MEMOIRS
OF THE
INDIAN MUSEUM

A Contribution towards the Revision of the
Passalidae of the World.

By
F. H. GRAVELY, D.Sc.
Assistant Superintendent, Zoological Survey of India.

CALCUTTA
PUBLISHED BY THE DIRECTOR, ZOOLOGICAL SURVEY OF INDIA.
SUPERINTENDENT GOVERNMENT PRINTING, INDIA
DECEMBER, 1918

Price Seven Rupees.
A Contribution towards the Revision of the Passalidae of the World.

BY

F. H. GRAVELY, D.Sc.

Assistant Superintendent, Zoological Survey of India

(With Plate I.)

When preparing my "Account of the Oriental Passalidae" (1913) the lack of a representative collection of American and African forms prevented me from considering the relationship to other groups, borne by the Indo-Australian groups to which the Oriental forms belong. Shortly after the publication of that paper, however, the Passalidae collected by Mynheer J. R. H. N. Van de Poll were offered for sale. These were bought by the Trustees of the Indian Museum, who thereby added a particularly fine set of Indo-Australian species to their collection, together with much material for comparison from America and Africa. My thanks are due to them for the encouragement which they have thus given me to extend my investigations, so that they may include a study of the classification of the whole family.

I have further to thank Mr. G. J. Arrow for assistance in various forms, including the loan of specimens from the British Museum; Mr. C. Holman-Hunt for material from the Malay Peninsula; M. R. Vitalis de Salvaza for material from French Indo-China; Mr. C. F. Baker for material from the Philippines; and M. Guy Babault and Mr. G. E. Bryant for material from various localities.

Morphology of the Head.

The study of a general collection of Passalidae, from parts of the world other than the Oriental Region, at once throws light on the question of the morphology of the anterior part of the head, a question which seemed most difficult before. It confirms as true for most species of Passalidae the suggestion, made on p. 337 of my "Account of the Oriental Passalidae," that "the whole of the upper surface of the anterior part of the head between the supra-orbital ridges and in front of the frontal ridges is frons, the whole of the clypeus being doubled beneath this out of sight;" but it shows that this is not true of all species, and that the groove which I supposed to represent the suture between the clypeus and frons is probably situated beyond the lateral extremities of the former plate.

The most primitive surviving forms of Passalidae appear to be included in the genera Oilénides and Papélius, as these are defined below; and Oilénides subrecticornis (see fig. 1, i on next page) may conveniently be taken as an example of them.

In this species the clypeus is not hidden, but is exposed as an extensive transverse plate above the labrum. The labrum is attached by a well developed membrane, which extends beneath it to the lower posterior margin of the clypeus, and not to its anterior margin.
Thus two parts of the clypeus may be recognised, namely, a dorsal free part and a ventral part closely opposed to the membrane uniting it to the labrum. The posterior part of the free surface of the clypeus is sunk in the anterior margin of the frons; the two plates being however, separated by a well marked suture, and the posterior angles are united with the adjoining portions of the frons to form a pair of small tubercles. These tubercles are those to which the name "outer tubercles" was given in my previous paper; a name which may conveniently be retained for them.

![Diagram of clypeus](image)

Having identified the clypeus in forms such as *Oleander subrecticornis*, in which no doubt with regard to it can arise, the fate of the free surface of this plate in other forms can readily be followed.

In species belonging to the subfamily Pseudeanlinae (of this paper) the clypeus is always separated from the frons by a definite suture, though this varies greatly in shape and in some species the minor tubercles are situated so as to interfere somewhat with its continuity. In the Passalinae, in a few species of Passalinae, and perhaps also in the Anacocyclinae, the clypeus has the same structure as in the Pseudeanlinae; but the suture is absent. In all other species the free surface of the clypeus is reduced to (at most) a narrow transverse band, inserted below the anterior margin of the head, and terminated laterally by a pair of small dorsi-ventrally directed tubercles, the "ventral tubercles" of my previous paper (1914, text fig. 184). These "ventral tubercles," really the anterior angles of the reduced free surface of the clypeus, are extremely persistent, and their presence or absence almost always enables one to determine whether the anterior margin of the head really conceals this surface of the clypeus or not. To see them clearly, however, it is often necessary to remove the labrum. The outer tubercles are normally situated immediately above or a little to the outer side of them, but in some forms these tubercles tend to come nearer together and may...
be situated on the inner side of them. That they still mark the lateral extremities of the free surface of the clypeus in these cases is shown by the fact that they are joined by the sides of the opposed surface of the clypeus. The accompanying diagrams (fig. i) will help to illustrate the various stages in the suppression of the clypeus. With them may be compared figs. v. 11-15 and vi. 6-11 on pp. 34 and 45, illustrating in a less diagrammatic fashion its suppression in *Ferris* and *Platyferis* and in *Pacilus* respectively.

The presence, in most American and African as well as Indo-Australian *Passalidae*, of definite frontal ridges and of central, inner and outer tubercles is sufficient indication of the morphological importance of these structures. The outer tubercles, as has just been shown, are formed in the more primitive species by a fusion of the frons and clypeus about the posterior angles of the latter. The central tubercle is normally situated at the angle formed by the union of the two frontal ridges which appear, from the evidence afforded by certain Indo-Australian species, to mark the position of part of the line separating the frons from the vertex. The inner tubercles appear to mark the point at which this line, usually quite imaginary for a short distance beyond this point, bends more or less backwards towards a suture a little to the inner side of the supraorbital ridges, in which it commonly ends (see Gravely, 1914c, p. 184). This suture is easily seen in imperfectly hardened specimens of various groups, but is less distinct in those which have become thoroughly hard and black.

The homologies of the tubercles found in genera such as *Leptaulax* and *Tarquinins*, in which more than one pair of tubercles is situated on the anterior margin of the head, with those found in genera with only one pair so situated, are more difficult to determine than appeared to be the case when Indo-Australian forms only were under consideration.

A comparison of *Tarquinins* with *Pseudopisphenus* leaves little room for doubt that the more medially situated pair of tubercles in the former is homologous with the pair of inner tubercles of the latter (see Gravely, 1914c, pp. 328-329), and in the absence of any evidence to the contrary it would be natural to assume the same homologies for the tubercles of *Leptaulax*, and of genera from the Ethiopian Region with similarly arranged tubercles.

But in the case of Ethiopian genera there is strong evidence in favour of different homologies. This is best illustrated by reference to the group characteristic of Madagascar, a group which is separated from the group found on the mainland of Africa by the possession of a pair of tubercles situated on the frons in the angle made by the fronto-vertical suture with the anterior margin of the head (see below pp. 68-69).

The most primitive of the Malagasy genera appears to be a new one described below (pp. 69-70, fig. viii. 1) under the name *Madagasabes*. In this genus the free surface of the clypeus, though almost vertical, is fully exposed. The outer tubercles, with a pair of well developed inner tubercles close behind them, project above it and are separated by a space equal to scarcely as much as two-thirds of its breadth. In *Solonycycles*, the next genus of the series, the inner tubercles are also well developed and are situated further back from the outer tubercles; and an additional pair of marginal tubercles is present immediately above the ends of the clypeus. The outer tubercles, as pointed out above (p. 2), are formed in the first instance about the posterior angles of the clypeus; and their closer approximation one towards the other in forms such as *Madagasabes* leaves space in which the tendency towards tubercle-formation at this point can manifest itself over again. Presumably, therefore,
this additional pair of marginal tubercles, formed as a result of this tendency, *Solenocycillus* is too closely allied to *Pentatula* and *Eriocera* to admit of any doubt as to the identity of the homologues of their cephalic tubercles. The cephalic tubercles of certain species of these however, bear the closest possible resemblance to those of the Indo-Australian genus *Leptoclaera*; and there does not appear to be any conclusive evidence to show whether the homologues of *Leptoclaera* are the same as those of *Tasquinia*, as previously suggested, or may not really be the same as those of *Eriocera*. In the former case the inner and outer pair of marginal tubercles will be the true inner and outer tubercles respectively, and the rudimentary tubercles sometimes formed on the frontal ridges at the point where these bend forwards will be secondary structures. In the latter case these rudimentary tubercles will represent the true inner tubercles, the inner pair of marginal tubercles will be the true outer tubercles, and the outer pair of marginal tubercles will be secondary structure.

It was suggested in my "Account of the Oriental Passalidae" (p. 200) that the Leptaulaenae were of comparatively recent origin, and were still spreading from some distributional centre towards the middle of the Indo-Australian area, into the existing parts of this area, such as the Indian Peninsula and Ceylon. If this is so—as all available evidence regarding their distribution seems to indicate—it is most unlikely that they are at all closely related to any but Indo-Australian groups, a suggestion whose correctness is confirmed by the fact that the anterior lower tooth in the Leptaulaenae is of a form found only in Indo-Australian groups (see below, p. 9). Presumably, therefore, the origin of the Leptaulaenae is to be sought among Indo-Australian forms. But there is no definite evidence to show that they are in any way related to *Tasquinia*, the only known Indo-Australian Passalid to which they bear even a superficial resemblance. The fact, moreover, that in most Indo-Australian forms the outer tubercles tend to be separated by a distance which is less than the width of the elytra, makes it easy to suppose that the evolution of the Leptaulaenae may have been on lines parallel to those of the evolution of Ethiopian forms.

In view of this uncertainty as to the homologues of the cephalic tubercles in the Leptaulaenae it seems best to continue to use the terms 'inner' and 'outer' tubercles in the connection in which they were used in my previous paper, but in addition to insert the word 'marginal' when speaking of the Leptaulaenae, in order to show that in this case the terms are used in a descriptive sense which is not necessarily in accordance with morphological.

*Flightless Species.*

In several groups of American and Indo-Australian Passalidae there are species which have lost the habit of flight. This tends in all cases to produce certain modifications of structure:

1. The union of the lateral and intersegmental areas of the metasternum.
2. The union of the elytra in the middle line.
3. The shortening of the elytra and the recession of all their contours.
4. The reduction of the wings, which appear to become thereby more efficient expelling organs.
Flightless species consequently tend to bear a strong resemblance to one another, especially as regards the general shape of the body, and Bates (1886, pp. 2-3) divided the American Passalidae into two sections on this character alone (see below, p. 6).

The extent of the modifications differs greatly in different species, and the relation which they bear one to another is not always the same. Thus in American species the union of the elytra tends to precede the modification of the metasternum, while in Indo-Australian species the reverse is the case. Similarly, reduction of the dentition, which seems to be to some extent associated in American groups with loss of the habit of flight (see below, p. 9) is only found in Indo-Australian forms (where it reaches its maximum development) among species which show no indication of this.

In the Indian Pleururus brachyphyllos, in which the wings are fully developed, the union of the elytra is not indicated in the pupa and is imperfect or absent in the newly hatched adult. This appears to be the case in some other species also, and it seems likely that the elytra may remain separate throughout life in certain individuals. I have not seen pupae of any of the more highly modified species.

Genitalia and Sexual Distinctions.

Very little appears to be known of the genitalia of the Passalidae. Sharp and Muir (1912, pp. 579-580, pl. xliv, figs. 11-139) found two forms of male genitalia to exist, one in which “the basal piece and the lateral lobes form one piece, either by consolidation or the suppression of the basal piece” and one in which “the tegmen consists of two distinct pieces, the basal piece and the lateral lobes.” The former they found in the genus Aulacocyclinae, the latter in all the other genera they examined: but their observations were very restricted. I have been able to add to these observations to some extent: but the results were not such as to warrant any extensive investigation, since all the genitalia examined proved to be very much alike, except in the Aulacocyclinae. Here both the types described by Sharp and Muir occur, one in one group of the subfamily and the other in the other, showing that the difference they found in Aulacocyclinae is not a distinctive character of the Aulacocyclinae as a whole, as suggested in my previous paper (p. 101). The only other positive result of my investigations was a curious fact which emerged in connection with species in which the central tubercle varies greatly in size. In these it was found that the specimens in which it was largest and best developed were females, and not males as would be expected by analogy with other groups.

Classification, etc., including note on the structure of the mandibles.

Although the Van de Poll collection is a remarkably fine one, it is by no means complete. There can, I think, be little doubt that a considerable number of described genera and species have no separate existence; but the absence from the collection of such distinctive forms as Platypyrres intermedium, and of other well-known species, affords sufficient proof that the names of the missing forms are not all to be lightly relegated to synonymy. The number of new species in so incomplete a collection, on the other hand, seems clearly to indicate that the Passalidae of the world as a whole are less fully known than are those of the Oriental Region dealt with in my previous paper.
In order to prevent subsequent confusion I have redescribed, or have at least directed attention to the distinctive characters of, every species that I have seen, excepting only the Oriental ones described in my previous papers and I have figured a large proportion of them. This is made essential by the unsatisfactory condition of most of the existing descriptions, a condition which has puzzled me to the incompleteness of the collection before me to make the compilation of a satisfactory synonymy of the species very difficult, if not impossible. No attempt has been made to deal with the synonymy of species, the references given being in all cases to original descriptions or to others on which I may have relied in making my determination.

The forms dealt with in my "Account of the Oriental Passalidae" naturally receive less detailed treatment than the others. The key to the determination of genera published in that work are, however, repeated with such alterations as further study has shown to be desirable, and, except in some of the smaller genera, key have been given to the identification of all species known to me, although in a few cases these are practically identical with those already published.

The first serious attempts made to divide the Passalidae up into genera were those of Kaup in 1868 and 1874, respectively. In his "Monographie der Passaliden" published in the latter year, he set forth a remarkable conception of the Animal Kingdom, which led him to postulate a series of sub-divisions into co-ordinated series of lives. Behaving, as he did, that none of his five sub-divisions of Passalidae could contain more than five groups, that no group could be composed of more than five genera, and no genus of more than five species, and believing that corresponding species, genera and groups were to be found respectively in all or almost all genera, groups and sub-families, this system of classification inevitably led to a considerable amount of wide separation of closely related genera and species.

In 1886 Bates introduced a number of changes into Kaup's classification of the American species. He brought together in one section all those in which the elytra are relatively short, and more or less prominent in the middle of the base, and into another all the rest, i.e., those in which the elytra are moderately long with broadly emarginate base—subdividing each of these sections primarily according to the length of the antennal lamellae. Unfortunately for this classification the shape of the elytra correlated with the modification of the wings for evaporation and the loss of the power of flight, changes which not only have to have taken place in some of the most highly specialized forms of several different American groups, but are also found among widely separated Indo-Australian genera (see below, p. 125); and the lengths of the antennal lamellae never seem to have much phylogenetic importance, being more or less variable in a number of genera, perhaps in all (see also Gavely, 1912). pp. 186 and 187.

Kuwert's elaborate "Passaliden dichotomisch bearbeitet" is still lacking in any sense of phyletistic values and disregards in addition the facts of geographical distribution.

Zang and Arrow have done much useful work in the direction of clearing up various items of the confusion thus produced, and my "Account of the Oriental Passalidae" has, I hope, helped to reduce the confusion of the forms with which it deals to order, but Kuwert's monograph of the Passalidae of the world. In my "Account of the Oriental Passalidae" I have recorded all references known to me relating to Oriental genera.
and species. The following appear to be the only forms not referred to either in Kuwert’s work or there:—

A. American Forms.


Epiphoroneus, n. gen. with Passalus aceritdalis, Eschscholtz, as type (Phoroneinae of Kuwert).
Arrow, 1907, pp. 459-460.

Eumelas nasutus, Arrow, 1907, p. 459.

--- bifidus, Zang, 1907, p. 232. =Oleus heros, part, Kaup, see Passalus heros, Truqui.

Nelides antillarum, Arrow, 1907, p. 452.
Nelus camerunii, Pangella, 1905b, pp. 9-11.
--- festae, Rosmini, 1902, p. 8.

Xinus homdae var. rosmini. Pangella, 1905a, pp. 11-12.

--- nobili, Pangella, 1905b, pp. 5-7.
Paxillosomus alfari. Pangella, 1905a, pp. 9-11.
--- borellii, Pangella, 1905b, pp. 3-4.
--- camerunii, Rosmini, 1902, pp. 4-5.
Paxilla parvus, Casey, 1897, pp. 644-645.
Petrejus archalodon, Arrow, 1907, p. 156.
--- henrici, Rosmini, 1902, pp. 6-7.
--- peruvianus, Arrow, 1907, pp. 456-457.
--- spinosus, Arrow, 1907, pp. 157.

Proclejides erasus, Casey, 1897, pp. 642-643.

--- granulipennis, Zang, 1905a, pp. 229-231.

Procula, n. gen. with P. inca, n. sp. as type (Petreijinae of Kuwert), Zang, 1905a, pp. 225-227.

Proculus beckeri, Zang, 1905a, p. 315.

--- densipes, Casey, 1911, p. 371.
--- mandibulares, Casey, 1911, p. 371.
--- magister, Casey, 1897, pp. 641-642.

Pfichopus borellii, Rosmini, 1902, p. 10.
Puihlius spinipes, Zang, 1905a, pp. 231-232.
Rhodocnthus bidlea, Pangella, 1905a, pp. 3-4.
Rimon manilus, Casey, 1897, pp. 643-644.

--- imbellis, Casey, 1897, p. 615-616.
Sporius comandi, Rosmini, 1902, p. 2.

--- dichotomus, Zang, 1905a, pp. 227-229.
Tetramerus centralis, Arrow, 1907, p. 458.

--- nobilii, Rosmini, 1902, pp. 5-6.
Triaemirgus solidus, Arrow, 1907, pp. 452-453.

Verres camerunii, Pangella, 1905a, pp. 7-9, text fig.

--- Zang, who knew it from the description only, placed this species in the genus Proclejides (1905a, p. 229). According to Arrow this is incorrect (1907, p. 159). I have not seen a specimen, but the description shows it to have the tridentate mandibles and hairless elytra of the genus Pasrdulius as this is defined below.
B.—Ethiopian Forms

Diplonyx concava, Arrow, 1907, p. 466
  - ramosa, Arrow, 1907, p. 466
  - sumatranus, Arrow, 1907, p. 466
  - leporeus, Arrow, 1907, p. 466
  - longimanus, Arrow, 1907, p. 466

Kanummetus platytera, Arrow, 1907, p. 466

C.—Indo-Australian Forms

Anaklethus barbatus, Zani, 1900, pp. 211-212
  - leucopus, Zani, 1895, pp. 39-41
  - typica, Heller, 1910, p. 39
  - afer, Heller, 1910, p. 39
  - boscianus, Zani, 1900, pp. 39-41
  - brachymelas, Zani, 1900, pp. 240-241
  - leucopus, Zani, 1900, pp. 240-241
  - leucopus, Zani, 1900, pp. 240-241

Adicorhinus maculatus, Heller, 1916, pp. 352-353

Cercomplenius, Heller, 1916, pp. 352-353
  - reform, Heller, 1916, p. 352
  - adesicalus, Heller, 1916, pp. 352-353
  - maculatus, Zani, 1900, p. 352

Eupreplexus palmarum, Heller, 1916, pp. 17-18
  - leucopus, Heller, 1916, pp. 17-18

Himantopus leucopus, Heller, 1916, pp. 18-29


Kampylodrurus hypomelas, Zani, 1900, p. 30

Lachesis hypomelas, Heller, 1916, pp. 16-17

---

* Phylogeny uncertain. It is likely that the genus "Kampylodrurus" is of the same family as "Cercomplenius" and "Adicorhinus", but it is not certain. It is also possible that it is a separate family.

† Originally named "Kampylodrurus luteus", Santus, 1880, p. 283.
.. subbohiquis, Tryon, 1892.
Pselops triumphantus, Zang, 1904b, pp. 182-184.
Pleschenus mandibularis, Heller, 1900, p. 11, pl. fig. 5.
.. scutellapunctatus, Zang, 1905a, p. 339.
Proatomocclus sternbergi, Zang, 1905a, pp. 236-238.

In view of the striking correlation which has been shown to exist, in certain Indo-Australian Passalidae, between classification and distribution (Gravely, 1914b), it is natural, when seeking for sound principles on which to base the classification of the family as a whole, to consider first whether it may not be possible on purely morphological grounds to regard the American and Ethiopian Passalidae respectively as series independent both of one another and of Indo-Australian forms.

It will be remembered that among the Indo-Australian Passalidae the Aulacoecyclinae stand by themselves, widely separated from all other forms (Gravely, 1914c, pp. 191-192). They are also widely separated from American and Ethiopian forms and need not be further considered in this connection. In all other Indo-Australian Passalidae, except certain highly asymmetrical ones with reduced dentition, the lowest terminal tooth is directed inwards and is situated beside the anterior lower tooth, which is broadly triangular as seen from above and tends to be flattened above and below. In American and Ethiopian forms, on the other hand, none of which are asymmetrical, either the terminal teeth are situated in a line one above another; or the anterior lower tooth (on the right side at least) is more columnar and tends to be flattened in front and behind, or may be concave behind much as it the Aulacoecyclinae, or both characters may be present. These characters are more marked in some species than in others, but in greater or less degree they are of universal application; and they are associated with various other, often more striking, differences of more limited application.

The reduction of the dentition takes place mainly in highly specialized genera of the Indo-Australian and American series, genera whose relationships are, as a rule, clearly indicated by other characters. Among the former it is confined to the more highly asymmetrical genera, and among the latter it is found chiefly in genera composed wholly or in part of flightless species. It is easy to follow the manner in which the reduction is carried out in the former; but in the latter it is often more difficult, the reduction being more abrupt. In the Indo-Australian series it is always due to the fusion of the anterior lower tooth with the lowest terminal tooth (see Gravely, 1914c, text-fig. 7, p. 314). In the American and Ethiopian series, with the possible exception of the genus Procclus, it seems always to be due to the fusion of the two lowest terminal teeth, though this is apt to be accompanied by a dorsoventral flattening of the anterior lower tooth, which thus loses its distinctive shape.

The reduction of the dentition in the American and Ethiopian series may most conveniently be illustrated by reference to the genera of the Proculejoideas group of Passalinae

1 Mustochilus cabilatus, Blackburn - Episphenoides querceturi, Kuwert. See Zang, 1905c, p. 223.
In *Chamtriconophalus*, the dentition is normal, though the right anterior lower tooth is less distinctly columnar than usual. In *Vinde*, the dentition is reduced, but the double origin of the lower of the two remaining terminal teeth may often be seen, especially in the right mandible of unwarped specimen of *V. aequanodus*. The anterior lower tooth of the left side is more central in this genus, with dorso-ventral rather than anterolateral compression, though that of the left side is still much broader than that of the right; and there is a more or less distinct tubercle at the base of the tooth on both mandibles. In *Proculepodes* all trace of the double nature of the two remaining terminal teeth is lost, the anterior lower teeth of the two sides become still more alike, and the tubercles at their base become more conspicuous.

Of the genera with modified dentition in other families, *Prochlopes* has teeth exactly like those of *Proculepodes*, and the only species of *Pubillus* known to me has teeth not unlike those of *Vinde*, but has no trace on either side of the third terminal tooth and has more markedly asymmetrical anterior lower teeth. The teeth of *Proculepus*, the most striking of all these genera, are, however, more puzzling. Superficially they usually resemble those of *Proculepodes*, but between what would be the anterior lower teeth in that genus and the large tubercle at its base there is ordinarily a scar, let by the breaking away of a columnar tooth which seems only to persist in imperfectly hardened specimens. This columnar tooth (see fig. 4) has the form of the type of anterior lower teeth characteristic of the American series, and it is impossible to be sure whether the tooth in front of it forms the most anterior part of a single but highly complex anterior lower tooth, or is a lowest terminal tooth, reduced in size and situated behind and on the inner side of the middle and upper terminal teeth in the Indo-Russian series.

The more typical American and Ethiopian forms can be distinguished from each other by the presence of one or more pairs, respectively, of marginal tubercles between the anterior angle of the head; but this distinction does not at first sight appear to be of universal application, since at least two genera, *Mototribus* and *Stephanocephalus*, which have been accepted as American, have the additional tubercles characteristic of African genera. Zangerl, moreover, notes records of the American genus "*Prochlopes*" (= *Prochlopes* of the present paper) from the Congo, Senegal, and Madagascar, and in the Van de Poll collection several specimens of *Pentakafles similares* bear the record "*Bolivia*", while of two specimens of a new species of *Eronceus*, described below under the name *E. trichostygodes*, one bears...
the record "Dar-es-Salaam" and the other "S. Catherina, S. O. Brazil (Staudinger)." If these records are correct, and the species to which they refer really do occur both in America and in Africa or Madagascar, the occurrence in America of genera belonging to the group typical of Africa would be very natural. But in the absence of direct personal evidence by a collector I find it easier to believe them to be due to mistakes in labelling, numerous though they are. The position of *Mitorhinus* and *Stephanoecephalus* therefore requires special consideration.

Judging from Kaup's figure (1871, pl. vi, fig. 3) *Passalus punctifrons*, Dejean, the type of the genus *Mitorhinus*, would seem to be from America and to belong in all probability, to the genus *Passalus* as this is defined below; but Kaup identifies the species with Percheron's *Passalus cayor*, a species the type of which is recorded as coming either from Senegal or from Brazil. As Percheron's figure (1835, pl. v, fig. 2) shows this to be an insect of the African type, the former is doubtless the correct locality. There can, I think, be little doubt that *cayor* belongs in reality to the African genus *Pentalobus*; and I suspect that both Kaup and Kuwert have confused prolongations of the anterior angles of the head with the tubercles on the inner side of these angles characteristic of African forms. Probably this has also been the case with the genus *Stephanoecephalus*, the only species-figured, Percheron's *Passalus hostilis* (1841, pl. lxxvii, fig. 4), whose locality was not known to its author, being in all probability African, although Kaup and Kuwert have applied the name to an American species, and have placed other American species in the same genus with it. For the present, then, the form of the anterior margin of the head may be regarded as separating American from Ethiopian groups; but further evidence on the point is much to be desired, especially as the aberrant genus *Ptichopus* is to some extent transitional between the two. 1

Another character by which the American and Ethiopian groups may be separated is afforded by the posterior plate of the prosternum. In the former this is usually more or less narrowed behind, and is often pointed; whereas in the latter it is always more or less parallel sided and broadly truncate. This plate has the African character in most species of the American genus *Paxillus*, but I know of no other exceptions to the rule, although the distinction is not equally well marked in all species.

The Ethiopian genera fall conveniently into a single subfamily Solenoceylinae. The American genera, on the other hand, fall into three groups, each in my opinion of sufficient size and distinctness for recognition as a separate sub-family.

The first of these, to which the name *Pseudacanthinae* may be given, is distinguished chiefly by the presence of a well marked clypeo-frontal suture. Traces of this suture are found also in the species described below under the name *Chondrocephalus quinquecornutus*, and it is more or less complete in *Vindex aquoscoverteus*. The former of these species may be regarded as in this character transitional between the two most primitive genera of the *Pseudacanthinae* and *Passalinae* respectively; and the latter agrees in every other character with the Passaline genus *Vindex* and not with any *Pseudacanthine* genus. In spite of these exceptions the presence of the suture in question remains the most distinctive single

---

1 See also below, p. 11, footnote 1.
character running through the Pseudoanthurinae. The second American sub-family may be called the Proenathidae. It includes forms in which the outer tubercles are rudimentary or absent; the clypeus is almost always exposed, though never separated from the frons by a distinct suture. The third and last American sub-family, the Passalinae, includes forms in which the outer tubercles are well developed and usually very widely separated, the clypeus being hidden in almost all species.

The classification of the Indo-Australian Passalidae was recently revised (Gravely, 1914, pp. 131-140, 316-318 and 328-330). They fall into two distinct sections, of which one forms the sub-family Aulacocyrtinae. The results of my previous work on the classification of the other section have been summarized as follows (1914, pp. 336-337):

"The second section has been subdivided into the Pleurotini, Acranius, Macrolimus, Kourapodides, Pseudococculus, Hyperplathocerus, Gymnophilus, Plasterius, Gomatus, Parquiminae and Leptanidae groups. Of these groups the first three and the last two appear to be of most importance, and have been provisionally ranked as subfamilies, the remainder being put together into a single subfamily which takes its name from the genus Gymnophilus. Their rank cannot be finally settled without reference to American and African species."

The number of subfamilies thus recognized is undoubtedly too great in comparison with the classification of American and African forms outlined above, and may advantageously be reduced to two. One of these, the Leptanilinae, remains as defined in my previous paper. The second, which may be called the Macroliminae, includes all the rest.

The above enumerated subfamilies of Passalidae may now be defined thus:

1. The distal ends of the anterior coxae projecting beyond the surface of the intercoxal portion of the pronotum, which is entirely hidden except in aberrant Chinese and Japanese forms, where it is exceptionally strongly keeled; the usual paired cephalic tubercles absent, the middle lower tooth almost always fixed. Aulacocyrtinae, p. 13.

2. The distal ends of the anterior coxae about on level with the general surface of the intercoxal portion of the pronotum, which is visible between them; at least one pair of the usual paired cephalic tubercles present in most species; the middle lower tooth always pointed or in the movable.

3. The anterior lower tooth more or less cylindrical; at least on the right side, being compressed before and behind or even concave behind; all three terminal teeth directed downwards and formed in a line composed another, or the distal two incomplete. The head always compressed (American and African forms).

4. The anterior lower tooth emarginate, compressed above and below; the inner terminal tooth directed forward and set a little behind the other two; the head often compressed; always more convex with rounded impressions (Indo-Australian forms).
No secondary tubercles or angular processes present on the anterior margin of the head (or behind the clypeus when this is exposed) between the outer tubercles and anterior angles, the posterior plate of the prosternum almost always much narrowed, often pointed, behind (American forms)...

At least one pair of secondary tubercles or angular processes present on the anterior margin of the head between the outer tubercles and the anterior angles; the posterior plate of the prosternum more or less parallel sided, broadly truncate behind (African forms)...

Solenocyclinae, p. 68.

The clypeus exposed and separated from the frons by a distinct suture...

Pseudacalhinae, p. 22.

The clypeus fused with the frons and usually hidden...

Proculinae, p. 32.

The outer tubercles obsolete or absent, the clypeus almost always exposed...

Passalinae, p. 43.

The outer tubercles distinct, the clypeus rarely exposed...

Macrolinae, p. 76.

The anterior margin of the head rarely with more than one pair of tubercles, though these may be compound in structure; the antennae rarely with less than four well developed lamellae; never with both these characters...

Leptaulinae, p. 111.

Subfamily AULACOCYCLINAE.

Three of the genera defined in my previous account of this subfamily (1914, pp. 102-3) appear, in the light of further material, to be unnecessary. Two of these—Caulifer and Auritibas—are monospecific, and may advantageously be merged in Aulacoeyclus and Cylindrocaulus, respectively. The third, Tristorthus, may also be merged in Aulacoeyclus. The best known species of Tristorthus is T. tricaps. Kaup, from New Caledonia, a species shown by its short antennal lamellae to be most nearly allied to the Australian species of Aulacoeyclus. With this are associated firstly, two other New Caledonian species, apparently distinguished largely by differences in size, and in my opinion doubtfully...

1 The processes especially characteristic of the Solenocyclinae are situated immediately above the ventral tubercles. Others may also, however, be present, and in all Malagasy forms a pair is more or less distinctly developed immediately on the inner side of the fronto-vertical suture. The most primitive Malagasy genus, Malagophagus, lacks the former pair of processes, and the above definition is applicable only by reason of its possession of the latter. The African and Malagasy groups are composed, broadly speaking, of parallel series of genera separated largely by the presence or absence of the latter pair of processes. I do not know of any African genus parallel to Malagophagus, but if one exists the above definition can hardly be expected to apply to it. See also above, pp. 10-11.

2 Except in one species of Vindex (below, pp. 13 & 17); imperfectly fused in one species of Chondriscophilus (below, pp. 13-15, fig. vi, 1). See also above, p. 11.

3 The clypeus is completely hidden only in the genus Phylloces, though in the transitional species Ferrus cornelli, it is hardly apparent. In both these species the inner tubercles are situated on the anterior margin of the head and may readily be mistaken for outer tubercles, though a comparison with other species of Ferrus, and especially with F. corollae, at once settles their true homology. The heads of the species in question are shown in fig. V, p. 74.

4 Only in the genus Taroniz, which has six well developed antennal lamellae.
distinct; secondly, a species which Zang (1905, p. 220) has shown not to be the Malayan species for which Kuwert took it, but probably also a form of *Trencaspis*; and thirdly, a species *felderi*, Stoliczka, from Ambon and Ceram with a simply pointed central tubercle and long anterior keels like those of the Moluccan species of *Aulacocyla*. The genus *Tristarchus* is thus seen to consist only of a New Caledonian species (or group of species) and a Moluccan species, allied respectively to different groups of the genus *Aulacocyla*, in which I therefore propose to place them.

The genera of *Aulacocyla* may now be redefined thus:

1. The middle lower tooth fixed, the pedicel composed of two conspicuous pieces, the segment and median lobe; the central tubercle always present near the middle of the upper surface of the head.
2. The middle lower tooth movable; the pedicel composed of three conspicuous pieces, the segment being composed of a basal piece and lateral lobes; the central tubercle absent or occupying a large part of the anteromedial part of the upper surface of the head.
3. The general with a strong median keel.
4. The median not keeled.
5. The upper surface of the pronotum large, more or less rugated or S-shaped; the central tubercle broad and low never pedunculate (Oriental forms only).
6. The upper surface of the pronotum not very large, more or less circular; the central tubercle taller, usually pedunculate; usually not Oriental.
7. The central tubercle present, often very strongly elevated, its apex fused with the anterior margin of the head; the elytra separate.
8. The central tubercle absent, the elytra united.

**Genus COMACUPES.** Kaul. 1851, p. 17.

Type, *Passalus cylindraceus* Herri. 1851, p. 30, fig. 3.

**Comacupes cylindraceus** (Herri).

*Passalus cylindraceus* Herri. 1851, p. 30, fig. 3.

*Comacupes cylindraceus* Gravely. 1910, p. 207, pl. 23, fig. 5 et al.

Specimens from the Malay Peninsula (Pahang), Singapore, North Nias (many from Hih Madjepa and one from U. Madjepa), Middle Nias (Dyma and Kahim Bango), Sumatra (Batak interior, on Goa Hill), Java and Borneo (Mt Marapok). Mr. C. Holman-Hunt has sent me for examination a specimen from Rawang in the Malay Peninsula. Length 24.5—27.5 mm.

1. These names, by way of 0 and 0.01, were those placed by Sharp and May (1812, p. 181—183 and 184—185).
Comacupes masoni, Stoliczka.

Comacupes masoni, Stoliczka, 1873, pp. 151-2.
Comacupes masoni, Gravely, 1914c, p. 207, pl. xi, figs. 4-1a.

One specimen from an altitude of about 600 ft. in the interior of Bedagei, Sumatra, and three without locality label. They all resemble the Sumatran specimen referred to in footnote 2 of p. 269 of my "Account of the Oriental Passalidae." Without further specimens from the Malay Peninsula, however, it is impossible to say whether the Malay and Sumatran races of the species are distinct. Length 29-30 mm.

Comacupes stoliczkae, Gravely.

Comacupes stoliczkae, Gravely, 1914c, p. 206, pl. xi, figs. 3-3a.

Two specimens from Djember, Bessoek, Java; two from Mt. Marapol, Borneo; and two without locality label. M. Babault has sent a specimen 24·5 mm. long from Medan, Sumatra, for identification. Length 23·7-25·0 mm.

Comacupes basalis (Smith).

Passalus basalis, Smith, 1852, p. 18, pl. i, fig. 5.

Five specimens from Mindoro and other parts of the Philippine Islands. Length 33·7-36·3 mm.

Comacupes cavicornis, Kaup.

Aulacoecus cavicornis = laevicornis, Kaup, 1868a, p. 6.
Comacupes cavicornis, Kaup, 1871, p. 19.
Comacupes cavicornis, Gravely, 1914c, pp. 204-205, pl. xi, figs. 1-2b.

Several specimens from Singapore, Java (Tjibodas, Telaga Bodas in Garoet, Preanger) and Borneo (Pontianak). Length 24·5-26·0 mm.

These additional specimens show that the local races described in my "Account of the Oriental Passalidae" (pp. 204-206) are not constant, and must be treated as one.

The species of Comacupes may be identified thus:—

1 The mesosternum strongly punctured all over; the abdominal sterna with at least a few hair-bearing punctures in fresh specimens...

2 The mesosternum unpunctured except at the sides, the abdomen unpunctured and hairless...

C. laevicornis, Kewert.

1 The lower margin of the overhanging portion of the central tubercle short, or ascending obliquely to meet the upper margin, which is always horizontal; the tubercle usually truncate or concave anteriorly, not sharply pointed, narrower, keeled or rounded above...

2 The lower margin of the overhanging portion of the central tubercle usually rather long, always horizontal, the anterior part of the upper margin descending obliquely to meet it in a more or less acute angle; the upper surface usually more or less distinctly grooved longitudinally, or excavate...

The central tubercle not strongly elevated, truncate or concave in front; very variable... C. cylindraceus, p. 11.

3. The whole anterior end of the central tubercle raised well above the supracaudal ridge, not truncate or concave in front... C. nivosus, p. 12.

The central tubercle marked above with at most a more or less distinct longitudinal groove...

4. The central tubercle strongly excavate above... C. cyanomelas, p. 15.

The central tubercle broad above, pedunculate... C. basilica, p. 15.

5. The central tubercle narrow, not pedunculate... C. stolarzii, p. 16.

Genus TAENIOCERUS, Kaup. 1871, p. 20.

Type. PASCOLES bicanthatus, Percheron. 1844, pp. 14-21, pl. 1xxix, fig. 5.

Taeniocerus bicanthatus (Percheron).

PASCOLES bicanthatus, Percheron. 1844, pp. 14-21, pl. 1xxix, fig. 5.
TAENIOCERUS bicanthatus, Gravely, 1916, pp. 209-210, pl. xix, figs. 7-7b.

One specimen said, probably erroneously, to come from Ceylon; others from Penang, Singapore, Bintan Island, and Borneo (a number of specimens from Mt. Marapok in Dent Province, northern spurs of Mt. Kina-Balu, Labuan and Pontianak). Mr. C. Holman-Hunt has sent a specimen from Rawang, Malay Peninsula, for examination. Length 26.9-29.5 mm.

Taeniocerus platypus, Kaup.

PASCOLES platypus, Kaup. 1860, p. 5.
TAENIOCERUS platypus, Kaup. 1871, p. 21.

Numerous specimens from Sumatra (Bedagai Interior, ca. 600 ft.), Java (Bochok Lawang in Baceecoeun) and Borneo (Mt. Kina-Balu). M. Rahaudi has presented us with specimens from Medan, Sumatra. Length 16.3-19.5 mm.

Taeniocerus pygmaeus, Kaup.

PASCOLES pygmaeus, Kaup. 1860, p. 5.
TAENIOCERUS pygmaeus, Kaup. 1871, p. 20.
TAENIOCERUS pygmaeus, Gravely, 1916, pp. 209-210, pl. xix, figs. 8-8a.

One specimen each from the Malay Peninsula and Sumatra (Bedagai Interior, ca. 600 ft.) and several from Borneo (two from Mt. Marapok, Dent Province). Mr. C. Holman-Hunt has sent specimens from Kuala Kangsar, Malay Peninsula, for examination. Length 13.2-15.0 mm.

Taeniocerus bicuspid, Kaup.

