THE DANISH EXPEDITION TO SIAM 1899-1900

III.

Chelonethi

An account of the Indian false-scorpions together with studies
on the anatomy and classification of the order

by

C. J. With

With four plates and a map

D. KGL. DANSKE VIDENSK. SELSK. SKRIFTER, 7. RÆKKE, NATURVIDENSK. OG MATHEM. AFD. III. 1

KØBENHAVN

HOVEDKOMMISSIONÆR: ANDR. FRED. HØST & SØN, KGL. HOF-BOGHADEL

BIANCO LUNOS BOGTRYKKERI

1906

Pris: 7 Kr. 95 Øre.

Det Kgl. Danske Videnskabernes Selskabs Skrifter, 6^{te} Række.

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D. Kgl. Danske Vidensk. Selsk. Skrifter, 7. Række, naturvidensk. og mathem. Afd. III. 1

III. Chelonethi

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C. J. With

København

Bianco Lunos Bogtrykkeri

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I. General part.

Introductory Remarks.

The observations, included in this paper, were chiefly made on material, belonging to the Zoological Museum of Copenhagen, mostly collected by the Danish Galathea and the Danish Siam Expedition, respectively by the Entomologist Mr. Kjellerup and the Zoologist Dr. Th. Mortensen, both able collectors. For the kindness of letting me work out these collections I ask Dr. C. F. Meinert, the curator of the Arthropods of this institution, as well as Dr. Th. Mortensen, who made such good collections at the Siamese Island of Koh Chang, to receive my best thanks. A good many of the observations, included in the general part, and the descriptions of a few Indian species were made during a stay in London on material, belonging to the British Museum (Natural History); for the liberality, with which this collection was handed over to me, I tender to the Director Professor E. Ray Lankester my best thanks once more. I feel also indebted to Professor Sydney J. Hickson of Manchester, because he sent me four specimens of *Ch. superbus* n. sp., remarkable on account of the coxal sac of the male, and to Mr. Edv. Ellingsen of Kragerö in Norway, because he kindly gave me the opportunity of examining *Feaella mirabilis* Ell., a most interesting form.

As the present work was already finished, long before the above mentioned animal was examined by me, I was not able to pay any attention to its most astonishing structures in the general part of these investigations and refer you to his paper on this subject (72., cf. also footnote under "Synopsis of families ...").

A host of scientists have worked on the natural history of the *Chelonethi*, but our knowledge is nevertheless rather incomplete. The authors, who have more than any others promoted the systematic study of this group by giving good and concise descriptions of the species are L. Kock and E. Simon, of the older generation and L. Balzan more recently. Our knowledge of the inner anatomy is principally due to A. Croneberg, and it was H. J. Hansen, who by his good observations as far as the chitinous skeleton is concerned, laid the foundation of a natural classification. The Bohemian Professor Ant. Nosek of Čáslavi has recently done a useful work by giving lists of the species of *Chelonethi* as well as of the papers, in which information about these animals may be found (cf. 60—62).

As far as the Indian species are concerned without doubt only a small percentage is known; many of the descriptions of these are too imperfect for a sure identification. The two authors, who have given the best descriptions of a greater number of Indian species are E. Simon and T. Thorell; those of the former are sharp and concise, but sometimes too short, those of the latter are very long and most often excellent, but rather difficult to use. The descriptions of both these authors would have been very much enhanced by drawings of the palps, like those given by L. Balzan, for it is very difficult to give the details of the structure of these appendages in a satisfactory manner without the support of figures.

The first chapter of the general part of this paper deals with the geographical distribution of the false-scorpions and gives a list of the described Asiatic species; in the following the history of our knowledge of and the variations in the structure of the antennae, maxillae, palps, legs and coxal sacs will be discussed; the last chapter of the general part will be given to criticism of the different established systems and to a synoptic key of the adopted families and subfamilies. In the systematic part the characteristics of each family and subfamily will be given, the value of the genera will be examined and new and old genera and specific characters will be discussed; under each subfamily a synopsis of the established genera, and under each genus one of the Indian species will be found. All species of *Chelonethi*, recorded from the Indian Region, will be mentioned in this paper, and as far as possible sufficient data given for their identification; of all the species, described and undescribed, which have been examined, a new description has been given, accompanied with at least a figure of the palp. The descriptions may perhaps be found too long, but it must be remembered, that the badly defined genera make it necessary to include characters, which are probably generic, in the description of a species, if we wish to make it possible for future workers with security to determine its genus. In the characteristic of the species characters are used, which are often difficult to examine and sometimes making a partly dissection of the animal necessary, e. g. the maxillae of *Chthonius* C. K. and the coxal sac of "*Lophochernes* Sim."; but this method is certainly justified, if our aim is not only to make an identification of the different forms possible, but also to judge about their whole systematic position.

Copenhagen, September 1905.

C. J. WITH.

1. Geographical Distribution.

I. General Remarks.

The order of the *Chelonethi* is distributed all over the world with the exception of the arctic and antarctic regions. Many of the genera are also mundane e. g. *Garypus* L. K. and "*Lophochernes* Sim.", but others seem to be restricted in their distribution e. g. *Pseudochiridium* n. gen. which has only been recorded from South-East Asia, *Microcreagris* Balz., which has only been found in China, *Tridenchthonius* Balz., which is only known to occur in South America, and *Obisium* Ill. (in widest sense), which is only known from North America, Europe and the Mediterranean regions of Asia and Africa, and probably from the North of Asia¹). Even if the above geographical facts do not weigh very much, because some of the continents especially Africa and Australia are practically unexplored in this respect, the complete want of *Obisiinae* Dad. in South America, which is fairly well examined as far as *Chelonethi* are concerned, is a little astonishing and is in need of another explanation.

