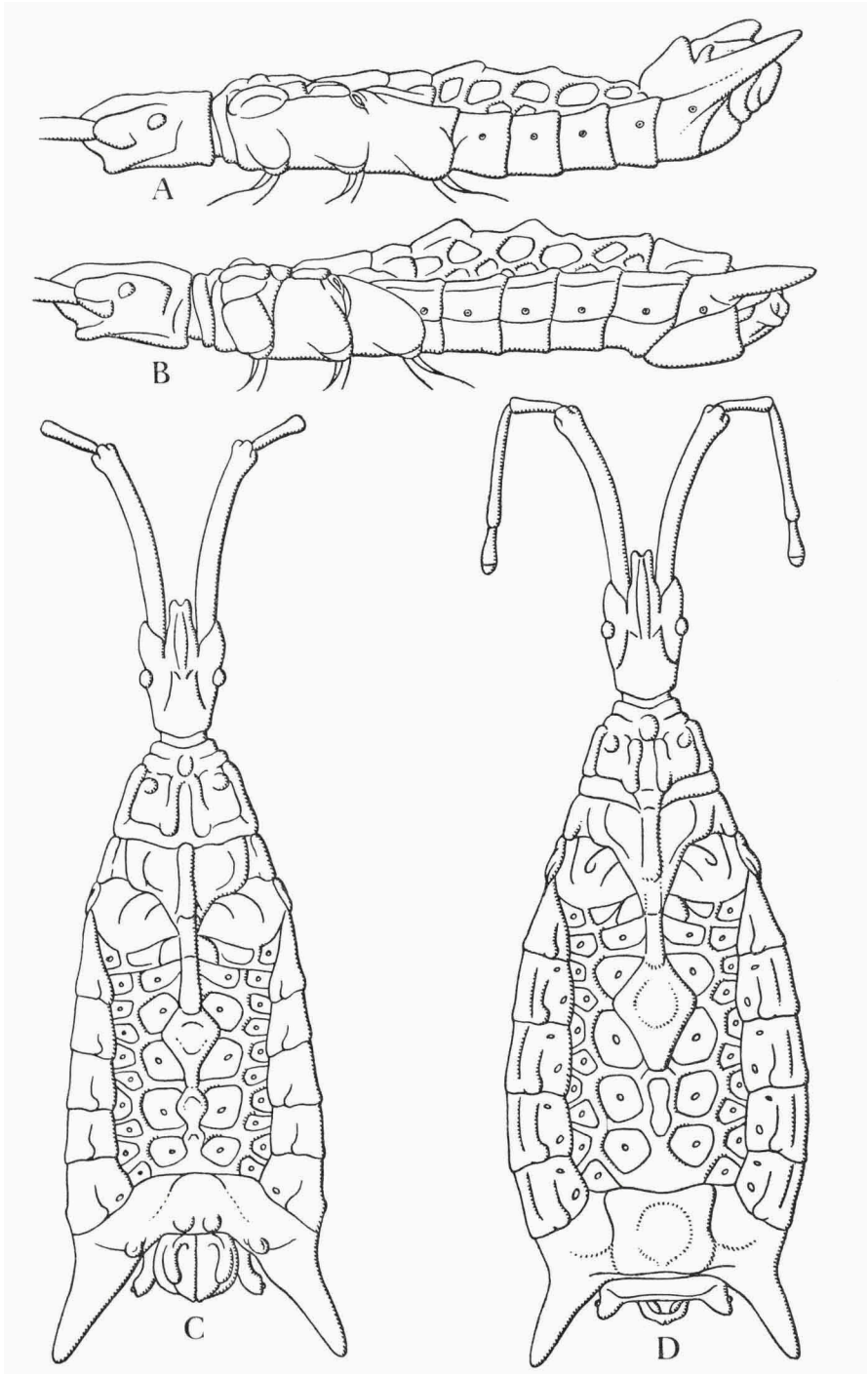

Fig. 4. *Chelonocoris mancinii* Usinger, n. sp. A, lateral view of male; B, lateral view of female; C, dorsal view of male; D, dorsal view of female.

depressed. Connexival segments with only vague elevations sublaterally. Disk of sixth abdominal tergite strongly elevated in front of genital segments with two distinctly separated elevations at middle of posterior margin. Lobes of seventh abdominal segment divergent, over three and one-half times as long as wide across middle, 54::15, with a very prominent tubercle at inner base.