TAENIOCERUS bicuspid, Kaup. 1869, p. 5.
TAENIOCERUS bicuspid, Kaup. 1871, p. 21-22.
TAENIOCERUS bicuspid, Gravely, 1916, pp. 210-211, pl. xix, figs. 9-20.

Four specimens from Tukvar Darjiling District, and one from "India." Length 18.5-
The species of *Taeniocerus* may be identified thus:

1. The upper surface of the central tubercle relatively broader as a rule, less flattened, unpunctured, the marginal ridge often indistinct or absent across the middle-line behind as well as in front... T. *berniatius*, p. 19.

2. The anterior tibiae very broad... T. *platypus*, p. 16.

3. The anterior tibiae slenderer... T. *pyroocus*, p. 16.

**Genus AULACOCYCLUS**, Kaup. 1868a, p. 4.


**Aulacocyclus glabriusculus**, Kuwert.

*Aulacocyclus glabriusculus*, Kuwert. 1897, pp. 280 and 282.

A number of specimens from Amb Island. Length 25.4–27.3 mm.

The antennal lamellae are long and slender: the central tubercle, which closely resembles that of *A. edentulus* (fig. iii, 7), is erect at base, oblique or almost horizontal above, where it is medially grooved, the apex scarcely or not at all bent downwards. The elytral grooves are shallow, and are scarcely punctured either above or below.

**Aulacocyclus perlatus**, Kaup.

Fig. III. 1, p. 18.

*Aulacocyclus perlatus*, Kaup, 1868a, p. 7.

Four specimens from New Guinea, three of them being from Stephensort, Astrolabe Bay. Length 19.5–21.6 mm.

The antennal lamellae are long and slender, as in the preceding species. The central tubercle is decumbent, and more or less distinctly bent downwards at the apex. All the grooves of the elytra are strongly punctured.

**Aulacocyclus parryi**, Kaup.

*Aulacocyclus parryi*, Kaup, 1868a, p. 8.

Represented by specimens from Ceram, Halmahera (Dodlinga), Ternate and Singapore. Length 23.2–25.3 mm.

The antennae and elytra resemble those of the preceding species. The central tubercle resembles that of *A. glabriusculus* and *A. edentulus*, but is inclined to be slightly thickened on the under side just at the apex, giving it a somewhat more hooked appearance.
Aulacocyclus aruensis, Kuwert.

Fig. III. 2

Aulacocyclus aruensis, Kuwert, 1897, p. 282.

Two specimens from each of the following localities: New Guinea, Jolo, Agra, Ceram. Length 21.28 mm.

The antennae and elytra resemble those of the two preceding species. The central tubercle somewhat resembles that of A. depressus, but is stouter and less elevated in front, and has the apex perhaps a little more distinctly overhanging than is usual in that species.

Aulacocyclus felderi (Stoliczka).

Fig. III, 3.


toon appendix felderi, Stoliczka, 1873, p. 172. (see note.

toon appendix felderi, Arrow, 1907, p. 147.

One specimen from Ambona, and one from Honitelo, West Seram (? Ceram). Length 21 mm.

This species differs from all others that are known in having the central tubercle ungrooved, erect, laterally compressed and simply pointed. The antennal lamellae are long

\[ \text{Fig. III.} \]

and slender. The elytral grooves are scarcely punctured either above or at the sides, but are decidedly stronger than in A. globrospinulosus.

Aulacocyclus mastersi, MacLeay.

Fig. III, 4.

Aulacocyclus mastersi, MacLeay, 1871, p. 171.

Aulacocyclus mastersi, Arrow, 1897, p. 274.

Several specimens from Queensland (Port Benson and Clarence River), N. S. Wales, Richmond River, and Victoria. Length 21.7-27.5 mm.

The antennal lamellae are somewhat stout but moderately long. The central tubercle is laterally compressed and comparatively low. It is somewhat variable, and may be scarcely more elevated than in Tanaocerus bisaspis; usually, however, it is somewhat higher and the apex may even be faintly overhanging. The fine puncturing on the head is usually inconspicuous, but a few. All the elytral grooves, except perhaps the first pair, are very finely punctured; none of them are very deep.

See 'Memoirs III' 42. Concerning the distribution of this species, Arrow, 1896, p. 447.
Aulacocyclus deyrollei, Kaup.

Aulacocyclus deyrollei, Kaup, 1866a, pp. 7-8.

Taeniocerus deyrollei, Kuwert, 1897, p. 275.

One specimen 25-5 mm. long, in the Indian Museum collection. I have also examined specimens in the British Museum.

A. deyrollei differs from A. mastersi only in the much greater breadth of the central tubercle and in the more conspicuous puncturing of the anterior part of the head.

Aulacocyclus tricuspis, Kaup.

Fig. III. 5.

Aulacocyclus tricuspis, Kaup, 1866a, p. 7.

Several specimens from New Caledonia and one from Woodlark Island. Length 22-25 mm.

This species is easily recognised by the tridentate form of the central tubercle, which resembles that of Comacynus caviconis, except that it is always broadest between the paired dorsal denticles. The antennal lamellae are much shorter than in A. deyrollei. The punctures in the grooves of the elytra are almost uniformly coarse.

Aulacocyclus errans, Blackburn.

Fig. III. 6.

Aulacocyclus collaris, Blackburn, 1896, p. 233.

Both sexes of this species appear to occur in two forms distinguishable from each other only by their size.

Large form.—Several specimens from Queensland. Mr. H. Schroder has presented with specimens from the New England District of New South Wales. Length 27-30 mm.

Small form.—Numerous specimens from Queensland, including four from Cooktown, three from the Melvour River and one from Cardwell. Length 19-6-23-0 mm.

The antennal lamellae are somewhat shorter than in A. deyrollei. The central tubercle rises almost vertically and is then bent over forwards, the antero-ventral surface gradually and the postero-dorsal abruptly, the dorsal surface being straight and more or less horizontal. The anterior enlargements of the pronotal marginal grooves are somewhat more pronounced than in other species of the genus. The grooves of the elytra are even more coarsely punctured than in A. tricuspis.

Aulacocyclus edentulus (MacLeay).

Fig. III. 7.

Passalus edentulus, MacLeay, 1826, p. 439.

A number of specimens from Queensland (Brisbane) New South Wales (Sidney) and Victoria. Length 23-30 mm.

The central tubercle is more strongly elevated than in A. errans and less abruptly bent forwards. The anterior enlargements of the pronotal marginal groove are not very pronounced. The elytral grooves are less strongly punctured, especially dorsally.

Aulacocyclus teres (Pentheron).

Fig. III. 8.

Passalus teres, Pentheron, 1841, pp. 30-40.

A number of specimens from Queensland, New South Wales and Victoria (Melbourne). Length 30-8-40-0 mm.
A term much larger than A. cibotii, its central tubercle is even more elevated, and is somewhat more abruptly bent forwards; neatly abruptly, however, as in A. cibotii. The elytral grooves are very shallow and are obscurely punctured at the sides only.

The above-mentioned species of _Ischnocera_ may be separated thus —

1. The external branchial bug and shorter; _Capenoi_ and Moluccan species...
2. The central tubercle depressed, with shorter overhanging apex...
3. The central tubercle not depressed, apex erect, laterally compressed and narrowly pointed...
4. The grooves of the elytra shallow and obscurely punctured...
5. The grooves of the elytra deeper and more or less strongly punctured...
6. The central tubercle depressed, with shorter overhanging apex...
7. The central tubercle less depressed, with stronger or scarcely overhanging apex...
8. The apex of the central tubercle well developed, usually more or less hook-like...
9. The apex of the central tubercle short, and not scarcely overhanging...
10. The central tubercle very short, its apex scarcely or not overhanging...
11. The central tubercle more strongly elevated with overhanging apex...
12. The central tubercle laterally compressed, the anterior part of the head not compressedly punctured...
13. The central tubercle very broad, the anterior part of the head somewhat compressedly punctured...
14. The central tubercle rather pointed at apex as seen from above, with a pair of small tubercles near the and dorsal grooves beyond...
15. The central tubercle somewhat broad at apex as seen from above...
16. The central tubercle moderately elongated and somewhat abruptly bent downwards; the elytral grooves very obscurely punctured...
17. The central tubercle more abruptly elevated and somewhat abruptly bent forwards, the elytral grooves almost smooth...
18. The central tubercle more abruptly bent forwards, the elytral grooves smooth and distinctly punctured...
19. The central tubercle somewhat abruptly bent forwards, the elytral grooves shallow and obscurely punctured...
20. The external branchial bug and shorter; _Capenoi_ and Moluccan species...

*Type, Passalus *fronticornis*, Westwood. 1842 pp. 124-125.*

*Ceracupes fronticornis* (Westwood).


*Ceracupes fronticornis*, Gravely, 1914 p. 212, pi. xi fig. 12.

Three specimens from 5,000-7,000 ft., Ruby Mines District of Upper Burma; two from Renong, Siam, and several without recorded locality. M. Vitalis de Salvaza has sent for examination a specimen from ca. 4,000 ft., Chapa, near Lao Kay, Ht. Tonkin; and Mr. J. Coggin Brown has presented us with a specimen from Loi Tawng Kyaw, Tawng Peng State, N. Shan States, Upper Burma. 5,500-7,000 ft.; and one from Man Pat, Mongnit State, 5,000 ft., Ruby Mines District, Upper Burma.

Length 20-23 mm.

This species is less distinct from *C. australis* and *C. arrowi* than I supposed when drawing up the key to the species (1914 e. p. 319). The shape of the central tubercle being very variable. The distinction given in that key between *C. australis* and the present species appears to hold good, though the distal bifurcation of the central tubercle of the latter is sometimes very weak. The most distinctive difference between *C. arrowi* and the present species is found in the elytra, whose grooves are deeply impressed and more coarsely punctured in the latter, but shallow and less strongly punctured in the former.

The species of *Ceracupes* may be identified thus:—

1. The grooves of the elytra, and their punctures, somewhat shallow 
   
2. The grooves of the elytra, and their punctures, very deep 
   
3. The apex of the horn formed by the fusion of the central tubercle with the anterior margin of the head more or less distinctly bifid 
   
4. The apex of this horn acute 


*Incl. Incitulus, Zang, 1905.*

*Type, Cylindrocaulus buccus*, Fairmaire, 1880. p. 164.

The species of this genus may be identified thus:—

1. The front coxae almost contiguous; the caudus extending about half way across the eye; the supra-orbital tubercles flattened, expanded at the apex truncate 

2. The front coxae widely separated; the caudus extending all the way across the eye; the supra-orbital tubercles slender and pointed 

The most extensive genera of this subfamily, and one of the most primitive, appear to be *Psopolus*, a name which is limited by previous authors, has proved most difficult to define satisfactorily. None of the characters hitherto used for this purpose appear really to have more than their specific value. Especially variable and intrinsically in many cases even by a specific character, is the shape and size of the central tubercle. Some of the most definite characters are found in the clypeus, but even these do not as a rule afford satisfactory generic distinction. It seems necessary, therefore, to sink the name *Heliscus* (= *Sermo*), *Oleododurus* (= *Passalis*, and *Passaloderus*) as synonyms of *Psopolus*. Similarly *Conopidus*, *Rinoec* and *Romozac* may be sunk as synonyms of *Oleodurus*. And both *Psopolus* and *Oleodurus* must be redefined.

The plastic and primitive genus *Psopolus* forms a starting point to which the remaining genera of American Passalidae may be traced back. The more primitive species of all the remaining subfamilies having the clypeus similarly exposed, although there is usually no clypeal frontal nature, and the more highly specialized having it hidden.

In the subfamily *Pseudacanthinae* itself three separate lines of evolution may be recognized. In one, which includes a new genus *Oleomatus* and the genus *Oleodurus* and *Eriopis*, the sides of the metasternum are broadly hairy. In another, which is represented only by the genus *Spurius*, the central tubercle is absent. In the third the elytra are united and the wings are of use for stridulation but not for flight.

The more primitive members of the third group have the three terminal teeth of the mandibles distinct as in *Psopolus*. I have only seen three such species; these belong to the genera *Psolodanthus*, *Trionococcus* and *Nuxopseudes*, in none of which are the sides of the elytra hairy. It will be convenient to unite these three genera. And with them should probably go the genera *Oegonius*, *Pseudolitus* and *Tomipes*, which have hairless elytra — unfortunately their mandibles have not been described. *Eriopis* should perhaps come here also. But Kawary's definition is inconclusive, and I have nothing else to go by. The name may equally well be synonymous with *Procopius*, or even with *Procopius*.

The genera *Procopius*, *Psolodius*, and *Eumptus* should likewise. In all probability, be united into one genus *Procopius*, differing from *Psolodanthus* in having only two teeth at the apex of the mandible instead of three and in having hairy sided elytra. The reduction in the number of teeth on the mandible probably takes place by the union of the two lower terminal teeth. The anterior lower tooth appears broad and bilobed in the genus on both mandibles, instead of bilobate on the left and undentate on the right as in allied terms of the preceding genera.

The genera of *Pseudacanthinae* may be defined thus:

| The elytra separate their vertical antennae part lightly convex... | 2 |
| The elytra united from the middle line. Their vertial antennae part broad convex... | 6 |

(James Faxon. Jour. Ent. vol. 2, p. 50.)
The sides of the metasternum broadly hairy and punctured throughout...  3.

The hair-bearing punctures of the metasternum confined to the lateral areas and extreme anterior parts of the anterior intermediate areas...  5.

The clypeus transversely trapezoidal...  Oileodes, p. 23.

The clypeus transversely linear, straight or undulating...  4.

The clypeus straight or lightly concave in the middle line...  Oileus, p. 25.

The clypeus strongly convex in the middle and on either side, strongly produced backwards at the two points uniting the three curves thus formed...  25.

The central tubercle absent...  Sporus, p. 26.

The central tubercle present...  Popilus, p. 26.

The mandibles tridentate at apex, the left one with a broadly bifid tooth between the apex and the movable tooth, the right one with a unidentate tooth in this position (fig. iv. 13, p. 24) ; the sides of the elytra hairless...  Pseudechus, p. 31.

The mandibles bidentate at apex, both of them with a broadly bifid tooth between the apex and the moveable tooth (fig. iv. 16, p. 21) ; the sides of the elytra hairy...  Proculeius, p. 31.

Genus OILEOIDES, n. gen.

Metasternum with a broad band of hair-bearing punctures on each side; clypeus expanded as in the more primitive species of Popilus. Otherwise like Popilus.

Type, O. parvicornis, n. sp.

Oileoides parvicornis, n. sp.

Fig. IV. 1, p. 21.

Two specimens from the Cauca Valley, Columbia. Length 7-28-5 mm.

The antennae have moderately long lamellae. The labrum is punctured and hairy, with distinctly concave anterior margin and convex sides, the latter somewhat convergent behind. Both mandibles have well developed upper, terminal and anterior lower teeth. The last-mentioned tooth is simple on the right side: on the left it is double, sometimes with the anterior of the two parts into which it is (vertically) divided itself divided to a less extent horizontally. The mentum is smooth in the middle, hairy and punctured laterally: its scars are not very strongly marked. The clypeus is extensive and flat like that of Sporus bicornis and dichotomus: it is lightly procurve and divided into the latter species. The frontal ridges are obsolete, and the central tubercle, though situated on the crest of a straight transverse ungrooved ridge formed by the union of the two parietal ridges, is very small. Between the central tubercle and the obsolete frontal ridges is a triangular area which is somewhat dull and strongly roughened, all the rest of the surface of the head being smooth and glossy.
The prosternum is transverse. The anterior margin is practically straight, the sides lightly and the posterior margin more distinctly convex. The scar are a little uneven, but are not definitely punctured. The prosternum is pointed behind.

The scutellum is smooth or distinctly but sparingly punctured. In the specimen in which the scutellum is unpunctured there is a strongly marked median groove, in the other this groove is much broken. The mesothoracic episterna are glossy and coarsely punctured all over, except in the posterior angles, which are matt and have less distinct or no punctures but may be more or less rugose. The mesosternum is more or less smooth and glossy all over, less so at the apex than in the middle.

The lateral areas of the metasternum are narrow. These, the anterior intermediate area, and the outer margins of the posterior intermediate areas are punctured and hairy. The rest of the plate is smooth, hairless and glossy, as are also the posterior coxae and the abdominal sternum. The grooves of the elytra are somewhat strongly punctured, especially laterally, but the punctures are small and round. The middle and hind tibiae are without spines except at the apex.

**Oileoides subrecticornis** (Kuwert)

Sooieoioides, Kuwert 1897 p. 296.

Three specimens from the Cauca Valley, Columbia. Length 22-24 mm.

*O. subrecticornis* differs from *O. parvicornis* in its somewhat smaller size, its shorter antennal lamellae, its straighter clypeus, its somewhat more strongly developed central
tubercle and frontal ridges, which may be united and never have a roughened area between them, and its prothorax which is strongly punctured in and close round the scars.

Genus **OILEUS**, Kaup, 1869, p. 3.


Type, *Passalus rimator*, Truqui, 1857, p. 266 (see Arrow, 1907, pp. 447-449.)

Species of this genus appear to be much larger than are those of the last, and further have always, so far as is known, a large decumbent central tubercle with free apex, instead of a feebly developed one, as well as a linear instead of an expanded clypeus.

**Oileus ridiculus** (Kuwert).

Fig. IV, 2.

*Rimoricus ridiculus*, Kuwert, 1897, p. 287.

Three specimens from Guatemala. Length 34-35 mm.

The lamellae of the antennae are extremely short, being equal to not more than two of the immediately preceding joints in length; the pronotum is punctured in and around the scars; the scutellum is roughened all over with obsolete punctures; the mesosternal scars are hairy; and the grooves of the elytra are very finely punctured. In one specimen the mesosternum is coarsely punctured.

**Oileus sargi** (Kaup).

*Rimor sargi*, Kaup, 1871, pp. 119-120.

One specimen from Guatemala. Length 30 mm.

The antennal lamellae are very long, being as long as about four of the immediately preceding joints; the pronotum is unpunctured; the scutellum is strongly punctured in the middle; and the mesosternal scars are not hairy.

**Oileus rimator** (Truqui).

*Passalus rimator*, Truqui, 1857, p. 266.

One specimen from Omilteme, Guerrero, 8,000 ft., lent by the British Museum. Length 37.8 mm.

This species is closely allied to *O. sargi*, from which it differs in having the clypeus lightly biconvex, the anterior margin of the pronotum biconcave and the mesosternal scars hairy.

Genus **UNDULIFER**, Kaup, 1869, p. 6.


**Undulifer incisus** (Truqui).

Fig. IV, 3.


One specimen from Cordova, Mexico, presented by the British Museum. Length 29 mm.

*Undulifer incisus* is closely related to *Oileus ridiculus* and *sargi*. The antennae of the single specimen before me are broken, but from the one remaining lamella I conclude that
the lamellae were very long and slender as in the latter of these species. The clypeus has the
form characteristic of the genus. The central tubercle is narrower and less separated from
the surface of the head than in O. *subrecticornis* and *O. *subrigida*. The pronotum is more extensively
punctured round the scar than in either of these species. The meso- and metathoracic episternum are
polished throughout. The meso- and metathoracic episternum are extensively covered with hair-bearing
punctures, especially laterally. The grooves of the elytra are quite as strongly punctured as in *O. subrigida*.

**Genus SPURIUS**, Kaup. 1871, p. 75.


*Spurius bicornis* (Truqui).

*Passalus borellii*, Truqui, 1857, p. 317

One specimen from Mexico and two from Guatemala. Length 17.5-18.0 mm.

*Spurius dichotomus*, Zang.

Fig. IV, 1, p. 24.

*Spuricus dichotomus* Zang, 1905c, pp. 227-229.

One specimen from Guatemala, and one unlabelled preparation of the head and
appendages. Length 21 mm.

This species may readily be distinguished from the preceding by its somewhat larger
size; by the smaller size of the conical processes representing the parietal ridges, which are
oblique instead of transverse; and by the shape of the clypeus, which is procurved instead of
straight.

**Genus POPILIUS**, Kaup. 1871, p. 75.

Incl. *Heliscus*, Zang, 1905 ( = *Sorinus*, Kaup, 1871, preoccupied) : *Odontotactius*, Kuwert, 1876 (= *Passalus*, auct. nec Fabricius, see Zang, 1905c, pp. 224-225) : *Passalodactius*,
Kuwert, 1876.

Type, *Passalus marginatus*, Percheron, 1835, pp. 80-90, pl. vii, fig. 1.

*Popilius recticornis* (Burmeister).

Fig. IV, 5, p. 24.

*Passalus recticornis*, Burmeister, 1847, pp. 518-519.

Four specimens from Mexico. Length 18.20 mm.

*P. recticornis* is the smallest species of its genus known to me. The antennal lamellae
are short. The clypeus is strongly procurved. The frontal ridges are obsolete, but the
central tubercle, which is directed forward, is very strongly developed, the apex being free.
Apart from some of these characters and the smoothness of the metathoracic
caracteristic of the genus, *P. recticornis* closely resembles the above described species of the
genus *Odontotactius*. The meso- and metathoracic episternum are, however, less extensively punctured
and more evenly glossy and the prothorax is truncate behind. The punctures round the
scar on the pronotum are usually more numerous even than in *O. subrecticornis*. 
**Popilius marginatus** (Percheron).

Fig. IV. 6. p. 21.

*Passalus marginatus*, Percheron. 1895, pp. 89-90, pl. vii. fig. 1.

Three specimens from Farinas, Bolivia. Length 21-22 mm.

*Popilius marginatus* is of about the same size as *Oileoides subrecticornis* or a little smaller, but it has longer antennal lamellae, its straight clypeus is less extensive antero-posteriorly and consequently less flat, there is a strong median keel or pair of keels between the small central tubercles and the obsolete frontal ridges, the pronotum is more thickly punctured above the scars and its median groove is complete, the scutellum is strongly punctured at least near the middle line in front. The metasternum resembles that of *P. recticornis* and other species of *Popilius*; it may have a few punctures in the posterior intermediate areas. The abdominal sternae arc punctured in the angles of the scars. In other respects *P. marginatus* resembles *O. subrecticornis*.

**Popilius amazonicus**, n. sp.

Fig. IV. 7. p. 21.

One specimen from the Amazon, Peru. Length 20 mm.

*P. amazonicus* resembles *P. marginatus* in general appearance, but the tubercles and ridges of the head resemble rather those of *P. intergeneus*, the pronotum is very sparsely punctured near the scars. The pointed posterior extremity of the prothorax is very slender, and the scars of the abdominal sternae are more extensively punctured.

**Popilius intergeneus** (Bates).

Fig. IV. 8. p. 24.

*Soraxus (?) intergeneus*, Bates. 1886, p. 21.

Numerous specimens from Guatemala. I am indebted to Mr. Arrow for their identification by comparison with Bates' type. Length 200-215 mm.

This species is intermediate in size between the two preceding. From *P. marginatus* it differs in having the antennal lamellae short, the anterior margin of the clypeus slightly convex and often indented in the middle line, the frontal ridges stronger and on an average more directly united with the central tubercle, the pronotum punctured in the anterior angles as well as above the scars, the prothorax truncate instead of pointed behind, the mesothoracic episterna uniformly glossy except for an unpunctured matt oval patch a little below and in front of the unpunctured posterior angles, the scars of the abdominal sternae more extensively punctured and the grooves of the elytra more strongly punctured.

**Popilius guatemalae** n. sp.

Fig. IV. 9. p. 21.

One specimen from Guatemala. Length 28-5 mm.

This species differs from *P. intergeneus* in its much larger size, straight margined clypeus, smaller and more arcuate frontal ridges, grooved parietal ridges, incomplete pronotal median groove, much less extensively punctured pronotum (the punctures being confined to the neighbourhood of the scars), pointed posterior end of prothorax, almost
unpunctured scutellum (the punctures being confined to a pair of longitudinal lines), normal mesothoracic episterna with matt and indistinctly punctured posterior angles, smoother abdominal sterna, and more finely punctured elytral grooves.

**Popilius tropicus** (Percheron).

*Pamalas tropicus* Percheron, 1835 pp. 97-99 pl. vii fig. 4

Five specimens from Mexico, and one without locality record. Length 25(6)-28(5) mm.

Kauf recognizes three varieties of this species, based on the sculpture of the upper surface of the head, and quotes Truqui to the effect that the central tubercle is very variable. One of the specimens before me has a much more strongly developed central tubercle than the others. It is a female and all the others are males.

The clypeus appears always to be distinctly recurved, and I doubt whether the frontal ridges, which are often absent, are ever very strongly developed. They are straighter than in *P. guatemalae*. The parietal ridges are not grooved, and the scutellum may be irregularly punctured. In other respects this species resembles *P. guatemalae*.

**Popilius brevioripennis** (Kuwert).

*Fig. IV, 11 p. 24.*

*Odocteryxus brevioripennis* Kuwert, 1897. p. 290.

One specimen from Mexico, distinctly smaller than the type (25 instead of 26 mm. long) and with numerous punctures above the scars. The number of these punctures is, however, very variable in the closely allied species, *P. striatopunctatus*, and the difference in size is within the usual limits of variability. The specimen of *P. brevioripennis* differs from the single female specimen of *P. tropicus* before me in having longer antennal lamellae, a strong median convexity of the anterior margin of the clypeus, a slightly truncate posterior prosternal plate, mesothoracic episterna like those of *P. intergenus*, and more strongly punctured elytral grooves.

**Popilius striato-punctatus** (Percheron).

*Pamalas striato-punctatus* Percheron, 1835. pp. 101-102, pl. vii fig. 7.

Numerous specimens from Mexico, one from British Honduras and two from Nicaragua. Length 25-28 mm.

The size of the central tubercle is variable; it is smaller in males than in females, but the difference is not a sharp one. *P. striatopunctatus* differs from *T. brevioripennis* in its larger size, its more strongly developed central tubercle and slightly less indistinct frontal ridges. The posterior end of the prosternum is variable.

**Popilius cornutus** (Fabricius).

*Pamalas cornutus* Fabricius, 1804 p. 256.

Numerous specimens from Florida, two from Mexico and one from each of the following places: New York, Illinois, Delaware (Wilmington), Ohio and Haiti. Length 29-37 mm.

1 In one the genitalia were found to be damaged, and I was unable to determine the sex with certainty.
The central tubercle is very variable in shape and size, and is larger in females than in males. *P. cornutus* differs from *P. striatopunctatus* in its larger size, somewhat shorter antennal lamellae, evenly arched anterior margin of clypeus, pedunculate and larger central tubercle, unpunctured pronotum, prosternum usually more broadly truncate behind, mesothoracic episterna with a broad matt band parallel to but not in contact with the lower margin, unpunctured posterior intermediate areas of metasternum, and more finely punctured elytral grooves.

The above species of *Popilius* may be distinguished from one another thus:—

1. The clypeus more or less broadly flattened and trapezoidal
2. The clypeus transversely linear or distinctly prominent in the middle line
3. The central tubercle elongate, with free forwardly directed apex
4. The central tubercle small, its apex not free
5. The antennal lamellae long, equal to about four of the immediately preceding joints in length
6. The antennal lamellae short, equal to about two of the immediately preceding joints in length
7. The frontal ridges short and curved, together forming almost a semi-circle
8. The frontal ridges long and approximately straight, meeting in a slightly obtuse angle
9. The central tubercle situated in, or a little in front of, the middle of the head; the frontal ridges well developed, long and approximately straight, meeting in an obtuse angle
10. The central tubercle situated a little behind the middle of the head; the frontal ridges weaker or absent
11. The clypeus straight; the frontal ridges forming a semi-circle in front of the central tubercle; the parietal ridges grooved
12. The clypeus lightly recurved; the frontal ridges absent, or extending straight to the obsolete frontal tubercles from either side of the base of the central tubercle at about a right-angle to each other; the parietal ridges keeled
13. The clypeus linear, parallel-sided, lightly recurved; the central tubercle sometimes with free apex, but never pedunculate
14. The clypeus with at least the posterior margin straight; or the central tubercle pedunculate
15. The anterior margin of the clypeus with a strongly developed median convexity, the central tubercle not pedunculate
16. The anterior margin of the clypeus at most lightly convex medially, the central tubercle pedunculate
17. The central tubercle of moderate size, its apex scarcely free
18. The central tubercle large in both sexes (especially the female), its apex entirely free
20. *P. marginatus*, p. 27.
21. *P. amazonicus*, p. 27.
22. *P. intergenues*, p. 27.
23. *P. guatemalae*, p. 27.
25. *P. cornutus*, p. 28.
**Pseudacanthus bifidus** (Zang).

*Neopseudecas bifidus*, Zang 1905, p. 232

-Six specimens from Mexico. Length 37.44 mm.

The antennal lamellae are long, being equal to three or four of the immediately preceding joints. The anterior margin of the labrum is deeply cleft; the sides of the labrum are straight and parallel. The elyptes are strongly arched on either side of a still stronger median concavity. The central tubercle resembles that of the genus *Odous* in general form. There are no frontal tubercles or ridges. The parietal ridges are obsolete. The pronotum is unpunctured; its median groove is very strong, but does not quite reach the anterior margin. The scutellum is strongly punctured on either side of the middle line. The mesothoracic episterna are punctured above and near the anterior margin only; they are glossy, except for a mottled oval patch behind the lower margin and a mottled streak in the posterior angle. The metasternum is glossy except in the scars, which are matt; it is unpunctured. The metasternum is hairless, and is unpunctured except in the posterior intermediate areas; the lateral areas are linear and smooth. The abdominal sterna are smooth. The grooves on the elytra are finely punctured laterally.

**Pseudacanthus solidus** (Arrow).

*Pseudacanthus solidus*, Arrow 1905, pp. 452-453

-Described from a (damaged) cotype, 30 mm. long, from Chuiipache, Quezaltenango, Guatemala, lent by the British Museum.

The anterior margin of the labrum is lightly concave. The elyptes is straight and bears a pair of small tubercles, each situated about half way from the middle line to the tubercle in which it terminates laterally. The parietal ridges, though somewhat small, are quite distinct. There are two or three punctures in or near the scars on each side of the pronotum. The matt areas of the mesothoracic episterna are even more restricted than in *P. bifidus*. The metasternum is punctured and hairy laterally behind. The lateral areas of the metasternum are broad; both these areas and the intermediate areas in front of and behind the usual group of coarse hairless punctures on the posterior intermediate areas, are covered with hair-bearing punctures. The abdominal sterna are smooth. In other respects this species resembles *P. bifidus*.

**Pseudacanthus jalapensis**, Bates.

*Pseudacanthus jalapensis*, Bates 1886, p. 8, pl. 1, fig. 10, 100.

-One specimen from Oajaca, S. Mexico. Also a cotype from Jalapa lent by the British Museum. Length 30.5 mm.
\( P. \) jalapensis is very much smaller than either of the preceding species of the genus, and its antennal lamellae are much shorter in proportion than in those species. The clypeus is very lightly concave (practically straight) and has no tubercles except at its lateral extremities. A pair of small frontal tubercles is situated a little behind it, each about a third of the way from the end to the middle line. The frontal and parietal ridges are obsolete. The central tubercle is very large and resembles in form that of the two preceding species. The pronotum resembles that of \( P. \) solidus. The scutellum is strongly punctured near the middle line, especially behind. The mesothoracic episterna have one or two matt areas close to the lower margin, the rest of the surface being glossy; they are punctured above and along the anterior margin. The mesosternum is polished except along the lateral margins where it is dull. The metasternum has hair-bearing punctures only beside the middle coxae; the lateral areas are linear and somewhat rough; the general surface is glossy and unpunctured. The abdominal sterna are slightly roughened in the broad outermost parts of the scars only. The elytra are somewhat coarsely punctured in the grooves.


Type, **Proculejus truquii**, Kaup. 1868b, pp. 16-17.

**Proculejus pubicostis**, Bates.

Fig. IV. 16, p. 24.

**Proculejus pubicostis**, Bates, 1886, p. 5, pl. i, figs. 4-1a.

Two specimens from Mexico. 30-31 mm. long.

The antennal lamellae are moderately long, being about equal to three of the immediately preceding joints in length. The labrum is parallel-sided, and is strongly concave in front. The clypeus is very lightly convex (practically straight); it bears an obscure tubercle at either end, and just behind and on the inner side of these tubercles is a pair of small frontal tubercles, which the obsolete frontal ridges do not clearly reach. The central tubercle is very large, it is massive and rounded at the base, but the long forwardly directed apex is somewhat slender. The parietal ridges are obsolete. The pronotum bears only a few fine hair-bearing punctures below the scars; the strongly impressed median groove scarcely reaches the anterior margin. The scutellum is strongly punctured on either side of the middle line, especially behind. The mesothoracic episterna are punctured above and in front; they are glossy except for an extensive matt band, which extends downwards from a little above the posterior angle of each towards the ventral angle. The mesosternum is polished except in the scars, which are deep and narrow. The metasternum resembles that of **Pseudocanthis jalapensis**. The abdominal sterna are smooth. The elytra are somewhat coarsely punctured above, very coarsely punctured at the sides; the last three ribs above the margin are finely punctured and hairy.
Proculejus sartorii, Kaup.

Proculejus sartorii, Kaup. 1886b. p. 17

One specimen without locality record. Length 12.5 mm.

The labrum is concave in front, but not so strongly as in P. pubescens. The clypeus is straight or lightly concave, and is united with the well-developed frontal tubercles a little distance from each end. The frontal tubercles are united by well-developed frontal ridges to the central tubercle, which is situated a little in front of the middle of the head: this tubercle is small and upwardly directed, and has no free apex. The scutellum is sparsely and somewhat finely punctured, especially in front. The mesothoracic episterna are punctured except in the posterior angles, and are glossy except for an oval patch behind the lower margin. In all other respects this species resembles the last, except that the mesosternal scars are shallower and that the elytral grooves are if anything even more coarsely punctured.

Proculejus truqui, Kaup.

Proculejus truqui, Kaup. 1886b. pp. 16-17.

One specimen from Mexico, 5.1 mm. long.

Proculejus truqui is much broader in proportion to its length than is either of the two preceding members of the genus. The head is ornamented much as in P. sartorii, but the frontal area is somewhat narrower and the central tubercle is situated more in the middle. The pronotum resembles that of the two preceding species. The scutellum bears a few obscure punctures. The grooves of the elytra are very much broader and more coarsely punctured than in either of the preceding species, being about as wide as the ribs at the sides, and about half as wide above, the punctures in each groove being much broader than the spaces between them. In all other respects P. truqui resembles P. sartorii.

Subfamily PROCULINAE.

Almost all members of this subfamily have the clypeus exposed as in the Pseudacanthinae; but in it is fused with the frons instead of separated from it by a distinct suture. faint traces of this suture, as of the outer tubercles, may perhaps be recognized in the genus Arroz, which is probably the most primitive genus of the family. From this genus the extensive genus Veturus may easily be derived; and this appears to have given rise to two divergent lines of descent, culminating respectively in the flightless genera Platycerces and Procadius. The former, in which the clypeus is completely hidden, is connected to Veturus through the genus Ferres, in which all stages of the disappearance of the clypeus may be traced (compare fig. v. 11-13, p. 34). The latter, in which the specialized features associated with flightless species reach their highest development, has the clypeus exposed, and is connected to Veturus by the genus Publius, a genus which only differs from species of Veturus with the two lowest terminal teeth fused by its fused elytra and reduced wings.

1 See pages pp. 1-5.
The genus *Proculus*, Zang (1905a, pp. 225-227, type, *P. inae*) is probably allied to *Publius* and *Proculus*, though in no other genus of Proculinae are the lateral areas of the metasternum known to be hairless—a character suggesting possible affinities with *Proculejooides*, in the subfamily Passalinae. It resembles *Publius* in having normal antennae, and *Proculus* in having egg-shaped elytra. The mandibles appear to resemble those of the last named genus.

The genera of Proculinae known to me may be defined thus:—

1. The elytra separate, their vertical anterior part lightly concave.
2. The elytra united along the middle line, their vertical anterior part more or less distinctly convex.
3. The anterior lower tooth of the left mandible bidentate as seen from above; the claspers always exposed and more or less horizontal; the anterior margin of the pronotum usually biconcave.
4. The anterior lower tooth of the left mandible tridentate as seen from above; the claspers steeper, or hidden and rudimentary; the anterior margin of the pronotum straight, or lightly biconvex.
5. Rudimentary outer tubercles present; the anterior margin of the pronotum straight.
6. The outer tubercles absent; the anterior margin of the pronotum more or less sinuous or with a strongly sinuous marginal groove.
7. The claspers entirely hidden; the mandibles tridentate distally.
8. The claspers broadly exposed; the mandibles usually bidentate distally.
9. The lamellae of the antennae of moderate length; the anterior lower tooth of the left mandible broader than that of the right; the sides of the elytra approximately straight and parallel; the metasternum with distinct lateral areas.
10. The lamellae of the antennae abnormally long and slender, the three together being narrower than any one of them is long; the mandibles symmetrical; the sides of the elytra strongly rounded; the metasternum without distinct lateral areas.

---

**Genus ARROX.** Zang, 1905b, p. 155.

- *Sertorius*, Kaup, 1871, preoccupied.

*Type, Sertorius agassizi*, Kaup, 1871, p. 114.
Arroxi agassizi (Kaup)

Fig. V. 4

The specimen from Nicaragua, 30 mm long. Both mandibles have three well-developed teeth. The anterior lower tooth of the right side is more or less columnar, that of the left is broadly indentate as seen from above, but the anterior denticle itself divided into two horizontally. The upper surface of the head though glossy is irregular, not smooth.

In the species of the allied genera Venturia and Ferres the elytrum is somewhat convex above. On either side of the elytrum is a rudimentary outer tubercle, but there is no ridge between these tubercles and the larger inner tubercles. The pronotum has a very few punctures only in the slightly enlarged anterior extremities of the narrow marginal groove. The median groove scarcely reaches the anterior margin. The scutellum is thickly punctured on either side of a smooth middle line. The mesothroacic episterna are glossy and closely covered with strong coarse punctures above, matt and more faintly and sparsely...
punctured and hairy below. The mesosternum is dull, unpunctured and hairless all over. The metasternum is punctured and hairy in the lateral and anterior intermediate areas only; the lateral areas are slightly broadened behind. The abdominal sterna are smooth and glossy, except the first pair of scars which are somewhat rough. The elytra are sparsely hairy between the shoulders; their grooves are somewhat strongly punctured. The middle tibiae each have a small spine before the end.

Genus **VETURUS**, Kaup, 1871, p. 110.


Type. *Passalus heydeni*, Kaup, 1868b, p. 27.

**Veturius sinuatosulcatus**, n. sp.

Fig. V. 3 & 5.

One specimen from Chaco, 40 mm. long.

The labrum is lightly concave in front, lightly convex at the sides. The mandibles (which are somewhat worn) appear to have been very like those of *Veturius agassizii*, but the two lowest terminal teeth have been fused, probably at the base only, and somewhat widely separated from the uppermost terminal tooth, especially on the left side. The head is smooth, with a strongly elevated central tubercle flanked by straight and somewhat forwardly directed parietal ridges. The central tubercle unites in front with a slender, finely pointed, V-shaped ridge or pair of ridges from which the obsolete frontal ridges arise at an obtuse angle to each other. The inner tubercles are well developed, but the frontal ridges do not reach them.