With regard to the species, a great number at least, seem to be rather circumscribed in their distribution, but a good many are so related as to be practically mundane. When we wish to deal with the geographical distribution of a species of this order, we must necessarily take into consideration, that the proper homestead of many species is very difficult to find, because they follow man and may thus be found far away from their native country. Such a species as *Chelifer cancrroides* L., which lives in houses, have been found in Europe, North America, South Africa and Argentine; *Chiridium museorum* Leach has a similar worldwide distribution. That many species travel from the one country or continent to the other, is proved by a number of direct observations; *Ch. depressus* C. K., *Ch. subruber* Sim., *Ch. navigator* n. sp. and *Obisium longicolle* Frauent. f. inst. have been found in ships from India, and *Ch. bicarinatus* Sim. in packages, recently dispatched from Japan to Paris. All localities of this kind, where the homestead of a species is open to suspicion, ought naturally to be excluded from a discussion of its original distribution. It is sometimes easy to distinguish between a primitive and an arti-

¹) *Roncus chthoniiformis* Balz. from Argentine is probably a *Chthonius* C. K. (46. p. 445; cf. below). *Obisium angustum* Gervais from Chile, as well as *Obisium longicolle* Frauent., *O. trifidum* Steck. and *O. pusio* from India can not with security be referred to any genus. In the dried collections of the British Museum big specimens of *Roncus* L. K. are found from Japan.

ficial locality, but very often it is attended with great difficulty. But apart from a number of cases, showing a wide distribution of a species, which may be traced back to importation from the one place to the other with more or less security, statements remain about the occurrence of species at stations widely apart from each other under such circumstances, that artificial transportation from the one to the other locality seems to be excluded. It is known from of old that false-scorpions use other animals like flies and beetles as means of transportation, but that this habit should in any large degree have influence on their geographical distribution, seems scarcely probable.

As it should certainly be of great interest to get incontestable facts, showing a very wide distribution of animals like Pseudoscorpions, it would without doubt be worth the trouble to discuss the available statements of this kind; to do so in this connection would not be possible, but I will set forth a few examples to illustrate, how doubtful the value of such statements often is. *Olpium longiventer* Keys. has according to Simon (16. p. 519) been found on Hawaii, and according to Pocock (53. p. 321) on Funafuti; but the specimens, which were examined by these two able naturalists, do not belong to the Australian species, but belong to new species of *Garypinus* Dad. Simon has referred a species from Hawaii to *Che-lifer bifissus* Sim. from Sumatra, but is probably wrong (cf. below). *Ch. scorpioides* Herm. is distributed over a good part of Europe and is found in the open air, but according to Daday (14. p. 477) it is very abundant in Friedrich-Wilhelmshafen in German New-Guinea; the same author mentions *Ch. nodulimanus* Töm. from Dalmatia, South America, Aschanti and Sumatra (11. p. 173); that the first of these localities is probably wrong has been shown by Ellingsen (22. p. 5 cf. below). With regard to these statements I am obliged to admit, that no further conclusion can be drawn from them, because the descriptions of the above mentioned author are so very insufficient, and because he does not seem to have realised how difficult these animals are to identify. Only direct and careful reexamination can settle the question.

Many species of different other groups have often been regarded as mundane, because the authors had not yet learned to use important characters. H. J. Hansen has f. inst. shown, that many species of *Pauropus* Lubbock, *Scutigerebella* Ryder and *Koenenia* Grassi have a much more restricted distribution than previously thought. The same naturalist writes about the distribution of species of *Koenenia* Grassi: "But I believe that most and perhaps all statements about this wide range of a species are quite wrong, originating from insufficient knowledge of the species or insufficient study of the specimens" (H. J. Hansen: On six species of *Koenenia*. Entom. Tidsk. 1901, p. 217). The studies of the Indian fauna, published here, have given me the same ideas as far as the *Chelonethi* are concerned, and made it clear for me, in the first place that the number of species is very great, and in the second place, that their range is rather limited, for it has occurred to me, that almost all the specimens, which I examined, were referable to new species, the

most marked exceptions being *Garypus irrugatus* Sim. from Siam and *Chelifer Murrayi* Poc. from the Nicobars. In my studies on the Indian *Gagrellinae* I arrived at a similar result (cf. „New and old *Phalangidae* from the Indian Region” in Linn. Soc. Journ. Vol. XXVIII, 1903, pp. 468—469).

A long time will probably elapse, before our knowledge in the details about the distribution of these animals will be sufficient for drawing conclusions of greater interest — Europe perhaps excepted — certainly the best way should be to study each subfamily or well defined specific group separately and all their known species without faunistic restrictions.

II. List of species of Chelonethi from Asia.

The figure in the bracket behind the specific names of all not Indian species refers to the paper, in which the species in question is mentioned as an Asiatic one.

The following 15 species have been mentioned from Caucasus.

Chelifer brevinianus Kolen. (2); *Ch. caucasicus* Dad. (29); *Ch. disjunctus* L. K. (29); *Ch. Frivaldszkyi* Dad. (29); *Ch. Hispanus* Dad. (29); *Ch. Hörvarthii* Dad. (29); *Ch. Kussariensis* Dad. (29); *Ch. meridianus* L. K. (12); *Ch. phaleratus* Dad. (29). *Chthonius microphthalmus* Sim. (29). *Obisium carcinoides* Herm. (29); *Ob. euchirus* Sim. (29); *Ob. macrodactylum* Dad. (29); *Ob. manicatum* L. K. (24); *Ob. muscorum* L. K. (29).

The following 10 species have been mentioned from Syria and Arabia.

Chelifer Letourneuxii Sim. (28); *Ch. persulcatus* Sim. (28). *Garypinus dimidiatus* L. K. (8). *Olpium Arabicum* Sim. (28); *Olp. biunpressum* Sim. (28); *Olp. pallipes* Luc. (11); *Olp. rubidum* (27). *Obisium muscorum* C. K. (11); *Ob. Simoni* L. K. (8); *Ob. validum* L. K. (23).

Only four species have been mentioned from China and Japan.

Chelifer bicarinatus Sim. (25); *Ch. bonciens* Karsch (26); *Ch. Pekinensis* Bal. (12). *Microcreagris Gigas* Bal. (12).

The species from New-Guinea are in the following regarded as belonging to the Indian Fauna. Of the 58 species, which may be regarded as Indian, four were collected in ships with rice arrived from India at Copenhagen viz. *Chelifer navigator* n. sp., *Ch. depressus* C. K. (?), *Ch. subruher* Sim. (?) and *Ch. nodosus* Schranck (?), and three other species in addition to these are recorded from other countries viz. *Ch. bifissus* Sim., *Ch. nodulimanus* Töm. and *Ch. scorpoides* Herm. (cf. below). Only four species have been collected in distant localities viz. *Chelifer Murrayi* Poc. in the Nicobars and Christmas Island, *Ch. plebejus* n. sp. in the Nicobars, in Malakka and Burma, *Garypus irrugatus* Sim. in Sumatra and Siam, and *Pseudochiridium clavigerum* Thor. in Burma and Christmas Island. About *Chelifer Javanus* Thor. and *Ch. politus* Sim. cf. below remarks in the descriptions of *Ch. Javanus* Thor. and *Ch. navigator* n. sp.