Ground color dark brown with pale pubescence.

Size: length 16 mm, width (middle of abdomen) $5^1/_4$ mm, (across apices of abdominal lobes) 6 mm.

Female similar to the male but longer, 17 mm, broader, $6^1/_4$ mm across middle of abdomen, with abdominal lobes more strongly tapering and slightly bent inward.

Holotype, male, and allotype, female, Sumatra, Muller, Leiden Museum. The holotype bears the label "stygius de Graaf in M. S." Two additional females, also from the Leiden Museum, are labeled "13.k" and "pk" respectively. These have not been designated as paratypes.

C. bloetei is closest to *depressus,* differing as indicated in the key. These two species are readily separable from the other two species described in this paper from Sumatra because of the uniformly short, appressed pubescence of the last three antennal segments.

This species is dedicated to Dr. H. C. Blöte, who has contributed so much to our knowledge of the Hemiptera, especially the fauna of the Dutch East Indies.

Chelonocoris ferrugineus Usinger, new species

(figure 5, C and D; figure 6, G)

Body densely pubescent, mesonotum produced backward as a raised carina which, with interruptions, continues to strongly elevated area at middle of basal half of abdominal disk. Lobes of seventh abdominal segment long, attenuated, narrowly rounded at apices. Antennae with short, subappressed but distinct hairs, some of which are suberect.

Head a little more than half again as long as wide across eyes, 67::42, the greatest width in front of eyes less than width across eyes, 40::42; eyes small, about one-sixth as wide, seen from above, as interocular space, 5::32. Postocular margins gradually narrowed, narrowest subbasally. Anterior process of head slightly less than one-fifth as long beyond level of apices of antenniferous tubercles as total length of head, 12::67. Genae rounded at apices, separated by a relatively broad, short cleft. Entire surface of head clothed with a dense, subappressed pubescence except for oblique bare areas, eyes and neck.