The sides of the pronotum are strongly concave, but are overhung by the strongly convex upper borders of the marginal grooves. The anterior margin is practically straight, but is bordered by a strongly sinuous marginal groove which, though much narrowed near the middle line, is scarcely broken. The pronotum is highly convex behind the median curve of this groove, which is enlarged on either side of the convexity. At the sides the groove is broad behind as well as in front, not narrow behind as in *V. sinuatosulcatus*, Kuwert. The median groove is deeply impressed and practically complete.

The scutellum is coarsely punctured in the anterior angles and on either side of all but the extreme posterior part of the middle line, bands meeting in the posterior angles to form an  Over-shaped figure being left unpunctured. The mesothoracic episterna are glossy and punctured above and along the anterior margin; matt and unpunctured behind. The mesosternum bears matt bands in the middle line and along the sides, meeting in a broad matt area in the anterior angle to form an  Over-shaped figure. Between these bands it is glossy. It is unpunctured and hairless throughout. The metasternum is punctured and hairy only in the anterior parts of the anterior intermediate areas and in the lateral areas; the lateral areas are moderately broad behind. The abdominal sterna are glossy. The grooves of the elytra are distinctly punctured, especially laterally; the shoulders are without hair. There is a strong spine a little beyond the middle of the middle and hind tibiae.
**Veturius spinifer**, n. sp.

Fig V, 1 p. 41

Fourteen specimens, Kuwert 1898 p. 172 (see Reichenbach).

One specimen from Columbia; two from Venezuela, and three from Santa Catarina, S. E. Brazil. I have selected one of the Brazilian specimen as the type of the species. Length 34.15 mm.

*Veturius spinifer* agrees closely with Kuwert's description of *V. similis*, but lacks the hairy shoulders of Reichenbach's species. It closely resembles *V. somutisulcatus* but differs in having more distinct frontal ridges, which proceed almost direct from the central to the upper tubercles at about a right angle to one another; in having a prominent pronotum with practically straight sides, in having a well-defined margin, in the marginal groove being more or less complete, and not enlarged in front, and in having a straight scutellum somewhat less regularly punctured; and in having the mesosternum more or less raised all over. There are (as always) some hair-bearing punctures in the anterior angles of the mesosternum. The anterior intermediate areas of the metasternum are almost covered with hair-bearing punctures. The two lowest terminal teeth are smaller than the upper one and are fused at the base but free distally.

**Veturius platyrhinus** (Hope)

*Pachyrenis platyrhina* Hope 1845 p. 28

*Paraceras platyrhina* Kiiop 1874 pp. 111,112

Three specimens from Chiriqu, Panama, and one from Brazil. Length 38 mm.

This species differs from the last only in its larger size, and in the absence of spines from the middle and hind tibule.

**Veturius unicornis**, n. sp.

Fig V, 6 p. 34

Two specimens from the Peruvian Amazon and one from the Upper Amazon. Length 34.57 mm.

The two lowest terminal teeth of both mandibles are completely fused. The inner tubercles and frontal ridge as well as the outer tubercles, are entirely absent; the central tubercle is distinct, but is less strongly elevated than in the three preceding species. The anterior margin of the pronotum is almost straight, and the marginal groove is narrow throughout. The scutellum is almost quite unpunctured. The mesosternum is glossy except for a narrow band along each side and across the middle behind the anterior angle. The hairy portion of the anterior intermediate areas of the metasternum are very restricted. The grooves of the elytra are somewhat more distinctly punctured than in any of the three preceding species. In other respects, this species resembles *V. spinifer*.

**Veturius similimus**, Kuwert

*Pachyrenis similimus* Kuwert 1898 p. 167

Eight specimens from Bahia, Brazil. 35.10 mm long.

The mandibles resemble those of *V. unicornis*. The head resembles that of *V. spinifer*, or may be somewhat more slender, in which case the frontal ridges meet in a more acute
angle. A well-marked tubercle is sometimes present between the frontal tubercles. The scutellum is strongly punctured, except over a more or less well-developed posterior median band and in the lateral angles. The whole of the mesothoracic episterna are punctured; in the matt areas the punctures bear hairs, but not elsewhere. The mesosternum bears a pair of glossy patches in an S-shaped matt figure as in _V. simillimus_; these patches bear a number of hair-bearing punctures, which become thicker on the matt surface anterior and lateral to them, but the median matt band is hairless and unpunctured. The metasternum is almost as extensively smooth as in _V. sinuatus_.

In all other respects _V. simillimus_ resembles _V. spinifer._

**Veturius cephalotus** (Saint-Fargeau and Serville).

_Passalus cephalotus._ Saint-Fargeau and Serville, 1825, p. 20 (see Kuwert).

One specimen from Cayenne, one from Surinam, and live from the Peruvian Amazon. Length 35-40 mm.

_Veturius cephalotus_ was first described from Cayenne, and our specimen from that locality bears a label showing that it was identified by Kaup. The species in our collection which most closely resembles Kuwert's _V. cephalotus_ appears to me to be _V. simillimus_, and one of these has been determined as _V. cephalotus_ by Kaup, who regarded the two as identical. Kuwert's _V. simillimus_ is probably the species described above as _V. spinifer_ although this lacks the hairy shoulders of the true _simillimus_ of Eschschoitz.

_V. cephalotus_ differs from _V. simillimus_ chiefly in the absence of the spines above the ends of the middle and hind tibiae, and in the uniformly punctured and hairy anterior intermediate areas of the metasternum. In addition, the two lowest terminal teeth are usually distinct at the apex on the right mandible and sometimes also on the left; the marginal grooves of the pronotum are inclined to be narrower in the anterior angles and more strongly punctured behind them; and the median matt band of the mesosternum is inclined to be broader, and the hair-bearing punctures to be more definitely concentrated into marginal bands.

**Veturius sinuatus** (Eschschoitz).


_Veturius cephalotus_ (see _sinuatus_). Kuwert, 1898, p. 108.

Seven specimens from Brazil, including one from Rio Grande do Sul, one from Bahia, and two from Blumenan. Length 37-44 mm.

_V. sinuatus_ is closely allied to _V. cephalotus_, but the two lowest terminal teeth, though fused at the base, are distinct distally on both mandibles; the frontal ridges are often obsolete; the matt posterior angles of the mesothoracic episterna are hairless and unpunctured; the metasternum resembles that of _V. simillimus_; and the elytra have a tuft of hair on the shoulders.

**Veturius criniceps**. Kuwert

Fig. V. 7, p. 34.

_Veturius criniceps._ Kuwert, 1898, p. 170.

Two specimens from Chiriqui, Panama. 32 mm. long.

The head differs from that of _V. simillimus_ in having the central tubercle less elevated and set further forward, with the result that the frontal ridges meet in a very obtuse angle.
The mesosternum bears a matt band, arranged as in _V. superciliatus_, but has in addition a band of hair-bearing punctures on either side of the whole length of the middle line. The anterior lateral and intermediate areas of the metasternum are entirely covered with hair-bearing punctures. The elytra have a tuft of hair on the shoulder; they are less glossy than in other species, although the head and pronotum are normal in this respect. The middle line on the hind tubercle is not clearly seen. Otherwise _V. crassiceps_ resembles the much larger _V. similans_ in structure.

**Veturius similans** (Walb.).

_Fig. V, 2 p. 41_

One specimen from Rio de Janeiro, 26 mm. long.

The mandibles resemble those of _V. similans_ and _V. crassiceps_, but the head is much narrower than in these species, and the central tubercle is set much further back than in the latter, being if anything somewhat further from the inner tubercles than those from each other. The lateral ridges are somewhat closer to the central tubercle, where they are directed straight towards the inner tubercles. The setulimbus is strongly punctured on either side of a broad median band. The mesosternum resembles that of _V. similans_, but has fewer punctures. The grooves of the elytra are very strongly punctured. The middle and posterior tubercle have no spines before the end. In other respects this species resembles _V. similans_.

**Veturius boliviae** p. 37.

_Figs. V, 9 p. 40_

Five specimens from Chaco, Bolivia, 34 mm. long.

_Veturius boliviae_ is very like _V. cephalotes_, but is smaller, has three well developed terminal teeth on both mandibles, has very few punctures on the scutellum and the many parts of the mesothoracic episternum, has hair-bearing punctures on either side of the middle line of the mesosternum, as well as in front and at the sides and sometimes diffused over other parts, the middle line being rather narrowly or not at all and has more or less marginal grooves on the elytra.

**Veturius heydeni**, Kämp.

_Fig. V, 10 p. 40_

_Panhallo Hindhake_ Kämp. 1885, p. 27.

One specimen from Mexico, 37 mm. long and very broad in proportion, determined by Kämp.

The lateral ridges and inner tubercles of this species are obsolete, and the short-punctured ridges are divided by the large central tubercle. In other respects the structure of the species resembles that of _V. boliviae_, except that the marginal grooves of the pronotum are narrower, that there is usually no hair near the middle line of the mesosternum and no trace of this and the marginal bands, which alone are nearly, and that the elytra are more distinctly punctured.
The abovementioned species of *Pterius* may be recognized thus:

The mesosternum hairless and unpunctured except, as a rule,

1. in the anterior angle

2. The mesosternum with hair-bearing punctures behind or at the side, as well as in front

3. The anterior margin of the pronotum practically straight, only the anterior marginal groove sinus: this groove almost complete across the middle line, where the pronotum is somewhat strongly convex immediately behind it

4. The pronotum normal, its anterior margin sinuous with widely broken marginal groove

5. The frontal ridges and inner tubercles present; the two lowest terminal teeth of both mandibles fused at base only

6. The two lowest terminal teeth of both mandibles completely fused (spines present above the ends of the middle tibiae: the elytra hairless at the shoulders)

7. The two lowest terminal teeth fused at base only, in unworn specimens, on the right and usually also on the left mandible

8. The two lowest terminal teeth of the left mandible completely fused (no spines above the ends of the middle tibiae; the elytra hairless at the shoulders)

9. The two lowest terminal teeth distinct at apex in unworn specimens on both mandibles.

10. The elytra with a tuft of hair on each shoulder

11. The elytra without any such tufts, (the middle tibiae without spines above the end)

12. The central tubercle normally situated, at least as far from the inner tubercles as these are from one another: the elytra normal: the middle tibiae without spines above the end

13. The central tubercle set unusually far forwards, being nearer to the inner tubercles than they are to each other: the elytra less glossy than the head and thorax: the middle tibiae with spines above the end

14. The central tubercle situated at least as far from the inner tubercles as these are from one another: the obsolete frontal ridges meeting in an acute angle

15. The central tubercle situated nearer to the inner tubercles than these are to each other: the frontal ridges meeting in an obtuse angle

16. The central tubercle moderate in length: not free at apex: the frontal ridges moderately distinct

17. The central tubercle slender, with free apex: the frontal ridges obsolete

V. *similis*, p. 36.

V. *anomus*, p. 36.

V. *pushor*, p. 36.

V. *plathurcous*, p. 36.

V. *solus*, p. 35.
Genus VERRES, Kaup 1871, p. 114.

Type Psacius corticola Truqui, 1857, p. 319.

**Verres furcilabris** (Eschscholtz).

Fig. V. 11 p. 34.

*Psacius furcatus* Eschscholtz 1829, p. 25.

Three specimens, of which two are from Para Brazil, length 20.34 mm.

The anterior margin of the labrum is very deeply notched. The mandibles each have three well-developed terminal teeth. The central tubercle is massive, the inner tubercles and parietal ridges are obsolete. The median groove of the pronotum is practically complete. The marginal grooves are abruptly terminated and deeply impressed near the anterior angles. The ctenellum is more or less densely punctured, except in the middle line and the anterior angles. The mesothoracic episterna are glossy and densely punctured, except in the posterior angles, which are extensively matted. The mesosternum is unpunctured and hairless (except in the anterior angle); it may be wholly mant or partially glossy. The metasternum is covered with hair-bearing punctures only in the anterior parts of the anterior intermediate areas and in the lateral areas, but there are some larger hairless punctures near the posterior margin. The abdominal sterna are smooth. The elytra are hairless; their grooves are strongly punctured, especially laterally. The middle and hind tubercles are without spines before the end.

**Verres sternipunctatus**, Kuwert.

Fig. V. 12 p. 34.


Three specimens from Nicaragua, 33.58 mm. long.

I am doubtful whether this species is really distinct from *V. lugens*, Kaup; if not, the name *lugens* must stand.

The labrum is less deeply notched than in the preceding species, and the parietal ridges are shorter. The ctenellum may be entirely covered with punctures. The mesosternum is entirely matted with a few hair-bearing punctures on either side of the middle line and along the outer margins. The anterior intermediate areas of the metasternum are entirely covered with hair-bearing punctures. The grooves of the elytra are less strongly punctured than in the preceding species, which this one resembles in characters not mentioned.

**Verres cavicollis**, Bates.

Fig. V. 13 p. 34.

*Verres cavicollis* Bates 1886, p. 21, pl. 1, figs. 26-29; and Kuwert (see Arrow 1887, p. 159).

One specimen from Guatemala, 37 mm. long.

The labrum is deeply notched, as in *V. furcilabris*, and is very strongly depressed behind the ctenellum. The mandibles resemble those of other members of the genus. The inner tubercles are well developed, and the part of the head in front of them is short and almost vertical. The central tubercle has a slender free apex and the parietal ridges, though small, are complete. The median groove of the pronotum does not nearly reach the anterior.
margin. The marginal grooves are rudimentary, except in the anterior angles where they form a pair of large circular pits punctured on the inner side. The scutellum is almost entirely covered with punctures. The mesothoracic episterna resemble those of other members of the genus. The mesosternum is matt and is entirely covered with hair-bearing punctures except near the middle line behind. The metasternum is covered with hair-bearing punctures, except the central area and the inner parts of the posterior intermediate areas, which bear a number of hairless punctures behind. The abdominal sterna are smooth. The elytra and legs resemble those of *V. sternipunctatus*.

**Verres corticola**, (Truqui).


Numerous specimens from Guatemala and one from Mexico. Length 31-36 mm.

The labrum is slightly concave in front. The mandibles resemble those of other members of the genus. The central tubercle is fused with the pair of short parietal ridges to form a massive protuberance, in front of which the more or less distinct frontal ridges extend towards the inner tubercles at a somewhat obtuse angle to one another. The inner tubercles are distinct as in *V. caricollis*, but are situated on the anterior margin of the head with only the angles of the clypeus visible in front of, or rather below, them. The angles of the clypeus are somewhat more widely separated than the inner tubercles, and a pair of rudimentary outer tubercles may perhaps be recognized in a pair of more or less tumid areas connecting them. The addition to fig. V. 14, illustrates these tubercles and the clypeus angle on the left side, being drawn on a larger scale than the main figure, and from a more anterior position. The prothorax and mesothorax resemble those of *V. furcilabris*, except that the scutellum is more sparsely punctured. The metasternum and elytra resemble those of *V. sternipunctatus*. The abdominal sterna and legs resemble those of other members of the genus.

The above mentioned species of Verres may be recognized as follows:

1. The clypeus extensive, oblique: the inner tubercles obsolete
   2. The clypeus smaller, almost vertical, or rudimentary: the inner tubercles distinct
   3. The labrum very deeply cleft: the parietal ridges obsolete
   4. The labrum less deeply cleft: the parietal ridges short but distinct
   5. The labrum very deeply cleft: the clypeus distinct: the apex of the central tubercle free: a pair of large circular pits in the anterior angles of the pronotum
   6. The labrum not deeply cleft: the clypeus hidden and rudimentary: the apex of the central tubercle not free: the pronotum normal

**Genus PLATYVERRES**, Bates. 1886, p. 0.

Type, *Verres intermedius*, Kaup. 1874, p. 115.
Platyveceres intermedius (Kamp.)

One specimen (with worn mandibles) from Rhind, collected near the British Museum. Length, 4.75 mm.

PUBLIUS, Kemp, 1874; P. 73.

PUBLIUS, Kemp, 1877; P. 74.

Platyveceres intermedius (Kamp.)

One specimen (with worn mandibles) from Rhind, collected near the British Museum. Length, 4.75 mm.

PUBLIUS, Kemp, 1874; P. 73.
Passalidae of the World.

Proculus goryi (Melly).

Passalus goryi, Melly, 1833, pl. lxi.

Two specimens from Vera Paz, Guatemala, 67-72 mm. in length.

Proculus goryi may readily be distinguished from the other two species before me by the obsolete upper tooth of the mandibles, normally flattened mentum, and glossy elytra.

Proculus opacipennis (Thomson).

Passalus opacipennis, Thomson, 1857, pp. 420-421, pl. xxi, fig. 1.

Three specimens from Ecuador and two from Guatemala: 51-56 mm. in length.

Proculus opacipennis has a long and slightly curved upper tooth on each mandible, a normally flattened mentum, and matt elytra.

Proculus maliszechii, Kaup, 1868.


Eight specimens from Guatemala (mostly from Vera Paz), one from Ecuador, and one from San Pedro Sula, Honduras. They vary from 53-60 mm. in length.

Proculus maliszechii has an acute and well-developed upper tooth on each mandible, glossy elytra, and a mentum with the inner margin of the forwardly directed lateral processes turned almost at right angles to the rest of the plate in a ventral direction to form a pair of smoothly rounded lobes.

Subfamily PASSALINAE.

The subfamily Passalinae as represented in the collection before me includes five clearly defined genera, and a large assemblage of species separated from one another by various combinations and modifications of characters so graded as thoroughly to obscure their true relationships one to another.

In the first three genera the clypeus is always exposed and the antennae always have three lamellae. The first of them, Chondrocephalus, only differs from the primitive Pseudacanthine genus Popillus in having no suture between the clypeus and the frons and no hair on the lateral areas of the metasternum. C. quinquecornutus is to some extent transitional between the two genera, having definite traces of the suture; but as these are not very distinct and as the lateral areas of the metasternum are hairless it seems to me to make, on the whole, a better Chondrocephalus than Popillus.

The second genus, Vindex, contains one species, V. agnoscentus, in which the clypeo-frontal suture is distinct throughout as in the Pseudacanthinae; and but for its flattened form and separate elytra with hairless sides, this species might have been held to indicate the relationship of its genus to Proculejus instead of to Chondrocephalus; for Vindex possesses the main peculiarities of the dentition characteristic of Proculejus (see above, p. 10).

One species of Vindex, described below for the first time, has the elytra united as they are in the next genus Proculejoides. But whereas this species retains the flattened form characteristic of other species of Vindex, Proculejoides has assumed the more massive form ordinarily assumed by flightless species of all groups.
The fourth genus, *Passalus*, is distinguished from all others by having more than three well-developed lamellae on each antenna. In some species the clypeus is exposed and in others it is hidden, but all are closely related to one another and as they are not very numerous, all the genera which have been established for them may conveniently be united into one. It is probable that a considerable proportion of the species that have been described are invalid (see Arrow, 1907, p. 443).

The remaining species, though undoubtedly numerous, probably require proportionally still more drastic reduction of their numbers. It seems to be impossible to separate them into groups having the same value as the genera mentioned above. Consequently I propose to regard almost all of them as constituting a single large and plastic genus *Passalus*.

The only exception is the genus *Ptychopus*, the last and in some respects the most highly specialized genus of the subfamily. It may readily be recognized from all others by the remarkable structure of its mandibles.

The genera of *Passalinae* known to me may be separated thus:

- The clypeus clearly exposed, the antennae with not more than three well-developed lamellae
- The clypeus hidden\(^1\); or, the antennae with more than three well-developed lamellae
- The dentition normal; the clypeus more or less horizontal *Chondrocephalus* p. 31
- The dentition reduced; the clypeus more or less vertical
- Much flattened insects with the inner and outer tubercles almost in a straight line on the upper part of the anterior margin of the head, and projecting forwards above the clypeus
- Robust insects with the cephalic tubercles normally situated
- The antennae with more than three well-developed lamellae
- The antennae with not more than three well-developed lamellae; the clypeus hidden\(^1\)
- The dentition normal
- The upper terminal tooth very large and acute directed forwards, the middle one rudimentary or absent, the lateral one very small directed upwards

Genus *CHONDROCEPHALUS*, Kirby, 1860, p. 221.

Type *Passalus quinquecornutus* Bates, 1886, p. 12, pl. 1, figs. 13-15.

*Chondrocephalus quinquecornutus*, n. sp.

Fig. VI. 1

Two complete specimens from Guatemala and one dissected head. Length 17 mm.

The lamellae of the antennae are moderately long and slender. The anterior lower tooth of the left mandible is broad and more or less distinctly bidentate, that of the right
mandible slender and scarcely if at all bidentate. The anterior margin of the labrum is straight, the sides all lightly convex. The parietal ridges are somewhat short. The central tubercle is laterally compressed; its base extends forwards to the point at which the frontal ridges diverge towards the stout conical inner tubercles, from which tubercles they bend abruptly outwards to end in the similar outer tubercles—a character in which this species differs from C. granulatum, Kuwert, to which it appears to be more nearly related than to any other species yet described. The transverse course of the ends of the frontal ridges, combined with the more irregular (though glossy) surface of the whole area in front of the inner and outer tubercles combine in some specimens to give this area an appearance of being definitely cut off from the rest of the head, as is the clypeus from the frons in the genus *Papilius*. The anterior margin of the clypeus is more or less distinctly notched.

The angles of the pronotum are rounded, the posterior more so than the anterior. The sides and marginal grooves of the pronotum are coarsely and irregularly punctured; there are no distinct scars. The scutellum bears a few punctures near the middle. The mesothoracic episterna are glossy throughout, and are coarsely but somewhat sparsely punctured except in the posterior angles, which are smooth. The mesosternum is smooth and glossy, except the lateral margins which are matt. The metasternum is hairless; its lateral areas are narrow and slightly roughened throughout; there are a few large punctures on the posterior borders of the intermediate areas. The abdominal sterna are glossy. All the grooves of the elytra are coarsely punctured. The middle and posterior tibiae are armed with about two spines each before the apex.

**Chondrocephalus cordiger** n. sp.

One specimen from Guatemala, 18.3 mm. long.

The antennae, mandibles and labrum resemble those of *C. quadracornatus*. The parietal ridges are somewhat longer than in that species. The frontal ridges extend straight from the anterior extension of the central tubercle to the small outer tubercles. Not far from the central tubercle they are united by a curved groove, immediately beyond which is a pair of almost obsolete inner tubercles. The somewhat heart-shaped area enclosed between this groove and the frontal ridges is smooth and glossy, like the surface of the
head without and behind the ridges; in front of this groove and between the ridges it is matt.

The marginal grooves of the pronotum are more finely and evenly punctured than in *P. quinquenotatus*. The coarse punctures on the sides of the pronotum are less numerous than in that species, and a pair of punctured scars are evident; there are a few coarse punctures on the dorsal surface as well as at the sides.

The metasternum is without punctures. The mesothoracic episterna, meso- and abdominal sterna resemble those of *P. quinquenotatus*; the metasternum is more extensively punctured in the posterior intermediate area. The puncture in the grooves of the elytra, and the spines on the middle and posterior tibiae, are not quite so pronounced as in that species.

**Chondrocephalus purulensis** (Bates).

*P. purulensis* Bates, 1886, p. 13

One specimen from Guatemala, 22.8 mm. long.

The anterior margin of the labrum is slightly concave, and the sides are slightly convergent behind. There are no inner tubercles. The frontal ridges, which are flattened above, are straight and meet in a more obtuse angle than in either of the preceding species; they and the elytra are glossy, the whole of the triangular area bounded by them being matt. In other respects the head resembles that of *C. cordiger*, as do also the antennae and mandibles.

The pronotum resembles that of *C. cordiger* in form, but the scars are more pronounced and there are no coarse punctures on the general surface, either at the sides or nearer the middle. The metatellum bears a group of punctures on either side of the middle line; in other respects the mesothorax resembles that of the two preceding species. The metasternum bears a few punctures in the inner angles only of the posterior intermediate area. The abdominal sterna, elytra and legs resemble those of *C. cordiger*.

**Chondrocephalus granulifrons** (Bates).

*P. granulifrons* Bates, 1886, p. 12

Numerous specimens from Guatemala, 26.2–32.2 mm. long.

*C. granulifrons* differs from *P. purulensis* in having the frontal ridges (which meet in a right angle) less flattened above, with the inner tubercles more or less imperfectly developed and sometimes united. The small area behind and between the inner tubercles is glossy, that between the inner and outer tubercles matt and the elytra more or less rough and glossy. The puncturing on the metatellum is variable. The spines on the middle and hind tibiae are stronger.

Genus *VINDEX*, Käup., 1871, p. 78.

Type *Pseudius auriculatus*, Percheron, 1841, p. 22, pl. lxxxiii, fig. 2.
Vindex agnosceudus (Percheron).

Passalus agnoscendus, Percheron, 1814, p. 22, pl. lxxviii, fig. 2.

Seven specimens from Mexico, 20-22.4 mm. long.

This species may readily be recognized from either of the other two members of the genus known to me by its free elytra, with coarsely, but not transversely punctured lateral grooves. It is also characterized by the presence of a distinct trace of the lowest terminal tooth of the right mandible, and of a distinct clypeofrontal suture. The inner tubercles are situated upon this suture as in certain species of Pseudacanthus and Proculejus, and the suture is most readily seen between them, where it replaces the ridge found in this position in other species.

Vindex sculptilis, Bates.


Numerous specimens from Guatemala, 20.5-23.0 mm. long.

In this species there is no definite trace of the lowest terminal tooth on either mandible, and there is no clypeofrontal suture. The elytra are free, and the punctures in their lateral grooves are very large and transverse.

Vindex synelytris, n. sp.

Fig. VI. 5, p. 45.

Three specimens from Guatemala, 23.8-25.0 mm. long.

The head and mandibles resemble those of V. sculptilis. The elytra are united in the middle line, though their form is unmodified and the wings are well developed; the lateral grooves are coarsely but not transversely punctured; their dorsal grooves are more finely punctured than in either of the other two species.

Genus PROCULEJOIDES, Kuwert. 1896, p. 221.

Type, Proculejus championi, Bates, 1886, pp. 5-6, pl. i, figs. 5-5a.

Proculejoides championi (Bates).

Proculejus championi, Bates, 1886, pp. 5-6, pl. i, figs. 5-5a.

Numerous specimens from Guatemala, which show that the species is very variable in size (length 23.5-32.0 mm.), and that the ridges bounding the frontal area are variable, both as to form and distinctness.

The mandibles closely resemble those of Proculejus. The clypeus, though exposed, is bent downwards as in Verres caricollis and is far from conspicuous, not even being prominent laterally as in that species. Both outer and inner tubercles are distinct, but the frontal ridges are obsolete in front of the latter. The prothorax resembles that of Chandracephalus granulifrons except for its greater convexity. The scutellum is not distinctly punctured. The mesothoracic episterna and mesosternum resemble those of C. granulifrons except for a ventral matt patch on each of the former. The
metasternum is unpunctured and has smooth hallow narrow lateral area. The abdominal sternum are glossy. The outermost grooves of the elytra are very indistinctly punctured; the dorsal grooves are unpunctured. The middle tubercle each bear two, and the posterior one, strong spine before the apex.

Genus PAXILLUS, MacLeay, 1819. p. 105

1. P. parilus, Kuwart, 1850; Parillosumus, Kuwart, 1866; Species.

Type, Paxillus beecher, MacLeay, 1819, p. 166 (Paris edition, p. 20).

Paxillus camerani (Rossmum)

Fig. VI. 6 p. 1.

Paxillus camerani, Rossmum 1802, pp. 17.

One specimen from the Upper Amazon; 15 mm. long.

The anterior margin of the labium is straight; the sides are lightly convex. The last five joints of the antennae are lamellate, the middle lamella being distinctly the longest, though this scarcely exceeds the one immediately preceding it, by as much as does the corresponding lamella of P. pentaphyllus. The mandibles each have three distinct terminal teeth, of which the middle one is perhaps slightly nearer to the one below it than to the one above it. The left anterior lower tooth is broader than the right and is probably bilobate, when unworn as in other species. The central tubercle and parietal ridges are small. The frontal ridges extend from the central tubercle at a very obtuse angle to each other towards the outer tubercles, their course being slightly curved. The inner tubercles are distinct and are nearer to the outer than to the central tubercle. The outer tubercles, which are bluntly conical, are little larger than the inner; they do not overhang the angles of the elytra, which project horizontally in front of them, terminating the lightly concave anterior margin of the elytra. The area between the frontal ridges is punctured in front of the inner tubercles, and smooth behind them.

The pronotum is coarsely punctured laterally except (? always) in the neighbourhood of the scar. The sides and anterior margin of the pronotum are straight, with the angles between them slightly prominent. The posterior margin and angles are rounded; the latter are densely covered beneath with long yellowish hair. The marginal groove is fine; the median groove is almost complete. The posterior plate of the proternum is broadly truncate behind, being little narrower behind than in front. There are a few indistinct scattered punctures on the antennae. The mesotome episternae are glossy above, and only except being the anterior margin, below, they are punctured except in the posterior angle. The mesotome epinotum is glossy with deep punctured scars. The lateral areas of the mesotome are narrow throughout, rugose, and very finely hairy; a row of punctures extends along the inner side of the posterior intermediate area. The abdominal sterna are polished except in the scars, which are matt. The elytra are densely and somewhat extensively hairy at and below the shoulders; their lateral grooves are coarsely, their dorsal grooves more finely punctured.
Paxillus brasiliensis (Saint-Fargeau and Serville).

Fig. VI. 7. p. 43.

Paxillus brasiliensis, Saint-Fargeau and Serville. 1825. p. 21.
Paxillodes brasiliensis, Kuwert. 1898. p. 181.

Three specimens from Bolivia, one from Bogota, one from Yucatan and two without locality labels. Length 18-24 mm.

I follow Kuwert with regard to this determination: the original description (quoted by Guérin, 1828. p. 90) being altogether inconclusive.

The anterior margin of the labrum is lightly concave as a rule. The ends of the five antennal lamellae form a straight line when furled, the middle lamella being scarcely if at all longer than the penultimate one. The anterior margin of the elytra may be lightly concave, or may be slightly convex close to (but on either side of) the middle line, where in this case it is faintly notched. The frontal ridges arise at right angles to one another and are practically straight; the extent of the transverse anterior punctured area between them is variable. The posterior angles of the pronotum bear only a small patch of short hair beneath. The musosternal scars may be smooth or rugulose, glossy or matt; the lateral areas of the metasternum are hairless. The strength of the puncturing of the dorsal grooves of the elytra is somewhat variable. The shoulders of the elytra are somewhat hairy, but are not densely covered with long pile as in the preceding species. In other respects the present species resembles the last.

Paxillus pentaphyllus (Beauvois).

Fig. VI. 8. p. 45.

Passalus pentaphyllus. Beauvois. 1805. p. 2. pl. i. fig. 2.

One specimen from Mosquito 26'3 mm. long.

The anterior margin of the labrum is somewhat more strongly convex than in the preceding species. The antennae resemble those of P. camerati, but the ends of their lamellae when furled form a somewhat more strongly curved line. The outer tubercles are long and slender, and are directed forwards above the angles of the elytra which, however, are exposed beneath them. The area between the outer tubercles is glossy and unpunctured. In other respects this species resembles the preceding one, except that the posterior intermediate areas of the metasternum are more extensively and very coarsely punctured.

Paxillus leachii, MacLeay.

Fig. VI. 9. p. 45.


Many specimens from Guatemala. Iquitas (Upper Amazon), Bahia, Rio de Janeiro, Para, Espeito-Santo (Brazil), Bolivia, Nicaragua, British Honduras, Mexico, and Montevideo. Length 16'0-21'5 mm.

This species differs from the last only in having the anterior margin of the labrum less strongly concave, in having the ends of the antennal lamellae in a straight line when the antennae are furled, in having coarse punctures between the outer tubercles of the head.
in having the lower side of the prothorax still less hairy, and in having the posterior intermediate areas of the metasternum more finely punctured.

**Paxillus robustus** (Percheron).

*Fig. VI. 10 p. 45.*

*Paxillus robustus* Percheron 1843: pp. 35-36, pl. in fig 1

Several specimens from different localities in Brazil (Santa Catherina Bahia, Rio de Janeiro and Espirito Santo) Length 15-2 - 18/0 mm.

This species and the next are less strongly flattened than any of the preceding members in the genus; they have the posterior plate of the prothorax strongly tapered behind and have the elytra entirely hidden; the outer tubercles are variable in size, but are probably always somewhat long and slender in un worn specimens, and the frontal ridges are obsolete behind them and the inner tubercles, though well developed between the inner tubercles and central tubercle. The anterior angles of the head are sometimes rather strongly produced and acute. The sides of the pronotum are more extensively, and the grooves of the elytra more coarsely punctured than in *P. brasilius*, which this species resembles in other respects, except that the shoulders of the elytra are entirely hairless. The tibiae of the intermediate (and to a less extent the hind) legs often bear several strong spines on the outer side, especially in small specimens.

**Paxillus crenatus**. MacLeay.

*Fig. VI. 11 p. 45.*


Several specimens from the Upper Amazon, Guadaloupe, Surinam and Masquito. Length 17.5 - 19.5 mm.

This species differs from the last only in having the frontal ridges broadly arcuate, instead of meeting abruptly, in having the anterior extremities of the marginal grooves of the pronotum broader and deeper, and in having the metasternum and elytra somewhat less strongly punctured.

The above mentioned species of *Paxillus* may be recognized from one another, as follows:

- Much flattened insects, with the elytra more or less exposed
- More robust insects, with the elytra entirely hidden
  - The outer tubercles short and blunt, not directed forwards above the elytra
  - The outer tubercles long and slender, in un worn specimens, directed forward above the angles of the elytra which they used to closure
  - The frontal ridges meeting in a strongly obtuse angle, the posterior angles of the pronotum, and the shoulders of the elytra, densely covered beneath with long yellowish hair
  - The frontal ridges meeting in a right angle; the posterior angles of the pronotum, and the shoulders of the elytra, less hairy beneath

*P. crenatus* p. 18

*P. brasilius* p. 19.
The ends of the antennal lamellae in a strongly curved line when furled; the anterior margin of the head unperforated \( P. \) pentaphyllus, p. 43.

The ends of the antennal lamellae in a straight line when furled; the anterior margin of the head coarsely punctured between the outer tubercles \( P. \) kephiris, p. 49.

The frontal ridges straight, arising at right angles to each other \( P. \) robustus, p. 50.

The frontal ridges together forming a crescent \( P. \) cervatus, p. 51.

Genus PASSALUS, Fabricius, 1792, p. 240.


Type, Lucanus interruptus, Linnaeus, 1767, p. 560.2

It seems probable, and has been assumed in the above synonymy, that all genera belonging to Kuwert's subfamilies Rhodocanthopinae, Neleidinae, Pertinacinae, Pleurariinae (except Pleurarius which belongs to the Indo-Australian Series), Phoronaecinae, Petrjeiniae, Vatiniinae and Xeleiniae should be included in this complex and heterogeneous genus: but I have been able to confirm this by reference to specimens only in the case of the genera marked with an asterisk (*). The genus Prosoelatus, Bates, has been omitted because I think, judging from Bates' description, which is all that Kuwert also had to go upon, that Bates was probably right in regarding the species for which he founded it as closely allied to the genus Proculepas.

One of Kaup's species of Proculejas, \( P. \) quietensis, was rightly removed by Kuwert to one of his subfamilies here included in the genus Passalus; but the genus Prosoelatus, in which he placed it, is probably allied to if not identical with Proculejas, not Passalus. \( P. \) quietensis differs from all other species of Passalus known to me in having the elytra united; but, if this character is to be regarded as in itself sufficient to warrant the separation of the species possessing it into special genera, new genera will be required for one of the four described species of Vatinius, and for each of two species that otherwise fall into two widely separated divisions of the genus Macrolobus. This multiplication of small genera seems to me undesirable, although I have found it convenient to retain the already existing small flightless genera Platyccerus and Publius, instead of uniting them.

1 See above, pp. 10-11.

2 This is the reference usually given, but is not the earliest description. See below, p. 63, footnote.
with Persea and Vateria respectively, a would have been more consistent. *Procaledus quitensis* consequently becomes *Passalus quitensis*.

In spite of the complex manner in which various specific characters are intermingled, the species of *Passalus* can be arranged in a series leading up from forms with the margin of the head between the outer tubercles straight or finely notched in the middle line, the inner and outer tubercles usually more or less widely separated, and the lateral areas of the metasternum usually narrow, smooth and hairless; to forms with the margin of the head abruptly emarginate in the middle line, the inner and outer tubercles in contact with one another, together forming an oblique edge, and the lateral areas of the metasternum broad, punctured and hairy. The following descriptions have been placed in this order.

**Passalus nanus** (Kuwert).

*Rhabdornaluca nanus* Kuwert 1898 p 139

One or two specimens from each of the following localities—Guatemala, Ecuador and the Cauca Valley in Columbia. Length 15.3-17.7 mm.

This species is very like *Passillus rolesiatus*, but its antennae have only three well developed lamellae, its frontal ridges are apt to be more denticulate (especially in Colombian specimens), its eyes are smaller and less prominent, its pronotum and elytra are much more coarsely punctured, the punctures in the lateral grooves of the elytra being more or less distinctly transverse, and its intermediate and hind tibiae are still more strongly spined. The epipleura are unpunctured and hairless as in *Passillus rolesiatus*.

**Passalus rugosus**, n. sp.

Fig. VII. 1

Three specimens from the Cauca Valley. Columbia. Length 21.0-21.8 mm.

The central tubercle is relatively nearer to the anterior margin of the head than in *P. nanus*, the frontal ridges consequently diverging in a more obtuse angle. The sides of the pronotum are very coarsely punctured, but there are no coarse punctures nearer the middle as in *P. nanus*; nor are there any on the central area of the metasternum as in that species. The grooves of the elytra are even more strongly punctured than in *C. nanus*, the punctures in the lateral grooves being distinctly transverse. The epipleura are punctured and hairy. In other respects this species resembles *P. nanus*.

**Passalus punctato-striatus**, Percheron.

Fig VII. 2

*Passalus punctato-striatus* Percheron 1865 pp 78-79 pl vi fig. 1

A large number of specimens from Guatemala and Mexico, some of the latter being from Oaxaca, a few from San Salvador, Honduras (San Pedro Sula), Nicaragua, Columbia and Sumatra. Length 22.3-28.3 mm. relative breadth extremely variable; the distance between the inner and outer tubercles and other characters, also variable to some extent.

The species differs from the last only in having the frontal area slightly larger, the pronotum and the grooves of the elytra less coarsely punctured, the epipleura unpunctured
and hairless, and the middle and hind tibiae usually unspined or nearly so. The difference is most marked as regards the punctures in the dorsal grooves of the elytra, those in the pair of grooves nearest the suture being almost impunctate in most specimens of the present species.

**Passalus rhodocanthopoides** (Kuwert).

*Fig. VII.*

*Passalus* spp.: specific characters in the upper surface of the head ×4.

3. *P. rhodocanthopoides* (Kuwert).
5. *P. latifrons*, Percheron.
6. *P. rupicola* (Kauf).
7. *P. punctulato-striatus* (Kauf).
10. *P. rupicola* (Kauf).
12. *P. punctulato-striatus* (Kauf).
17. *P. quadrifidus*, Eschscholtz.

**Necrosphe rhodocanthopoides**. Kuwert, 1898. pp. 142-143.

Several specimens from Peru (Cumbasa and the Amazon region). Length 24-25 mm.