From New Guinea: *Chelifer æquatorialis* Dad.; *Ch. megasoma* Dad.; *Ch. scorpoides* Herm. *Chthonius Wlassicsi* Dad. *Ideobisium bipectinatum* Dad.

From Celebes: *Chelifer superbis* n. sp.

From Borneo: *Chelifer Borneonensis* Ell.

From Christmas Island: *Chelifer Murrayi* Poc. and *Pseudochiridium clavigerum* Thor.

From Java: *Chelifer Birmanicus* Thor.; *Ch. Kraepelinii* Tullg.; *Ch. Javanus* Thor.; *Ch. Waburgi* Tullg. *Garypus Javanus* Tullg. *Ideobisium minutum* Tullg.

From Nicobars: *Chelifer concavus* n. sp.; *Ch. Galathea* n. sp.; *Ch. modestus* n. sp.; *Ch. Murrayi* Poc.; *Ch. Nicobarensis* n. sp.; *Ch. plebejus* n. sp.; *Ch. rotundus* n. sp.; *Ch. vermiformis* n. sp.; *Obisium loughicollae* Frauenf. *Pseudochiridium Thorellii* n. sp.

From Sumatra: *Chelifer articulatus* Sim.; *Ch. bifissus* Sim.; *Ch. Birmanicus* Thor.; *Ch. nodulimanus* Töm.; *Ch. Sumatranus* Thor.; *Ch. Thorellii* Balz. *Chthonius curvidigitatus* Sim. *Garypus irrugatus* Sim.

From Pulu Pinang: *Chelifer Balzanii* Thor.; *Ch. hians* Thor.

From Malay Peninsula: *Chelifer cocophilus* Sim.; *Ch. plebejus* Sim. *Garypus elegans* Sim.

From Burma: *Chelifer Birmanicus* Thor.; *Ch. bisulcus* Thor.; *Ch. Hansenii* Thor.; *Ch. orites* Thor.; *Ch. plebejus* n. sp. *Olpium Birmanicum* n. sp. *Pseudochiridium clavigerum* Thor.

From Siam: *Chelifer Mortensenii* n. sp. *Chthonius terribilis* n. sp. *Garypinus nobilis* n. sp. *Garypus irrugatus* Sim. *Ideoroucus laminatus* n. sp.; *I. Siamensis* n. sp.

From India: *Chelifer Indicus* n. sp.; *Ch. orites* Thor. af. Ell.; *Olpium biareolatum* Töm. *Obisium pusio* Kolen.

In ships with rice in Copenhagen: *Chelifer depressus* C. K.; *Ch. navigator* n. sp.; *Ch. nodosus* Schranck; *Ch. subruber* Sim.

Without locality: *Chelifer bidens* Steck.; *Ch. Helferii* Steck.; *Ch. monitor* n. sp. *Chthonius desideratus* Steck.; *Ch. Kockii* Steck. *Obisium trifidum* Steck.

2. Antennae.

Introductory Remarks.

Before giving a few historical remarks I am going to set forth as an introduction the main-points in the anatomy of these organs. The last portion of this chapter will be given to studies on the differences found in all the appendages of these organs in the various forms of the *Chelonethi*.

The antennae consist always of two joints, forming a chela with each other, and are articulated under the front margin of the head, and connected with this as well as with the maxillae by a soft articulate-membrane. They vary in size as well as in shape in the different genera, and so do the more or less complex organs with which they are adorned. In some forms we find the fingers gaping when closed, while the two fingers of other forms almost touch each other in their whole length when closed but with their tips crossing each other; both fingers

bear a different number of marginal teeth along the upper and inner margin. (Pl. I, figs. 1 c, 4 a and 5 a, pl. II, fig. 16). The immovable finger of the chela, which is always placed upwards and inwards, bears below the marginal teeth an organ, which is more or less plateshaped in *Chelifer* Geof. and genera related to it, while it is shaped like a serrula in *Chthonius* C. K. and forms related to it (Pl. I, figs. 1 c, 4 a and 5 a; pl. II, 3 a-6 a, pl. IV, fig. 4 a); this organ is according to its structure named *lamina* or *serrula interior*. The immovable finger bears besides in at least all the *Panctenodactyli* a narrow plate, placed along outer side of the finger nearer to the middle line of the body, which is designated the *lamina exterior*. The movable finger is either terminated in a more or less branched process, named *galea* (Pl. I, fig. 4 b, pl. II, 2 a and 4 c, pl. IV, 4 c) or in a little marked rounded protuberance, through which the spinning glands, which are found in the cephalothorax, debouch. The movable finger is besides below near to the inner margin provided with a serrulishaped blade, *serrula exterior*, which is either completely fused with the finger (Pl. II, figs. 2 a and 4 c) or more or less free distally (Pl. I, figs. 1 a and 4 b). The hand of the antennae is, near the base of the movable finger, provided with a number of peculiar hairs; the name *flagellum* has been given to these hairs.

I. Historical Remarks.

In spite of the many interesting features, which a representation of the development of our knowledge as far as the structures of the antennae are concerned should provide, I have in this paper found it necessary to confine myself to the following few remarks.

A few authors gave already in the first half of the last century a rather good description of these structures in different forms (viz. Tull 1843, 30. p. 56; Schiödte 1851, 31. p. 24, tab. I, fig. 2 c, and in a less degree Menge 1855, 33. tab. I); but a naturalist has nevertheless as lately as in 1889 (Daday 11. p. 166) represented these very facts as being new; as a whole the rather slow progress in the studies of these organs may partly be ascribed to a regrettable want of knowledge as far as the results arrived at by predecessors and contemporaries are concerned, which is a conspicuous feature in many papers on *Chelonethi*. It was chiefly in the years from 1882—88 that several naturalists studied these organs partly in single forms (Thorell 1882, 6. pp. 38—39; Croneberg 1888, 45. pp. 425—427), partly from a more systematic and comparative point of view (Hansen 1884, 9. pp. 523—524; Canestrini 1885, 42); but all these broke entirely new ground, as the one did not know the result, at which the other had arrived, and were of course unable to derive full advantages of the progress, which was necessarily very much retarded. And it is only recently owing to papers by Balzan (1890, 46. p. 406), but especially by Hansen (1894, 49. pp. 227—229), that the real structures of the antennae have been understood by most workers on the *Chelonethi*, though it was so by the most advanced more than twenty years ago.