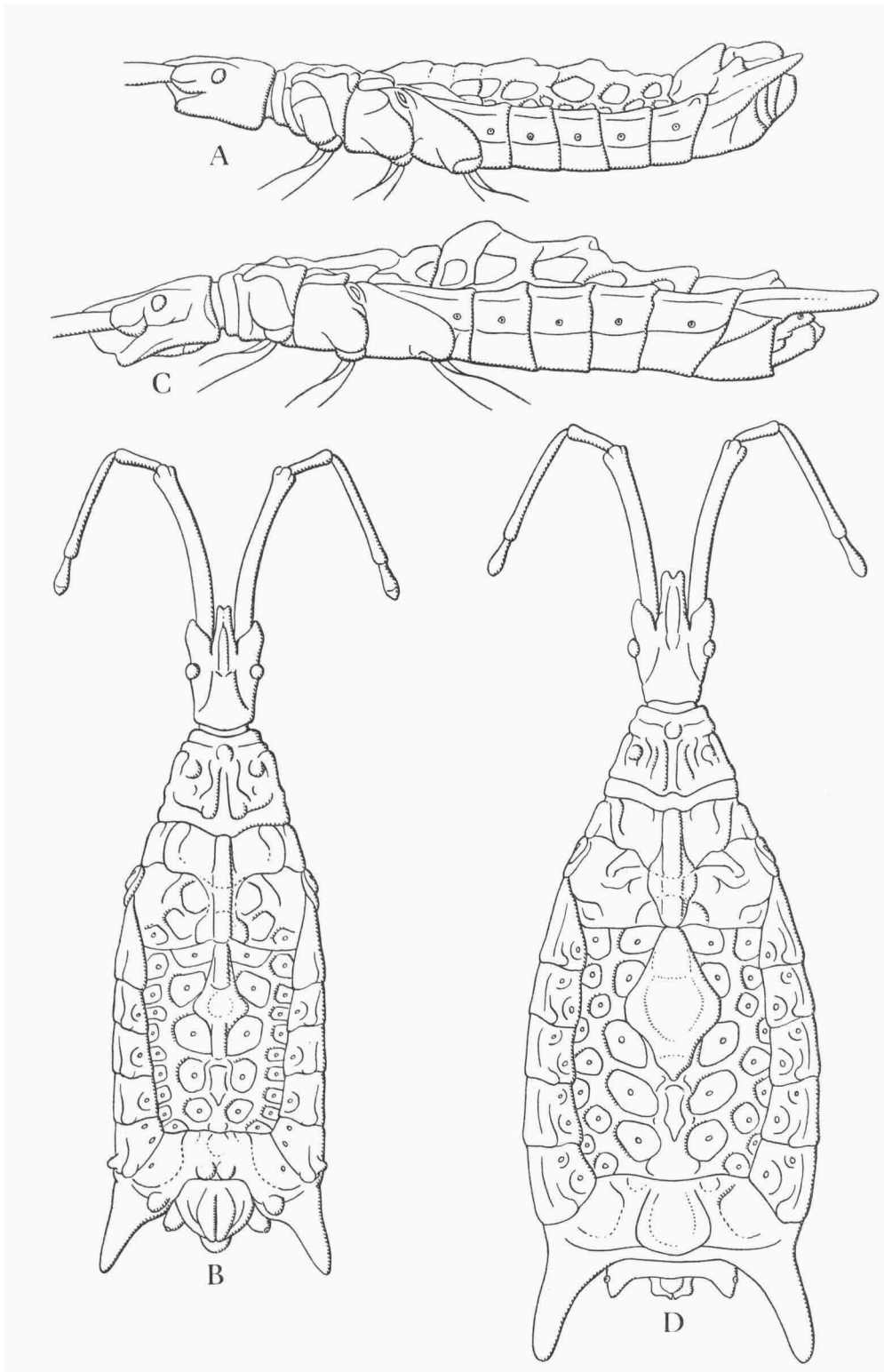

Figure 5. *Chelonocoris depressus* Usinger, n. sp. A, lateral view of male; B, dorsal view of male. *Chelonocoris ferrugineus* Usinger, n. sp. C, lateral view of female; D, dorsal view of female.

Antennae exceeding in length the distance from apex of head to hind margin of metanotum; first segment distinctly longer than head, 84::67; proportion of segments one to four as 85:25:57:19. Basal segment outwardly curved, with a few suberect bristles basally. The remaining pubescence short, subappressed, becoming sparser toward apex.

Pronotum three-fourths as long on median line as wide across postero-lateral angles, 47::65, the anterior margin distinctly concave, the lateral margins sinuate and interrupted by two constrictions, hind margin produced backward at middle where mesonotal carina begins. Disk longitudinally sulcate at middle with two short, crescentic sulci on either side of middle, the sulci naked. A short, rounded elevation on either side sublaterally. Anterior constriction delimiting a "collar" one-seventh the length of pronotum. Posterior constriction widest laterally, narrowing towards the middle.

Mesonotum less than half as long as greatest width, 40::85, the sides posteriorly divergent, the hind margin produced backward and fused with median longitudinal elevation, the elevated carina gradually increasing in heighth and widening posteriorly, then slightly depressed just before the indistinct suture separating mesonotum from metanotum. Hind margin of mesonotum on either side of middle sinuately concave. Disk with an ill-defined longitudinal carina sublaterally.

Metanotal disk depressed and naked adjacent to mesonotal margins.

Abdominal disk strongly elevated at middle of basal half, extending to level of fourth abdominal segment, as high as thickness of body measured in side view from venter to connexival margin. Abdominal elevation highest at middle of basal third, abruptly lowered and subtriangular behind this, terminating just behind median scent gland opening. Connexivum with submarginal longitudinal suture which is not pubescent and a raised lobe posteriorly and sublaterally on each segment.