A somewhat flatter insect than the preceding, with the inner tubercles situated almost vertically behind the outer tubercles but separated from them by a well marked concavity. The posterior intermediate areas of the metasternum are coarsely punctured.

---

1 One of the Mexican specimens has numerous small spines on these tibiae, and the Columbian specimen has them numerous and very strong. The latter specimen has the elytra more coarsely punctured than any other that I have seen and may prove to belong to a different species.
the lateral area are hairy and punctured, as are also the epipleura and the shoulders and anterior half of the lower margin of the elytra. In other respects this species resembles the preceding one.

Passalus morio, Percheron

*Passalus morio* Percheron, 1845, pp. 33-34, pl. vii, fig. 4.

Sixteen specimens from Brazil (Esprito-Santo, Bahia, Blumenau, Rio) Length 10-27.5 mm.

This species is somewhat more convex than either of the two preceding. The length of the antennal lamellae is somewhat variable.

The head is very like that of *P. rhodoscapulatus*, but the outer tubercles are very obtuse; the anterior margin is somewhat thickened, the frontal area behind this thickening is flat with no special depression between the inner and outer tubercles, and the inner tubercles are situated much nearer together than the outer. The punctures on the pronotum are usually confined to the scars and marginal grooves, but may be absent from the former or may extend beyond them. The mesosternal scars are represented only by triangular matt areas which are not sunk below the level of the surrounding surface. The posterior intermediate areas of the metasternum are as a rule strongly punctured; the lateral areas are more or less linear, smooth or slightly roughened, with or without hair-bearing punctures. The epipleura are hairless and unpunctured, the puncturing of the elytra in this and other respects resembling that of *P. punctato-striatus*. The armature of the middle and hind tibiae is variable, never as strong as in *P. rugosus*.

Passalus latifrons, Percheron.

*Passalus latifrons* Percheron, 1845, pp. 32-33, pl. xxix, fig. 1.

Three specimens from Surinam, length 30.6-32.1 mm.

*P. latifrons* is very like *P. morio*, and will perhaps prove to be no more than a local race of it. The outer tubercles are more prominent and consequently less obtuse; the inner tubercles are less distinct; the frontal ridges diverge at a more obtuse angle and extend more distinctly beyond the latter towards the former. The anterior angles of the pronotum are produced forwards to form a somewhat obscure but distinctly acute projection. The punctures in the pronotal scars and on the posterior intermediate areas of the metasternum are few in number in all our specimens, and the lateral areas of the metasternum are smooth and hairless. The mesosternal scars are entirely absent.

Passalus pertusi (Kampf).

*Passalus pertusi* Kampf, 1809, p. 22

Two specimens without locality labels. Length 30.6-41.5 mm.

The frontal area is smaller in all directions than in *P. latifrons* and more densely punctured in front. The inner tubercles are obsolete and the frontal ridges do not reach the outer tubercles. The anterior angles of the pronotum are strongly rounded. The
posterior intermediate areas of the metasternum are more extensively punctured than in *P. latifrons*, which the present species resembles in other respects.

**Passalus convexus**, Schönherr.

*Passalus convexus*, Schönherr, 1817, p. 333, and appendix pp. 142-143.

Ten specimens from Cumaná (Peru), Tejuca, Upper Amazon, and Amazonas. Length 38.0-43.7 mm.

This species, like the last, is closely allied to *Passalus latifrons*, from which it differs only in its larger size, in not having the frontal ridges continued beyond the inner tubercles, in having less prominent outer tubercles, and in having the anterior angles of the pronotum more or less rounded.

**Passalus quitensis** (Kaup).

Fig. VII. 7, p. 53.

*Passalus quitensis*, Kaup, 1871, pp. 63-64.

Described from a holotype from Quito, lent by the British Museum. Length 32 mm.

In addition to its rounded pronotum and fused and rounded elytra *Passalus quitensis* differs from *P. convexus* in having the inner tubercles directly behind and much nearer to the outer tubercles, in having curved instead of straight frontal ridges, in having well developed mesosternal scars, and in having the posterior intermediate areas of the metasternum strongly and extensively punctured.

**Passalus affinis**, Percheron.

*Passalus affinis*, Percheron, 1835, pp. 72-73, pl. v. fig. 3.

Several specimens from Cuba, three from St. Domingo and one from Haiti. Length 37.5-42.0 mm. Relative breadth very variable.

The frontal area resembles that of *P. quitensis*, but is more closely and extensively punctured in front, while the inner and outer tubercles are contiguous, together forming a pair of more or less oblique ridges on the anterior margin of the head, as in *P. interruptus*, etc. The mesosternal scars are well developed; the posterior intermediate areas of the metasternum are coarsely and extensively punctured. The lateral areas of the metasternum, the epipleura and the shoulders of the elytra are punctured and hairy. In other respects this species resembles *P. convexus*.

**Passalus catharinae**, n. sp.

Fig. VII. 8, p. 53.

One specimen from Santa Catharina and one from Charo. Length 31-33 mm.

The head is very like that of *P. affinis*, but the frontal ridges and all the tubercles are more strongly elevated, the broad and rectangular or obtuse apex of the central tubercle slightly overhanging the frontal area, which is more or less sparsely punctured. There are a few strong punctures above the pronotal scars. The posterior intermediate areas of the metasternum bear a few coalescent punctures along the inner margin; the lateral areas are linear, hairless and unpunctured. The elytra resemble those of *P. affinis* except that the dorsal ridges are less and the lateral more coarsely punctured, the three grooves
nearest the nature being unpunctured, the fourth containing more or less obsolete punctures, the fifth and sixth containing strong round punctures, and the seventh, eighth and ninth containing larger and more or less transverse punctures. In other respects this species resembles \textit{P. affinis}.

\textbf{Passalus recticypeatus} (Kuwert)

\textit{Passalus recticypeatus} Kuwert 1848, p. 292

Four specimens, without locality record. Length 23.5–24.7 mm.

This species is very like the preceding one, but is smaller and has the apex of the central tubercle acute, free and directed forwards above the finely roughened but unpunctured frontal area, the inner tubercles being obsolete or absent. The posterior intermediate areas of the metasternum are almost or quite unpunctured; the lateral areas are more or less rugose and bear a few fine hairs. The lateral grooves of the elytra, though much more strongly punctured than the dorsal, are less strongly punctured than in \textit{Passalus catheriniae}, which this species resembles in other respects.

\textbf{Passalus eucadorensis}, n. sp.

Fig. VII, 9, p. 53

One specimen from Ecuador, 20.4 mm. long.

In this species the cephalic tubercles and ridges resemble those of \textit{P. catheriniae}, except that the central tubercle is weaker; otherwise the insect resembles \textit{P. recticypeatus}, except that the anterior margin of the head is slightly prominent in the middle line, and that the metasternum and elytra are entirely hairless.

\textbf{Passalus curtus} (Kaup).

Fig. VII, 10, p. 53.

\textit{Passalus curtus} Kaup 1869, p. 38

One specimen from the Cauca Valley, 23.5 mm. long.

The free apex of the central tubercle is longer than in \textit{P. recticypeatus}, but the frontal ridges are less strongly elevated and become obsolete in front. The frontal area is irregularly marked with coarse punctures. The sides of the pronotum and the posterior intermediate areas of the metasternum are somewhat more extensively punctured. The meso- and metasternal scars and the lateral areas of the metasternum are finely punctured and hairy. The epipleura are without, and the shoulders of the elytra almost without, hair-bearing punctures. The puncturing of the dorsal grooves of the elytra is about as coarse as that of the lateral grooves. In other respects this species resembles \textit{P. recticypeatus}.

\textbf{Passalus gracilis} (Kaup).

\textit{Passalus gracilis} Kaup 1869, p. 38

One specimen from Columbia, 16.5 mm. long.

A much smaller species than the preceding, with more flattened central tubercle, central forwardly directed parietal ridges, somewhat more distinct frontal ridges, smooth
unpunctured frontal area, hairless mesosternal scars, metasternal lateral areas and elytra shoulders, and less coarsely punctured dorsal grooves on the elytra.

**Passalus prominens, n. sp.**

Fig. VII, 11. p. 53.

One specimen from the Peruvian Amazon, 22 mm. long, and somewhat convex.

The anterior margin of the head is slightly prominent as in *P. eucadoiensis*, forming an obtuse angle in the middle line; but the frontal area is larger, being quite half as long as it is wide in front, and its general surface is smooth and somewhat sparsely marked with large punctures instead of being finely roughened all over. The central tubercle is laterally compressed, with an antero-posteriorly obtuse apex situated behind the junction of the frontal ridges. The frontal tubercles are obsolete. In other respects this species resembles *P. gracilis*, except that the anterior angles of the pronotum are more acute and the posterior angles (like the hind part of the posterior intermediate areas of the metasternum) are somewhat densely punctured, the anterior ends of the marginal grooves being densely punctured and strongly enlarged.

**Passalus guatemalensis** (Kaup).

Fig. VII, 12. p. 53.

*Oleus guatemalensis*, Kaup, 1869, p. 6.

Three specimens from Nicaragua, 19.6 20.3 mm. long.

*Passalus guatemalensis* differs from all other species of *Passalus* known to me in having a vertical and more or less conspicuously exposed elypons. It should perhaps be regarded as the type of a distinct genus allied to *Vindex*, but such a course would hardly be justifiable at present.

*P. guatemalensis* is a somewhat flatter insect than the last, with a more or less punctured obtuse-angled frontal area, the frontal tubercles being situated about half way between the less prominent central and more prominent outer tubercles. The margin of the head between the outer tubercles is straight, with or without a median notch. The sides of the pronotum are somewhat rounded, and the anterior angles are not acute; the median groove is complete, and the anterior ends of the marginal grooves are scarcely enlarged or punctured; the scar is transverse and punctured, with a longitudinal band of punctures above them. In other respects this species resembles *P. prominens*, except that the punctures on the posterior intermediate areas of the metasternum are more widely dispersed.

**Passalus incertus**, Percheron.

*Passalus incertus*, Percheron, 1811, pp. 27-28, pl. lxxviii. fig. 4.

Six specimens from the Cauca Valley, and one from Venezuela. Length 10.4 24.3 mm.

A slender and somewhat flattened insect, differing from the last only in having the elypons entirely hidden, the median notch of the anterior margin of the head sometimes
very pronounced, the frontal area more or less rugose but unpunctured, the frontal ridge strongly arched, the inner and outer tubercles nearer together, the anterior ends of the marginal grooves of the pronotum more strongly dilated and punctured the sides of the pronotum more extensively punctured in small and less in large specimens, the posterior intermediate areas of the metasternum less strongly and extensively punctured, the grooves of the elytra somewhat more strongly punctured and the shoulders and epipleura punctured and hairy. The spines on the middle tibiae are variable in number in none of our specimens are they very strong.

Passalus interstitialis, Eschscholtz.

Fig. VII, 13 p. 34.

Passalus interstitialis Eschscholtz, 1829, p. 1849

One or more (often numerous) specimens from each of the following localities—Mexico, Guatemala, Honduras (San Pedro Sula), Panama (Chiriqui), Cuba, Surinam, Peru (Cimbaloe and Awagem), Brazil (Amazonas, Pernambuco, Bahia, Rio and Blumenau), Bolivia (Cordico and Patagon) and Paraguay. Length 24-34 mm.

The anterior margin of the head is much more extensively notched in the middle line than in the preceding species, and the notch is bounded by a pair of very prominent tubercles. These tubercles are fully as strong as the outer tubercles which are somewhat small and are more or less obscured by the inner tubercles, the latter being very long and projecting from a point contiguos to and a little behind and on the outer side of them. From the inner tubercles the imperfectly dentate frontal ridges extend in a straight line backwards and upwards to meet in a right or slightly obtuse angle. The anterior part of the frontal area is more or less punctured.

The pronotum resembles that of the preceding species in shape and is more or less extensively punctured at the sides, but the anterior ends of the marginal grooves are not expanded. The mesothorax is normal. The posterior intermediate areas of the metasternum are closely and coarsely punctured, the lateral areas are moderately broad and are covered with hair-bearing punctures. The dorsal grooves of the elytra are strongly but finely punctured, the lateral grooves are coarsely punctured. The epipleura, shoulders and anterior half or two thirds of the outermost tip of the elytra are thickly covered with hair-bearing punctures. The middle tibiae are armed with one stout spine.

Passalus glaberrimus, Eschscholtz.

Passalus glaberrimus Eschscholtz, 1829, p. 20

Four specimens, of which three are from Brazil (Blumenau and Rio), and one bears no record. Length 20 mm.

Passalus glaberrimus is very like P. inermis, but has the anterior margin of the head more definitely notched than in usual in that species, the sides of the pronotum usually more extensively punctured, the anterior angles of the pronotum somewhat more acute, and the elytra devoid of hair-bearing punctures.
Passalus spinosus (Kuwert).

*Rhodocantha spinosus* Kuwert. 1898. p. 149.

Two specimens from Chiriqui, Panama. 20-3 mm. long. A somewhat more robust insect than the preceding.

The frontal ridges are straight and meet in a right angle; the inner tubercles are situated about half way from the central to the outer tubercles and there is a pair of small secondary tubercles between them and the latter; the anterior margin of the head is broadly notched in the middle; the anterior part of the frontal area is moderately strongly punctured. The pronotum resembles that of *P. incertus* in shape, but is only punctured in and close to the scars and in the marginal grooves, whose anterior ends are smaller. The mesothorax resembles that of *P. incertus*. The metasternum differs from that of *P. incertus* only in having the lateral areas somewhat broader and less smooth behind. The elytra are hairless; their four dorsal grooves are about as strongly punctured as in *P. incertus*; the next four are marked with very large transverse punctures, the transverse ridges between which tend to become obsolete behind. In the two remaining grooves these ridges are obsolete throughout, and at the extreme posterior end the longitudinal ridges become obsolete also, the remaining surface being matt. The middle and hind tibiae are armed with three or four strong spines.

Passalus spinipes, n. sp.

Fig. VII. 14 p. 53.

One specimen from Nicaragua, 22-7 mm. long.

This species is closely allied to *P. spinosus*, but the inner tubercles and the secondary tubercles in front of them are less pronounced, the sides of the pronotum bear a longitudinal band of punctures above the scars, the posterior intermediate areas of the metasternum are less extensively punctured, the lateral areas are extremely narrow throughout, the punctures in the grooves of the elytra are finer, those in the lateral grooves though moderately coarse not being transverse.

Passalus spiniger (Bates).


One specimen from Columbia, 22 mm. long.

This species is very like the last two, but the anterior margin of the head is less broadly and perhaps more sharply notched, the frontal area is scarcely as long or as distinctly punctured, there are no secondary tubercles between the inner and outer tubercles, the sides of the pronotum are more coarsely and extensively punctured, the lateral areas of the metasternum are intermediate between the two in width, and the puncturing of the grooves of the elytra is somewhat coarser than in *P. spinosus* above and less coarse (scarcely if at all transverse) at the sides, all the transverse ridges being distinct and broadly elevated as in *P. spinipes*. 
Passalus abortivus, Percheron.

Fig VII. 15 p. 59

Passalus abortivus, Percheron. 1853, pl. vii. fig. 7.

Three specimens from the Amazon, of which at least two are from Peru. Length 28-0-28-3 mm. long. One specimen with deformed antennae.

This species differs from all other species of Passalus known to me in sometimes having a distinct lamella in front of the three ordinarily found on the antennae of species of this genus. This lamella, however, is not fully developed as are the additional lamellae found in the genus Paridius, but is either much slenderer than those following it as well as only about half their length, or is quite short and inconsiderable.1 The anterior margin of the head bears a pair of small but well developed tubercles on either side of the median notch, which is consequently much more pronounced than is ever the case in Paridius. The cephalic tubercles and ridges closely resemble those of Passalus spinaiger. The pronotum resembles that of P. spinaiger in shape, but is unpunctured except in the scars and marginal grooves. An oval patch a little below the middle of the mesothoracic episternum, the mesosternal scars, the lateral areas of the metasternum, and the lower parts of the shoulders of the elytra (but not the epipleura) are covered with hair bearing punctures. The posterior intermediate areas of the metasternum are coarsely punctured below and on the inner side. The elytra are strongly and uniformly punctured. The middle and hind tubiae bear from one to three spines which are stronger on the former than on the latter.

Passalus jansoni (Bates).

Phororina jansoni. Bates. 1886, p. 18, pl. i. fig. 28. 17-47 a.

One specimen from Nicaragua. 32 mm. long.

This species is very like the last, but the triconcave margin of the head between the outer tubercles is thickened and lightly convex as a whole; the frontal area and the pronotum (even in the scars and anteriorly weak marginal grooves) are unpunctured; the mesothoracic episternum, the mesosternal scars, the metasternum and the elytra are hairless, the second and third being entirely unpunctured, and the last being punctured in the lateral grooves only; and there are no very distinct spines on the middle and hind tubiae.

Passalus mucronatus, Burmeister.

Fig VII. 16 p. 53


One specimen from Columbia and one from Guatemala. Length 24 mm.

The head and pronotum resemble those of the preceding species in outline, but the central tubercle is much elongated with free decumbent apex, the frontal ridges are freely developed, the anterior margin of the head is not thickened, and the sides of the pronotum, including the scars and anteriorly enlarged marginal grooves, are strongly punctured. The

1 In all affinuous specimens in which the antennae are undeformed it is slender and about half the length of Cerastes, in the other it is nearly two fifths from the elytra and often found in the same position in other species.
mesothorax is normal. There are a number of coarse punctures on the posterior intermediate areas of the meta-sternum, the lateral areas being linear, smooth and hairless. The anterior intermediate areas of the meta-sternum, and the shoulders of the elytra with the anterior parts of the epipleura, are covered with hair-bearing punctures; the shoulders of the elytra being densely hairy. All the grooves of the elytra are distinctly punctured, the lateral scarcely more strongly than the dorsal. The middle and hind tibiae are without distinct spines.

**Passalus quadricollis**, Eschscholtz.

Fig. VII. 17. p. 53.

*Passalus quadricollis*, Eschscholtz 1892, pp. 21-22.

*Phoroius quadricollis*, Kaup, 1871, p. 102.

Two specimens from Brazil, one of them in the collection of M. Guy Babault of Paris. Length 33 mm.

The central tubercle is set further back than in *P. mucronatus* and the free apex extends forwards horizontally at right angles to the massive base by which it is raised high above the large and coarsely rugose frontal area. The frontal ridges and inner tubercles are more strongly developed than in *P. mucronatus*. The pronotum resembles that of *P. mucronatus*, except that the punctures are confined to the scars and marginal grooves, those in the former being of very large size. The mesosternal scars are matt, but are not depressed. The inner angles of the posterior intermediate areas of the meta-sternum are marked with very large and more or less coalescent punctures; the anterior intermediate and lateral areas of the meta-sternum and the shoulders of the elytra are covered with hair-bearing punctures. The grooves of the elytra are marked with shallow punctures which are very broad in the lateral grooves. The middle tibiae bear a stout spine on the outer side.

**Passalus occipitalis**, Eschscholtz, 1829.

Fig. VII. 18. p. 53.

*Passalus occipitalis*, Eschscholtz. 1829, p. 21.

One specimen 33 mm. long. Locality not recorded.

This species is closely related to the last, but the massive central tubercle is set still further back and has no free horizontal apex. The frontal ridges diverge at about a right angle and then bend forwards and run parallel to one another as far as the inner tubercles, which are situated not very far behind the outer. The anterior margin of the head, though straight as a whole, is a little irregular; it is not distinctly notched in our specimen; the whole anterior part of the frontal area is thickly covered with large punctures. The whole of the thorax resembles that of *P. quadricollis*, except that the mesothoracic scars are to some extent depressed, and the punctures in the inner angles of the posterior intermediate areas of the meta-sternum are much smaller. The elytra are punctured as in that species in the lateral grooves more finely or not at all in the dorsal ones. The legs resemble those of that species.

1 See also, however, Arrow, 1907, pp. 450-460.
Passalus nasutus, Pchereron.

Passalus nasutus Pchereron, 1855, pp. 19-91, pl. vi. fig. 8

One specimen from Parana, 24.4 mm. long.

This species resembles the preceding, but is much smaller; the central tubercle is conical, free distally and directed forwards and a little upwards; the pronotum has less acute anterior angles and somewhat more numerous punctures in the scars; the epipleura and shoulders of the elytra are densely covered with hair-bearing punctures; the grooves of the elytra are punctured much as in P. quadrivalvis.

Passalus polli, n sp.

Passalus polli is much larger than P. nasutus and has a smaller central tubercle situated somewhat farther forwards, whose apex is scarcely free. The frontal ridges are small and extend almost directly outwards, then arching slightly forwards to end in the inner tubercles, which are equidistant from the central and outer tubercles; the whole surface of the head in front of the inner tubercles is rugose and glossy. The anterior ends of the marginal grooves are somewhat curved but scarcely expanded. The mesosternal scars are depressed and covered with moderately large, indistinct, coalescent punctures. The posterior intermediate areas of the metasternum are closely covered with coarse punctures; the lateral areas are very broad, especially behind, and are covered with hair-bearing punctures. The puncturing of the grooves of the elytra resembles that of P. quadrivalvis, but is somewhat deeper laterally; the shoulders, epipleura and anterior half of the rib immediately above each of the thickened lateral margins are covered with hair-bearing punctures. The middle and hind tibiae are each armed with one stout spine.

Passalus toriferus, Eschscholtz.

Passalus toriferus Eschscholtz 1829, pp. 17-18

Three specimens from Brazil, one from Yucatan, and one said (without incorrectly) to come from S. Australia. Length 28-34 mm.

This species differs from the last only in having the anterior part of the head less rugose (the frontal area sometimes punctured), the inner tubercles situated close behind and slightly on the outer side of the outer tubercles, the sides of the pronotum strongly and coarsely punctured at least near the scars, and the extreme anterior part of the eighth groove of the elytra hairy. The central tubercle is very variable and may be distinctly or not at all free distally.

Passalus punctatissimus, Eschscholtz.

Passalus punctatissimus Eschscholtz 1829, pp. 19-20

A number of specimens from the Peruvian and Upper Amazon, two from Rio and one from Blumenau. Length 26.5-30.0 mm. Also one specimen 34.2 mm. long, said to
come from Queensland. This specimen has hairy mesosternal scars and may belong to a distinct species.

Passalus punctatissimus differs from P. toriheras chiefly in having all the cephalic tubercles longer and more acute, and in not having the eighth groove of the elytra hairy in front. The frontal area may be partially or not at all punctured. The anterior ends of the marginal grooves of the pronotum are not expanded but may be somewhat curved. The pronotum is sometimes wider in front than behind, with acutely produced anterior angles. The outermost rib of the elytra is sometimes hairy throughout instead of only in its anterior half. The last two variations may perhaps indicate a tendency for the species to split up into various local races, but more material is needed to settle this.

Passalus unicornis. Saint-Fargeau and Serville.

Passalus unicornis. Saint-Fargeau and Serville. 1825, p. 20.

Six specimens from Guadaloupe, 38° 5'-42° 0' mm. long.

The central tubercle is extremely long and slender, much more so than in the preceding species, but the other cephalic tubercles are much less prominent and more obtuse than in that species. The pronotum is unpunctured, except in the uniformly narrow marginal grooves, and in and close to the scars. The epipleura, shoulders, tips, and eighth and tenth (usually also the ninth to a less extent) ribs of the elytra are covered with hair-bearing punctures.

Passalus opacus, n. sp.

Fig. VII, 22, p. 33.

One specimen from Farinas, Bolivia. 39° 5' mm. long.

The whole surface of this insect is dull as in P. languidus (Kuwert, 1898, p. 275), from which it differs in having all the grooves of the elytra much more strongly punctured. Apart from its dulled surface P. opacus differs from P. unicornis in having the head more rugose with a much shorter central tubercle. The sides of the pronotum more extensively punctured, the marginal grooves of the pronotum very broad in front of the scars, the mesosternal scars indistinct, no hair on the ribs of the elytra above or behind the extreme anterior part of the tenth, and all the grooves of the elytra much more coarsely punctured. The punctures in the lateral grooves being transverse.

Passalus interruptus (Linnaeus).

L. 1767, p. 590.

One or more (often numerous) specimens from each of the following localities:—Texas, Mexico, Guatemala (including one specimen from Eseintila). Honduras (San Pedro Sula). Nicaragua, Panama (Chiriqui), Columbia, Venezuela (Caracas), Guiana (Demerara, Surinam, Cayenne). Peruvian Amazon, Upper Amazon, Brazil (Amazonas, Pernambuco.

---

1 This is most marked in the series from the Upper Amazon.
2 This is so in the two specimens from the Peruvian Amazon.
3 This is the reference usually given, but Linnaeus himself described the species at greater length in 1767 (p. 34) and refers there to yet earlier descriptions. I have been unable to consult these and cannot say in which or by whom the name interruptus was first introduced.
Passalus glaber, n. sp.

Fig VII. 23 p. 53.

One specimen without locality record. Length 37 mm.

This species is very like the last, but has only a few hair-bearing punctures on the elytra, these being confined to the lower parts of the shoulders immediately in front of the epipleura, it has the mesosternal scars replaced by broad matt areas which are not sunk below the general level of the plate; and it has the metasternum somewhat less extensively punctured.

Passalus binominatus, Percheron.


One specimen from Santa Catharina, 32 mm. long.

The secondary tubercles on the anterior margin of the head are less widely separated, as although the frontal edges are lightly arched the frontal area is more nearly triangular than semicircular. The central tubercle is obtuse and has no free forwardly directed apex. There are no coarse punctures on the general surface of the pronotum. The mesosternal scars are entirely absent. There are only a few coarse punctures on the inner side of the posterior intermediate area of the metasternum. In all other respects this species resembles P. glaber.

Passalus erosus, Truqui.

Fig VII. 24 p. 53.

Passalus erosus, Truqui 1867, p. 208.

One specimen doubtfully recorded from Brazil, and one sand (doubtless incorrectly) to have come from India. Length 35-36 mm.1

1The punctures on the elytra generally may seem at first glance to be superficial; consequently they are probably less large and less evenly scattered than in fig. beare.
This species differs from the last only in the form of the frontal area, which is slightly longer in proportion to its width and is more or less distinctly grooved in continuation of the median notch on the anterior margin.

The species of *Passalus* known to me may be distinguished from one another thus:

| The punctures in the grooves of the elytra extremely coarse, transverse laterally; the anterior margin of the head straight between the outer tubercles; the lateral areas of the metasternum hairless (small insects only) | ... ... ... ... | 1. | P. punclato-striatus, p. 52. |
| The punctures in the grooves of the elytra less coarse, not transverse laterally; or, the anterior margin of the head strongly notched in the middle; or, the lateral areas of the metasternum hairy | ... ... ... ... | 2. | P. navus, p. 52. |
| The epipleura hairless | ... ... ... ... | 3. | P. rugus, p. 52. |
| The epipleura hairy | ... ... ... ... | 4. |  |
| The anterior margin of the head straight or simply notched in the middle, without secondary tubercles; the frontal area large, with the central tubercle about half as far from the anterior margin as the outer tubercles are from each other, and with the frontal ridges usually straight and diverging at about a right angle; the central tubercle small, without free apex; the outer tubercles prominent, the inner tubercles usually situated very near them, always nearer to them than to the central tubercle; the lateral areas of the metasternum, and the epipleura and shoulders of the elytra, hairless | ... ... ... ... | 5. | P. rhobenthropoides, p. 53. |
| Not as above | ... ... ... ... | 6. |  |
| The anterior margin of the head straight between the outer tubercles; the clypeus entirely hidden; the central tubercle small, with no trace of free apex; the inner tubercles usually much less widely separated than the outer, and when distinct always situated a considerable distance behind them; the frontal ridges straight, not arched, meeting in a distinct though sometimes more or less obtuse angle; the epipleura usually hairless, when hairy the lateral areas of the metasternum always hairy also | ... ... ... ... | 7. | P. morio, p. 54. |
| Not as above | ... ... ... ... | 8. |  |
The anterior angle of the pronotum produced to form a pair of small but distinctly acute downwardly directed processes
8. The anterior angles of the pronotum not so produced
9. The frontal area small, crowded closely punctured in front
10. The frontal area large, usually or always with a few large punctures in front
11. The elytra fused, their vertical anterior part lightly convex
12. The elytra separate, their vertical anterior part not convex
13. The anterior margin of the head straight between the outer tubercle or very faintly notched in the middle, the lateral areas of the metasternum hairy
14. The anterior margin of the head strongly notched or provided with secondary tubercle between the outer tubercles, or the lateral areas of the metasternum hairy
15. The frontal area about three times as wide as long, broadly rounded and not angular behind, the anterior margin of the head straight or slightly convex between the outer tubercles
16. The frontal area about twice as wide as long, or angular behind, the anterior margin of the head usually notched or provided with secondary tubercle between the outer tubercles
17. The central tubercle without very long and slender free apex; the frontal ridges strong
18. The central tubercle with long and slender free apex, the frontal ridges weak
19. The epipleura hairy, the apex of the central tubercle more or less free
20. The epipleura hairless, the apex of the central tubercle not free
21. The apex of the central tubercle scarcely free, somewhat blunt
22. The apex of the central tubercle distinctly free, sharper
23. The lateral areas of the metasternum hairy
24. The lateral areas of the metasternum hairless
25. The anterior margin of the head convex between the outer tubercles, but without median notch or secondary tubercles
26. The elytra not overhung by the metasternum
27. The elytra partially hidden
28. The lateral areas of the metasternum hairless; the epipleura hairy throughout, the central tubercle without free apex
29. Not as above
The inner tubercles large, directed forwards above the somewhat smaller outer tubercles, close behind the outer side of which they are situated; a pair of well developed and somewhat widely separated secondary tubercles present between the outer tubercles; the frontal ridges straight, meeting in a right or slightly obtuse angle; the lateral areas of the metasternum, and the epipleura, shoulders and anterior parts of the sides of the elytra densely hairy... *P. interstitalis*, p. 58.

Not as above... 20.

The central tubercle small, without free apex, normal; the anterior margin of the head not thickened; the lateral areas of the metasternum hairless... 21.

The middle and hind tibiae armed with at most one small spine... 22.

The middle and hind tibiae more extensively armed... 23.

The pronotum punctured only in the marginal grooves and in and immediately above the scars... 24.

The sides of the pronotum with an extensive band of punctures above the scars... 25.

The grooves of the elytra somewhat finely punctured... 26.

The grooves of the elytra very coarsely punctured... 27.

The inner and outer tubercles clearly separate; the former never more distant from one another than the latter, sometimes more or less obsolete... 28.

The inner and outer tubercles situated close together, forming together a pair of small oblique ridges on the anterior margin of the head, with the former tubercles somewhat more distant from one another than the latter... 29.

The epipleura hairless, or the central tubercle with free apex... 30.

The epipleura densely hairy; the central tubercle without free apex... *P. polli*, p. 62.

The central tubercle without free apex, normal... 31.

The central tubercle with free apex, or more or less columnar... 32.

The lateral areas of the metasternum hairy; a more or less rudimentary fourth lamella often recognizable on the antennae... 33.

The lateral areas of the metasternum hairless... 34.

The frontal area fully twice as broad as long; the central tubercle decumbent throughout, with long slender free apex; the lateral areas of the metasternum hairless... *P. aborescens*, p. 63.

The frontal area less than twice as broad as long; the lateral areas of the metasternum more or less hairy... 35.

The central tubercle strongly elevated at base, massive, with small decumbent forwardly directed free apex... *P. quadrivittatus*, p. 64.
The central tubercle erect, more or less columnar, broadly rounded above
The central tubercle descending throughout, with slender free apex
The epipleura densely hairy
The epipleura hairless
The general surface glossy, the punctures in the lateral grooves of the elytra coarse but scarcely transverse
The general surface quite dull; the punctures in the lateral grooves of the elytra very coarse, more or less transverse
The frontal area less than twice as broad as long; the central tubercle without free apex
The frontal area more than twice as broad as long; or the central tubercle with free apex
The central tubercle with long and slender free apex
The central tubercle not extensively free
The eighth ribs of the elytra hairless and unpunctured throughout
The eighth ribs of the elytra punctured and hairy, especially in front
The frontal area more than twice as broad as long
The frontal area not grooved in continuation of the median concavity between the secondary tubercles on the anterior margin
The frontal area grooved medially in front, in continuation with the concavity between the secondary tubercles on the anterior margin

Genus PTICHOPTUS, Kaup, 1860, p. 27.

Type, Passalus angulatus, Percheron, 1835, pp. 84-86, pl. vi, fig. 5.

Ptichopus angulatus (Percheron).

Passalus angulatus, Percheron, 1835, pp. 84-86, pl. vi, fig. 5.

Several specimens from Mexico, Guatemala, Honduras (San Pedro Sula), and Nicaragua. Length 2.5-35 mm. These specimens show the species to be a somewhat variable one, even in the characters used by Kuwert to distinguish others from it; and the validity of species thus distinguished seems very doubtful. The generic definition, therefore will probably suffice for the identification of the present form, which is very unlike any other Passalus known to me.

Subfamily SOLENOCYCLINAE.

The characteristics of this subfamily have been discussed and defined above (pp. 10-13). Specimens from Madagascar are characterized by the presence of a pair of more or less pronounced marginal tubercles immediately on the inner side of the fronto-vertical
suture. no tubercles being developed in this position in specimens from Africa. Kuwert has, it is true, described from Madagascar one species of each of his otherwise purely African genera *Erionomus* and *Didinocoides*; but it remains to be seen whether he was right. In the case of the former genus the sentence "Der ganze Clypeus in der Breite der ganzen Oberlippe scharf vorgezogen" suggests, for instance, that *studt* may belong in reality to the new genus *Malagasalus*, established below to receive the only species of Solenocyclininae known to me in which the clypeus is exposed, and the pair of marginal tubercles most characteristic of the family as a whole—*i.e.*, those immediately above the lateral extremities of the clypeus are entirely absent.

None of the Malagasy genera hitherto described contain very many species; and the differences between them may advantageously I think be regarded as specific rather than generic. I propose, therefore, to unite all of them under the name *Solenocyclus*.

Some of the African genera appear to be decidedly larger; but in spite of this I am unable to find satisfactory characters by which to define more than two. I propose, therefore, to unite under the name *Pentalobus* Kaup, all species with hairy sides to the metasternum and a more or less distinct tubercle or pair of tubercles or excavation in the middle of the anterior margin of the head; and to unite under the name *Erionomus* Kaup, all species in which the sides of the metasternum are hairless and the middle of the anterior margin of the head is straight.

The genera of Solenocyclininae may now be defined as follows:—

<table>
<thead>
<tr>
<th>A more or less distinct pair of marginal tubercles present immediately on the inner side of the fronto-vertical sutures (Malagasy forms)</th>
<th>Malagasalus, p. 69.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tubercles not present in this position (African forms)</td>
<td>Pentalobus, p. 70.</td>
</tr>
<tr>
<td>The clypeus exposed</td>
<td>Malagasalus, p. 69.</td>
</tr>
<tr>
<td>The clypeus hidden</td>
<td>Pentalobus, p. 70.</td>
</tr>
<tr>
<td>The sides of the metasternum hairless; the anterior margin of the head more or less distinctly notched in the middle line, or with a median tubercle</td>
<td>Pentalobus, p. 72.</td>
</tr>
<tr>
<td>The sides of the metasternum hairy; the anterior margin of the head without any median notch or tubercle</td>
<td><em>Erionomus</em>, p. 71.</td>
</tr>
</tbody>
</table>

Genus MALAGASALUS, n. gen.

Type, *Malagasalus clypeatus*, n. sp.

The clypeus exposed; a pair of marginal tubercles present immediately on the inner side of the fronto-vertical sutures; the sides of the metasternum hairless.

Malagasalus clypeatus, n. sp.

Fig. VIII, t. p. 70.

Two specimens from Fenerive, Madagascar. Length 34 mm.

The antennae each have three well-developed lamellae. The labrum is concave in front, convex at the sides, slightly narrower behind than in front. The central tubercle is strongly elevated above the short parietal ridges, but is somewhat obtuse. The frontal ridges diverge from it in an angle of about 90°; they extend to the strongly developed
The pronotum is slightly wider behind than in front, and its anterior angles are obtuse. Its anterior margin is straight, and its posterior margin lightly convex. The marginal groove is somewhat widely incomplete in front and is strongly punctured. The median groove is strong and complete. The scars are punctured, and there may be a few punctures in the anterior angles. The surface of the prothorax is closely punctured and hairy, but the hair is not very long. The metasternum is smooth and glossy, with large and deeply impressed roughened scars. The anterior intermediate areas of the metasternum are somewhat coarsely and sparsely, and the lateral areas more finely and densely punctured and hairy, the latter being, however, to some extent roughened and hairless behind. A somewhat extensive patch of close, coarse, hairless punctures is present beside the posterior margin of the posterior intermediate areas, and a band of finer hair-bearing punctures extends from behind this patch outwards along the posterior margin to the posterior angles. The elytra are hairless, with the lateral grooves strongly and the dorsal somewhat more weakly punctured.

**Fig. VIII**

Salenocyclus. gen. nov. Characters in the upper surface of the head 3, 1.

1. Manriqueus elyphatus, Grassi.
2. Salenocyclus exaratus (Klug).
3. Prothorax (Klug).
4. Eriomorus lektionis, Grassi.
5. Eriomorus pleurocera (Ehsholz).

**Genus SOLENOCYCLUS, Känp. 1868a, p. 10.**

Incl. Cicaronus - Semocyclus, Känp. 1871. Also Flaminus - Vitellinus, Kuwert.

Type, Pseudus exaratus, Klug. 1852, p. 173.

**Solenocyclus approximatus** (Klug).

*Pseudus approximatus*, Klug. 1852, p. 173.

Six specimens from Madagascar, five of them being from Fenerive. Length 26.5 - 29.0 mm.

The clypeus is hidden. The inner tubercles are smaller than in *Malagascius elyphatus*, and are situated at a greater distance behind the outer tubercles, which are larger.
Between the outer tubercles is a pair of small and more or less closely approximated (sometimes fused) secondary marginal tubercles, and another such tubercle is situated immediately on the outer side of each. The tubercles situated immediately on the inner side of the fronto-vertical suture are somewhat larger than the two pairs of marginal tubercles last referred to, and are widely separated from them, but they are less pronounced than in *Madagascarius clypeatus*. Coarse punctures are scattered all along the sides of the pronotum. The metasternum is practically hairless. In all other respects the present species resembles the preceding one.

**Solenoclyclus morbillosus** (Klug).

*Passalus morbillosus*, Klug. 1832, p. 175.

*Passalus morbillosus*, Percheron. 1841, pp. 18-19, pl. lxxvi, fig. 6.

Eleven specimens from Madagascar, eight being from Fenerive and one (marked "Ciceromius antananar. Kiw.") from "Antananarivo" (=Antananarivo). Also two from Andakana, belonging to M. Guy Babault. Length 20.5-24.0 mm. A smaller but more robust insect than the last.

The pair of secondary marginal tubercles situated next to the outer side of the true outer tubercles is distinctly larger than the pair situated close to the fronto-vertical suture, and is situated much nearer to the latter than to the former, which are much larger than either. The margin is often notched medially, and the notch may be bounded by an additional pair of minute secondary tubercles. The frontal ridges diverge at right angles from the low central tubercle and extend direct to the inner tubercles where they bend more or less abruptly and extend parallel to one another, or slightly converging, to the outer tubercles. The general surface of the head is smooth and glossy.