Terminology. Flagellum, galea, serrula, lamina interior and exterior are the names given by Hansen to the different organs of the antennae. Thorell (1882, 6. p. 38) names the galea „procursus apicalis”, corresponding to Balzan’s “apofisi apicali” and adds a note „Procursus apicalis digiti inferioris mandibulae interdum galea appellatus fuit; nescio qua ratione”. Later on (1891, 13. note p. 353) he suggests „*procursus textorius*” as the name; though his criticism is well founded and though the latter name is a very characteristic one, I prefer the short indifferent galea, as it has been accepted by most authors. *Flagellum* and *serrula* have been accepted by almost all naturalists, working on this group, and so they are here, the only difference being, that the serrula is named *serrula exterior* to distinguish it from the serrula interior of most of the *Hemictenodactyli*. Hansen’s *lamina interior* and *exterior* is preferred to Thorell’s and Balzan’s *velum inferius* and *superius*; *lamina exterior* is a good and characteristic name and so is *lamina interior* in such a form as *Chelifer* Geof., but cannot properly be attached to the serrula of the immovable finger in such a genus as *Chthonius* C. K., even if the two organs are homologous. This organ is properly called *serrula interior* to distinguish it from the serrula exterior of the movable finger. I use in the following the expressions *lamina* and *serrula interior* indiscriminately in reference to the structure of the organ. In genera like *Ideobisium* Balz., *Olpium* L. K. or *Chelifer* Geof. we can use the name, which seems to be most obvious according to the development of the basal plate-shaped or the distal more serruli-formed portion.

II. Structure of the antennae.

In the following I will give a description of as well as a comparison between the modifications of the organs, which adorn the antennae of the *Chelonethi*, going from *Chthonius* C. K. to *Chelifer* Geof. Though the most important facts, respecting this theme are found in Hansen’s paper (1894, 49. pp. 205—236), the following contribution will certainly be useful, because the arrangement of the facts is different, and because the number of forms examined or referred to is much bigger than that, on which Hansen based his investigation; to this paper references will be found everywhere.

Size etc. The antennae vary very much in size; they are as a rule comparatively large in the *Hemictenodactyli*, especially in *Chthonius terribilis* n. sp. (Pl. I, fig. 1 a) and *Microcreagris gigas*. Balz. (12. pl. 12, fig. 34 a), being here half as broad and almost as long as the cephalothorax; they are much smaller in the *Panctenodactyli* especially in *Garypus* L. Kock and *Chiridium* Menge; but the differences in size will be found to be almost as well marked between the antennae of a *Chthonius tenibilis* n. sp. and an *Ideobisium* Balz. sp. both belonging to the *Hemictenodactyli*, as between those of an *Olpium* L. Kock sp. and *Ideobisium* Balz. sp., the former belonging to the *Panctenodactyli*, the latter to the *Hemictenodactyli*. The space, left between the fingers, when they are closed, provide interesting modifica-

tions within the genera (cf. Hansen 49. pp. 224–229); the fingers of *Obisium* Ill. as well as those of *Chthonius* C. K. cross each other with their tips, when closed, leaving no space between in the former genus, but a small one in the latter on account of the curving of the fingers. In *Ideobisium Balzanii* With (21. pl. X, fig. 2a) and in *Ideoronus Mexicanus* Bks. (pl. IX, fig. 2d) both belonging to the *Pseudobisiinae* Hans. the space between the fingers is moderate and they cross each other with their outmost tips. In *Garypus* L. Kock, but chiefly in *Chelifer* Geof. this space is well marked, and in the former genus almost filled with the *lamina interior*, in the latter completely so.

The antennae are most often smooth, but sometimes provided with a number of granules or spines e. g. *Chthonius terribilis* n. sp. (Pl. I, fig. 1c). The antennae bear a number of hairs, which are long, slender and simple; only in species of *Chelifer* Geof. those of the hand are provided with a distal short branch or tooth. In the arrangement and number of the “lyriform fissures” (cf. Hansen pp. 204 and 209) there seems to be a difference between the genera, but as I have not studied this matter thoroughly I refer to the figures, given by Dr. Hansen and myself.

Marginal teeth. The upper and inner margins of the two fingers are in both suborders mounted with a row of teeth; these teeth are especially well developed within the *Hemictenodactyli*, and their number and arrangement furnish useful systematic characters in species of *Ideobisium* Balz. and *Chthonius* C. K. (Pl. I, figs. 1c-d, 4a-b, 5a) (cf. Hansen 49. tab. V, figs. 5 and 12; Balzan 46. tab. XVII, fig. 23b; Balzan 12. pl. 12, figs. 31-34a; With 21. pl. IX, figs. 2c-d, and pl. X, 2a-b). These marginal teeth are slightly developed in the *Panctenodactyli*, especially the *Cheliferidae* Hans.; the immovable finger has a marginal row, consisting of about 5–10 more or less indistinct teeth (Pl. II, fig. 6a, pl. IV, fig. 4a); the movable finger has in most species of *Chelifer* Geof., perhaps in all, and at least in many of *Garypus* L. Kock and *Olpium* L. Kock one or two teeth behind the distinct terminal hook (Pl. II, fig. 7d, pl. III, figs. 8d-e).

Flagellum. The flagellum attains its highest development in *Chthonius* C. K. for inst. in *Ch. Rayi* L. K. (Hansen 49. tab. V, fig. 12f) and *Ch. terribilis* n. sp. (Pl. I, fig. 1c), in which it consists of about ten (most often unilaterally) pinnate hairs, placed at the root of the movable finger in a thinly skinned spot and arranged in one or two tufts (cf. Daday 14. tab. XI, fig. 1). *Lechyti* Balz., which seems to be nearly related to *Chthonius* C. K., has according to Balzan (12. p. 499) a flagellum, consisting of a few almost simple hairs, placed in a row. A similar position, being in a long regular row, is characteristic of the *Obisiinae* Dad. and most typically developed in *Blothrus spelaeus* Schiödte, where about ten pinnate hairs are placed in a very long row, extending from the middle of the hand to the root of the movable finger. In *Roncus alpinus* L. Kock there are about nine long partly simple hairs, placed in a similar manner, and in *Obisium muscorum* Leach. eight bristles, of different size (Hansen 49. tab. V, fig. 9f). The flagellum of the *Pseudobisiinae* Hans. is varied in its structure, though as a whole of a rather simple nature. It