Lobes of seventh abdominal segment four times as long, measured from antero-lateral angle to apex, as wide at middle, 62::15, gradually tapering and narrowly rounded at apex.

Color black but densely clothed with thick, ferrugineous pubescence except for small naked areas which follow a regular pattern in this group.

Size: length 18 mm; width (abdomen) $6^2/_3$ mm.

Holotype, female, Groot Mandeling, Tapanoeli, "Sumatra occid.", Heyting. Mus. Leiden.

This species is closest to *sumatrensis,* n. sp. but in the latter species the pubescence is slightly less dense and with less reddish tinge and the inflated portion of the abdominal disk is less than half as high as the thickness of the body.

Chelonocoris mancinii Usinger, new species

(figure 4, A-D; figure 6, C and D)

Body clothed with a dense, mostly appressed pubescence, mesonotum produced backward as a raised carina which continues backward to prominent abdominal elevation. Lobes of seventh abdominal segment long, tapering, narrowly rounded at apices. Antennae and legs densely clothed with fine, subappressed hairs and also with suberect or curved hairs.

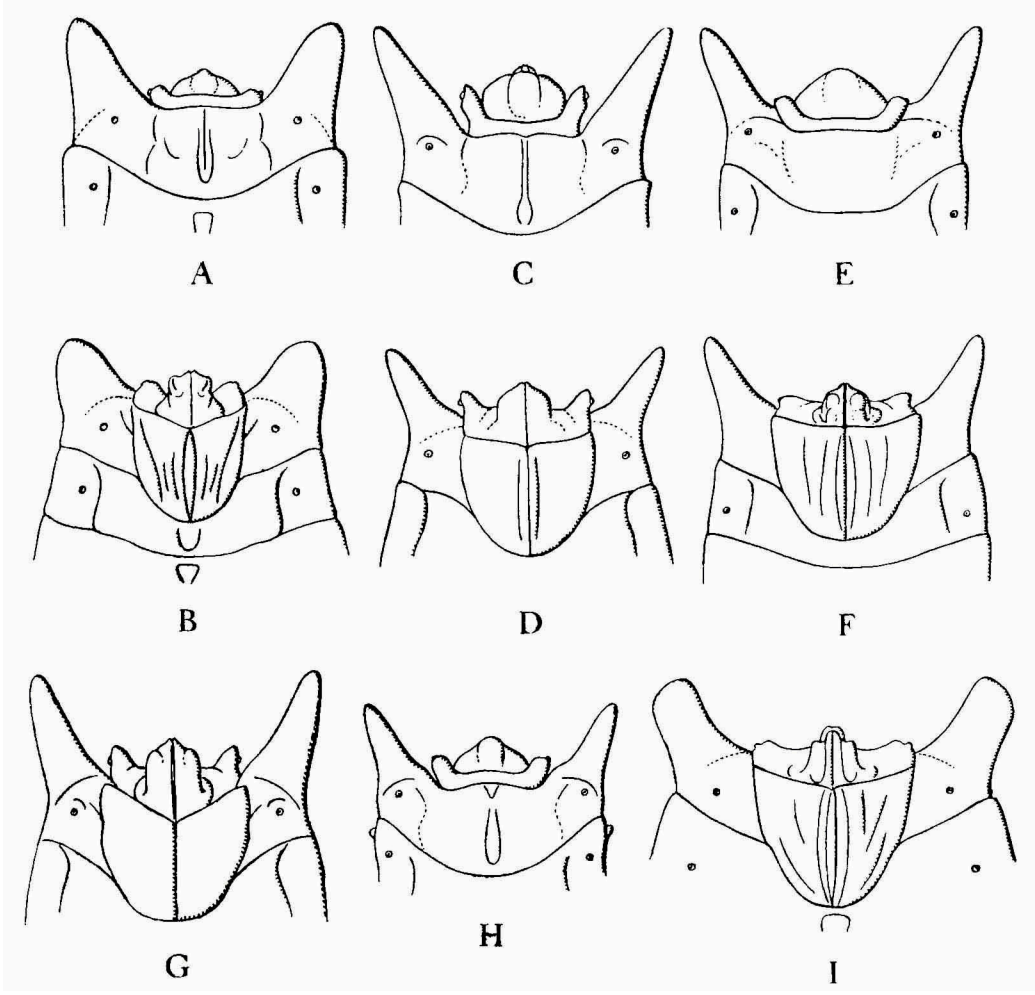

Figure 6. Ventral views of terminal segments of abdomen. A, *Chelonocoris kormilevi* Usinger, n. sp., male; B, same, female, C, *Chelonocoris mancinii* Usinger, n. sp., male; D, same, female. E, *Chelonocoris bloetei* Usinger, n. sp., male; F, same, female. G, *Chelonocoris ferrugineus* Usinger, n. sp., female. H. *Chelonocoris depressus* Usinger, n. s.p., male. I, *Chelonocoris javensis* Usinger, n. sp., female.

Male. Head about half again as long as wide across eyes, 63::42, the greatest width in front of eyes less than width across eyes, 39::42; eyes about one-sixth as wide as interocular space, 5::32; apical process of head one-sixth as long in front of level of apices of antenniferous tubercles as total length of head, the bifid apex with cleft short, the genal lobes very short, rounded, scarcely exceeding depressed apical groove between lobes. First antennal segment much longer than head, 85::63; over three times as long as second segment, 85::23, the remaining segments broken.

Pronotum slightly less than three-fourths as long on median line as wide across postero-lateral angles, 43::60; anterior margin strongly concave, lateral margins convexly arched, subapical and subbasal transverse impressions distinct, sinuate, hind margin produced backward at middle where mesonotal carina begins. Disk longitudinally sulcate at middle with a rounded tubercle anteriorly touching collar, a rounded elevation or tubercle sublaterally and a pair of rounded tubercles posteriorly, one on each side of median sulcus.