The pronotum is strongly punctured at the sides, and as a rule more or less all over the dorsal surface also. The median groove is strong and complete: the marginal groove is somewhat widely incomplete in front. The mesosternum is more or less coarsely rugose, especially near the lateral sutures; the scars are ill-defined or absent. The metasternum and abdominal sternum resemble those of *S. approximatus*. The grooves of the elytra are almost uniformly punctured.

**Solenoclyclus exaratus** (Klug).

Fig. VIII, 2.

*Passalus exaratus*, Klug. 1832, p. 173.

*Passalus manCook*, Percheron. 1835, p. 62, pl. iv, fig. 7.

A number of specimens, mostly from Fenerive. Length 28-32 mm.

The outer tubercles, and the three pairs of secondary tubercles on the anterior margin of the head, are all of about equal size and about equidistant from each other, except that the secondary tubercles between the outer tubercles are sometimes weaker than the rest. The central tubercle is very large, with a forwardly directed free apex; the whole surface of the head in front of it is coarsely rugose; the inner tubercles are minute, and are situated close to the base of the central tubercle, and the frontal ridges are absent in front of them.

The pronotum is without strong punctures, except in the lateral parts of the marginal groove and in and beside the scars. Both the marginal and the median grooves are
complete. In other respects this species resembles the preceding one, except that the lateral grooves of the elytra are somewhat more coarsely punctured

Solenocyclus grayi (Kamp).

Solenocyclus grayi Kamp, 1871, p. 48

Five specimens from Madagascar, including two from Andakama sent for identification by M. Guy-Bahault. Length 36.5, 36.0 mm.

The head is smooth and glossy except close behind the anterior margin, where there are a few large and more or less coalescent punctures. The outer tubercles, though obtuse, are distinctly larger than in S. exaratus, and there are no secondary tubercles between them. The free apex of the central tubercle is much larger than in S. exaratus, and there is no trace of frontal ridges or inner tubercles.

There are a few punctures in the scars and marginal groove of the pronotum, the pronotum being otherwise unpunctured. The median groove is not very deeply impressed, and neither it nor the marginal groove are complete in front. Along the lateral margins of the mesosternum there extends a band of hair-bearing punctures, on the inner side of which the scars are more or less clearly recognizable. The anterior intermediate and lateral areas of the metasternum, and the posterior border of the posterior intermediate areas, are covered with somewhat fine hair-bearing punctures; there are no coarse punctures anywhere on the metasternum. The elytra are somewhat hairy at the shoulders. The puncturing of their grooves is more or less obsolete, at least dorsally.

Genus PENTALOBUS, Kamp, 1868a, p. 17.

Incl. Didimus, Kamp, 1871. Also Didinoides, Eumelomus, Kuwert, 1866.

Type, Passalus barbatus, Fabricius, 1801, p. 256.

Pentalobus klugi (Kamp).

Pentalobus klugi Kamp, 1868a, p. 12

Two specimens from Barombi, Cameroons Interior; one from Abetefi, Ashanti; one from Franceville, French Congo; and several from Gaboon. Length 22.0-25.3 mm.

Each antenna bears three short lamellae. The anterior margin of the head bears five more or less equidistant tubercles. The central and inner tubercles are moderately elevated, and the frontal ridges distinct throughout. The surface of the head is punctured partly behind the central tubercle, and somewhat more densely in front. The sides of the pronotum are very broadly and coarsely punctured; the median groove of the pronotum is complete; the marginal groove is incomplete in front. The mesosternum is usually more or less matt with somewhat obscure scars. The anterior intermediate areas of the metasternum are more or less distinctly punctured; the lateral areas are very sharply defined throughout and are enlarged behind; the posterior intermediate areas are smooth and glossy. The abdominal sternum are densely and extensively punctured. The lateral grooves of the elytra are transversely punctured.
Pentalobus sansibaricus (Harold).

*Pentalobus sansibaricus*, Harold. 1880, pp. 262-263.

Five specimens from Zanzibar, one from Abyssinia, one from Abetefi, one from Rhombomp (Sierra Leone), a number from Dar-es-Salaam, and six said to come from Bolivia. Length 16.5-27.5 mm.

*P. sansibaricus* differs from *P. klugi* only in having the antennal lamellae somewhat longer, in having the upper surface of the head thickly punctured more or less all over, in having the mesosternum smooth and polished, with well defined scars, and in having the posterior intermediate areas of the metasternum coarsely punctured. The central plate of the metasternum is lightly and sparsely punctured in small specimens.

Pentalobus punctipectus (Kaup).

*Leptanurus punctipectus*, Kaup. 1868a, p. 11.

One specimen from Gaboon. Length 18 mm.

This species differs from small specimens of the last in having a median pair of secondary marginal tubercles instead of a single median tubercle, and in having the central plate of the metasternum less sparsely covered with stronger punctures.

Pentalobus barbatus (Fabricius).

*Passalus barbatus*, Fabricius. 1891, p. 256.

A large number of specimens from Abetefi, Ashanti; also a few from Ann, Ashanti; Gaboon; Old Calabar; Aquapim, Guinea; Barombi, Cameroons; and Angola: all 25-29 mm. long. Also one specimen from East Africa. 20 mm. long, and two from Franceville, French Congo, 17-19 mm. long, between which and the larger forms I am unable to find any structural difference.

This species differs from *P. punctipectus* in having five antennal lamellae, all of them very long and slender; and in having the central area of the metasternum unpunctured.

Pentalobus parasiticus (Imhoff).

*Passalus parasiticus*, Imhoff, 1843, pp. 171-172.

One specimen from Aquapim. Guinea, and one from Barombi, Cameroons Interior. Length 21-24 mm.

The punctures on the head are somewhat shallow, and the anterior margin of the head is lightly excavate medially, but has no median tubercles. The punctures on the central area of the metasternum are more or less concentrated beside the posterior margin. The transverse punctures of the lateral grooves of the elytra are more or less obsolete in the two outermost of these grooves, and all the grooves except the fifth and sixth tend to unite in a matt depression behind. In other respects this species resembles *P. punctipectus*. 
Pentalobus tur (Kuwert)

Three specimens from Ashanti, Ashanti. Length 21-25 mm.

It is possible that this form, which Kuwert considered as an aberration of P. duplicatus (Harv.) may be no more than a variety of P. parasiticus. It differs from the latter only in being without punctures in the posterior angles of the pronotum, in having the punctured area of the central area of the metasternum less strongly marked, in having the punctures of the seventh and eighth grooves of the elytra weaker and less distinctly transverse, and in having the posterior angles of the elytra polished instead of matt. These are much the same characters as those by which Kuwert distinguishes this form from the form which he regards as the typical duplicatus, a species which I have not seen.

The above mentioned species of Pentalobus may be distinguished as follows:—

1. The anterior margin of the head with a more median tubercle
2. The anterior margin of the head medially concave
3. The posterior tuberculate margin of the metasternum unpunctured
4. The posterior tuberculate margin strongly punctured
The anterior margin of the head with a strong median concavity bounded by a pair of strong concave tubercles
5. The anterior margin of the head with a less median concavity not bounded by definite tubercles
Antennae each with three moderately stout lamellae
Antennae each with five long and slender lamellae
Elytral grooves 7-8 strongly marked with transverse punctures, the posterior angles of the elytra matt
Elytral grooves 7-8 more faintly punctured, the posterior angles of the elytra glossy

Genus ERIONOMUS, Kämp. 1868, pp. 16-17.

Incl Cabalus = Epicurus = Erionomus, Kuwert, 1869.

Type, Passalus pellucens, Eschscholtz, 1829, pp. 22-23.

Erionomus palini (Percheron).

Passalus palini. Percheron, 1844, pp. 8-9, pl. xxv, fig. 1.

A number of specimens from Ashanti, Ashanti, and two from Gaboon. Length 3-78 mm.

This species superficially resembles Pentalobus litoralis. The antennae have, however, only four lamellae: the anterior margin of the head is approximately straight in the middle; the punctures of the sides of the prothorax is somewhat less extensive; the lateral areas of the metasternum are hairy, and the punctures of the lateral grooves of the elytra, though very strong, are not transverse.
Erionomus trichostigmoïdes n. sp.

Fig. VIII. 4. p. 70.

Two specimens, one from Dar-es-Salaam, and one said to come from Santa Catharina in S. E. Brazil. Length 27.5-29.5 mm.

This species bears a close superficial resemblance to species of the Oriental genus Trichostigma from which, however, it may readily be distinguished by the structure of the mandibles, and of the lateral areas of the metasternum, which resemble those of its African allies.

The antennal lamellae are extremely short. The surface of the head is polished and somewhat rugulose: the frontal area is fully as broad as long, and the inner tubercles are somewhat indistinct. The pronotum is without strong punctures: its grooves resemble those found in other members of the genus. The mesosternum is punctured and hairy in front, and roughened and hairy behind, with a small smooth and hairless area in the middle. The metasternum is punctured and hairy, except in the central and posterior parts of the central area. The punctures in the grooves of the elytra are more or less obsolete, but the eighth to tenth ribs are covered with small hair-bearing punctures.

Erionomus alterego (Kuwert).


Two specimens from Abetefi, Ashanti. Length 29-31 mm.

The antennal lamellae are very short. The anterior margin of the head bears a more or less distinct median pair of marginal tubercles, the outer tubercles are somewhat small, and the secondary tubercles on the outer side of them are broadly truncate. The pronotum resembles that of E. trichostigmoïdes, except that the marginal grooves are more strongly punctured. The smooth and hairless central areas of the mesosternum and metasternum are much larger, though the punctures on the latter plate are stronger where they occur. The elytra are hairless except at the shoulders: their dorsal grooves are scarcely, their lateral grooves distinctly but not transversely, punctured.

Erionomus planiceps (Eschscholtz).

Fig. VIII. 5. p. 70.

Passalus planiceps. Eschscholtz. 1829, pp. 22-23.

Three specimens from Guinea and two from Abetefi, Ashanti. Length 38.0-41.5 mm.

In this species the outer tubercles are directed upwards instead of forwards, and appear in consequence to be situated a little behind the anterior margin of the head, beneath which, however, dissection shows the true clypeus to be hidden as usual. The marginal grooves of the pronotum are not strongly punctured. The posterior intermediate areas of the metasternum bear a posterior marginal band of fine close punctures, the rest of these areas being smooth as much as in E. alterego, which the present species also resembles in all other respects.

The above-mentioned species of Erionomus may be distinguished as follows:

1. Each antenna with four long slender lamellae
2. Each antenna with three short stout lamellae
The main of the cuticle covered throughout with hair-bearing

The main of the cuticle covered except at the elytron.
The outer tubercle situated as usual on the anterior angles of
The outer tubercle situated slightly behind the anterior margin

Sub-family MACROLINAE.

As defined above (pp. 124-125) this sub-family includes the Macrolininae, Pleinariinae

When that account was written only the Indian and Burmese genera and species were

Before it was published I was able to revise some extent. In the light of a hurried study of the collections in London, Berlin and Hamburg, my ideas regarding the forms from further east, but the arrangement of these forms there suggested is, I believe, capable of considerable improvement, as indicated in the present paper.

The symmetrical genus Macrolinena has here been placed next to the genus Pleinaria, which seems to replace it in the Indian Peninsula, i.e., before, instead of after, all Oriental genera containing a symmetrical species.

Kuwert's Hebechilus additus has been removed from the genus Aecpector to the genus Ophecanverus, where it has been put next to O. hermanni and O. stephanus, which it resembles much more closely than it does any species of Aecpector. To permit of this change the genera Ophecanverus and Aecpector have been redefined, greater importance being attached to the character of the mandibles than to that of the elytra, and with the result that Aecператор minor and neopaleus of my previous paper have also to be transferred to Ophecanverus. The remaining species of Aecператор can then be arranged in a single series leading up from forms allied to minor and neopaleus to grandis and echeclus, which appear to be the most highly specialized members of the genus.

Parapleogoeus Parapleogoeus Gnaphalocornus, Plesiotra and Plithoconus are entirely sub-family Macrolininae. They resemble the Oriental forms dealt with above in that.
whenever asymmetry occurs in the mandibles, the dentition is reduced chiefly on the right side.

The distinctive characters of the first four of these genera do not appear to me to have more than specific significance, and I propose to unite them under the name *Pelopides*. The fifth genus, *Plesthenes*, seems to be distinct. It is possible (see below, p. 121) that these genera may have been derived from *Tiberioides*, but as this is by no means certain I have not placed *Tiberioides* beside them, but have left it next to the symmetrical species of *Episphenes*.

*Phoraechilus, Episphenoides, Mastochilus, Analabches and Cetejus* may likewise be united, the scars on the mentum, with the aid of which they have hitherto been defined, being variable and not sharply distinctive. The somewhat large genera resulting from this union is, however, composed of four more or less distinct groups of species, for which four of the above names may be retained in a subgeneric capacity. Thus *Phoraechilus* may be defined so as to include only large Australian species with extremely short antennal lamellae and more or less extensive matt lateral borders to the mentum. And *Episphenoides* may advantageously. I think, be reunited with the very few known species of *Mastochilus*, and may then be defined so as to include the remaining large symmetrical species. *Analabches* and *Cetejus* are very difficult to separate from *Mastochilus* on structural grounds, but contain species of a much smaller size, many of which are distinctly asymmetrical. *Analabches* contains somewhat larger and flatter species than *Cetejus* with distinctly longer antennal lamellae. According to Heller, who has examined Zangs material (1910, pp. 14 and 21), the upper edge of the left mandible is toothed near the base, and this is in agreement with my observations on the few species before me. This tooth is sometimes, however, situated so near to the base as to be hidden beneath the anterior angles of the head. This is so, for instance, in Stoliczka's *australicensis*, which Heller places in the genus *Cetejus*, in spite of its flattened form and long antennal lamellae, but which dissection shows to be an *Analabches*.

*Mastochilus* (s. lat.) appears to represent the simpler stock from which the remaining genera, all more highly specialized, have been derived. All these other genera are found mainly in the islands east of Celebes, and whenever their dentition is reduced this occurs most markedly on the left side, instead of on the right as in Oriental groups (see pl. 1).

*Kampioleides, Hyperplesthesium, Aurelius, Labicous* and *Kampiodes* all have symmetrical mandibles with complete dentition. In the most highly specialized species the elytra are united, and in all of them the intermediate and lateral areas of the metasternum are fused, a fusion which is closely associated with the union of the elytra, tending to follow it in the other groups of Passalidae in which it occurs. Probably, therefore, these genera are losing, if they have not already lost, the power (or at least the habit) of flight, the wings doubtless becoming more efficient stridulatory structures at the same time. None of these genera are very large, and they may advantageously be united under the name *Labicous*.
Memor of the Indian Museum [Vol. VII.

Protracunculus resembles Labium in having the lateral and intermediate areas of the mesonterate fixed, though so far as I know the elytra are never united, but it has the dentition reduced especially on the left side. It is probably allied to the pyrometral forms of Mammillata through the more primitive species of Labium (i.e., typophthalma) and typophthalma, but does not appear to be allied to the higher forms of the latter genus.

Genus, with which the imperfectly separated Omasturus (C. and Tanius, which I have not seen a specimen) may be united also tends to have the dentition reduced, especially on the left side.

Pseudophthalma and Tarassonaus form the last line of descent from Mammillata (sub. lat.). They are so unlike superficially that it seems best to retain both genera in the absence of other forms throwing light upon them. Concerning their relationship see Gravely, tor. 3, pp. 328-330.

The genera of Macrancus may now be redefined thus:

1. The supracapital, and superoccipital areas discontinuous
   Always always without scars, the muscle always with
   primary, but without secondary scars.

2. The superorbital and superoccipital ridges continuous, the
   latter sometimes produced forwards beyond the former or
   accompanied always without scars of any kind on the
   mesonterae.

3. The muscle without scars, the outer side of the mandibles
   angulate at the base of mentum.

4. The muscle with scars, or the outer side of the mandibles,
   angulate opposite the anterior lower tooth.

5. Only those lateral teeth recognizable when the antennae is
   placed on the anterior lower tooth.

6. More than three lateral teeth recognizable when the antennae
   is placed on the anterior lower tooth.

7. The outer tubercles separated by a space 1-2 as long as that
   separating the outer tubercles.

8. The left outer tubercle acute and smaller or no larger than the
   right, or much larger and curved forwards with an extremely rounded
   instead of conical, and never angular on the outer side of
   mentum. The dentition complete in Carmetrical species the
   lacer terminal tooth always present on both sides, the
   right inner lower not smaller than the left on the more
   highly carinate species. The edges of the elytra laciniate.

9. The left outer tubercle larger than the right, directed more or less
   upwards, triangularly, the outer angle of expansions disease.

10. The mandible of conversion descending, bearing a more or less transverse apical apex to the
    tubercles for the upper of the elytra family. The dentition complete
    on both the inner terminal and outer lower teeth reduced.
The dentition complete in un worn specimens on both mandibles; the mandibles in most species symmetrical; the elytra often hairless except at the shoulders ................................................................. *Ophiomyrmex*, p. 86.

The lowest terminal and anterior lower teeth of the right mandible absent, or represented only by very minute denticles; the anterior lower tooth of the left mandible very large; the elytra more or less extensively hairy at the sides ................................................................. *Acronius*, p. 89.

The dentition of the left mandible not more reduced than that of the right and the right outer tubercle at least as large as the left; the mentum without primary scars; the secondary scars very large, more or less completely cutting off the median from the lateral pieces, usually more or less linear; the lateral and intermediate areas of the metasternum never fused ......................................................................................................................................................................................................................................................................................... 8.

Neither as above; the dentition of the right mandible never more reduced than that of the left ......................................................................................................................................................................................................................................................................................... 9.

The anterior margin of the labrum with a (frequently indistinct) tooth near the middle; all the elytral grooves deeply impressed throughout, at least the lateral ones strongly punctured; the pronotal scars hairless; at least one of the outer tubercles more or less complex, or truncate with an additional tubercle between itself and the anterior angle of the same side of the head (Oriental forms) ......................................................................................................................................................................................................................................................................................... *Pelopides*, p. 93.

The anterior margin of the labrum not toothed; some at least of the elytral grooves feebly impressed and more or less obsolete behind, none of them at all strongly punctured; the pronotal scars more or less hairy; the outer tubercles acute or truncate, but never complex or associated with secondary tubercles (Celebean forms) ......................................................................................................................................................................................................................................................................................... *Plesiome*, p. 96.

The mentum with well developed primary scars; the lateral and intermediate areas of the metasternum distinct ......................................................................................................................................................................................................................................................................................... *Mastochilus*, p. 97.

The mentum without definite primary scars; or, the lateral and intermediate areas of the metasternum fused ......................................................................................................................................................................................................................................................................................... 10.

The lateral and intermediate areas of the metasternum fused ......................................................................................................................................................................................................................................................................................... 11.

The lateral and intermediate areas of the metasternum not fused ......................................................................................................................................................................................................................................................................................... 12.

The dentition of both mandibles complete, normal; mandibles more or less symmetrical ......................................................................................................................................................................................................................................................................................... *Labioius*, p. 103.

The dentition of both mandibles reduced—especially that of the left one; the anterior lower tooth (when present) widely separated from the middle lower tooth, and partially fused with the lowest terminal tooth ......................................................................................................................................................................................................................................................................................... *Proctomyrmex*, p. 107.

1 The fusion is less obvious than in the Americal forms where it occurs, as the greater part at least of the posterior intermediate areas are hairless and either smooth or coarsely punctured, while the areas on the outer side and in front of them are very hairy and densely but somewhat finely punctured.
Memories of the Indian Museum

The mandible articulate on the outer side close to the base of the first at all of the usual deep narrow ending from the base to the upper margin.

The mandible articulate on the outer side almost opposite the anterior lower tooth, a strong groove extending from this point to the anterior margin.

The inner tubercles situated behind the posterior margin of the head, giving the insect a Leptobracihe appearance, the outer tubercles being reduced.

Germs MACROLINUS, Kaurp. 1869, p. 48.

Type Passalus latipennis, Percheron. 1841, pp. 8-9, pl. lxxxii, fig. 3.

Macrolinus andamanensis (Stolica).

Badean, 1873, pp. 160-162.


Ten specimens from the Andamans, where Mr. Kemp recently collected two at Port Blair. Length 32.8-36.5 mm.

Macrolinus sikimensis (Stolica).

Badean, 1873, pp. 161-162.

Macrolinus sikimensis Gravely 1916, pp. 243-244, pl. vii, fig. 1242.

Nine specimens from the Darjiling District (Tukvar, also specimens recently collected by myself at Pashok, ca. 2,000 ft.), Assam (Marghinita) and the Naga Hills. 2,000-5,000 ft.

Macrolinus rotundifrons, Kaurp.

Macrolinus rotundifrons, Kaurp. 1874, pp. 44-45.

Macrolinus rotundifrons, Gravely 1916, pp. 242-243, pl. vii, fig. 125.

Four specimens from Ceylon, one being from Behilul Oya. Length 27.3-32.0 mm.

Macrolinus obesus, n. sp.

Fig. 1 X 1

Four specimens from Ceylon, three being from Behilul Oya. Length 29.4-37.1 mm.

The antennal lamella are very short and stout, even more so than in M. rotundifrons, the first three being scarcely twice as long as thick, and scarcely more than half as long as the last three. The edges and tubercles of the head resemble those of M. rotundifrons, but the general surface is less extensively punctured and rugose.
The pronotum is at most sparsely punctured in the anterior angles and in and near the scars. The marginal grooves are widely discontinuous in front and somewhat less widely behind; they are very narrow and are unpunctured except at their anterior ends, which are slightly enlarged and directed a little backwards from the anterior margin. The median groove is very fine, and is incomplete in front. The sides and angles are lightly rounded.

The scutellum is smooth and glossy. The mesothoracic epimera are smooth and glossy antero-dorsally, punctured and glossy below and behind this, then unpunctured and matt, and finally smooth and glossy along the oblique ventral margin. The mesosternum is glossy throughout, but is sometimes indistinctly punctured in the more or less rudimentary scars.

The intermediate and lateral areas of the metasternum are fused and are densely punctured. They are hairy except on the greater part of the space corresponding to the posterior intermediate areas, where the punctures are specially coarse. The abdominal scars are strongly and extensively, but somewhat finely, punctured. The elytra are united; they are lightly convex between the shoulders, short in proportion to their length and lightly convex at the sides, being distinctly broader behind than in front; the grooves are strongly and uniformly punctured, about as strongly as are the lateral grooves of *M. rotundifrons* or the dorsal ones of *M. crenatipennis*.

**Macrolinus batesi.** Kuwert.


Four specimens from Perak, Malay Peninsula, and large numbers from Mana-Riang, Renau, Palembang, Sumatra, 3,000 ft. and from Bng. Proepoe, Pad. Bovenland (= interior of Padang), Sumatra, ca. 1,600 ft., Mr. Holman-Hunt has sent specimens for examination from the Selangor-Pahang boundary, ca. 3,000 ft., Malay Peninsula; and M. Guy Babault from Medan, Sumatra. Length 25-30 mm.

In my "Account of the Oriental Passalidae" *M. batesi* was regarded as identical with *M. lutipennis*. The specimens which I now refer to the former are distinguished by the relative shortness of the second antennal lamella, whose apex does not fall in line with the apices of the first and third lamellae when the antennae are furled; by the small unpunctured frontal area; by the more or less distinctly shouldered outer tubercles; by the large inner tubercles with strongly concave instead of straight or convex connecting ridge; by the narrow marginal grooves of the pronotum, which are hairless except below the scars; by the matt but entirely unpunctured mesosternal scars; and by the coarser puncturing of the lateral grooves of the elytra.

**Macrolinus depressus.** n. sp.

Fig. IX, 2.

One specimen from Java, 33 mm. long. Closely allied to *M. batesi*, but larger and proportionally flatter. The outer tubercles are strongly shouldered. The pronotum is unpunctured except in the small round hairless scars, and between these and the posterior
halves of the sides, where it is densely hairy. The posterior intermediate areas of the metasternum and the dorsal grooves of the elytra are unpunctured.

**Macrolinus latipennis** (Percheron)

*Macrolinus latipennis* Percheron, 1841, pp. 89 pl. DXXXIII fig. 3

*Macrolinus latipennis* Gravely, 1916, pp. 204-216 pl. XIX fig. 13-14

One specimen from P. Oelak Tanding; two from Hii Macipelja, N. Nias; one each from Bedage Interior, ca. 600 ft. and Bug. Proepoe, Padang Interior, 1,600 ft., Sumatra; one from Tengger Mountain and several from Buitenzorg, Java, two from Mt. Marapok, Deni Province, Borneo; and one from Mt. Kina-Balu, Borneo, as well as a few without definite locality records. Length 22-5-25-2 mm.

**Macrolinus sulcipectus**, Kuwert

*Macrolinus sulcipectus* Kuwert, 1898, p. 181

One specimen from Toh-Toh, N. Celebes, 26-7 mm, long.

**Macrolinus duivenbodei**, Kaup.

*Macrolinus duivenbodei* Kaup, 1868 &. p. 19, 1871 p. 13, pl. IV, fig. 6

Four specimens from Celebes, three being from Menado and one from Loewoe. Length 26-28 mm.

The first two antennal lamellae are more or less distinctly shorter than the remaining four; but all six lamellae are slenderer than in the Ceylonese species *waterhousei* & *roberttii* associated by Kaup (1871) in this respect with the present species.

**Macrolinus urus**, Heller

*Macrolinus urus* Heller, 1898 pp. 23-24 pl. I fig. 26

Numerous specimens from Bua-Kraeng, 5,000 ft., S. Celebes. Length 35-3-41-5 mm. The first three antennal lamellae are much shorter than the last three.

Although the elytra are united in most specimens the lateral and intermediate areas of the metasternum are distinct. This is also the case in *Pleurococcus brachyphyllus*, from the Indian Peninsula, a species in which the elytra are concave between the shoulders and the wings show little or no trace of reduction. The elytra of the present species are convex between the shoulders and the wings or always reduced, being intermediate in form between those of *Pleurococcus brachyphyllus* and those of *Macrolinus obscosus*.

The key given to the identification of the different species of *Macrolinus* on pp. 323-24 of my "Account of the Oriental Passalidae" requires considerable modification for the species which I have now seen for the first time to be included in their proper places. It may be emended as follows:

1. The frontal ridge complete and well developed, the inner lamellae more or less distinct. 2.

1. The inner lamellae, and the anterior part or whole of the frontal ridge obsolete, species confined to Celebes 13.
The six antennal lamellae stout and as a rule not very long, the first three usually very short; species from the Indian Empire, Indo-China, (? Siam and Ceylon...

The six antennal lamellae long and slender; species from the Malay Peninsula, Sunda Islands, Philippines and Celebes.

The ridge joining the inner tubercles separated from the anterior margin of the head throughout its whole length by a more or less concave surface; species from the Indian Empire, Indo-China and (? Siam...

The ridge joining the inner tubercles closely approximated to the anterior margin of the head either in the middle or throughout; species from Ceylon...

The lateral grooves of the elytra narrow, their punctures normal...

The lateral grooves of the elytra broad, their punctures transversely linear...

The outer tubercles slender in profile, truncate; the ridge joining the inner tubercles concave...

The outer tubercles stouter and distinctly bifid in profile, the ridge joining the inner tubercles straight...

The ridge between the inner tubercles straight throughout almost its whole length; the anterior angles of the pronotum unpunctured; the antennal lamellae somewhat long...

The ridge between the inner tubercles convex, evenly curved throughout; the anterior angles of the pronotum strongly punctured; the antennal lamellae short...

The lateral grooves of the elytra almost as broad as the intervening ridges, their punctures very coarse indeed...

The lateral grooves of the elytra much narrower than the intervening ridges...

The elytra separate, parallel-sided, with finely punctured grooves...

The elytra united, more ovate, with coarsely punctured grooves...

The frontal area small and unpunctured; the inner tubercles large and connected by a strongly concave ridge; the marginal grooves of the pronotum hairless in the anterior angles...

The frontal area large and punctured all over; the inner tubercles small, and connected by a ridge which is straight as a whole and situated immediately above the anterior margin of the head, and may have a more or less angular median convexity; the marginal grooves of the pronotum hairless only in their anterior terminal enlargements...

The anterior angles of the pronotum strongly and extensively punctured; the pronotal scars with a few small hairs...

The anterior angles of the pronotum with not more than one or two punctures; the pronotal scars thickly hairy...
H3.

The third lobe of the antenna not distinctly shorter than the fourth, the median groove of the pronotum obsolete.

11. The third lobe of the antenna distinctly shorter than the fourth, the median groove of the pronotum distinct enough.

12. The tip of the second hamula not reach the line joining the tips of the first and third hamula when the antenna is furled.

13. The tip of all six hamulae arranged in a straight line when the antenna is furled.

The apex of the central tubercle acute, directed forwards somewhat overhanging.

The apex of the central tubercle approximately rectangular in profile, directed upwards, not overhanging.


Type: Pleurarius pilipes, Kaup, 1868, pp. 1-2.

Pleurarius brachyphylus. Stoliczka

Pleurarius brachyphylus. Stoliczka, 1875, pp. 152-153

This species is not represented in the Van de Poll collection.

Since compiling the list of localities in my "Account of the Oriental Passalidæ" I have collected specimens in Cochin at Kayalib, ca. 1,300-3,000 ft., and between miles 10 and 14 on the State Forest Tramway, 0-300 ft. M. Guy Babault has presented specimens from near Mahé on the Malabar Coast, and from Kodakkanal in the Pahni Hills; he has also sent for examination specimens from Wallah in Travancore and from the Coorg region.

It is doubtful whether P. pilipes, the only other species of the genus described, is really distinct from P. brachyphylus, although the former is supposed to come from Sumatra and not from India (see Gravely, 1914, p. 320).


Type: Tiberius kuwerti. Arrow, 1906, p. 149.

Tiberioides kuwerti (Arrow).

Pl. 1

Tiberius kuwerti, Arrow, 1906, p. 145.

Tiberioides kuwerti, Gravely, 1914, pp. 21, 210, pl. x, fig. 11.

Two specimens from Darjiling and one from N. Manipur, 5,000-9,000 ft. Length 8.5-10.5 mm.
Tiberioides borealis (Arrow).

Fig. X.


One specimen from N. Manipur, 3,000-9,000 ft. Length 38 mm.

The species of _Tiberioides_ may be identified thus:

1. The lateral grooves of the elytra broad, their punctures transversely linear .................................................. _T. kwerti_, p. 85.

2. The lateral grooves of the elytra narrow, their punctures normal ................................................................. _T. austeni_, Gravely.

3. The median part of the mentum without depressions or ridges ................................................................. _T. borealis_, p. 85.

4. The median part of the mentum with a low convexity flanked by broad shallow depressions close to the middle of the anterior margin, with a strong transverse ridge behind it .................................................. _T. borealis_, p. 85.

Genus **EPISPHENUS**, Kaup. 1871, p. 45.

Type, _Episphenus moorei_, Kaup. 1871, p. 45.

_Episphenus moorei_, Kaup.

_Pl. 1._

_Episphenus moorei_, Kaup. 1871, p. 45.

_Episphenus moorei var. Pearsoni_, Gravely. 1914c, pp. 217-218, pl. xi, figs. 16-17.

Eight specimens from Ceylon (Belihul-Oya and Colombo) and one said to be from the Himalayas. Length 30.7-34.2 mm.

_Episphenus comptoni_ (Kaup).

_Pl. 1._

_Accratus Comptoni_, Kaup. 1868a, p. 28.

_Episphenus comptoni var. fluctu_, Gravely. 1914c, pp. 218-219, pl. xi, figs. 18-19a.

Eleven specimens from Ceylon, including four from Belihul-Oya and one recently collected by Mr. Kemp on Horton Plains. Length 29.3-32.8 mm.
Episphenus neelgherriensis (Percheron)

Pl. 1

Parthenon neelgherriensis. Percheron, 1841, p. 4, pl. xxxiv, fig. 1

Five specimens from India, one being from Cochin and one from the Madras Presidency. Also specimens presented by Mr. T. Bambridge Fletcher from the Nilgiris (Ootacamund), Mysore (Bababudum Hills, 4,500 ft.) and Coorg (Mercara, Santi Koppa and Pollibeta) ; by M. Guy Babault from Wallardi in Travancore and from the neighbourhood of Trichinopoly and Mahé; and by myself from Cochin (Kavalai, ca. 1,300-3,000 ft.). Length 23:3-28:5 mm.

Episphenus indicus (Stoliczka). 1873, pp. 159-160.

Pl. 1

Parthenon indicus. Stoliczka, 1873, pp. 159-160

Eight specimens, one from the Madras Presidency, one from Mercara, Coorg, and six said to be from Assam. Also specimens presented by M. Guy Babault from Wallardi in Travancore, and from near Mahé on the Malabar Coast; by Mr. T. Bambridge Fletcher from Santi Koppa in Coorg ; and by myself from Kavalai, 1,300-3,000 ft., in Cochin. Length 27:2-30:2 mm.

The species of Episphenus may be identified thus:

1. The anterior margin of the head symmetrical; the anterior margin of the mentum not depressed or grooved

2. The anterior margin of the head more or less asymmetrical; the anterior margin of the mentum more or less depressed or grooved

3. The anterior margin of the head not very strongly asymmetrical as a rule, the anterior margin of the mentum strongly grooved on either side of a strong median tubercle (occasionally palered)

4. The anterior margin of the head strongly asymmetrical, the mentum without any strongly marked tubercle

5. The anterior angles of the head not prominent

6. The anterior angles of the head more or less prominent

E. indicus, p. 85
E. comptoni, p. 85.
E. neelgherriensis, p. 86.
E. indicus, p. 86.

Genus OPHRYGONIUS. Zang, 1894, pp. 697-700.


Ophrygonius cantori (Percheron).

Parthenon cantori. Percheron, 1841, pp. 314, pl. xxi, fig. 2
Ophrygonius cantori, male, specimens and description. Gravely, 1946, pp. 224-225, pl. xi, figs. 22-23.

Numerous Himalayan specimens, including three from Tukvar; one specimen from N. Mempur, 5,000-6,000 ft.; and one from the Ruby Mines District of Upper Burma, 5,000-7,000 ft. Specimens have been presented by M. Guy Babault from Kulu (Kandi
and Mandi); by Mr. C. Beeson from Kumaon (Ramgarh, 6,000 ft., under bark of dead oak); by Dr. B. L. Chaudhuri and myself from the Darjiling District (Senchal, ca. 8,000 ft., and Pashok 5,500 ft.); by Mr. S. W. Kemp from the Khasi Hills (Shillong, 4,400 ft., and Mawsynram, 5,900 ft.); and by M. Vitalis de Salvaza from Tonkin (Lao Kay).

One specimen labelled "Darjeeling" in the van de Poll collection is only 28.5 mm. long. All the remaining Himalayan specimens are 30 mm. long or over. The Manipur specimen is 30 mm. long; all the remaining specimens found east of the Darjiling District are 20 mm. long or under. Although, therefore, occasional specimens may transgress the normal limits of the race characteristic of their locality, the validity of difference in size as a distinction between O. cantorii, s. str., and its sub-species convexifrons is confirmed. The form of mentum, on the other hand, described as distinctive of the sub-species dusiriensis, does not appear to be a good character, and although specimens from the Dunsiri valley range from 28 to as much as 31 mm. in length I think that they can best be regarded as belonging to the sub-species convexifrons.

**Ophrygonius birmanicus**, Gravely.

*Ophrygonius birmanicus*, Gravely, 1914-, p. 226, text-fig. 3A.

One specimen from the Ruby Mines District of Upper Burma. Another has been presented by Mr. J. Coggin Brown from Man Lom, Homang, X. Tawngpeng, X. Shan States, Upper Burma, 4,500-5,500 ft.; and others by M. Vitalis de Salvaza from Chapa, Ht. Tonkin. Length 29.5-33.5 mm.

**Ophrygonius singapurae**, Gravely.

*Ophrygonius singapurae*, Gravely, 1914, pp. 226-227, text-fig. 3B.

One specimen from Laos, and two from Mt. Marapok, Dent Province, British North Borneo. Length 30.5-32.2 mm.

In fresh specimens the anterior lower teeth each have their apices produced into a sharp and slender point. The left outer tubercle is distinctly thicker at the base than in the preceding species, but may point more definitely inwards than in the type specimen.

**Ophrygonius wallacei** (Kuwert).

*Heterochloa Wallacei + crinitus + aestivalis*, Kuwert, 1898, p. 331.

*Acraeus wallacei*, Gravely, 1914, pp. 228-229, pl. xii, figs. 24-26b.

One specimen from Singapore and a number from Borneo (Mts. Kinabalu and Marapok). Length 33.5-38.0 mm.

The anterior lower tooth on each side is much broader than the lowest terminal. Both are small on the right mandible, but are perfectly distinct in fresh specimens.

**Ophrygonius inaequalis** (Burmeister).

Pl. 1.

*Passalus inaequalis*, Burmeister, 1847, p. 468.

*Ophrygonius inaequalis*, Gravely, 1914, pp. 227-228, pl. xii, figs. 24-24b.

A number of specimens from Mt. Marapok, Dent Province, British North Borneo; and one from Mt. Kinabalu. Length 23-27 mm.

The punctures in the lateral grooves of the elytra are variable, and I no longer think it at all likely that oreolepis, Smith, will have to be recognized as a distinct variety.
Ophrygonius aequus, n. sp.

Fig XI. 1.

A number of specimens from Chapa Tanka have been sent by M. Vitaly de Salvaia. They vary from 27-3-31.6 mm in length, and differ from *O. minor* only in their larger size, in having only four antennal lamellae pubescent, in having the upper teeth of both mandibles well developed, in having the left outer tubercle still more nearly identical in size and form with the right, in having the frontal area shorter and distinctly transverse, and in having the punctures on the sides of the pronotum densely clustered in and confined to the scars, instead of very thinly scattered over a slightly more extended area.

Ophrygonius javensis, n. sp.

Fig XI. 2-3

One specimen from Boeoe Lawang, Pasoeocean, Java. Length 26 mm. Closely allied to *O. minor*, from which it differs only in having somewhat better developed upper teeth, and in having the punctures and hair on the elytra confined to the ninth and extreme hinder end of the seventh ribs, instead of over the whole of these two ribs.

Ophrygonius aequus (Gravely).

Six specimens from Mt. Kinabalu. Length 27.51 mm.

The species of *Ophrygonius* as re-defined in the present paper may be recognized as follows:

1. The antennal lamellae short and stout: the antennal marginal depressions of the mentum quite small, the sides of the elytra hairy.

2. The antennal lamellae long and slender: the antennal marginal depressions of the mentum very large, or the sides of the elytra hairy.

3. The antennal lamellae long and slender: the antennal lamellae not falling in line with those of the last two antennal segments when the antennae are turned; the antennal marginal depressions of the mentum quite small, the sides of the elytra bare.

4. The tips of all six antennae forming a single line when the antennae are retracted, or the sides of the elytra hairy.

5. The antennal marginal depressions of the mentum small, hairy.
The tips of all six lamellae forming a straight line when the antenna is furled; the anterior marginal depressions of the mentum always large and separate; the sides of the elytra hairless. O. signiparac, p. 87.