has the greatest similarity to that found in *Obisium* C. K., and in *Ideobisium crassimanum* Balz. (49. tab. V, fig. 6 f) for inst., in which it consists of seven pinnate hairs. In *Ideoroncus pallidus* Balz. for inst. we find four hairs with the front margin more or less branched (46. tav. XVII, fig. 23 a, and pl. I, figs. 4 a & 5 a). In most other species we have three hairs with or without ramifications for inst. in *Ideoroncus Mexicanus* Bks. (21. pl. IX, fig. 2 b). The flagellum consists in many species of the *Garypidae* Hans. of three more or less toothed hairs, as it may be observed in most species of *Olpium* L. K. (46. tav. XVI, figs. 17—20; as well as 49. tab. V, fig. 3; cf. pl. II, fig. 6 b); as well as in *Garypus Floridensis* Bks. (Pl. II, fig. 4 b). In a few species we find three simple hairs, which in *Garypus saxicola* Wath. are long, slender and of equal length, while they are rather short and of unequal length in *Garypinus* sp. from Funafuti (Pl. II, fig. 5 a). In a few again we have four hairs f. inst. in *Garypinus* sp. from Hawaii, in which the two anterior ones are toothed and the two posterior ones almost simple (fig. 2, p. 17), as well as in *Olpium Birmanicum* n. sp. (Pl. II, fig. 7 b) and *Garypinus nobilis* n. sp. (Pl. II, fig. 8 b), in which the longer front one is toothed, while the remaining three are simple and decrease in length from front to back, thus providing great similarity to the structure in *Chelifer* Geof. The most remarkable reduction in the shape of the flagellum within this family and even the whole order is that found in a group of species of *Garypus* L. K., for in these it consists of a single, rather short, pointed hair (Pl. II, figs. 1 b & 3 a); the species providing this interesting characteristic are for inst. *Garypus irrugatus* Sim. The flagellum of *Chelifer* Geof. seems always to consist of four or three hairs (cf. below) as may be observed in numerous figures in Balzan's paper (46. tav. XIII—XV) as well as in this paper (Pl. III, figs. 7 c & 8 c, pl. IV, figs. 4 a, 7 a, 10 a). The foremost hair is almost always the longest and broadest, and is more or less distinctly dentated or branched along the front margin (cf. pl. III, fig. 7 c). The two or three hairs behind decrease in length as well as in breadth from front to back, and are almost always simple (cf. 46. tav. XIV, fig. 9 a). The characters found in the structure of the flagellum within this genus are valuable, but must be used critically on account of the variations, which several species show in this respect. The flagellum of *Pseudochiridium Thorellii* n. sp. consists of two hairs, of which the anterior one bears three teeth, while the posterior only a single one (Pl. IV, fig. 12 b). The flagellum of *Chiridium corticum* Balz. consists according to Balzan of four simple hairs (46. tav. XIII, fig. 1 c), while that of *Chiridium muscorum* Leach. consists of a very broad, almost triangular foremost hair and two smaller ones behind. Before drawing definitive conclusions with regard to the systematic value of the flagellum more facts seem to be necessary, but it is nevertheless evident, that families, genera or even species or more correctly groups of species within certain limits are characterized by the development of their flagellum. It may also be noticed, that there is a certain simplification in the number as well as in the ramifications of its hairs, if we go from the *Hemictenodactyli* to the *Panctenodactyli*, not gradual and not without exceptions, and

that the families, in which these organs are most variable, are those which stand in the middle, namely the *Garypidae* Hans. and the *Pseudobisiinae* Hans.

Galea. The galea, through which the spinning glands, which are situated in the cephalothorax, emit their discharge, is present in all the *Panctenodactyli* and in the two subfamilies of the *Hemictenodactyli*, and even in the two other subfamilies of the latter suborder viz. the *Obisiinae* Dad. and the *Chthoniinae* Dad. the aforesaid glands debouch on a more or less marked little tubercle. This is rounded, but distinct in *Obisium* C. K., and rather large and prominent in *Chthonius* C. K. The galea is in most species of the *Ideobisium* Balz. a styliform and moderately curved organ (Pl. I, fig. 4 b), but in *Microcreagris gigas* Balz. (12. pl. 12, fig. 34 a) and *Ideoblothrus Strandi* Ellingsen (58. p. 88) it is more developed being provided with a few branches. In *Tridentchthonius parvulus* Balz. (46. tav. XVII, fig. 28 a) it consists of three undivided portions, the one placed behind the other. The galea of the *Garypidae* Hans. varies from being extremely simple to being very complicated. It is in most species of *Olpium* L. K. and *Garypinus* Dad. at least in the female rather slender and divided into three longer and shorter terminal branches (cf. 46. tav. XVI, figs. 17-21 a; 49. tab. V, fig. 4; and pl. II, fig. 8 c). In the female of *Garypus Floridensis* Bks. (fig. 4 c) and *G. saxicola* Wath. it is distally divided into about 6 or 7 teeth, and in *G. cuyabanus* Balz. (46. tav. XVI, fig. 22 a), it is strong and clumsy, provided with about ten branches, arising from the middle to the apex, while it is a short, pointed stylet in *Garypus irrugatus* Sim. (Pl. II, fig. 1 b), and *G. longidigitatus* Rainb. (fig. 3, p. 17). In the females of the Genus *Chelifer* Geof. it attains its highest development and is variable to a degree (cf. Balzan 46. tav. XIII, figs. 2-6 a; and pl. III, figs. 8 d-e, pl. IV, fig. 4 c); but even if both its shape and ramifications are multifarious, the thus furnished excellent characters ought however to be used with perseverance and criticism on account of the specific variations, shown for inst. by *Chelifer communis* Balz. (46. tav. XIII, fig. 4 a), *Chelifer scorpoides* Herm. (14. tab. XI, figs. 10-13) as well as by *Chelifer nodosus* Schrank. The galea is in *Chiridium museorum* Leach. small and almost simple, and in *Ch. corticum* Balz. (46. tav. XIII, fig. 1 a) moderately branched; in *Pseudochiridium clavigerum* Thor. and *P. Thorellii* n. sp. it is very remarkable, being divided into two independent divisions (Thorell 10. tav. 5 a; pl. IV, fig. 12 c; cf. below). In the relative development of the galea an excellent sexual character is often found at least in the *Panctenodactyli* (cf. Thorell 6. p. 32 and 10. p. 595; Balzan 12. p. 500, Hansen 49. p. 236). The galea of the male seems generally to be shorter and more simple in its ramifications than that of the female; differences in this respect will be seen by comparing the drawings of the galeae of the two sexes in *Chelifer Birmanicus* Thor. (Pl. IV, figs. 4 c-d), *Ch. Murrayi* Poc. (Pl. III, figs. 8 d-e) as well as *Garypinus nobilis* n. sp. (Pl. II, figs. 8 c-d). I have observed the same character in *Garypus Floridensis* Bks. (figs. 4 b-c), but not in any species of this genus, in which the galea of the female is a simple stylet viz. *G. irrugatus* Sim. (Pl. II, fig. 1 b). Banks states that the male of *Ideoncus obscurus* Bks. has no galea; it could be very interesting to