Mesonotum less than half as long as greatest width, 32::77, the sides short, roundly carinate, posteriorly divergent, the hind margin produced backward and subfused with median longitudinal elevation. Elevated carina very distinct, slightly swollen near apex of mesonotal lobe, of uniform width on metanotum.

Abdominal disk two-thirds as high as thickness of body measured in side view from venter to connexival margin. Median carina increasing in height to hind margin of first visible tergite, then roundly depressed and expanded with middle depressed, narrowed to a simple carina again on third visible tergite. Connexivum with an ill-defined elevation sublaterally on hind margin of each segment, the elevation with erect hairs. Also with a small lateral tubercle at postero-lateral angles of sixth segment. Abdominal disk strongly elevated posteriorly just in front of genital capsule, with a pair of rounded lobes at hind margin and a prominent raised tubercle on each side at inner basis of abdominal lobes.

Lobes of seventh abdominal segment as long, measured from anterolateral angle to apex, as distance across lobes of eighth segment, gradually, evenly tapering to narrowly rounded apices.

Ground color black but almost completely covered with ferrugineous pubescence except for characteristic naked areas.

Size: length $16\frac{1}{2}$ mm, width (abdomen) $5\frac{1}{2}$ mm.

Female, similar to male but with the abdomen broader, $7\frac{2}{3}$ mm, and the abdominal lobes shorter, the ratio of length in the male to length in the female, 62::52.

Holotype, male, and allotype, female, Sumatra, Si-Rambe, Dec. 1890 to Mar. 1891, E. Modigliani; Museo Civ. Genova.

Two females with identical locality labels agree with the above in most of the characters which appear to be diagnostic, e.g., pubescence, first antennal proportion and thoracic and abdominal carinae. The complete antennal proportions are 85:25:51:18. The suture between mesonotum and metanotum is clearly indicated on the median carina. The abdominal lobes are broader on basal half and slightly more broadly rounded at apices. Finally, the genal lobes are decidedly more prominent with a broad "U"-shaped cleft between.

Size: length $17\frac{1}{2}$ mm, width (abdomen) 7 mm.

This species differs from *ferrugineus* as indicated in the key. It is named for Dr. Cesare Mancini who was so helpful during my brief visit to the Genoa Museum in 1949.