The tips of the first two lamellae not falling in line with those of the other four when the antenna is furled; the anterior marginal depressions of the mentum very variable, often fused or rudimentary; the sides of the elytra densely hairy in front. O. wallacei, p. 87.

The anterior marginal depressions of the mentum very large; the sides of the elytra hairless. O. inequivalvis, p. 87.

The upper tooth of both mandibles well developed, more or less rectangular; the frontal area markedly transverse. O. acoulae, p. 88.

The upper tooth of both mandibles rudimentary or at least more obtuse; the frontal area about as long as broad. O. acoulae, p. 88.

The anterior lower tooth of the left mandible very large, much larger than that of the right mandible. O. acoulae, p. 88.

The anterior lower tooth of the left mandible scarcely larger than that of the right. O. acoulae, p. 88.

The upper tooth of the left mandible obtuse but moderately large; the seventh ribs of the elytra almost unpunctured. O. jarensis, p. 88.

The upper tooth of the left mandible minute; the seventh ribs of the elytra sparsely punctured and hairy throughout. O. minor (Gravely).

Genus ACERAIUS. Kaup, 1868a, pp. 26-27.

Type, Passalus grandis, Burmeister, 1847, p. 465.

Acera us lamellatus n. sp.

Mr. Holman-Hunt has submitted two specimens from the Malay Peninsula (Ulu Gombak), and Mr. Bryant two from Penang, one of each of which has been presented to the Indian Museum collection. Length 23 mm.

This species appears to be allied to various species of the genus Ophrygionius on the one hand, and to the genus Aceraius on the other. The antennal lamellae and mentum resemble those of Ophrygionius signiparac, the former being exceptionally large for so small an insect. The mandibles are of the Aceraius type, and resemble those of A. helferi except that the convexity of the posterior part of the upper margin is pressed further back from the small upper tooth. In other respects this species resembles Ophrygionius minor, except that the eighth ribs of the elytra are punctured instead of (or as well as) the seventh.

Aceraius helferi, Kuwert

Pl. 1.

Aceraius helferi, Kuwert. 1898, pp. 345-347.

Aceraius helferi = lineopus + assamensis + himalayensis, Gravely, 1914, pp. 236-238, pl xii figs. 36-39.

One specimen from Burma and four from Siam, three of the latter being from Renong. M. Vitalis de Salvaza has presented a fine series of this species from Tonkin (Chapa and Xieng Khounang), and has sent for examination specimens from Ban Tink and Lao
Kay in the same country and from Cambodia. Mr. J. Coggon Brown has presented a specimen from Lou Tawg Kyaw, 5,500 ft., Man Lom, Hamang, 4,500-5,500 ft., and between Man Lom and Man Hpat, 4,500-5,500 ft., all in Tawnpeng in the Northern Shan States, Upper Burma. Mr. Holman-Hunt has sent for examination a specimen and to come from the Malay Peninsula (Ulu Gombak) and M. Guy-Babault one and to come from Sumatra (Medan). Length 20-3-37-2 mm.

I have already pointed out (1914, p. 202 footnote) that *A. furciferus,* from Southern Tenasserim, is not really distinct from *A. helleri* from further north. The series from Tonkin shows in addition that *A. assumensis,* and *A. himalayensis* are no more than imperfectly separated local races of the same form. Specimens from northerly localities (see pl. i. "Aceraius, other spp.") ordinarily have much squarer and less slender left outer tubercles than have specimens from further south. But the shape of this tubercle is not altogether constant in specimens from a single locality; and the gradation of the southern form into the northern seems to be so complete as to render impossible the separation of the species even into two definite races.

**Aceraius alutaceosternus**, Kuwert.

*Aceraius alutaceosternus*, Kuwert, 1898 pp. 347-348 44. 14. pl. XU figs. 34.35b

One specimen from Perak and one from Borneo. Mr. C. Holman-Hunt has presented a specimen from Bukit Kutu in the Malay Peninsula. Length 35-3-39-5 mm.

The shape of the left outer tubercle of this species is the same as that of the most extreme form found among southern specimens of the preceding, of which it is little more than a local race. The size of the posterior convexity of the upper margin of the left mandible, and the faint median groove on the anterior part of the mentum, appear, however, to afford constant distinctive characters by which it may be recognized.

**Aceraius borneanus**, Kaup.

*Aceraius borneanus*, Kaup, 1871, p. 52 45. 14. pl. XU figs. 25.26b

One specimen from the Malay Peninsula (Pahang), four from Sumatra (three being from the interior of Bedagen on the east coast, *cf. Geos* ft.), many from North Nias (Hill Madjedja and G. Madjega), five from Middle Nias (Dvema and Kalim Bungo), one from Java, and many from Borneo (Doessonlanden, Brunei, and Mrs. Marapok and Kumbah). Mr. C. Holman-Hunt has presented a specimen from Ulu Gombak, Malay Peninsula. Length 23-5-26-2 mm.

This species appears to be somewhat rare in the Malay Peninsula and Java, but to be abundant in Sumatra and Borneo.

**Aceraius pilifer** (Pércheron).

*Pilifer pilifer*, Pércheron 1866, pp. 24-25, pl. 3, fig. 2 46. 14. pl. XU figs. 33.34

Numerous specimens from the following places in Java: Tj. Bodas 1,300 ft., Tj. Kukur 1,300 ft., Tj. Gede, 1,300 ft., Telaga Bodas.
Aceraius perakensis. Kuwert.


A number of specimens from Mt. Kinabalu. M. Guy Babault has presented a specimen from near Dolok-Baros, Medan, Sumatra. Length 34-40 mm.

*A. laevicornis*. Zang, appears to be identical with the species which I previously separated as *A. perakensis*.


*Aceraius tricornis + kuweri*. Gravely. 1914, p. 235, text-fig. 1 B, pl. xi, fig. 31.

Two specimens from Mt. Maropok, and a number from Mt. Kinabalu. Length 46-0-52-5 mm.

The characters by which *A. tricornis* is separated from *A. kuweri* prove to be variable, and the second name must fall.


*Aceraius laniger*. Gravely. 1914, p. 231.

Three specimens from Borneo, two being from Mt. Kinabalu. Length 54-0-56-5 mm.

The characters distinguishing this species from the last, small though they are, do not appear to vary.

Aceraius moschleri. Kuwert.

*Accesus moschleri*. Kuwert. 1898, p. 344.
*Aceraius moschleri*. Gravely. 1914, pp. 229-230, pl. xii, fig. 33.

Four specimens from Mt. Kinabalu in Borneo. Length 35-37 mm.

Aceraius illegalis. Kuwert.

*Accesus illegalis*. Kuwert. 1898, p. 345.
*Aceraius illegalis*. Gravely. 1914, p. 230, pl. xii, figs. 32-32a.

Nine specimens from Borneo (Mt. Kinabalu and Marapok). Length 40-45 mm.

Aceraius laevicollis (Illiger).

*Passalidae laevicollis*. Illiger. 1800, p. 103.
*Aceraius laevicollis*. Gravely. 1914, pp. 230-231, pl. xii, figs. 27-27a.

Many specimens from the Malay Peninsula (Singapore, Larut, Penang, Perak). Sumatra (Bedagei Interior, ca. 600 ft.; Tanjung-Djati, Riau). Palembang, ca. 2,000 ft.; S. E. Serdang, E. Coast, ca. 1,000 ft.): N. Nias (Hili Madje Ija and G. Madjeja): Middle Nias
(Duma) Java Borneo (Mt. Marapiok and Kinabalu British N. Borneo, Riam Kahan and Pangareon, Mattapeora) Bahl, and S. Celebes (Tjamba) Length 30.7-37.5 mm

**Aceraius grandis** (Burmester).

Pl. 1

*Aceraius grandis*, Burmester 1847, p. 163

Specimens of the typical form from Sumatra (Mano-Riang, Renan, Palembang, 2,000-3,000 ft. Bug. P excuse, interior of Padang, ca. 1,600 ft.; also specimens presented by M. Gui Babault from Médon): North Nias (Hill Madjedja and G. Madjedja); Middle Nias (Kahui Burgo and Duma): Java (G. Tji Salinar, W. Preninger. 3,000 ft.); Kawie Mountains, Posoerae; Tji Bokas, ca. 4,000 ft.) and Borneo (Mt. Kinabalu and Brunei). Length 30.55 mm.

Specimens of sub species *hirsutus*. Kuwert, from Nepal: Darjiling District (Tukwar): Assam (Margherita: Chandelkira, Sylhet); Upper Burma (Cachin Cauri); Laos, Tonkin (Xeang Khonang, Hsabunk, Chapa and Napé—all presented by M. Vitalis de Salvaza, who has also submitted one from Ban Tink for examination) and S. Palawan. Length 30.8-9.7 mm.

The examination of the above recorded specimens has shown that southern specimens must all be regarded as belonging to a single race. Neither of the names *reculens* and *addens* (see Gravely, 1914, p. 322 footnote) need, therefore, be retained.

**Aceraius occulidens** Zang.

*Aceraius occulidens*, Zang, 1907, p. 190-191

*Aceraius occulidens*, Gravely, 1914, p. 231, text fig. 4A.

Specimens from the Malay Peninsula have been presented by Mr. Holman-Hunt, who has also submitted one for examination from Gap, 2,700-3,000 ft., on the Selangor-Pahang boundary. Length 35.5 mm.

The species of *Aceraius*, as re-defined in this paper, may be identified as follows:

1. The upper teeth of the left mandible simple, set in a hollow in the front of a convexity of the upper margin, from which it is distinctly separated at base

2. The upper margin without a convexity behind and distinct from the upper tooth, this margin concave or straight, or else uniformly convex the whole way from the tip of the upper tooth backwards, or the upper tooth bent

3. The maxillary lacinia exceptionally long and slender

4. The second to seventh rips of the elytra (inclusive) punctured throughout

A. *borensis*, p. 84
1918.

F. H. Graeule: Passalidae of the World. 93

The convexity of the upper margin of the left mandible moderately high; the mentum with no trace of a median groove ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... A. helieri, p. 89.

The convexity of the upper margin of the left mandible very pronounced; the mentum with a fine groove in front ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... A. bulbecostatus, p. 90.

The anterior angles of the head more or less obtuse, never prominent ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... 6.

The anterior angles of the head sharper, more or less distinctly prominent ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... 9.

At most 32 mm. long; usually shorter ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ......
Pelopides symmetricus (Zang)

Pl. I

Pelopides symmetricus Zang, 1904, p. 12
Pelopides symmetricus Gravely, 1914, pp. 245-247, text fig. 6AB

Two specimens from Mt. Malayu and a number from Mt. Kinabalu. Length 37.0-42.7 mm.

Pelopides gravidus Kuwert

Pl. II

Pelopides gravidus Kuwert, 1908, p. 322

Five specimens, apparently cotypes, from Davao, Mindanao. Length 35.0-6.0 mm.

P. gravidus is to some extent transitional between P. symmetricus and P. simplex. The anterior lower tooth of the right mandible is distinct when unworn, but is smaller than in P. symmetricus. The head has both the outer tubercles broad as in P. symmetricus, but the inner portion of the right one is distinctly more prominent than that of the left, while the left one is flanked by a very deep and the right by a shallower concavity. The elytra are very like those of P. monticulosis. In all other respects P. gravidus resembles P. symmetricus.

Pelopides dorsalis (Kaup).

Pl. I

Eriocerus da L. K. 1871, p. 11
Trepsuska da L. E. respectabilis, Gravely, 1914, pp. 245-247, text fig. 50 C, D, pl. XIV, fig. 48.

Six specimens from Perak and one from Sumatra. Also four from Medan (mr. Dolok Baroe, Sumatra, presented by M. Guy Babault). Length 32.5-40.0 mm. The smaller specimens have the grooves of the elytra more strongly punctured than the larger ones.

Pelopides burmeisteri (Kaup).

Eriocerus B. 1869, p. 22
Cuphodes burmeisteri, Gravely, 1914, p. 249, pl. XVI, fig. 49 P

A number of specimens from Sumatra (Maja Bang and Tandjong Djatt, Keran, Palembang; Boeda, Palembang. Brg. Proepoe, interior of Padang, Kandg, Ampar, Padang, Benedict; also two from Medan, presented by M. Guy Babault) and two from Java (one being from Tj. Senak, Wyckoff's Bay) and six from Borneo (one being from Sintang and three from Sarawak). Length 38.40 mm.
### Pelopides monticulosus (Smith)

*Passalus monticulosus*. Smith, 1852, p. 6, pl. i., fig. 1.

*Grapholomemis monticulosus*. Gravely, 1914, pp. 219-250, pl. xiii. fig. 199.

Three specimens from Sumatra (two being from Bedagei Interior, *ca*. 600 ft.), and a number from Borneo (Mts. Kinabalu and Marapok). Length 39-45 mm.

### Pelopides tridens (Wiedemann)

PL. 1.

*Passalus tridens*. Wiedemann, 1823, pp. 109-110.


Nine specimens from Sumatra (Bedagei Interior, *ca*. 600 ft.; Gng. Talang, Padang Interior; Mt. Singalang): many from Java (Telaga Bodas, Garoet. 4,000-5,000 ft.; G. Tji Salimau, *ca*. 5,000 ft.; Tji Bodas, Gng. Gede, *ca*. 4,000 ft., all in Preanger; also Bantenzorg and Tjandirato): and one said to come from the Key Islands (near New Guinea). Length 46-56 mm.

The species of *Pelopides* may be identified as follows:

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Key</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>The anterior lower tooth of the right mandible small but distinct in unworn specimens</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>The anterior lower tooth of the right mandible absent</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>The outer tubercles at least approximately symmetrical: the anterior lower tooth of the right mandible larger</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>The inner angle of the right outer tubercle produced forwards and inwards beyond that of the left: the former acute, the latter obtuse; the anterior lower tooth of the right mandible smaller</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The left outer tubercle consisting of a single, somewhat slender, obliquely truncate process; the right one, of a similar but broader and slightly bifid inner process together with smaller pointed outer and middle processes</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Both tubercles consisting of two or three denticles more or less fused together, the tubercle as a whole being very broad on the right or on both sides</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The right and left outer tubercles of equal size, though not always of identical form</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>The right outer tubercle much broader than the left</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The lateral grooves of the elytra all narrow, simply punctured</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Grooves 5-7 of the elytra more or less broad: each containing a polished flattened band, which is marked by a single row of punctures, and defined on either side by a more or less distinct tonguèmed line with which the punctures may be to some extent confluent</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

*P. symmericus*, p. 91.

*P. gravolus*, p. 91.

*P. simplex*, (Gravely).

*P. douglas*, p. 94.

*P. bremerstöer*, p. 91.
PLESTHENUS. (Pleth. 1829, p. 441.)

Type, Plesthenus personatus, Kever, pp. 36-39.

Of the fine specimens selected by Kever (1829, pp. 36-39) in the genus Plesthenus one, from Baden-Württemberg, probably belongs to an American species; the other three being February (see above p. 8). Therefore, of these three naming, Kever, in the first instance, the species is contained in the Van der Voort collection for purposes, these specimens. Each of these is however distinguished by some certain characters from the others; and at least two characteristics represented by the three specimens, one of which bears no identity with it. It is impossible to be certain at present whether the three specimens belong to three separate species or not, and it will probably be known to the nature of action by the one species alone, reducing at the same time to the individual differences.

The other main species, Plesthenus. Kever, and Kever, Vichten, are together represented by three specimens from the Bremen, two in the north and one in the south. The species of the northern one distinctly larger than the southern, and they have no noticeable or even colorations common with the other similar one, the only color present being grey, or the nobility, in the posterior portion, on the other hand, the right eye color is much the most strongly colored, and the left eye, although it is good enough developed, is some measure much weaker. Here again it seems impossible to determine, with certainty, how many species any representatives, in this material belong to, the differentias between differences among them, and these individually correlated with identity.

I propose, therefore, to treat all as a single species, Plesthenus, and consider it as a more or less distinct individual. Thus, the three to be distinguished (more exactly) by one that is biventer.

I am unable to identify any of the specimens known to me, either of the species (described only Kever’s work has published too many species), but it is possible, I think, that these may prove to be no fewer than several forms of Plesthenus.

Plesthenus invitus. Kever.

P. 1

Pleusthenus personatus, Kever, 1829, p. 36.

These specimens, one of which is from Tiemser, Baden-Wurttemberg, and another from Mendo, both the specimens, whose identity was overlooked are 1 1 1 1 1 1 , 1 1 1 1 1 1 1 . The other specimen is much larger, being 1 1 1 1 1 1 .

This species differs from Plesthenus personatus, Kever, and seems only in the penis, character mentioned above (p. 36) in having the left anterior inner tooth wholly distinct from the second posterior tooth instead of being basally based with it, and in the weaker
and more crescentic scars on the mentum. The outer tubercles of the head are practically symmetrical, the right one being slightly broader than the left, at least in the Tondano specimen. In this specimen the space between the inner and outer tubercles is surrounded by fine but distinct ridges, of which the lateral and posterior are straight, and the anterior procurred. In the large specimen the lateral ridges are absent, the anterior one is procurred and the posterior one recurved; and in the Menado specimen even the anterior and posterior ridges are indistinct.

Plethensus quadricornis, Kaup.

Pl. I.

Plethensus quadricornis, 1871, p. 40, pl. iv, fig. 4.

Four specimens of the northern race, quadricornis, s. str. (see above, p. 96), from Toli-Toli and three from Menado, both in Northern Celebes. One specimen of the southern race, gelon (Schaufuss, 1885, pp. 187-188), from Samanga, one from Patunuang, and two from Macassar, all in Southern Celebes. Length of the northern race 49-53 mm. Length of the southern race 55-60 mm.

P. quadricornis differs from P. invitus only in having the right outer tubercle somewhat longer, and sometimes more obliquely truncate or even acuminate, and in having the left outer tubercle smaller and acuminate or obsolete. In the Toli-Toli specimens the left outer tubercle is an acutely pointed process, scarcely shorter than the inner side of the somewhat obliquely truncate right outer tubercle. In the Menado specimens it is much shorter, the apex being rectangular or even obtuse. This is the case in the specimens from Samanga and Patunuang also; but in these the right outer tubercle is somewhat slenderer and more obliquely truncate; in size, moreover, these specimens resemble those from Macassar and not the preceding. In the Macassar specimens the left outer tubercle is scarcely recognizable, and the right outer tubercle is acuminate.

The two above described species of Plethensus may be identified thus:

- The outer tubercles approximately symmetrical, both of them truncate
  - P. invitus, p. 96.
- The outer tubercles asymmetrical, the right one much larger than the left and truncate, except when the latter is obsolete, in which case it may be acuminate; the left one never truncate
  - P. quadricornis, p. 97.

Genus MASTOCHILUS, Kaup, 1868a, pp. 19-20, corrected 1868b, p. 31.

Type, Passalus polyphyllus, MacLeay, 1826, p. 439.

This genus, as pointed out above (p. 77), may be divided into four more or less distinct sub-genera:

- The mentum laterally with a narrow depressed matt border, or more extensively matt; large Australian forms with very short antennal lamellae; always symmetrical
  - Phaenochilus, p. 98.
- The mentum uniformly glossy in fresh specimens; the antennal lamellae much longer; or not Australian
  - 2.

1 Kaup, 1868a, pp. 20-21. Type, Passalus dilatatus, Dalman.
Mastochilus (Pharochilus) dilatatus (Schönherr).


A few specimens from Queensland (Cardwell) and New South Wales (Richmond River and Sydney). Length 34-36 mm.

The inner tuberules are large, somewhat as in M. questionus, but they are widely separated, the frontal area being always strongly transverse, and not elevated. The general texture of the upper surface of the head resembles that of M. australasicus. The more or less confluent and transverse grooves on the mentum are deeply crescentic, being almost equidistant from the anterior and posterior margins near the middle line; and the punctured lateral parts of the mentum have a narrow matt border on the outer side. The elytra resemble those of M. questionus and M. australasicus, except that the punctures are somewhat transverse, especially towards the posterior end, where the ridges between them are apt to be more or less obsolete.

Mastochilus (Pharochilus) nitidulus. MacLeay.

Pl. 1

Mastochilus nitidulus. MacLeay, 1871, p. 175.


Two specimens from New England, New South Wales, presented by Mr. H. Schrader. Length 44 mm.

The lateral lobes of the mentum resemble those of M. dilatatus. The median part of the mentum resembles that of M. politus, which species this one resembles in all other respects.

1 The only exceptin known to M. persistens (Heller) from New Guinea (length 39.5 mm). Concerning the position of this species, see Rohwer, 1919, pp. 17-18.
2 The only exception known is a specimen from Nauru, which is apparently found both in Australia and New Guinea (length 25.5 mm).
3 Kuwert, 1898, p. 230. Type, P. pubescens pubescens, Kuwert, 1898, p. 333, over Zang, 1905a, p. 238, footnote, also p. 74.
4 Kuert, 1898, p. 5. Type, C. pubescens Kuhl, 1806a, p. 5.
Mastochilus (Pharoichilus) politus (Barmeister).

Fig. XIII. 1.

*Passalus politus*, Barmeister, 1847, pp. 465-466.

A number of specimens from Queensland and Victoria, and two from Tasmania (Brighton). Also three presented by Mr. H. Schrader, two being from Tingha and one from the Clarence River, both in New South Wales. Length 30.5-37.0 mm.

The upper surface of the head resembles that of *M. dilatatus*, except that there is a secondary tubercle developed on the upper side of the base of each of the outer tubercles, which consequently appear very high and obliquely truncate in side view. The ridge bounding posteriorly the crescentic groove on the mentum is usually more pronounced, and the lateral matt border is very broad and extends round in front on to the inner side of the punctured area. The punctures in the lateral grooves of the elytra, though sometimes irregular, and inclined to be more or less transverse behind, as a rule resemble those of *M. quesestionis* and *australasiens* more closely than they do those of *M. dilatatus*.

**Mastochilus (Pharoichilus) punctiger**, n. sp.

Fig. XIII. 2.

Two specimens from New South Wales. Length 33 mm.

The small triangular frontal area is bounded laterally by high frontal ridges and inner tubercles, somewhat as is *M. quesestionis*, but is not itself elevated. The ridges joining the inner tubercles to each other and to the outer tubercles are absent, a broad transverse flattened rugose band extending between the supraorbital ridges from the inner tubercles to the anterior margin of the head; behind this band the head is smooth and glossy. The mentum is somewhat coarsely and sparsely punctured between the scars, with a more or less triangular, extensive (but sometimes indistinct) depression in front. Its lateral parts are more closely and finely punctured on the inner side, obliquely striate with a more or less smooth matt border on the outer.

The median groove of the pronotum is deeply impressed, but may be incomplete in front; the marginal grooves are coarsely punctured in their anterior extremities, which bend slightly inwards; the remainder of them is very finely punctured, as are also the pronotal scars. The general surface of the pronotum is unpunctured. The semitellum...
bears a number of scattered punctures, especially in front. The meso-sternum is matt, with a coarsely punctured V-shaped area in front. It is without scars. The posterior intermediate areas of the metasternum are closely and coarsely punctured, with the exception of a band bordering the somewhat narrow and rugose lateral areas. The elytra resemble those of *M. australasicus*.

**Mastochilus (s. str.) quaestionis** (Kuwert).

*Fig XIII, 3 p 99*

**Euphtheroidea quaestionis**, Kuwert, 1896 p 327.

A number of specimens from New South Wales, several being from the Richmond River. Length 44-54 mm.

Easily distinguished from all other known species by its large inner tubercles, which are situated very close to one another and to the central tubercle, the whole of the small triangular concave frontal area being strongly elevated. The small central part of the mentum is usually marked with a pair of more or less confluent shallow transverse grooves a little behind, and a small depression in the middle of, the anterior margin; but either or both of these may be faint or absent; or one may be so strongly developed as to obliterate the other. Strong ridges, however, are never present. The lateral parts of the mentum, in front of the primary scars, are glossy, punctured and hairy throughout. The pronotum has no median groove; its scars are punctured. The elytra are more coarsely punctured at the sides than above.

**Mastochilus (s. str.) australasicus** (Percheron).

*Fig I*.

**Passalus australasicus**, Percheron, 1841, pp 67 pl lxxvi fig 2.

A number of specimens from Queensland, New South Wales (Richmond River) and Victoria (Melbourne); also a series said to come from Dodinga in Halmahera; also specimens presented by Mr. H. Schrauder from Tintha and New England, New South Wales. Length 57-58 mm.

The small inner tubercles are situated nearly half as far from the outer tubercles as the latter are from each other, and almost directly behind them. The ridge uniting the inner tubercles is often absent. When present it may be close in front of the frontal ridges, or some distance in front of them. The frontal area, which may thus be almost non-existent or of considerable size, is smooth and glossy; the area between it and the anterior margin of the band is very rough. The pronotum, mentum and elytra resemble those of *M. quaestionis*.

**Mastochilus (s. str.) polyphyllus** (MacLeay).

*Passalus polyphyllus*, MacLeay, 1826 p 439.

Several specimens from Queensland and New South Wales (Sydney); also one said to come from Dodinga in Halmahera. Length 54-50 mm.

The central and inner tubercles are more widely separated than in the preceding species; and the frontal ridges, instead of running direct between the two, diverge either from an

---

1. Probably part of a series from Australia which has been wrongly labelled.
anterior prolongation of the central tubercle or at very acute angle, and curve first outwards and then a little forwards, with the result that the frontal area appears markedly transverse. The ridge joining the inner tubercles together is present, but there are no ridges in front of these tubercles. The mentum is glossy throughout, and bears a small but deeply impressed V- or U-shaped groove in the middle in front; only the lateral parts are punctured. The pronotum resembles that of *P. punctiger*, the median groove being very strongly developed. The dorsal grooves of the elytra are imperfectly, the lateral ones strongly but not very coarsely, punctured.

**Mastochilus (Analaches) australiensis** (Stoliczka).

Fig. XIII, 1. p. 99.

*Cetejus australiensis*, Stoliczka, 1873, pp. 157-158 (continuation of footnote to p. 156).

A number of specimens from Queensland, one from New South Wales and one from New Guinea (Stephansort, Astrolabe Bay). Length 25.5-30.0 mm. The smallest and flattest species known from Australia, also the only one with asymmetrical outer tubercles.

All six antennal lamellae are extremely long and slender. The upper tooth of both mandibles is obsolete, and the denticle behind it, though well developed, is more or less hidden beneath the ends of the supra-orbital ridges; from this denticle a slight ridge extends downwards to the outer angle of the mandible, which is produced into an acute and outwardly (almost forwardly) directed tooth. The outer tubercles are very large, the left one slightly more so than the right; the gap between them is semi-circular. The inner tubercles are situated at their base; the frontal area is about twice as broad as long. The general surface of the upper side of the head is more or less strongly punctured. The secondary sears on the mentum are transverse and matt; with the middle of the anterior margin they enclose more or less completely a small triangular glossy area.

The pronotum is more or less sparsely covered at the sides with large punctures, which tend to concentrate in and around the sears. Its marginal grooves are punctured throughout and are scarcely bent inwards at their anterior ends. The median groove is more or less obsolete. The dorsal grooves of the elytra are finely punctured; the lateral ones are much broader than the ridges between them, and the transverse ridges between their enlarged matt punctures are more or less obsolete.

**Mastochilus (Analaches) puberilis** (Kuwert).

*Epilaches puberilis*, Kuwert, 1898, p. 337.¹

One specimen from Milne Bay, British New Guinea, and one presented by the British Museum, also from New Guinea. Length 31.3-33 mm.

The mandibles are not angulate externally, and the denticle near the base of the upper margin is not covered by the anterior angles of the head. The outer tubercles resemble those of *M. australiensis*, but the inner ones are situated a considerable distance behind them. The frontal area is smaller and more triangular. The pronotum is somewhat indistinctly punctured in the sears and marginal grooves; except for this it is unpunctured; the median groove may be somewhat stronger. The dorsal grooves of the elytra are

¹ First mentioned in Kuwert's 1891 list, where the name is spelt *puberilis* as above.
unpunctured; the lateral ones are strongly punctured. In other respects the species resembles \textit{M. australiensis}.

**Mastochilus (Cetejus) grabowskii** (Kuwert).

\textit{Cetejus\ grabowskii}, Kuwert, 1898, p. 330.

Three specimens from Humboldt Bay, New Guinea.\(\textsuperscript{1}\) Length 28.5-29.6 mm. A stouter insect than \textit{M. australiensis} or \textit{M. puberulis}, with shorter antennal lamellae.

The mandibles are not angulate externally, and there is no denticle exposed on the upper margin behind the rudimentary upper tooth. The upper surface of the head resembles that of \textit{M. puberulis}, except that the outer tubercles are more outwardly directed, that the central and inner tubercles are more widely separated, and that the frontal ridges are more or less incomplete between them. The secondary scars on the mentum are represented by a more or less broken transverse groove a little behind the anterior margin. The scars, anterior angles, and marginal grooves of the pronotum are coarsely punctured; the median groove is very strong. All the grooves of the elytra are somewhat coarsely punctured.

**Mastochilus (Cetejus) sodalis** (Kaup).

\textit{Aserris sodalis}, Kaup, 1869a, pp. 29-30, and 1869b, p. 5.

A number of specimens from Ternate and Batjan, one of the latter being from Labuan; also one from Taruna, Gt. Sangir, 2,000 ft. Length 24.0-25.8 mm.

This species closely resembles the last, but is smaller and therefore less perceptibly asymmetrical; it has a somewhat shorter frontal area, and has the groove formed by the secondary scars on the mentum deep and unbroken.

**Mastochilus (Cetejus) peltostictus** (Kaup).

\textit{Aserris peltostictus}, Kaup, 1869b, pp. 5-6.

Two specimens from Ternam and many from New Guinea, one of the latter being from Stepheonort. Length 22.5-26.3.

The outer tubercles are strongly asymmetrical, the left one being slightly longer than the right. A broad and truncate instead of slender and pointed, and more inwardly directed. The groove representing the secondary scars on the mentum is more strongly arched away from the anterior margin than in \textit{M. sodalis}, and the grooves of the elytra are more finely punctured, especially the dorsal ones. In other respects \textit{M. peltostictus} resembles \textit{M. sodalis}.

\(\textsuperscript{1}\) The two specimens which I received from Stephenson 1911, p. 331, though compared with one memorandum in Berlin, do not agree with his description of the present specimens and are apparently \textit{M. puberulis} Kaup.
The above-mentioned species of Mastochilus may be grouped into four sub-genera as indicated above (pp. 97-98), and may be distinguished from one another thus:

I. Sub-genus PHAROCHILUS, Kaup.
1. The median part of the mentum with at most two or three punctures
2. The median part of the mentum strongly punctured throughout
3. The lateral lobes of the mentum with a more or less narrow matt border on the outer side
4. The lateral lobes of the mentum broadly matt on the outer side
5. The ridges of the elytra obsolete in the extreme posterior angles

II. Sub-genus MASTOCHILUS, s. str.
1. The frontal area small, almost equilaterally triangular, raised above the general surface of the head
2. The frontal area not raised above the general surface of the head, usually much broader than long
3. The secondary scars very variable in development; when present always extending inwards from the ends of the anterior margin of the median part of the mentum
4. The secondary scars always developed as a pair of fine grooves defining a small and more or less equilaterally triangular shield in the middle of the anterior margin

III. Sub-genus ANALACHES, Kuwert.
1. The lateral grooves of the elytra much broader than the ridges between them; the transverse ridges between their enlarged matt punctures more or less obsolete
2. The lateral grooves of the elytra narrow and strongly punctured

IV. Sub-genus CETEJUS, Kaup.
1. The left outer tubercle pointed, directed forwards or a little outwards
2. The left outer tubercle truncate, directed inwards
3. The secondary scars on the mentum represented by a more or less broken transverse groove a little behind the anterior margin
4. The groove formed by the secondary scars on the mentum deep and unbroken

Genus LABIENUS, Kaup. 1871, p. 39.


Type, Eriocnemis pter. Kaup. 1868, p. 25.
Labienus inaequalis, n. sp.

Figs. XIV 1 and XV 1

Two specimens from Hattam, Arfak, Dutch New Guinea. Length 37.7–38.7 mm.

This species is closely allied to *L. trigonophorus*, from which it differs in the following particulars only. The anterior margin of the labrum is more strongly concave. The primary scars on the mentum are much smaller, and the secondary ones, much larger, the latter almost meeting in the middle line immediately in front of the posterior margin. The general surface of the head is less rugose than in *L. trigonophorus*, and the left outer tubercle is much larger and more definitely directed inwards; the frontal ridges are obsolete in front of the inner tubercles. The anterior angles of the prothorax are somewhat more obtuse; the median groove is complete. The posterior intermediate areas of the metasternum are almost unpunctured as well as being hairless; the lateral areas are thickly punctured and hairy as in *L. trigonophorus*, their surface being on the same level as that of the intermediate areas, an abrupt change of level occurring only where they touch the central area. Neither in *L. trigonophorus* nor in *L. inaequalis* are the elytra united.

Labienus dolhni (Kuwert).

Fig XIV. 2, also pl. 1.

*Ascidias dolhni*, Kuwert 1898 p 326.

Four specimens from Dutch New Guinea, three being from Hattam, Arfak, and one from Kapaur. Length 42.47 mm.

This species is easily recognised by the small free forwardly directed apex of the central tubercle and the absence of inner tubercles. The frontal and parietal ridges are obsolete or absent. The outer tubercles may be simple and symmetrical, or the left one may be more or less distinctly double; the anterior margin of the head is usually more or less rough between them, this rough area being separated from the rest of the head by a fine ridge or groove.

The pronotum is much broader behind than in front; its median groove is indistinct; it is without punctures except in the posterior angles (including the true scars, though other unpunctured depressions may be present near them), which are densely hairy and punctured. The scutellum bears two longitudinal lines of fine punctures. The mesothoracic episterna are punctured except in the posterior angles. The mesosternum is smooth and polished; its scars are distinct, but very small and less close to the margin than usual. The metasternum resembles that of *L. trigonophorus*. The grooves of the elytra are deep but unpunctured.
Labienus ptoxoides, n. sp.

Figs. XIV. 3 and XV. 2.

Two specimens, one from Andai and the other from Mt. Arfak, both in New Guinea. Length 44-46 mm.

This species is allied to L. gracilis and L. ptox. The antennae resemble those of L. ptox, the first two lamellae being quite short and the remaining four very long. The secondary scars of the mentum are straight, and extend to the posterior margin. The head closely resembles that of both L. gracilis and L. ptox, especially the latter. The pronotum resembles that of L. ptox, the scars being more densely hairy and punctured than in L. gracilis. In all other respects the present insect resembles both species.

Labienus ptox. Kaup.

Fig. XV. 3.


Numerous specimens from New Guinea (Stephansort, Bongu, Milne Bay and Room Islands), Aru (Ueinnung and Wamma Dobbo) and Waigen. Also one said to come from Borneo and three from Sumatra. Length 48-58 mm.

This species differs from the last only in its larger size and in having the scars on the mentum strongly arched instead of straight.

Labienus compergus (Boisduval).

Fig. XIV. 4: also pl. 1.

Passalus compergus, Boisduval, 1835. pp. 214 216.
Vallepus compergus, Kaup, 1871. p. 36.

Several specimens from New Guinea (Milne Bay; Stephansort, Astrolabe Bay; Andar; Kapaur; and Hattam, Arfak) and one from Waigen. Length 32-36 mm.

The antennae resemble those of the majority of species belonging to the genus. The right outer tubercle is more or less distinctly double. The left outer tubercle may be similar, or may be composed of three more or less distinct processes. The pronotal scars are unpunctured and hairless. The mesosternal scars are variable. The posterior intermediate areas of the metasternum are unpunctured. All the grooves of the elytra
especially the lateral ones are distinctly punctured. In other respects the species resembles \( L. \text{ ple} \).

**Labienus moluccanus** (Fischer).  

\( P. \text{ moluccanus} \) Fischer 1855, pp. 31–33, pl. 6 fig. 7  

Numerous specimens from Ceram (Reevesesat-Panca in the central part, Wahai in the north, Elsavati Bay in the south, Hometoe in the West), Lautae in Nusa Laut, Sapania, Huu and Lemmor in Ambon, Batjan. Length 42–52 mm.

This species differs from the last only in having the frontal ridge more or less obsolete behind the inner tubercles, in having the two processes of each of the outer tubercles less distinct (much as in \( L. \text{ ple} \) and \( pteroides \)) and in having the elytra united in the middle line.

**Labienus gigas** (Kaup).

Pl. 1.

\( L. \text{ gigas} \) Kaup 1882, p. 23  

Seven specimens from Batjan, including five from Labuan, one from Halmahera, one from Ternate, and two without locality records. Length 36–61 mm. I am unable to distinguish between \( L. \text{ gigas} \) from Ternate and \( L. \text{ crassus} \) from Batjan.

The elytra are united as in \( L. \text{ moluccanus} \), which the present species resembles in all respects except in having each of the outer tubercles composed of three more or less distinct blunt processes, and in having the posterior intermediate areas of the metasternum and a rule the protal scar punctured, though not hairy.

The species of \( L. \text{ bohreni} \) known to me may be identified thus:—

| 1. The coecal scars on the mentum convergent behind curved | \( L. \text{ tropangulatus} \) (Zanger) |  |
|———|———|———|
| 2. The secondary scars on the mentum strongly arched outwards, very widely separated as a whole | \( L. \text{ crassus} \) p. 134 |  |
| 3. The outer tubercles simple, central the grooves of the elytra punctured | \( L. \text{ kiiweri} \) p. 164 |  |
| 4. As above | \( L. \text{ abdita} \) p. 164 |  |
| 5. The left outer tubercle exactly longer than the right; the mentum with primary scars | \( L. \text{ baileyi} \) (Graves) |  |
| 6. The left outer tubercle much longer than the right; the mentum without primary scars | \( L. \text{ taeniates} \) p. 104 |  |
| 7. The central tubercle free and not | \( L. \text{ ple} \) |  |
| 8. The central tubercle not free | \( L. \text{ abdita} \) |  |
The anteninal lamellae normal

The first two anteninal lamellae very short, the remaining four exceptionally long

The first two anteninal lamellae very short, the remaining four exceptionally long

The anteninal lamellae normal

The elytra separate; insects of moderate size

The elytra united; insects of large size

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
<th>Genus</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The anteninal lamellae normal</td>
<td>L. graecus</td>
<td>Heller</td>
</tr>
<tr>
<td>7</td>
<td>The first two anteninal lamellae very short, the remaining four exceptionally long</td>
<td>L. platzaelii</td>
<td>p. 105</td>
</tr>
<tr>
<td>8</td>
<td>The first two anteninal lamellae very short, the remaining four exceptionally long</td>
<td>L. phyl.</td>
<td>p. 105</td>
</tr>
<tr>
<td>9</td>
<td>The anteninal lamellae normal</td>
<td>L. concolor</td>
<td>p. 105</td>
</tr>
<tr>
<td>10</td>
<td>The outer tubercles much narrower than the space between them, each being composed of two more or less distinct blunt processes only; the posterior intermediate areas of the metasternum smooth</td>
<td>L. moluccanus</td>
<td>p. 106</td>
</tr>
</tbody>
</table>


= *Pelops*, Kaup, 1871, preoccupied.