get further verification of this remarkable "fact". The comparative length of the galea is sometimes of value in the identification of the species as well as of the sex, it is therefore often of practical value (cf. Thorell 6. p. 32) to compare its length with that of the terminal hair of the movable finger (cf. *Chelifer Murrayi* Poc. (Pl. III, figs. 8 d-e), *Ch. Birmanicus* Thor. (Pl. IV, figs. 4 c-d) and *Garypinus nobilis* n. sp. (Pl. II, figs. 8 c-d)). As the galea differs in structural features of more essential as well as of minor interest, it becomes valuable in the definition of both subfamilies, genera and species; the character found in its presence or absence is of paramount importance in the subfamilies of the *Hemictenodactyli*. In contrast to several other organs of the antennae viz. the serrula exterior, we find no gradual development, going from *Chthonius* C. K. to *Chelifer* Geof., but it is nevertheless interesting to notice, that the galea of the *Hemictenodactyli* is wanting or almost simple, slightly more developed in *Olpium* L. K., and much more so in most forms of *Garypus* L. K. and *Chelifer* Geof.; those forms of *Garypus* L. K. viz. *G. irrugatus* Sim. in which it is so exceedingly simple seem to be degraded from those with a more developed one.

Serrula exterior. The serrula exterior of the movable finger, the different structure of which gave Balzan the idea of naming his two suborders, the *Hemictenodactyli* and the *Panctenodactyli*, shows great differences, if we compare that of *Chthonius* C. K. with that of *Chelifer* Geof., but if we go to examine the intermediate forms, we will discover many connecting links. The serrula of the *Hemictenodactyli* is never completely fused with the finger, but has always a longer or shorter portion free distally; it is most often "narrower posteriorly than outside the middle" (49. p. 231, and tab. V, figs. 7 and 10), and never distinctly broader posteriorly than anteriorly (Pl. I, figs. 1 d and 4 b). In the *Chthoniinae* Dad. the two distal thirds of the serrula are completely free, as the figure of this organ of *Chthonius terribilis* n. sp. shows (Pl. I, fig. 1 d); its structure is like a blade, which has the inner margin dissolved into a number of squarely truncate teeth, as long as two thirds of the breadth of the serrula itself; only the tip is long, slender and distinctly pointed. The *Obisiinae* Dad. have only the distal third or half part free; the free portions of the teeth are much shorter than in *Chthonius* C. K., because they are fused basally, and the different parts of the serrula are not placed on the same level, as at least the basal fourth is more or less curled over downwards. The teeth are sometimes squarely truncate or rounded, and even enlarged distally as in *Blothrus spelaens* Sch. and *Roncus alpinus* L. K., and sometimes pointed as in *Obisium muscornm* Leach. (49. tab. V, fig. 10). The serrula of the *Pseudobisiinae* Hans. provide most often a great similarity to that of the last mentioned subfamily, but it differs to the extent, in which it is fused with the finger, having as a rule only one fourth or fifth free f. inst. in *Ideobisium crassimanum* Balz. (49. tab. V, fig. 7) or in *Ideoroncus Siamensis* n. sp. (Pl. I, fig. 4 b); *Ideoroncus Mexicanus* Bks. forms in this respect an exception, for it has the distal third free (21, pl. IX, fig. 2 c). The teeth are almost completely fused; they are most often rounded distally (Pl. I,

fig. 4 b), seldom squarely truncate as in *I. Mexicanus* Bks. (21. pl. IX, fig. 2 c). The different portions of the serrula are at least in *Ideobisium Balzani* With not on a level with each other (21. pl. X, fig. 2 b).

The serrula exterior of the *Panctenodactyli* is always completely fused with the finger and narrower anteriorly than posteriorly. In the *Garypidae* Hans. this organ provides a number of interesting modifications, being sometimes to a high degree similar to that found in *Chelifer* Geof. and sometimes most peculiarly shaped, but not showing any marked similarity to the corresponding structure in the *Pseudobisiinae* Hans. The most simple serrula, which is characterized by the squarely truncate and almost completely fused teeth of almost equal length is found in several species of *Olpium* L. K. for inst. in *Olpium cordimanum* Balz.

Fig. 1.
Olpium cordimanum Balz.
♂. Movable finger of
left antenna, $\times 244$.

Fig. 2.
Garypinus n. sp.
from Hawaii; ♀. Movable finger
of left antenna, $\times 275$.

Fig. 3.
Garypus longidigitalis Rainbow
Movable finger of left
antenna, $\times 375$.

(fig. 1); this serrula provides a similarity to that of *Ideoroncus Mexicanus* Bks., greater than to anyone else of the *Hemictenodactyli*, but is nevertheless widely different by the complete fusing with the finger (cf. 21. pl. IX, fig. 2 c). A modification a little different from the one described is found in *Olpium furciferum* Balz., which has the four basal teeth well separated from the rest and the terminal tooth shorter than the preceding one and pointed (cf. Hansen 49. tab. V, fig. 4). The serrula of *Olpium Birmanicum* n. sp. (Pl. II, fig. 7 d) and *Olpium* n. sp. from Queensland differs from the usual form by having the basal tooth distinctly longer than the following and widened out distally, but it has the terminal tooth completely like the others, neither pointed nor more independent. The serrula of *Garypinus nobilis* n. sp. is almost completely similar to that of *Olpium* sp. from Queensland,

but differs by its short, pointed terminal tooth (Pl. II, fig. 8 c), and as far alike that of *Ol. furciferum* Balz. The two last described forms of serrulae are only in points of the slightest importance different from those found in *Chelifer* Geof. or not at all different. The structural features, which may be observed in *Garypinus nobilis* n. sp., are much more developed in an undescribed species of *Garypinus* Dad. from Hawaii, as seen in fig. 2 p. 17. From this structure to that of *Garypus longidigitatus* Rainb., the distance is not great; in this species we have the two basal teeth distinctly longer than the following and enlarged towards their tips in a marked degree, while the terminal one is completely free, directed obliquely forwards and pointed (fig. 3 p. 17). This structure leads directly to the most remarkable modification of the serrula, known in any of the *Chelonethi*, namely that found in *G. elegans* Sim. and *G. irrugatus* Sim., in which the two basal teeth are much longer than the following and singularly enlarged distally, the one partly covering the other with their extremities (Pl. II, figs. 2 a & 1 b); the penultimate tooth is much longer than the preceding ones, distally free and pointed; the terminal tooth is completely free, pointed and directed obliquely forwards under an upwards curvature. Other modifications of the simple type found in *Olpium cordimanum* Balz. may be observed in *Garypus Floridensis* Bks. and *G. saxicola* Wath. as seen in fig. 4 c, pl. II. The serrula of the *Chelifer* Geof. is as already stated only a modification or a repetition of that of *Garypinus nobilis* n. sp.; the teeth seem most often to be higher, and their number varies from less than 20 to 37 (*Chelifer equester* With, 21. pl. VIII fig. 3 c ♂), apparently dependent on the size of the animal. The terminal tooth, which is more or less free, and either pointed or blunt, but especially the basal, which is distinctly the longest, enlarged terminally and here provided with a differently shaped, membranaceous flap, sometimes provides systematic characters of value (Pl. IV, figs. 2 a and 4 c). The serrula of *Pseudochiridium Thorellii* n. sp. (Pl. IV, fig. 12 c) has the teeth (16) comparatively higher and the terminal, as well as terminal but one more independent than in the corresponding organ in *Chelifer* Geof., the serrula of *Chiridium* Menge has a very similar structure.

The facts, set forth regarding the structure of the serrula, bear out the evidence, that the serrula in the members of the two suborders is always easily distinguished from each other, for the difference is well marked in this respect even between species of *Ideoroncus* Balz. and *Olpium* L. K., which in other characters bear similarity to each other; but they also show, that the similarity between forms of the *Pseudobisiinae* Hans. and the *Garypidae* Hans., is greater than that between the latter and the other subfamilies of the *Hemictenodactyli*. It is also of interest to notice, that the development of this organ as well as its generic and specific variations, attained in the family of the *Garypidae* Hans., is unsurpassed.

Lamina exterior. The lamina exterior is a plate-shaped organ, situated along the outer margin of the immovable finger in all the *Panctenodactyli*, and according to Hansen (49. p. 230), who only had observed it in this suborder, of great

systematic importance. But as the finger of *Ideoroncus laminatus* n. sp. (Pl. I, figs. 5 a, b), which is one of the *Hemictenodactyli*, bears a well developed lamina exterior, this character must at least be modified.

Serrula interior. If we compared the serrula interior of a *Cthonius* C. K. with the lamina interior of a *Chelifer* Geof., we should scarcely find any similarity, but the study of the intermediate forms will connect the extremities in the most beautiful manner. This organ is in the *Chthoniidae* Hans. f. inst. *Ch. terribilis* n. sp. (Pl. I, fig. 1 c) pointed and only fastened at its base with the two distal thirds free and directed forwards; it is of a slender structure and has its inner margin divided into a number of more or less obtuse teeth. The serrula is at any rate in some species of the three genera of the *Obisiinae* Dad. broader, has only the terminal portion free and the more or less pointed teeth partly fused; in *Obisium muscorum* Leach. almost all the teeth are pointed and the basal ones are not placed on a level with the others, but directed downwards and forwards (cf. Hansen 49. tab. V, fig. 9 b). The serrula of the *Pseudobisiinae* Hans. has a different structure in the different forms, sometimes providing similarity to that of the already mentioned subfamilies, and sometimes to that of the *Garypidae* Hans. The terminal tooth or perhaps more correctly the pointed tip is remarkable in many species like *Ideoroncus laminatus* n. sp. (Pl. I, fig. 5 a) by being without any apparent connection with the more proximal portion, and by its position on a lower level behind the bases of the preceding teeth; that this independent spine of those forms, in which it occurs, is really the homologous of the terminal spine of other species, may be regarded as probable on account of their similarity and the whole structure of the terminal portion of the serrula, as seen, if comparing the drawings of these organs in *Ideoroncus laminatus* n. sp. and *I. Siamensis* n. sp. (Pl. I, figs. 4 a and 5 a, b). A similar independent terminal spine is observed in the lamina interior of the *Garypidae* Hans. cf. p. 20), as well as in the serrula exterior of *Garypus irrugatus* Sim. (cf. p. 18). The serrula of *Ideoroncus Mexicanus* Bks. (21. pl. IX, fig. 2 b) is a slender organ, which has the distal fifth free: the distal teeth are completely free, triangular and serrated along their hindmost margin; the three basal teeth are pointed and free like the distal, and directed obliquely forwards, but the median ones are more or less fused and less pointed; the terminal spine is quite on a level with the proximal portion of the serrula and fused with it. The serrula of *Ideobisium Balzanii* With (21. pl. X, fig. 2 a) and of *I. crassimanum* Balz. is fused with the fingers in its whole length and has the teeth at least distally triangular and serrated along their hindmost margin (49. tab. V, fig. 6 b); the terminal spine is long, slender and moderately curved; it is serrated along the inner margin and placed on a lower level than the preceding teeth. The serrula interior of *Ideoroncus Siamensis* n. sp. (Pl. I, fig. 4 a, a) bears similarity to that of the previously mentioned forms, but the basal and median teeth are almost completely free and obtuse, while the distal ones are partly free and more pointed; the terminal spine is well developed, on a level with and fused with the preceding portion of the

serrula. The obliteration of the individuality of the teeth is much better marked in *Ideoroucus laminiatus* n. sp. (Pl. I, fig. 5 a, a) than in the just mentioned species; for the former has the basal tooth very broad, apparently consisting of several fused ones, and the following teeth so little marked, that it is possible to distinguish between a plate-shaped proximal portion in contrast to a short serruli-formed one, consisting of about 6 teeth, in addition to a long terminal spine, placed on a lower level (fig. 5 a, t).