**Type, Passalidae australis**, Boisduval, 1835, pp. 246-247, pl. vi, fig. 21.

**Protomocoelus australis** (Boisduval).

Pl. I.

**Passalidae australis**, Boisduval, 1835, pp. 246-247, pl. vi, fig. 21.

**Pelops australis**, Kaup, 1871, p. 38.

Five specimens from the Solomon Islands (including one from San Cristoval and one from Bougainville), three from New Britain, many from New Guinea (Milne Bay) Stephanosort and Isola Yule), and several from Waigen, Aru (Wampa Dobbo and Urening) and Ceram. Also one specimen said to come from Australia. Length 30-47 mm. The Solomon Islands specimens (except the one from Bougainville, which is only 35 mm. long), and the specimen labelled Australia, are much the largest, none of the others exceeding 37 mm. in length. Apart from the Bougainville specimen the smallest of the Solomon Islands specimens is 41 mm. long. I am unable, however, to find any constant structural difference between the Solomon Islands specimens and the others, and am consequently unable to recognize *P. solonanis* (Kauf) as distinct. *P. australis* is somewhat variable, and the validity of Kuwert's species may be doubted.

**Protomocoelus australis** is probably allied more closely to *Labuus inequalis* than to any other species yet described. It differs from it, however, in the structure of the mandibles (see above, pp. 78 and 79); in the broader and often more widely separated, but very variable

---

1 See Gravely, 1913, for figures of this species.
2 Passalidae in *Proc. Zool. Soc.* 1888, p. 10, cannot belong, as supposed by Kuwert, to the present genus. Two outer tubercles are equal and obtuse instead of unequal and acute. It comes from Sydney, and belongs therefore to *Labuus inequalis* by Kuwert; it is said by Fisher to be allied to *Mesochroma pheusplatyclus*, and doubtless belongs to the same genus.
area on the mentum; in having the frontal ridge more or less obsolete behind instead of in front of the upper tubercle; in the deep concavity between the outer tubercle and the anterior end of the supra-orbital ridge of the left or of both sides of the head; in having the right outer tubercle about as long as the left although more slender; in having no distinct median groove on the pronotum; in usually having punctures on the posterior inner intermediate areas of the metasternum, and in having the dorsal grooves of the elytra as distinctly punctured as the lateral ones. The elytra are not united in either species.

Genus GONATAS. 

Kamp. 1871, p. 59.

Type: Panaetus carbonarius. Percheron, 1844, op. 12, pl. xxxiv, fig. 1.

Gonatas minus [Kuwent].

Pl. 1

Gonatas minus [Kuwent].

Kamp. 1871, p. 59.

Several specimens from New Britain, of which two are from Herbertshohe and said to be from Wawatam and one without locality recorded. Length 20-25 mm.

Gonatas pumilio, Kamp.

Kamp. 1871, p. 59.

Several specimens from New Guinea (Torres Straits, Fuy River, Kapmar, Waigen, Mandina, Kutimoi, and Gevan (Herbertshohe in the western, Waigen in the northern, and


F. 3. XVI 1


One specimen from Herbertshohe, New Britain. Length 25 mm.

The antennae resemble those of G. minimus, the mandibles those of G. pumilio. The posterior margin of the mentum is very lightly curved as in both species, but the lateral
forwardly directed parts of the scars are much more, and the other parts less, deeply impressed than in either. The lateral areas of the metasternum are somewhat smoother and the pronotum and elytra somewhat more convex than in either.

Gonatas schellongi. Kuwert.

Pl. I.

_Gonatas schellongi_, Kuwert, 1898, p. 311.

Numerous specimens from New Guinea (Stephansort, Milne Bay, Humboldt Bay, Torres Straits), Kei Islands, and New Brittian (Herbert-shoek). Length 28.5-32 mm.

The antennal lamellae are longer than in the two preceding species, and the posterior margin of the mentum is more strongly curved, the scars consequently forming a W-rather than a v-shaped figure. The left mandible is as broad as the right and scarcely if at all longer; its anterior lower tooth is less distinct than in _G. minuteus_ but more distinct than in other species of the genus. The form of the outer tubercles varies slightly, and _G. tridentatus_. Kuwert, is unlikely, I think, to prove distinct; _G. differens, albertsis, major_ and _maculiferidium_ will perhaps also prove to be identical with the present species. The lateral areas of the metasternum are punctured and hairy. The dorsal grooves of the elytra are less distinctly punctured than are the lateral ones.

Gonatas germari. Kaup.

_Accemes germari_, Kaup, 1865a, pp. 30-31.
_Gonatas germari_, Kaup, 1871, p. 51.

Numerous specimens from Ternate and Batjan (Labuan), five from Halmahera (Dolinga), and Great Banda, one from Morty Island near Halmahera, one from the Kei Islands, and one said to be from Australia. Also one from New Guinea (Dorey) and four from Buru (Wakollo in the central part of the island, and Hat on the east coast) all of much larger size. Length, excluding the Dorey and Burn specimens, 28.5-26.3 mm.; length of Dorey specimens 29.0 mm.; length of Burn specimens 31.0-32.3 mm.

The antennae and mentum resemble those of _G. schellongi_. The left mandible is distinctly longer than the right, and its anterior lower tooth is more or less obsolete. The lateral areas of the metasternum are punctured and more or less hairy. The difference between the distinctness of the punctures in the dorsal and lateral grooves of the elytra is less great than in _G. schellongi_.

Gonatas tenimbreensis. n.sp.

Fig. XVI. 2.

Five specimens from Tenimber (or Timor Laut), four being from Jandema. Length 25.5-27.0.

Closely allied to the preceding species, from which it differs only in having still less or no trace of the left anterior lower tooth, in having antennae with shorter lamellae like those of _G. minuteus_ and _G. ctenoides_, and in having the lateral areas of the metasternum unpunctured and hairless. The scars on the mentum are deeply impressed throughout.
Gonatas carolinensis, n. sp.

Fig. XVI, 3, p. 108.

Three specimens from the Caroline Islands. Length 22.4-23.2 mm.

This species differs from the last only in its smaller size, slightly longer antennal lamellae, and more even mentum, the scars being less deeply impressed, especially medially.

Gonatas minor, n. sp.

Fig. XVI, 4, p. 108.

Four specimens from Melor ("Major") and one from Raro ("Roon") Islands. Length 21.3-22.2.

The antennae are very long as in G. germanica. The difference in length between the right and left mandibles is somewhat greater in G. minor and in the next species than in any other. The mentum resembles that of G. germanica; its scars are less deeply impressed than in G. robusticeps, but more deeply impressed than in G. carolinensis. The lateral areas of the meta-mentum are smooth and hairless. In other respects the present species resembles G. germanica and G. naviicator.

Gonatas naviiculator (Percheron).

Fig. XVI, 5, p. 108; pl. 1.

Percheron, 1844, pp. 1-2, pl. 1. (Fig. 1)
Gonatas naviculator, Krupp, 1871, pp. 50-51.

Numerous specimens from Saparua Island, several from Ceram (Kairatou in the Western and Roonmatel-Pasama in the central part of the island) and Buano, one from Nuba and another to come from New Guinea. Length 23.6-24.5 mm.

G. naviculator can be distinguished from all other species of the genus known to me by the strongly and as a rule abruptly curved posterior margin of the mentum, though this character is not always so clearly marked in specimens from the mainland of Ceram as in those from the neighbouring islands. The antennal lamellae are comparatively short and stout in G. robusticeps, etc. The mandibles resemble those of G. minor. The outer tubercles are somewhat broader than in G. germanica, which the present species resembles in other respects.

The above-mentioned species of Gonatas may be identified thus:

1. The posterior margin of the mentum very distinctly curved.
2. The posterior margin of the mentum more or less straightened.
3. The anterior margin of the mentum more or less slightly curved.
4. The anterior margin of the mentum more or less distinctly curved.
5. The mentum longer, more of the left mandible rudimentary to.
6. The mentum shorter, more of the left mandible rudimentary to.
7. The antennal lamellae very slender; the scars on the mentum distinctly shaped.
8. The antennal lamellae strongly arched; the scars on the mentum not strongly incurved, more or less abruptly impressed behind. 
9. The antennal lamellae arched; the scars on the mentum not strongly incurved, more or less strongly impressed behind.

G. carolinensis, p. 108.
G. minor, p. 108.
G. naviculator, p. 108.
The left anterior lower tooth small but distinct, the left mandible of about the same size as the right.

The left anterior lower tooth more or less rudimentary: the left mandible more or less distinctly longer and slenderer than the right.

The posterior margin of the mentum moderately strongly arched.

The posterior margin of the mentum very strongly arched; the antennal lamellae somewhat short and stout; the lateral areas of the metasternum somewhat rough and hairy.

The lateral areas of the metasternum more or less rough and hairy; the antennal lamellae very long and slender.

The lateral areas of the metasternum smooth and hairless.

The antennal lamellae somewhat long and slender; the scars on the mentum very deeply impressed.

The antennal lamellae longer and slenderer; the scars on the mentum less deeply impressed.

The left mandible and the antennal lamellae moderately long and slender; the scars on the mentum very lightly impressed, especially near the middle line.

The left mandible and the antennal lamellae somewhat longer and slenderer; the scars on the mentum normal.

Genus **PSEUDEPISPHENUS**, Gravely, 1914c, p. 327.

Type, *Pseudepisphenus perplexus*, Gravely, 1914c, pp. 327-328, text-fig. 8, A-B.

**Pseudepisphenus perplexus**, Gravely.

Pl. 1.

*Pseudepisphenus perplexus*, Gravely, 1914c, pp. 327-328, text-fig. 8, A-B.

One specimen from Snow Mts., 4,000-6,000 ft., Dutch New Guinea, presented by the British Museum. Length 29.5 mm.


Type, *Tarquinius pedulus*, Kuwert, 1898, p. 279; Gravely, 1914c, pp. 178 & 327, text-fig. 8, c-v. (see pl. 1).

Subfamily **LEPTAULACINAE**.

The genera of Leptaulacinae may be separated thus:

- The sides of the elytra hairy
- The sides of the elytra hairless

Genus TRICHOSTIGMUS. Kaup, 1874, p. 31

Trichostigmus ursulus. (Schult.)

Length 1600-1925 mm.

Trichostigmus ursulus resembles Leptaulax bicolor, except in the generic character and in having the sides of the pronotum more sparsely punctured in the neighbourhood of the scutum and not at all in the anterior angles.

Trichostigmus thoreyi, Kaup.

Length 1677 mm.

Tr. thoreyi differs from the preceding and only other known species of the genus only in the structure of the pronotum.

The species of Trichostigmus may be distinguished thus:

| Pronotum with a few punctures, the interior angles 9 | pronotum bicolor, Zang; and I was able to make a hurried examination of the named collection in Berlin. But I had had no opportunity of examining a large and representative collection at leisure an opportunity which has now been afforded by the obtaining of the Van de Poll collection for the Indian Museum.

The careful examination of the additional material convinces me that the drastic reduction in the number of species advocated in my previous paper was fully justified except in the case of L. bicolor, and indeed, that a few further reductions must be made. Thus L. obtusus proves to be a synonym of L. bicolor; and L. osagensis var. together with the names regarded as synonyms with it, are almost certainly synonyms of the same species, or partly of the same species and partly of L. dentatus.

I have seen nothing in the collection that can be distinguished as L. mucronatus; but a specimen labelled with this name, and associated with specimens both of L. bicolor and L. dentatus, proves to belong to the former species. I am still reluctant to think, judging from Schult."'s description, that the type may prove to be of a distinct species, the coexistence of the head being apparently much rarer than in L. bicolor, and the convexity of...
of the body much greater than in *L. cycloptenaecius*, the only other species known to me from Celebes with which it can possibly be identified. But for the present it seems best to drop the name *macassariensis*, raising the Bornean *anabasis* to specific rank.

The variation of *L. cycloptenaecius* in size, form, and head-puncturing proves to be much greater than I previously supposed, especially in Malaysian specimens; and the distinction between the Malaysian and continental races breaks down. The name *kinalagae* therefore becomes a synonym only. *L. anipunctus* is very near *L. cycloptenaecius* and may prove to be identical with it. For the present it seems best to regard it as a variety of that species.

I am no longer able to regard the varieties *laticostis* and *glabreclusis*, of *L. bicolor* and *dentatus* respectively, as distinct.

The three species *L. bicolor*, *L. cycloptenaecius* and *L. dentatus* are so variable as to require very special care in their discrimination. The first and third can always be told apart by the structure of their parietal ridges, which extend outwards to the supraorbital ridges in the former, and end abruptly not far from the central tubercle in the latter. In *L. cycloptenaecius* these ridges are variable; but the puncturing of the lateral grooves of the elytra is much more distinctly scalariform than is ever the case in *L. bicolor* (this is usually, but not always, so in *L. dentatus* also); and the central area of the metasternum is almost invariably punctured either irregularly or over a more or less V-shaped area, punctures being absent or confined to a single symmetrically placed pair in *L. dentatus*. In the rare cases where the general appearance of the specimen resembles that of *L. cycloptenaecius*, and the central area of the metasternum is entirely without punctures—I have only seen one such, and very few in which these punctures were not at least moderately numerous, all of these being from Sumatra or the Malay Peninsula—one can only base one's identification on the somewhat indefinite and variable characters afforded by the shape of the frontal ridges and the puncturing of the head.

**Leptaulax planus** (Illiger).


*Leptaulax planus*, Gravely, 1914, pp. 290-291 and 310, pl. xiii, fig. 58.

One specimen from Siam, nine from the Malay Peninsula (four of them from Perak, and one from Larut), many from Sumatra (Bedagei Interior, ca. 600 ft.; Tandjong Morawa: Serdang; S. E. Serdang, ca. 1,000 ft.; Png. Pandjung. Padang Interior. ca. 2,000 ft.; Tandjong-Djati. Raman, Palembang, ca. 2,000 ft.) and Borneo (Sarawak; Brunei; Doesonlanden: Martapura; Mt. Marapok, Dent Province: Mt. Kina-Balu) and one from Celebes (Tondano, Minahassa). M. Guy Babault has sent specimens for examination from Medan, Sumatra. Length 12.3-13.0 mm.

**Leptaulax glaber** (Kirsch).

*Tricostygus glaber*, Kirsch. 1877b, pp. 139-149.


One specimen from Batjan and four from New Guinea (Humboldt Bay, Mt. Arfak and Takar). Length 14.0-15.8 mm.

But for the reddish-brown colouration commonly found on the anterior parts of the elytra, this species might easily be confused with small and much flattened specimens of the
Polynesian form of I. bicolor. The specimen before me, however, show the extent of this colouration to be extremely variable; for in one of the Humboldt Bay specimens it covers about a half and in the other about a third of the whole area, while in a third specimen from New Guinea it is confined to a somewhat indistinct patch between the shoulder and in the fourth it is entirely absent. The chief characteristics of the species, apart from brown, are its extreme flatness, the fineness of the marginal grooves of the pronotum, and the almost entire absence of punctures from the pronotum and metasternum. The frontal ridges extend outwards and slightly forwards, to end somewhat abruptly at a considerable distance behind the outer marginal tubercles.

**Leptaulax sambawae, n. sp.**

Four specimens from B. Aroe Hessa, Sambawa, 2,000-5,000 ft., and two from Poera, Allor Islands, 3,000-4,000 ft. Length 24-27 mm.

This species differs from L. bicolor only in having the pronotum somewhat less distinctly rectangular in shape, and entirely unpunctured except somewhat indistinctly in the scar and still more indistinctly in the marginal grooves; in having the punctures on the posterior intermediate areas of the metasternum more or less obsolete, and in having the elytra distinctly wider behind than in front with their lateral grooves much less strongly punctured. The abdominal sternum are polished and are entirely unpunctured in two specimens, the terminal segment being marked in others with hair-bearing punctures.

**Leptaulax barbicauda (Zang).**

*Leptaulax barbicauda* Zang, 1905a pp 164 165

Several specimens from the Malay Peninsula, (Gap, ca. 3,000 ft., Selangor-Pahang boundary) submitted by Mr. C. Holman Hunt. Length 27-30 mm.

This species is transitional between L. sambawae and L. bicolor, and is so near the latter most variable species that I have some hesitation in regarding it as distinct. It is, however, distinctly bigger, with large and strongly rectangular pronotum, the general appearance of the insect consequently resembling that of L. dentatus. The puncturing of the pronotum and metasternum is weaker than is usually the case in L. bicolor, tending to resemble rather that round in L. sambawae; there are always, however, a few punctures in the anterior angles of the pronotum, and the punctures in the pronotal scars and on the posterior intermediate areas of the metasternum are somewhat stronger.

**Leptaulax bicolor (Fabricius).**

*Phloicus bicolor* Fabricius 1793 p 276

*Phloicus bicolor* var. formosus LeConte 1867 pp 257-259 and 307-309

Numerous specimens, including one or more from each of the following localities: Ceylon (Belinda Oya); Perambalum, Cochin State; 1,500-3,200 ft. (collected by myself); South Kooppa, Y Coorg (presented by Mr. T. Bambiruge Fletcher); Tukvar, Darjeeling District, P. Jack, Darjeeling District, 2,000 ft. (collected by myself); Margherita, Assam, Port Blair, Andaman (collected by Mr. S. W. Kemp); Tonkin (Napé, Thadum, Chapa, Heanam, and Xiong Khounang submitted by M. Vital de Salvaza; and Cape Fonquet, submitted by M. Guy Baladit); Sam: Perak, Malay Peninsula; Gap, 3,000 ft.
Schangor-Pahang boundary, Malay Peninsula (one specimen sent for examination by Mr. C. Holman-Hunt) ; Hili Madjedja and G. Madjedja, North Nias ; Kalim Bungo, Middle Nias, Sumatra (Bedagai Interior, ca. 600 ft. ; Below Lawang, Paroebaum : Mama Riang, Palembang, 2,000-3,000 ft. ; Tandjong-Pattu, Ranau, Palembang, ca. 2,000 ft. ; Kandg, Amapat, Lower Padang; Bug. Proepoe, Pad. Bovenland, ca. 1,000 ft. ; Engano Island, Benkoelen; also specimens from Medan, submitted by M. Guy Babault) ; Java (Bogor- Buitenzorg ; Tji Bodas, Gng. Gede, ca. 4,000 ft. ; Telega Bodas, Garoet, Preanger, 4,000-5,000 ft. ; Mt. Tjikorai, 4,000 ft. ; Sukabumi, 2,000 ft. ; and Pengalengan, 4,000 ft. ; W. Java: G. Tji Salinar, ca. 3,000 ft. ; W. Preanger; Tji Solak, Wunokoops Bay; Mt. Tengger, 4,000 ft.; E. Java ; Malang; Borneo (Mt. Marapok; Mt. Kinabalu ; Sarawak; Pontianak; Dodonlanden; N. S. 115° E.; Bangney Island) ; Philippine Islands (Davao; also specimens presented by Mr. C. F. Baker from Iaugim, N. Visayas ; Mt. Makiling, Luzon; Zambanga, Mindanao; Mt. Bonatao and Los Banos) ; Talaut Islands (Salihan) ; Celebes (Lumpa-Battau, 3,000 ft.; Tjamba and Rantiboeroeng in the south; Menado; Loka, Bonthain); Halmaheira (Gilo); Morty; Ternate; Batjan (Labuan); Wakollo, Central Burma; Hat. Burn East Coast; Mysol; Kei Islands; New Guinea (Humboldt Bay; Kapaur; Dore; Run). Length 12-24 mm.

In the large and representative collection now before me I find it impossible to subdivide the species satisfactorily into groups distinguished by the amount of puncturing on the abdominal sterna. There is, however, a marked though imperfect correlation of the extent of this puncturing with the localities from which the specimens come. Specimens with smooth sterna being characteristic of Ceylon, the Andamans and Nicobars, the Philippines, and the Archipelago easterly of the Sunda Islands. In specimens from Java the abdominal sterna are as a rule less extensively punctured than in specimens from Sumatra and Borneo; but specimens with absolutely unpunctured abdominal sterna do occur in Borneo and in small islands near Sumatra, if not actually on the mainland.

The form of the mesosternal scars is also variable. Normally they are rounded on the inner side, and are not very large; but in specimens from the archipelago easterly of Borneo the inner side is usually straight, extending much further backwards. Such forms also occur further west, though more rarely. Celebes specimens appear to occupy a somewhat intermediate position.

In very small specimens from the Archipelago easterly of Celebes, which are usually extremely flat like _L. planus_, the frontal ridges resemble more or less closely those of _L. glaber_, ending behind the anterior margin of the head and usually between its inner and outer tubercles; and the marginal tubercles of often closely approximated. When a series of specimens is examined, however, this character also proves to be somewhat indeterminate, and I am no longer able to regard _L. obtusidens_, Kuwert, as distinct.

The size of the punctures in the lateral grooves of the elytra is very variable both in _L. bicolor_ and in _L. dentatus_. As a rule it is much smaller in the former than in the latter, but the difference in the case of extreme specimens is very small. There is never any difficulty, however, in distinguishing the two species from each other, by the structure of the parietal ridges, which extend to the supra-orbital ridges in _L. bicolor_, but end abruptly about half way between the central tubercle and the supra-orbital ridges in _L. dentatus_.

q 2
Leptaulax anabarbis, Kuwert.

*Leptaulax anabarbis*, Kuwert, Gravely 1914, p. 293.

One specimen from Mt. Kinabalu. Length 2.2 mm.

Leptaulax cyclothaenius, Kuwert.

*Leptaulax cyclothaenius*, Zang, 1907, p. 234-235.

A number of specimens of the typical form from the following localities:—Margherita, Assam; Xiang Khoang, Tonkin and Cambodia (presented by M. Vitalis de Salvaza); Perak, Malay Peninsula (also specimens from Gap, 2,700-3,000 ft. Selangor-Pahang Boundary, and foothills of Gunong Hitam, Selangor, Malay Peninsula, submitted by Mr. C. Hohman Hunt); Sumatra (Kandg., Ampat, Lower Padang; Gunung-Agung, Palembang, 5,000 ft.; S. E. Serdang, ca. 1,000 ft.; Engano Island, Benkullen Residency; also specimens from Medan, Sumatra, submitted by W. Guy Babault); Borneo (Mts. Kinabalu and Marapok) and North Celebes (Tondano, Minahassa; Toli-Toli).

Also several specimens of the variety *anabarbis*, Zang, from Chapa and Lao Kay, Tonkin, and from Cambodia, presented by Mr. Vitalis de Salvaza.

Length 1.17-2.09 mm.

The varietal form *anabarbis* differs from the typical form only in having the pronotum somewhat sparsely, though extensively, punctured in the anterior angles and round about the apex, instead of densely punctured on the sides from end to end; and in having the posterior intermediate areas of the metasternum somewhat weakly punctured on the inner side only.

The structure of the head is very long. The parietal ridges are usually long as in *L. bicolor* in small specimens, and short as *L. dentatus* in larger ones. The latter usually have the surface of the head densely punctured and the frontal area longer than broad; the former usually have the surface of the head more or less unpunctured and the frontal area broader than long. Very small specimens are usually extremely flat like *L. planus*, larger ones being somewhat stouter; this is the case in *L. bicolor* also.

Leptaulax dentatus (Fabricius).


Numerous specimens from the following localities:—Madras; Nepal; Darjiling District (Tukvar, Van de Poll collection; Singla, presented by H. E. Lord Carmichael; and Kumapong, presented by myself); Tonkin (Lao Kay, Vietnam, Hoabunk, Napé), Laos (Kheo-Kme) and Cambodia (Kumpong Kedey) submitted by M. R. Vitalis de Salvaza; Rendong State, Karen Hills, Burma, 4,000 ft.; Annam (Port Blair, presented by Mr. S. W. Kemp); Penang, Perak, Malay Peninsula; Carey Island (presented by Mr. C. Holman-Hunt); Hih Madjedja, X. Nias; Calim Baro, Middle Xias; Sumatra (Medan, submitted by M. Guy Babault); Tanjond-Devi, ca. 2,000 ft. and Mara-Rhum, ca. 1,000 ft.; Kenun, Palembang; S. E. Serdang, E. Coast, ca. 1,000 ft.; Bedagei.
Interior, East Coast, ca. 600 ft.: Kandj. Amapat. Lower Padang: Java (Malang: Tengger Mt., 4,000 ft.; Tjicopo; Boeboe Lawang. Paseroean: Senggoro, southern Paseroean; Central Java, 1,500 ft.); Bali: Borneo (Mts. Kinabalu and Marapok: Doesonlanden; Martapura. S. E. Borneo): Philippines (Mindoro: S. Palawan: Babac: also specimens presented by Mr. C. F. Baker from Imugin, N. Vissale: Mt. Makiling and Limay, Luzon; Iligan Mindanao: Mt. Banahao; and Los Banos): Taruna, Great Sangir: Celebes (Tondano: and Tangari, Minahassa. Menado and Toli-Toli in the north: Bonthain, Bua-Kraeng, 5,000 ft.; Tjamba and Bantimurung in the south): Sapit, Lombok, 2,000 ft.; Bumi (North Coast; Kajeli; Iliat, East Coast; Wae Kibo; Tifu Bay): Hitu. Amboina: Ceram (Wahaai; Rumasosal-Pasania: Kairatoe) Banao: Nus Laut. Also a specimen said to come from British Honduras, and others from the following localities which I have been unable to trace:—Sula Besi (Doherty); Labumarang, Andonara (Doherty): Pach. (Mouhot): Mat. (Wallace). Length 17.5-32.7 mm.

The puncturing of the abdominal sterna is very variable and proves, as in L. bicolor, to be of no use for the distinction of definite varieties—hence the name glabriventis becomes a synonym. The central area of the metasternum bears at most a pair of symmetrically placed punctures. It never bears irregular punctures such as are ordinarily characteristic of L. cyclochaenius.

**Leptaulax timoriensis** (Percheron).


Three specimens from Gng. Leo, Dutch Timor, 2,000-4,000 ft.; five from Dilli. Port Timor, 2,500 ft.; one from Iwaki, Wetter; and two from the Alor Islands. Length 24-35 mm.

This species is very near *L. dentatus*, being distinguished only by the structure of the pronotum, which is less distinctly rectangular, and is unpunctured in the anterior angles, except in very small specimens in which one or two punctures may be present in this position. In small specimens the puncturing in and around the pronotal scars and marginal grooves is more extensive than in large ones.

**Leptaulax anna**, Zang.


Four specimens from B. Aru Hassa, Sambawa, 2,000-5,000 ft. Length 30-31 mm.

*L. anna* is very like *L. timoriensis*, but has the pronotal scars less densely punctured, has the elytra more distinctly broadened behind with their lateral grooves matt and marked with somewhat worn-looking punctures, and has the metasternum hairy laterally and in front. In the Van de Poll specimens (30-31 mm. long) the lateral and intermediate areas of the metasternum are united; but in a smaller specimen in our collection (26 mm. long and a co-type) they are distinct, though the ridge between them is somewhat weak behind. The elytra are separate.
Leptaulax humerosus, Kuwert.


*Leptaulax humerosus*, Gravely, 1911, pp. 271-272, pl. xiii, fig. 141.

Numerous specimens from the following localities: - Perak Malay Peninsula : Sumatra (Matang-Ring, 2,000; 3,000 ft. and Tendjou-Djati, ca. 2,000 ft., Reun. Palembang; Bag. Procope, Padang Interior, ca. 6,000 ft., S. F. Serdang, ca. 1,000 ft. and Bedagei Interior, ca. 6,000 ft., East Coast, Beloe Lawang, Peroece); Java (Malang, Pengalengan, S. Preanger, 4,000; 5,000 ft., G. Gedeh, N. W. Preanger, 4,000 ft., Telaga Bodas, Garoet, Preanger, 4,000; 5,000 ft.; G. Tji Salunar W Preanger, 3,000 ft., Tegger Mountain, E. Java, 3,000 ft.). Borneo (Martapura and Kinabalu) Length 15-8-22.5 mm.

Easily distinguishable from *L. verna*, which it resembles as regard, the sculpturing of the elytra, by its smaller size by its more strongly rectangular pronotum with thickly punctured sides, and more or less prominent anterior angles, and by its slenderer elytra.

The species of *Leptaulax* which I have been able to recognize may be distinguished from one another thus:

1. The elytra polished throughout

2. The depressed surface of the two or three outermost grooves of the elytra dull; the punctures somewhat worn looking

3. The puncturing of the lateral grooves of the elytra not strongly transverse; the parietal ridges united with the supraorbital ridges

4. The puncturing of the lateral grooves of the elytra strongly transverse; or the parietal ridges ending more or less abruptly about half way to the supraorbital ridge

5. The abdominal sternum covered evenly all over with somewhat obscure broad, yellow punctures

6. The puncturing of the abdominal sternum variable in extent; sometimes absent, when present always finer, and when extensive deeper and less uniform

7. The median grooves of the pronotum extremely fine; their puncturing more or less obsolete; the sides of the pronotum and the posterior intermediate areas of the metasternum at least weakly punctured

8. The median grooves of the pronotum coarsely but strongly punctured; the sides of the pronotum and the posterior intermediate areas of the metasternum as a rule strongly and extensively punctured

9. The puncturing strongly expanding the elytra more or less generally, small punctures not more than 15 mm. in diameter

10. The sides of the pronotum immediately behind the elytra more or less distinctly holocellate, long-punctate, not less than 21 mm. long

Lam. *L. humerosus*, p. 111.
The frontal ridges ending in the inner marginal tubercles; insects always micolorous above... The frontal ridges extending parallel to the anterior margin of the head to a point between the inner and outer marginal tubercles, where they end somewhat abruptly: the anterior parts of the elytra commonly reddish brown in otherwise black insects... Large insects (over 28 mm. long); the puncturing of the pronotum and metasternum very scanty... Smaller insects (not more than 25 mm. long); the puncturing of the pronotum and metasternum much denser... The parietal ridges united with the supraorbital ridges; the central area of the metasternum unpunctured... The parietal ridges ending more or less abruptly about half way to the supraorbital ridges; or, the central area of the metasternum punctured... The central area of the metasternum almost invariably with at least a few more or less irregularly placed punctures; the parietal ridges variable... The central area of the metasternum with at most one pair of symmetrically placed punctures; the parietal ridges always ending more or less abruptly about half way to the supra-orbital ridges... The pronotum strongly rectangular; its anterior angles more or less extensively punctured... The pronotum more rounded; its anterior angles unpunctured, except in small specimens, where a small group may be present... The grooves of the elytra not tuberculate... A more or less distinct polished tubercle formed out of each of the transverse ridges in the lateral grooves of the elytra... The pronotum convex, punctured only in the scars and marginal grooves and usually in the anterior angles; the elytra short, dilated behind; the metasternum hairy laterally and in front, its lateral and intermediate areas often united... The pronotum somewhat flattened, densely punctured laterally, its sides practically straight; the elytra slender, more or less parallel sided; the metasternum hairless, the intermediate and lateral areas always distinct... 


ZOOGEOGRAPHICAL RESULTS:

It would be useless to attempt to give here a detailed account of the distribution of the various species of Passalidae. For in the case of Oriental genera the information gathered together in my "Account of the Oriental Passalidae" can readily be supplemented by the
additional records contained in the present paper; and in the case of other genera no compilation is possible without a much more detailed revision of synonymy than I am at present able to achieve. But the general distribution of the family requires some further consideration in the light of certain facts set forth in the present paper.

It will be convenient to deal with the Indo-Australian area first.

The area is inhabited by three subfamilies of Passalidae, namely the Aulacoxylinae, Macrolininae and Leptaulacinae.

The Aulacoxylinae, though not a very large subfamily, appears to be a somewhat highly specialized one. In none of its species are there frontal and parietal ridges or inner and outer tubercles, such as are found in the more primitive species of all other subfamilies - and in the three largest genera, Camacupes, Taeucoecerus and Aulacoxyclus the basal piece and lateral lobes of the male genital tube form one piece, either by consolidation or by the suppression of the basal piece, instead of being separate as in other subfamilies (see Sharp and Muir, 1912, p. 385; also above, p. 5), while the middle lower tooth on each mandible is unicuspid. In all other Passalidae, even in such primitive forms as Dolichodes salicornarius, this tooth is jointed. Jouting does not occur, so far as I know, in any beetles other than Passalids, and is clearly an indication of specialization: but its absence in Camacupes, Taeucoecerus and Aulacoxyclus is probably secondary and not primitive, especially as it is correlated with specialization of the male genital tube. In the two remaining genera, Ceracupes and Cylindrocyclus, the structure, both of the tooth in question and of the male genital tube, resemble those found in other subfamilies.

The largest genus, Aulacoxyclus, is found in the Australian Region, but extends into the Sunda Islands and Indian Peninsula. This discontinuous distribution suggests that ground is being lost in the Oriental Region, which is occupied by Brunner's genera Camacupes and Taeucoecerus predominately. These genera are confined to the Oriental Region, except for a single species of Camacupes (C. toracoides) which has established itself in Celebes. Only one species, Taeucoecerus béraspe, is known north of the Malay Peninsula; this extends northwards to the Himalayas.

The genera Ceracupes and Cylindrocyclus, in which the male genital tube and middle lower tooth resemble those of other subfamilies, only occur towards and beyond the northern confines of the Oriental Region. With these presumably primitive characters they combine cephalic exoesences which give them a most unusual appearance. Such exoesences frequently indicate the senility of a group, and it seems probable that Ceracupes and Cylindrocyclus are some survivors of a transitional group through which the more typical Aulacoxylinae of the present time may have been derived. Ceracupes is less aberrant than Cylindrocyclus and occurs in Burma, the Himalayas, Tonkin and Formosa. The latter only occurs still farther north, namely in China and Japan. Its species are the only Aulacoxylinae known to have mud dystra.

The Macrolininae fall into two series of genera, whose distribution must be considered separately. The first of these comprises the genera Macrolinus and Pleurotus, whose combined range covers the Oriental Region and Celebes, but does not extend into the Papuan Sub-Region. Ceylon is occupied by species of Macrolinus which are closely allied to one another but differ in certain characters, common to all of them, from the remaining.
species of the genus, 1 The genus Pleurarius appears entirely to replace Macrolinus in the Indian Peninsula. This genus has otherwise been recorded only from Sumatra, whence it was originally described. In the absence of further records from that island I am inclined to doubt the validity of the record and to believe the genus to be confined to the Indian Peninsula. If this is so the genus probably contains one species only, a species whose elytra are united. Other groups of Macrolinus occupy respectively (1) the Indo-Chinese Sub-Region, (2) the Malayan Sub-Region and (3) Celebes, except that one rare Celebean species belongs to the Malayan group. Species of Macrolinus with fused elytra are known only in the Ceylonese and Celebean groups.

The second series of genera of Macrolininae (Pl. I) is found throughout the Indo-Australian area and is remarkable for the pronounced asymmetry which is developed in most of its more highly specialized members. It comprises the Acreinae and Gnaphalocneminae of my previous papers, one of which was devoted to a special study of its distribution (1914b).

The study of more extensive material fully confirms the geographical separation, in Ceylon and Australia respectively, of the primitive and closely related symmetrical forms by the more highly specialized and less closely related descendants of each: but shows that I was mistaken in confusing the Celebean Passalid fauna with the Papuan, and that my suggestions regarding phylogeny can be improved upon.

Concerning the distribution of the genera Epiphenus, Ophrygonius and Aceraius there is nothing fresh to add. The first named is confined to the Indian Peninsula and Ceylon, the two last to the rest of the Oriental Region. The species inhabiting Ceylon are less highly specialized than those inhabiting the Indian Peninsula, which in their turn are less highly specialized than those found on the other side of the Ganges, taking these as a whole. And in each of these areas the most asymmetrical (i.e., the most highly specialized) is also the most abundant, the most variable, and among the largest. It also has gregarious habits (Gravely, 1914b, pp. 202-204: 1914c, pp. 311-313).

Similarly, in the genus Pelopides, the most abundant species in the Sunda Islands are large and highly asymmetrical (P. tridens, etc.); but in the Malay Peninsula the most abundant species (P. dorsalis) is smaller and more nearly symmetrical. The most symmetrical species of all appears to be confined to Borneo, the island where a primitive form would be least expected: but it does not seem to be common there.

The genus Pelopides is found all over the Malayan Sub-Region, and extends beyond it into the extreme south of Burma, but no further. Its connection with simpler genera is obscure, but it would be quite in keeping with the general relationship between the evolution and distribution of asymmetrical Passalids for some ancestral form to be found in Continental Asia. It seems to me possible that such may be represented in the genus Tiberioides, a symmetrical genus whose presence in the area occupied by Ophrygonius and Aceraius does not accord well with any direct relationship with them. If this is the case, the grooves on the mentum of T. boracilis no doubt represent an early stage in the development of the large secondary scars found in all species of Pelopides. Closely allied to Pelopides is the genus Plesthemus, which is confined to Celebes (see above, p. 96).

1 For the distinctive characters of the several local groups of species of Macrolinus see sections 1-2 of the table on pp. 82-84 above.
The most primitive species of the Australian Region belong to the genus *Mastochilus*, a genus which, like the Oriental *Epiphenus*, contains both symmetrical and more or less strongly asymmetrical species. The subgenera *Pharochilus* and *Mastochilus*, which with one exception (*M. pertinacens* Heller, from New Guinea) are confined to Australia, contain large and robust symmetrical insects. The subgenera *Anabaches* and *Corephus*, which with one exception (*M. australiensis* from Australia) are found in the islands north of Australia, contain smaller and often lighter insects which are almost always more or less asymmetrical. In the two species of *Epiphenus* inhabiting Ceylon the dominant one is slightly asymmetrical, the other, which is symmetrical, being closely allied to it, but much less abundant and of smaller size. In Australia, on the contrary, the various symmetrical species are dominant, the asymmetrical *Mastochilus* (*Anabachines*) *australiensis* being comparatively rare, which suggests that *M. australiensis* is a comparatively recent introduction and has not been derived directly from its symmetrical compatriots. This suggestion is supported by the fact that *M. australiensis* is much more closely related to Papuan than to Australian species, being indeed one of the most highly asymmetrical members of its genus, and by the fact that it has been recorded from New Guinea as well as from Australia.

The genus *Mastochilus* probably represents the primitive stock from which the genera *Labices* (with *Protomococcus*), *Gematus* and *Psuedephenus* (with *Tarapanus*) have been derived.

In *Labices* specialization affects mainly the metasternum, apparently in association with the wings, which tend to lose their normal function and doubtless to become more efficient stridulating organs at the same time. In the most highly specialized members of the genus, which appear to be confined to the Moluccas, the elytra are united in the middle line, species with separate elytra being apparently to be confined to New Guinea, the Aru Islands, etc.

*Protomococcus* appears to have been derived from the simpler forms of *Labices*. Its derivation is reduced, in which respect it is the most highly specialized of all the species with a modified metasternum. But the elytra are not united nor do they show any tendency to become ovate. The genus occurs in the Solomon Islands and has been recorded from the Moluccas, as well as from the Islands inhabited by the simpler forms of *Labices*.

The genus *Gematus* constitutes a second line of descent from *Mastochilus*. The metasternum, wings and elytra are always normal; but the mandibles become very strongly asymmetrical, and the posterior margin of the mentum very strongly arched, in highly specialized form. The progressive stages of this development are still preserved in the less highly specialized species. The most primitive species of all, *G. simplicus*, appears to be confined to New Guinea and its neighbouring islands; but *G. puahio*, the species most closely allied to it, although occurring there appears to be centred in the Moluccas. Much larger and more abundant than either are *G. schellomi*, *G. germanus* and *G. inerculator*, which must be regarded as the dominant species of the genus. *G. schellomi* is somewhat more primitive than either of the others, and is confined to New Guinea, the other two being centred in the Moluccas, though recorded from New Guinea and from Java and the Philippine Arch.
The third and last line of descent from Mastochilus is found in the genera Pseudepispheneus and Tarquinius, two extremely rare forms known only from New Guinea. Their affinities have already been fully discussed elsewhere (Gravely, 1924c, 328-329).

The Leptahilacinae are centred in the Malayan Sub-Region, whence several have spread westwards and eastwards to the Indo-Chinese Sub-Region and Celebes respectively. The two dominant species, L. bicolor and L. dentatus, have spread beyond these limits into the Indian Peninsula and Ceylon in the west, and into the Moluccas, New Guinea, and possibly even Australia in the east. Isolated species have arisen in several of the islands or island groups of both the eastern and western parts of the archipelago. The number of distinct species appears, however, to be small and the more widely distributed species especially are extremely variable and often difficult to distinguish from one another. They are also extremely abundant. This probably indicates that the subfamily is of relatively recent origin and that it has not yet reached a condition of equilibrium.

The importance of Palk Strait, the Gangetic Plain, the China Sea and Isthmus of Kra (together), the Straits of Macassar and Torres Strait in the distribution of the Macrolininae has already been pointed out (Gravely, 1914c, p. 338). The further study of the Passalidae of the Australian Region shows that the Molucca and Gilolo Straits are of no less importance and, indeed, that the former belongs the special importance which I previously attached to the Straits of Macassar, the fauna of Celebes being even more unlike that of the Australian Region than it is unlike that of the Oriental Region.

The Passalids hitherto recorded from Celebes are as follows: 1—

<table>
<thead>
<tr>
<th>Genus</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conocephes fornicollis subsp. minor</td>
<td></td>
</tr>
<tr>
<td>Aulacephalus celebensis</td>
<td></td>
</tr>
<tr>
<td>Macrolinus subperfectus</td>
<td></td>
</tr>
<tr>
<td></td>
<td>denticulatus</td>
</tr>
<tr>
<td></td>
<td>nitidus</td>
</tr>
<tr>
<td>Accraeus lacriolius</td>
<td></td>
</tr>
<tr>
<td>Plesthesusspp.</td>
<td></td>
</tr>
<tr>
<td>Trichostigmus uruslbus</td>
<td></td>
</tr>
<tr>
<td>Leptanax planatus</td>
<td></td>
</tr>
<tr>
<td></td>
<td>bicolor</td>
</tr>
<tr>
<td></td>
<td>cyclotomus</td>
</tr>
<tr>
<td></td>
<td>dentatus</td>
</tr>
</tbody>
</table>

(1) These two constitute a group which is endemic.

(2) Genus otherwise purely Oriental; C. fornicollis, s. str., confined to Borneo.

Endemic. Genus Indo-Australian.

Endemic. Belongs to the group of Macrolinus otherwise known only from the Malayan Subregion.

(1) A Malayan species. The genus is so definitely Oriental that I am inclined to doubt this record.

Endemic. Allied to the Oriental Pelopodes.

Endemic. The only other known species of the genus is Oriental.

(1) Oriental species which appear to be extending their range. One at least has reached New Guinea and possibly Australia.

Although a large proportion of these species are endemic, and it is doubtful whether either of the two most characteristic asymmetrical Oriental genera, Accraeus and Pelopodes, occur in Celebes at all, it will be seen that every species known from Celebes is related to species which are essentially Oriental, although some have established themselves in the Australian Region also.

1 Concerning Kuwert's record of "Pelopades imprescriptus" see above, p. 107, footnote 2.
The Passalid fauna of the Moluccas is closely allied to that of New Guinea, and several species have been recorded as common to both. In the genus *Gonatus*, however, it is noteworthy that of the two species with most primitive mentum the one with complete dentition is only known from New Guinea, while of the three common species with more highly specialized mentum the one with the most primitive dentition seems to be confined to New Guinea and the other two to the Moluccas. Similarly, in the genus *Labecnus*, species with normal elytra appear to be confined to New Guinea and those with fused elytra to the Moluccas. The allied *Protanomocela*, in which the mandibles are modified instead of the elytra, belongs however to New Guinea, and although it is undoubtedly more widely distributed than any of its allies, the single record of its occurrence in the Moluccas should be confirmed before it is finally accepted. *Pseudoposphenus* and *Turquanus* are only known from New Guinea.

The information at present available regarding the distribution of American and Ethiopian Passalidae is much less satisfactory than that regarding the Indo-Australian subfamilies. The probable distinctness of the American and Ethiopian Passalid faunas, in spite of several records to the contrary, has already been dealt with (above, pp. 10 to 11). It is perhaps worthy of note here that no Ethiopian Passalidae are known to have the elytra united, and that in America, although species with fused elytra attain the largest size, the commonest and most widely distributed species have separate elytra. Among the Pseudaneiidae *Popillus curvatus* is the largest and most highly specialized of the species with separate elytra and is the commonest and most widely distributed species in the subfamily. Among the Proctotrupidae no species appears to be exceptionally abundant. Among the Passalidae *Parasitabela, Passalas intermedius* and *Passalas interrupta* are particularly abundant and widely distributed. The last named is probably the most abundant and widely distributed of all, and is also extremely variable. The group of species to which it belongs appears to me to be the culminating point of the general trend of evolution throughout its genus, a genus whose wealth of closely interrelated species suggests that it bears the same kind of relation to the rest of the American Passalid fauna as *Leptanula* does to the rest of the Indo-Australian.

**SUMMARY.**


The elytra is exposed and separated by a suture from the frons only in the subfamily *Pseudaneinae*. In a few other genera, mostly American, it is exposed but united to the frons. In the majority of Passalids the whole of the upper surface of the anterior part of the head, between the supra-orbital ridges and in front of the frontal ridges, is frons, the whole of the elytra being doubled beneath this out of sight (pp. 13, fig. 1, 1+4).

It is uncertain whether the inner and outer marginal tubercles of the *Leptanulae* are homologous with the inner and outer tubercles respectively of other Passalidae (pp. 2-3).

The dentition is reduced only in somewhat highly specialized forms. In American subfamilies it seems to be associated with the loss of the habit of flight, and to come about
through the fusion of the two lowest terminal teeth. In Indo-Australian subfamilies it is always associated with cephalic asymmetry and never with the loss of the habit of flight, and comes about through the fusion of the anterior lower and lowest terminal teeth (pp. 9-10, fig. ii).

The loss of the habit of flight appears to allow of greater specialization of the wings as stridulating organs. It produces definite structural modifications in the insect (pp. 4-5). The following genera contain, so far as is known, only flightless forms:—*Cylindrocuulus, Platyporres, Pleurarias, Procoeleoides, Procoelus, Procubus, Pseudacanthus* and *Publius*. The following species are also flightless:—*Labienus moluccanus* and *gigas, Macrolinus obesus* and *ursus, Passalus quitensis* and *Vinder supelcytis*.

The structure of the male genital tube is almost uniform throughout the family. The genera of Anlacocyclinae other than *Cercanipes* and *Cylindrocuulus* differ, however, from the rest of the family in that the basal piece and lateral lobes are represented by one undivided plate (p. 5).

The central tubercle is usually larger in females than in males in species in which it varies greatly in size (p. 5).

2. Classification.

Seven subfamilies have been recognized, of which one, the Anlacocyclinae, confined to the Indo-Australian area with China and Japan, is somewhat widely removed from all the others (p. 9). Two others are confined to the Indo-Australian area. These are distinguished from American and Ethiopian subfamilies by the structure of the mandibles (p. 9). The Ethiopian subfamily is distinguished from the four American ones by the structure of the anterior margin of the head (pp. 10-11).

The number of genera has been greatly reduced. Specific synonymy has not been dealt with, but there can be little doubt that a similar reduction is required in the number of species.


Passalidae appear to flourish only under more or less moist tropical conditions.

American, Ethiopian and Indo-Australian forms belong respectively to different subfamilies, probably without exception (pp. 9-12).

The group of Macrolininae with strong asymmetrical tendencies is of special zoogeographical interest. Its most primitive species inhabit Ceylon and Australia. These are closely allied to one another but give rise to divergent lines of descent, confined respectively to the Oriental Region with Celebes, and to the Australian Region. Both these regions are composed of a series of smaller areas, each characterized by a distinct Passalid fauna, which is more highly specialized in those nearer to Celebes than in those further away. These areas are: in the Oriental Region—Ceylon, the Indian Peninsula, the Indo-Chinese Subregion and the Malayan Subregion: and in the Australian Region—Australia, New Guinea and the Moluccas (pp. 120-124). These facts bear out the suggestion (Gravely, 1913, p. 204) that conditions towards the centre of the Archipelago are peculiarly favourable for evolution, and that as more and more highly specialized forms have arisen there, they have migrated outwards, driving before them the less highly
specialized, which have rarely survived except where they have been able to establish themselves behind some obstacle to migration.

The fauna of Celebes, though related to the Oriental fauna, is very distinct from it, and contains a large proportion of endemic species and one endemic genus (p. 123).

The genera Macrolopus and Pleuraria are Oriental. The former genus has produced local races in Celebes, and in each of the areas into which the Oriental Region proper has been divided above, with the single exception of the Indian Peninsula where it is replaced by the latter genus (pp. 123-124).

The Leptanulaeae appear to be centred in the Malayan Subregion and to be undergoing rapid development and expansion (p. 123).

The Aulacoxydinae appear to be a very highly specialized subfamily, now on the decline. The genera Ceracerpes and Cykladoceras appear to be the true representatives of an old group, in some respects more primitive than the forms at present dominant in the subfamily. They are only found towards and beyond the limits of distribution of the rest of the subfamily (p. 126).

The Solenocyclae appear to be peculiar to the Ethiopian Region, and the Pseudocantinaceae, Proculae and Passalinae to America. The information at present available as to their distribution is much less complete than is that available concerning Indo-Australian forms (pp. 5 & 124).

BIBLIOGRAPHY.

Papers marked with an asterisk (*) are not available in Calcutta.

1767. Linnæus, C. *Systema Naturæ* (2) Ed. XII Reformata (Stockholm, 1767).
1792. Fabricius, J. C. *Entomologia Systematica emenda et aucta*. 1, 2 (Hafniae, 1892), pp. 219-4.
1804. Weber, F. *Observaciones Entomologicae* (Kiihne, 1804).*


* 1826. Sturm, J. Catalog meiner Insector-Sammlung, I (Nürnberg, 1826).


(b) "Prodromus zu einer Monographie der Passaliden." Coleopterologische Hefte, IV, 1868, pp. 1-7.


1871. Macleay, W. "Notes on a collection of Insects from Gayndah (Coleoptera)." Trans. Ent. Soc. N. S. Wales II, 1871, pp. 159-263.


1890. Kuwert. (a) "Einige neue Passaliden." Deutsche Ent. Zeitschr. 1890, pp. 97-104.

* (b) "Die Passaliden und ihr Monographie von Kaup." Soc. Ent. V. 1890, pp. 1, 9 and 17.


(b) "Bemerkungen zur Alten Passaliden-Litteratur." *Deutsche Ent. Zeitschr.* 1903, pp. 117-120.


(b) "Viaggio del Dr. Alfredo Borelli nel Paraguay e nella Repubblica Argentina—Passalidi." *Boll. Mus. Torino XX.* 1905, No. 508, 16 pp.


(b) "Anderung in der Nomenclatur der Passaliden (Coleoptera)." *Zool. Anz.* XXIX, 1905, pp. 154-5.


INDEX.

Synonyms are printed in italics: page numbers referring to keys, descriptions, locality or synonymic records, and figures are printed in ordinary type: other numbers are in bold face.

The summary of the paper on pp. 124-126 has been designed partly as a guide to the whereabouts of the principal facts recorded. References to it are not included in this index. References to the list of recently described genera and species on pp. 7-9 have similarly been omitted.

<table>
<thead>
<tr>
<th>Synonym</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>abortivas (Passalus)</td>
<td>53, 60, 67</td>
</tr>
<tr>
<td>Acerinales</td>
<td>76, 121</td>
</tr>
<tr>
<td>Acerinales group</td>
<td>76, 79, 89 etc., 121, 123</td>
</tr>
<tr>
<td>aequalis (Ophrygnus)</td>
<td>88, 89</td>
</tr>
<tr>
<td>aequidens (Acerinales, Ophrygnus)</td>
<td>76, 88, 89</td>
</tr>
<tr>
<td>affinis (Passalus)</td>
<td>2, 55, 66</td>
</tr>
<tr>
<td>agassizii (Arroxy, Septurinii)</td>
<td>33, 31, 35</td>
</tr>
<tr>
<td>agnoscoenius (Vindex)</td>
<td>10, 11, 43, 46, 17</td>
</tr>
<tr>
<td>albirtisi (Comatus)</td>
<td>109</td>
</tr>
<tr>
<td>Adonocerus</td>
<td>51</td>
</tr>
<tr>
<td>altevii (Erioniwnus, Erioiternia)</td>
<td>75, 76</td>
</tr>
<tr>
<td>altaceosternus (Acerinales)</td>
<td>90, 93</td>
</tr>
<tr>
<td>amazonicus (Popiliius)</td>
<td>21, 27, 29</td>
</tr>
<tr>
<td>Aulacches</td>
<td>77, 97, 101 etc., 103, 122</td>
</tr>
<tr>
<td>andamanensis (Basiliwnus, Macroliwnus)</td>
<td>80, 83</td>
</tr>
<tr>
<td>angulatus (Passales, Peichopus)</td>
<td>68</td>
</tr>
<tr>
<td>angustifrons (Leptaulax)</td>
<td>116</td>
</tr>
<tr>
<td>anubarbis (Leptaulax)</td>
<td>113, 116, 119</td>
</tr>
<tr>
<td>anumtnctus (Leptaulax)</td>
<td>113, 116</td>
</tr>
<tr>
<td>anna (Leptaulax)</td>
<td>117, 119</td>
</tr>
<tr>
<td>aulacocylinae (Cijeronius, Solenoeyclus)</td>
<td>71</td>
</tr>
<tr>
<td>Apenrenches</td>
<td>51</td>
</tr>
<tr>
<td>approximatus (Passales, Solenoeyclus)</td>
<td>70</td>
</tr>
<tr>
<td>arrowi (Ceracupes)</td>
<td>21</td>
</tr>
<tr>
<td>Arroxy</td>
<td>32, 33, 33 etc.</td>
</tr>
<tr>
<td>arnensis (Aulacocylinae)</td>
<td>18, 20</td>
</tr>
<tr>
<td>assimilis (Passales, Veturnius)</td>
<td>31, 38, 39</td>
</tr>
<tr>
<td>Aulacocylinae</td>
<td>2, 5, 9, 12, 13 etc., 120</td>
</tr>
<tr>
<td>Aulacocylinae</td>
<td>5, 13, 14, 17 etc., 120, 123</td>
</tr>
<tr>
<td>Aulaclinas</td>
<td>77, 103</td>
</tr>
<tr>
<td>Auralalus</td>
<td>13, 21</td>
</tr>
<tr>
<td>austeni (Ceracupes)</td>
<td>21</td>
</tr>
<tr>
<td>austeni (Tiberionides)</td>
<td>85</td>
</tr>
<tr>
<td>Page</td>
<td>22, 100, 103</td>
</tr>
<tr>
<td>------</td>
<td>---------------</td>
</tr>
<tr>
<td>77, 98</td>
<td>101, 103, 122</td>
</tr>
<tr>
<td>107</td>
<td></td>
</tr>
<tr>
<td>72, 73, 74</td>
<td></td>
</tr>
<tr>
<td>112, 114, 119</td>
<td></td>
</tr>
<tr>
<td>15, 16</td>
<td></td>
</tr>
<tr>
<td>80, 86</td>
<td></td>
</tr>
<tr>
<td>81, 83</td>
<td></td>
</tr>
<tr>
<td>119</td>
<td></td>
</tr>
<tr>
<td>112, 113, 114, 119, 123</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td></td>
</tr>
<tr>
<td>16, 17</td>
<td>120</td>
</tr>
<tr>
<td>23, 29</td>
<td></td>
</tr>
<tr>
<td>61, 68</td>
<td></td>
</tr>
<tr>
<td>76, 84, 88</td>
<td></td>
</tr>
<tr>
<td>34, 38, 29</td>
<td></td>
</tr>
<tr>
<td>85</td>
<td></td>
</tr>
<tr>
<td>90, 92</td>
<td></td>
</tr>
<tr>
<td>5, 82, 84</td>
<td></td>
</tr>
<tr>
<td>45, 49, 50</td>
<td></td>
</tr>
<tr>
<td>24, 28, 29</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td></td>
</tr>
<tr>
<td>31, 35, 66</td>
<td></td>
</tr>
<tr>
<td>33, 35, 66, 66</td>
<td></td>
</tr>
<tr>
<td>43, 47</td>
<td></td>
</tr>
<tr>
<td>53, 55, 66</td>
<td></td>
</tr>
<tr>
<td>34, 40, 41, 47</td>
<td></td>
</tr>
<tr>
<td>15, 16</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
</tr>
<tr>
<td>37, 39</td>
<td></td>
</tr>
<tr>
<td>37</td>
<td></td>
</tr>
<tr>
<td>44, 49</td>
<td>120</td>
</tr>
<tr>
<td>77, 97, 102, 103, 122</td>
<td></td>
</tr>
<tr>
<td>108, 119</td>
<td></td>
</tr>
<tr>
<td>10, 17</td>
<td></td>
</tr>
<tr>
<td>85</td>
<td></td>
</tr>
<tr>
<td>2, 10, 11, 43, 44 etc.</td>
<td></td>
</tr>
<tr>
<td>Species</td>
<td>Page</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>Ciceronius</td>
<td>70, 71</td>
</tr>
<tr>
<td>clypeatus (Malaca-salus)</td>
<td>69, 70</td>
</tr>
<tr>
<td>Comacupes</td>
<td>11 etc., 120, 123</td>
</tr>
<tr>
<td>compergus (Labienus, Passalus, Velleius)</td>
<td>101, 105, 107</td>
</tr>
<tr>
<td>comptoni (Aervatius, Eipispheurus)</td>
<td>85, 86</td>
</tr>
<tr>
<td>Convexa</td>
<td>22, 25</td>
</tr>
<tr>
<td>convexus (Passalus)</td>
<td>55, 66</td>
</tr>
<tr>
<td>conviger (Chondrocephalus)</td>
<td>15</td>
</tr>
<tr>
<td>cornutus (Passalus, Popilius)</td>
<td>28, 29, 124</td>
</tr>
<tr>
<td>corticola (Passalus, Verres)</td>
<td>34, 40, 41</td>
</tr>
<tr>
<td>crassus (Passalus, Poblius)</td>
<td>34, 42</td>
</tr>
<tr>
<td>crematipennis (Macrolinus)</td>
<td>81, 83</td>
</tr>
<tr>
<td>crematinus (Paxillus)</td>
<td>45, 50, 51</td>
</tr>
<tr>
<td>criniceps (Veturius)</td>
<td>31, 37, 39</td>
</tr>
<tr>
<td>crenitatis (Heterochilus, Ophrygonius)</td>
<td>87</td>
</tr>
<tr>
<td>curtus (Passalus, Petrejaus)</td>
<td>53, 56, 66</td>
</tr>
<tr>
<td>cyclotaeinius (Leptaulax)</td>
<td>113, 116, 119, 123</td>
</tr>
<tr>
<td>cylindraceus (Comacupes, Passalus)</td>
<td>14, 16</td>
</tr>
<tr>
<td>Cylindrocaulus</td>
<td>14, 21, 120</td>
</tr>
<tr>
<td>Cyphocrocalus</td>
<td>42</td>
</tr>
<tr>
<td>dentatus (Leptaulax, Passalus)</td>
<td>112, 113, 116, 119, 123</td>
</tr>
<tr>
<td>depressus (Macrolinus)</td>
<td>80, 81, 83</td>
</tr>
<tr>
<td>devrollei (Aulacocycius, Tarriocerus)</td>
<td>19, 20</td>
</tr>
<tr>
<td>dichotoxus (Spurina)</td>
<td>24, 26</td>
</tr>
<tr>
<td>Dolinoideas</td>
<td>69, 72</td>
</tr>
<tr>
<td>Dolinus</td>
<td>72</td>
</tr>
<tr>
<td>differens (Gonatas)</td>
<td>109</td>
</tr>
<tr>
<td>dilatatus (Mastochilus Pharochilus, Passalus)</td>
<td>97, 98, 163</td>
</tr>
<tr>
<td>dohrni (Aurelius, Labienus)</td>
<td>101, 106</td>
</tr>
<tr>
<td>dorsalis (Eriocnemis, Pelopides)</td>
<td>94, 95, 121</td>
</tr>
<tr>
<td>duivenbodei (Macrolinus)</td>
<td>82, 83, 123</td>
</tr>
<tr>
<td>dunsiriensis (Ophrygonius)</td>
<td>86</td>
</tr>
<tr>
<td>duplicatus (Dolinus, Pentalobus)</td>
<td>71</td>
</tr>
<tr>
<td>edentulus (Aulacocycius, Passalus)</td>
<td>17, 18, 19, 20</td>
</tr>
<tr>
<td>Epeus</td>
<td>74</td>
</tr>
<tr>
<td>Epipertinius</td>
<td>51</td>
</tr>
<tr>
<td>Epiphanus</td>
<td>51</td>
</tr>
<tr>
<td>Epiphoraceus</td>
<td>51</td>
</tr>
<tr>
<td>Epipleurothrix</td>
<td>51</td>
</tr>
<tr>
<td>Episphemoides</td>
<td>77</td>
</tr>
<tr>
<td>Episphenus</td>
<td>78, 85 etc., 121, 122</td>
</tr>
<tr>
<td>Eriocnemis</td>
<td>93</td>
</tr>
<tr>
<td>Eriosomus</td>
<td>4, 10, 69, 71, etc.</td>
</tr>
</tbody>
</table>
hevdeni (Passalus, Veturini)

himalayae (Leptaulax) ..

himalagensis (Aceraius) ..

hiranai (Aceraius) ..

hostilis (? Erionomus. Passalus, Stephanocephalus) ..

humerosus (Leptaulax) ..

Hyperplesthenus ..

Hyperplesthenus group ..

illegalis (Aceraius) ..

impar (Labienus) ..

impessicollis (Maestochilus s. lat., Passalus, Pelops,

Protonogaews) ..

inaequalis (Labienus) ..

inaequalis (Ophrygonius, Passalus) ..

incertus (Passalus) ..

inaequus (Passalus, Rholocanthopus) ..

inequalis (Passalus, Undulifer) ..

indiceus (Basiliana, Episphenusa) ..

intergenus (Popilius, Soranus) ..

intermedius (Phytverres, Verres) ..

interruptus (Lucanus, Passalus) ..

interstitalis (Passalus)..

invitus (Plesthenus)..

jalapensis (Pseudacanthus) ..

jansoni (Passalus, Phoroneus) ..

javaensis (Ophrygonius) ..

Kaupioloides ..

Kaupioloides group ..

Kaufius ..

klugi (Leptaulax, Pentalobus) ..

kuverdi (Aceraius) ..

kuverti (Tiberioides, Tiberius) ..

Labienus ..

lauricollis (Aceraius, Passalus) ..

locuinarca (Aceraius) ..

lamellatus (Aceraius) ..

languidus (Veleus, Passalus) ..

laniger (Aceraius) ..

Lasinpriix ..

latifrons (Passalus) ..

latipennis (Macrolinus, Passalus) ..

leachii (Paxillus) ..

Leptaulacoides ..

Page.

31, 35, 38, 39.

113, 116.

89.

92.

11.

118, 119.

77, 103.

12.

91, 93.

106.

107.


86, 87, 89.

57, 66.

59.

21, 25.

86.

21, 27, 29.

5, 34, 42.

51, 63, 68, 124.

53, 58, 67, 124.

96, 97.

24, 30.

60, 67.

88, 89.

77, 103.

12.

77, 103.

72, 71.

91.

84, 85.

77, 78, 79, 103 etc., 122, 124. 

91, 93, 123.

91.

88, 89, 92.

63.

91, 93.

51.

53, 54, 66.

80, 82, 83.

15, 48, 49, 51, 124.

112.
<table>
<thead>
<tr>
<th>Page(s)</th>
<th>Memoirs of the Indian Museum</th>
</tr>
</thead>
<tbody>
<tr>
<td>138</td>
<td></td>
</tr>
</tbody>
</table>

- Leptaulax concreta
- Leptaulax
- Leptaulax grisei
- Leptia phylodes
- Lucilius [Mastacabola or lat. Pseudolesca, Phoberus]

<table>
<thead>
<tr>
<th>Page(s)</th>
<th>Memoirs of the Indian Museum</th>
</tr>
</thead>
<tbody>
<tr>
<td>12-14, 111 etc.</td>
<td>123.</td>
</tr>
<tr>
<td>3-4, 111, 112 etc.</td>
<td>123, 124.</td>
</tr>
<tr>
<td>12.</td>
<td></td>
</tr>
<tr>
<td>51.</td>
<td></td>
</tr>
<tr>
<td>76.</td>
<td>61.</td>
</tr>
<tr>
<td>112, 116.</td>
<td>120, 123.</td>
</tr>
<tr>
<td>51, 76, 78, 88 etc.</td>
<td>120-121, 122.</td>
</tr>
<tr>
<td>12.</td>
<td></td>
</tr>
<tr>
<td>51.</td>
<td></td>
</tr>
<tr>
<td>109.</td>
<td>3, 69 etc.</td>
</tr>
<tr>
<td>51.</td>
<td></td>
</tr>
<tr>
<td>71.</td>
<td>24, 26, 27, 29.</td>
</tr>
<tr>
<td>15, 16.</td>
<td></td>
</tr>
<tr>
<td>18, 20.</td>
<td></td>
</tr>
<tr>
<td>77, 78, 79, 97 etc.</td>
<td>122.</td>
</tr>
<tr>
<td>77, 100, 122.</td>
<td>51.</td>
</tr>
<tr>
<td>108, 110, 122.</td>
<td>123.</td>
</tr>
<tr>
<td>108, 110, 111.</td>
<td>76, 89, 107.</td>
</tr>
<tr>
<td>10-11, 51.</td>
<td>10, 14.</td>
</tr>
<tr>
<td>106, 107.</td>
<td></td>
</tr>
<tr>
<td>53, 54, 65.</td>
<td>51.</td>
</tr>
<tr>
<td>94, 96.</td>
<td></td>
</tr>
<tr>
<td>53, 60, 67.</td>
<td></td>
</tr>
<tr>
<td>52, 65.</td>
<td></td>
</tr>
<tr>
<td>22.</td>
<td></td>
</tr>
<tr>
<td>51, 62, 68.</td>
<td>108, 110, 111, 122.</td>
</tr>
<tr>
<td>51.</td>
<td></td>
</tr>
<tr>
<td>51.</td>
<td></td>
</tr>
</tbody>
</table>

- Lucilius (Notanthus, Omeiaria)
<table>
<thead>
<tr>
<th>Taxon</th>
<th>Page(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neleus</td>
<td>51, 80, 82, 83</td>
</tr>
<tr>
<td>nicobaricus (Macrolinus)</td>
<td>83</td>
</tr>
<tr>
<td>Niptoides</td>
<td>51</td>
</tr>
<tr>
<td>nitidulus (Mastrochilus Pharochilus)</td>
<td>98, 103</td>
</tr>
<tr>
<td>nobilis (Trapezochilus)</td>
<td>94</td>
</tr>
<tr>
<td>normochilinae (Gonatas)</td>
<td>109</td>
</tr>
<tr>
<td>normoequinae (Leptaulax)</td>
<td>112</td>
</tr>
<tr>
<td>olivus (Macrolinus)</td>
<td></td>
</tr>
<tr>
<td>obliqua (Mastrochilus s. lat.)</td>
<td>98</td>
</tr>
<tr>
<td>obtusidens (Leptaulax)</td>
<td>112</td>
</tr>
<tr>
<td>occipitalis (Epiphoroncus, Passalus)</td>
<td>53, 61, 68</td>
</tr>
<tr>
<td>occulifex (Aceraius)</td>
<td>76, 92, 93</td>
</tr>
<tr>
<td>occuliferocarpus (Het rochius, Ophrygonius)</td>
<td>87</td>
</tr>
<tr>
<td>Odontotaenius</td>
<td>22, 26, 51</td>
</tr>
<tr>
<td>Oceus</td>
<td>22, 30</td>
</tr>
<tr>
<td>Opogyes</td>
<td>22, 30</td>
</tr>
<tr>
<td>Oleoides</td>
<td>1, 2, 22, 23 etc., 123</td>
</tr>
<tr>
<td>Oleus</td>
<td>22, 23, 25, 76, 108</td>
</tr>
<tr>
<td>Omegarius</td>
<td>13</td>
</tr>
<tr>
<td>opacopennis (Passalus, Proculus)</td>
<td>53, 63, 68</td>
</tr>
<tr>
<td>opacus (Passalus)</td>
<td>76, 79, 86 etc., 121</td>
</tr>
<tr>
<td>Ophrygonius</td>
<td></td>
</tr>
<tr>
<td>paradoxis (Tarquinius)</td>
<td>111</td>
</tr>
<tr>
<td>Paracapelopides</td>
<td>76, 93</td>
</tr>
<tr>
<td>Parapelopides</td>
<td>51</td>
</tr>
<tr>
<td>parastictus (Passalus, Pentalobus)</td>
<td>73, 74</td>
</tr>
<tr>
<td>palini (Erionomus, Passalus)</td>
<td>71, 75</td>
</tr>
<tr>
<td>parry (Aulacocyclus)</td>
<td>17, 20</td>
</tr>
<tr>
<td>parvicornis (Oleoides)</td>
<td>23, 24</td>
</tr>
<tr>
<td>Passalataenius</td>
<td>22, 26</td>
</tr>
<tr>
<td>Passalinae</td>
<td>2, 12, 13, 43 etc., 124</td>
</tr>
<tr>
<td>Passalus</td>
<td>2, 41, 51 etc., 124</td>
</tr>
<tr>
<td>patalis (Cylindrocaulus)</td>
<td>10, 26</td>
</tr>
<tr>
<td>Paxilloides</td>
<td>21</td>
</tr>
<tr>
<td>Paxilloides</td>
<td>48</td>
</tr>
<tr>
<td>Paxius</td>
<td>48</td>
</tr>
<tr>
<td>pearsoni (Episphenus)</td>
<td>85</td>
</tr>
<tr>
<td>pectingera (Episphenoidea, Mastrochilus)</td>
<td>98, 122</td>
</tr>
<tr>
<td>Pelopides</td>
<td>76, 77, 79, 93 etc., 121, 123</td>
</tr>
<tr>
<td>Pelopinae</td>
<td>76</td>
</tr>
<tr>
<td>Pelopis</td>
<td>76, 107</td>
</tr>
<tr>
<td>pelrostictus (Aceraius, Mastrochilus Ceteus)</td>
<td>102, 103</td>
</tr>
<tr>
<td>Page</td>
<td></td>
</tr>
<tr>
<td>------</td>
<td></td>
</tr>
<tr>
<td>4, 10, 69, 72 etc.</td>
<td></td>
</tr>
<tr>
<td>13, 48, 49, 71</td>
<td></td>
</tr>
<tr>
<td>31, 33</td>
<td></td>
</tr>
<tr>
<td>17, 18, 20</td>
<td></td>
</tr>
<tr>
<td>111</td>
<td></td>
</tr>
<tr>
<td>51</td>
<td></td>
</tr>
<tr>
<td>51</td>
<td></td>
</tr>
<tr>
<td>53, 51, 66</td>
<td></td>
</tr>
<tr>
<td>51</td>
<td></td>
</tr>
<tr>
<td>22, 50</td>
<td></td>
</tr>
<tr>
<td>51</td>
<td></td>
</tr>
<tr>
<td>77, 95, 98 etc., 103, 122.</td>
<td></td>
</tr>
<tr>
<td>51, 51</td>
<td></td>
</tr>
<tr>
<td>76, 77, 79, 95 etc., 121, 123.</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
</tr>
<tr>
<td>76</td>
<td></td>
</tr>
<tr>
<td>51</td>
<td></td>
</tr>
<tr>
<td>3, 5, 32, 36, 41, etc., 51.</td>
<td></td>
</tr>
<tr>
<td>76, 77, 79, 95 etc., 121, 123.</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
</tr>
<tr>
<td>51</td>
<td></td>
</tr>
<tr>
<td>5, 51, 76, 78, 82, 84, 120-121.</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
</tr>
<tr>
<td>73, 62, 67.</td>
<td></td>
</tr>
<tr>
<td>51</td>
<td></td>
</tr>
<tr>
<td>99, 103</td>
<td></td>
</tr>
<tr>
<td>73, 62, 67.</td>
<td></td>
</tr>
<tr>
<td>51</td>
<td></td>
</tr>
<tr>
<td>97, 100, 103</td>
<td></td>
</tr>
<tr>
<td>1, 10, 22, 23, 26 etc., 53, 124.</td>
<td></td>
</tr>
<tr>
<td>13, 22, 33, 43, 44, 47 etc.</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td></td>
</tr>
<tr>
<td>10, 22, 23, 31 etc., 43, 47, 51.</td>
<td></td>
</tr>
<tr>
<td>2, 12, 13, 32 etc., 124.</td>
<td></td>
</tr>
<tr>
<td>33, 12</td>
<td></td>
</tr>
<tr>
<td>9, 19, 32, 43, 42 etc</td>
<td></td>
</tr>
<tr>
<td>55, 68.</td>
<td></td>
</tr>
<tr>
<td>22, 51</td>
<td></td>
</tr>
<tr>
<td>78, 79, 107 etc., 122, 124.</td>
<td></td>
</tr>
</tbody>
</table>
Protonocrochus group
Pseudocanthinae
Pseudocanthus
Pseudipiphenus
Psilomus
Ptichopus
ptox (Erioconemis, Labiennes)
ptoxoides (Labiennes)
Psychotrichus
Puberilus (Epiibachis, Mastochilus Auralches)
Pubicostis (Proculejus)
Pubulus
Punio (Acerias, Gonatas Omegarius)
Punctatissimus (Passarals)
Punctato-striatus (Passarals)
Punctifrons (Mitrochimus, Passarals)
Punctiger (Mastochilus Phalrichus)
Punctipectis (Leptanilax, Pentalobus)
Purniensis (Chondrocephalus, Popilius)
Pygaeus (Chondrocephalus, Taeniocerus)
Quadricollis (Passarals, Phorcenus)
Quadricornis (Eriocemis, Plesthenus)
Quadrifera (Ophrygonius)
Quaestionis (Episphooides, Mastochilus s. str.)
Quintensis (Passarals, Proculejus, Prosoclitus)
Recticlypeatus (Passarals, Petrejus)
Recticornis (Passarals, Popilius)
Rectolens (Acerias)
Respectabilis (Pelopides, Trapezocephalus)
Rhagocerus
Rhagospis
Rhodacanthopinae
Rhodocanthooides (Nelenops, Passarals)
Rhodocanthopus
Ridiculus (Oileus)
Rimat (Oileus)
Rimort
Rimorius
Robustus (Passarals, Paxillus)
Roejstofi (Leptanilax)
Rotundifrons (Macrolemus)
Rugosus (Passarals)
\[ \text{Mem} \text{n of the Indian Museum.} \]

Page

111, 112

10, 73, 74

24, 32

51, 96, 111, 122

78

57

51

80, 83

36, 39

95

76, 87, 89

35

34, 35, 36, 37

37, 39

36

102, 103

11, 13, 68 etc

3 4, 69, 70 etc

24, 30

107

22, 26

51

34, 36, 39

59, 60, 67

53, 59, 67

59, 67

22, 24, 26

31, 10, 11

10, 11, 51

7, 16

28, 29

69

1, 2, 21, 120

82, 83, 120

94, 95

45, 47

51

11, 19 etc, 120

17

76
<table>
<thead>
<tr>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>V.</td>
</tr>
<tr>
<td>Vatiminae</td>
</tr>
<tr>
<td>Vatinae</td>
</tr>
<tr>
<td>V.</td>
</tr>
<tr>
<td>Verres</td>
</tr>
<tr>
<td>V.</td>
</tr>
<tr>
<td>V.</td>
</tr>
<tr>
<td>V.</td>
</tr>
<tr>
<td>V.</td>
</tr>
<tr>
<td>Species</td>
</tr>
<tr>
<td>-------------------------</td>
</tr>
<tr>
<td>wallacei (Acetamus, Het. = 684, Ophyrogenes)</td>
</tr>
<tr>
<td>weberi (Macrotinus)</td>
</tr>
<tr>
<td>weberi (Macrotinus)</td>
</tr>
<tr>
<td>Zetor brzezinski</td>
</tr>
</tbody>
</table>
Explanation of Plate I.

Diagram illustrating the evolution and distribution of the Macrolothine.

The somewhat isolated genera Macrolothus and Planorius have been omitted. The latter is probably confined to the Indian Peninsula, and the former to other parts of the Oriental Region and Celebes.

The species used in the preparation of the diagram are as follows:

- **Macrolothus grandis**... *Macrolothus* dominant sp. E. Himalayas to Borneo
  - *helifer*... other spp., E. Himalayas to Borneo

- **Episphenus**... *Episphenus* dominant sp., Ceylon.
  - *medicus*... dominant sp., Indian Peninsula.
  - *moorei*... other spp., Ceylon.
  - *neoliberinctus*... other spp., Indian Peninsula.

- **Gonatus**... *Gonatus* simplest sp., New Guinea, etc.
  - *maculatus*... other spp., Molucca.
  - *helongii*... dominant sp., New Guinea, etc.

- **Laberius**... *Laberius* other spp. (left), New Guinea, etc.
  - *dehmi*... other spp. (right), New Guinea, etc.
  - *hippocrepis*... spp. with fused elytra, Moluccas.

- **Mastochalus**... *Mastochalus* symmetrical sp., Australia.
  - *astralis*... symmetrical spp., etc.
  - *ostolalus*... only sp. shown, Molucca New Guinea, etc.
  - *peltostictus*... etc.

- **Ophryophorus**... *Ophryophorus* only sp. shown, E. Himalayas to Borneo.

- **Pelopodes**... *Pelopodes* other spp., E. Himalayas to Borneo.
  - *dorsalis*... simplest sp., E. Himalayas to Borneo.
  - *squamosana*... dominant spp., E. Himalayas to Borneo.
  - *tridens*... etc.

- **Phleterus**... *Phleterus* other sp., Celebes.
  - *ortans*... dominant sp., Celebes.
  - *quadricornis*... etc.

- **Protomeclotherus**... *Protomeclotherus* only sp. shown, New Guinea, etc.

- **Pseudolothus**... *Pseudolothus* only sp. shown, New Guinea, etc.

- **Tibethelus**... *Tibethelus* only sp. shown, E. Himalayas to Borneo.

- **Tibetobus**... etc.

*— shows p. 121*
Gravely, Frederic
Henry, 1885-
P2G7
Ent.
A contribution
towards the revision of the Passalidae of the world.