The serrula or lamina interior of the *Garypidae* Hans. provides interesting modifications, as it sometimes bears similarity to that of *Ideoroucus* Balz. and sometimes to that of *Chelififer* Geof.; the species, which, in this respect at least, show the most pronounced similarity to *Ideoroucus laminiatus* n. sp. for inst. are *Garypus Floridensis* Bks. and *G. saxicola* Wath. The lamina is in the former of these species an elongated narrow organ, which is connected with the finger in its whole length, and by transverse lines divided into about 25 divisions or "teeth" with the distal portion partly free and squarely truncate; terminally we observe three or four more free and indistinctly serrated lobes in addition to the rather slender spine, which is placed on a higher level than the lamina proper and indistinctly serrated interiorly (Pl. II, fig. 4 a). A similar structure, but shorter with broader teeth, is usual in many forms, for inst. in *Garypus longidigitatus* Rainb. (Pl. II, fig. 3 a), in which only a short plate-shaped portion, probably consisting of two fused teeth, is present, while the greater portion of the organ is divided into broad, squarely truncate and marginally dentated lobes, numbering about twelve; the two terminal lobes are partly free like the slender spine, which is placed on a higher level and without marginal teeth. A similar structure is found in *Olpium* sp. from Queensland, but with the terminal spine more clumsy and serrated, and so it is in *Garypinus* sp. from Hawaii and *G. irrugatus* Sim. (Pl. II, fig. 1 b), but in these the plate-shaped portion (a') is comparatively more developed than in *Garypus longidigitatus* Rainb. *Olpium Birmanicum* n. sp. has the basal portion well developed, distinctly plate-shaped and with distinct transverse lines, and the distal serruli-formed one well set off, consisting of four dentated lobes, in addition to a short serrated terminal spine (Pl. II, fig. 7 c); *Olpium cordimanum* Balz. has a broad indistinctly divided plate-shaped portion, not well separated from the serruli-formed one, which consists of three broad dentated lobes, the one covering the front margin of the preceding one, in addition to a very long, slender terminal spine without any marginal teeth, but placed on a higher level (Pl. II, fig. 6 a). The serrula of this form provides great similarity to that of *Chelififer* Geof. especially on account of the sharp distinction between the plate-shaped and serruli-formed portions. The lamina of *Garypinus nobilis* n. sp. (Pl. II, fig. 8 b) is remarkable on account of the exceedingly broad plate-shaped portion with distinct transverse lines, well limited from the serruli-formed one, which consists of about three well developed simple teeth and a short terminal spine. *Olpium furciferum* Balz. (49. tab. V, fig. 3 b) has a lamina interior, which „has become narrower than in *Chelififer*,

in the full length with commencing transverse partitions from the free margin towards the basis so much as to render the margin posteriorly crenated" (49. p. 228); the thus described lamina appears similar to that of *Garypus Floridensis* Bks. in most features, but differs from all the species, examined by me, thereby that the terminal spine is placed on a lower level than the lamina proper and as far resembling the terminal spine in for inst. *Ideoroncus laminatus* n. sp. (Pl. I, fig. 5 a, t).

The lamina interior seems to be shaped alike in most species of the *Cheliferae* Sim., and is always divided into a proximal plate-shaped and a distal serruli-formed portion. The proximal division is a thin transparent plate, divided by distinct transverse lines, which has the rounded margin adorned by slight incisions, corresponding to these; this plate fills the space between the gaping fingers, when the antennae are closed, and is not placed on quite the same level, especially not towards the extremity, where it has become distinctly narrower. Its marginal portion is here suddenly and sharply folded towards the immovable finger and then again away from it, and is at last terminally fused with the most proximal of the dentated lobes of the serruli-formed portion: this terminal part of the plate-shaped membrane covers, when observed from below, the hinder margin of this lobe, and is placed beneath or just in front of the first mentioned fold, not far removed from the apparent end of the lamina proper (Pl. IV, figs. 4 a-b). The plate-shaped portion is followed by a variable number, but usually three dentated lobes, which are placed obliquely to the main axis of the finger and with their downwards directed portion the most distal; these lobes are placed so closely to each other, that each covers the front margin of the preceding (more proximal) with its own hinder, as easily observed, when the antenna is examined in a dorsal view. The whole organ is terminated with a spine, which is serrated along the inner margin and basally fused with the terminal lobe as well as with the finger between the second and third marginal tooth (Pl. IV, fig. 4 b, t). The number of the dentated lobes as well as their armature vary in the species, and so they do to a certain degree in the same species; *Chelifera Mortensenii* n. sp. has 2 lobes in the male and four in the female, *Ch. Birmanicus* Thor. (♀) has four (Pl. IV, fig. 4 a) and *Ch. equester* With has six lobes in the males, but only five in the female (21. pl. VIII, fig. 3 b, s). The length of the terminal spine as well as its armature is variable and of some systematic importance; *Ch. nodosus* Schrank for inst. has a spine, which is scarcely longer than broad and provided with three very long teeth, while it in *Ch. Birmanicus* Thor. for inst. is very long and slender provided with about seven tiny teeth (Pl. IV, fig. 4 b, t). The lamina interior of *Pseudochiridium Thorellii* n. sp. (Pl. IV, fig. 12 b) is shaped almost as in *Chelifera* Geof., but it has the three dentated lobes more pointed and a rather short spine; this organ consists in *Chiridium museorum* Leach of a well developed plate-shaped portion, one or two almost obsolete, not dentated lobes and a distal short spine.

The difference between the organ described, as it may be observed, if we

compare it in a *Chthonius* C. K. and a *Chelifer* Geof., is greater than that found in any other of the structures of the antennae, but these extreme forms are nevertheless connected by an almost complete number of intermediate steps. For, if comparing the two already mentioned forms, we will scarcely find any point of similarity, but a comparison of a *Garypus Floridensis* Bks. and *Ideoroncus lamiatus* n. sp. in this respect will show, that the similarity of the one to the other is greater than that of either to a *Chelifer* Geof. or to a *Chthonius* C. K. respectively, as far as the structure of the lamina (serrula) interior is concerned. In the structure of the flagellum and serrula exterior the most interesting forms were found in the *Garypus irragatus* Sim. group, while their structure in *Chelifer* Geof. was only a slight modification of that found in the less specialized forms; but in the lamina interior by far the most interesting and specialized form is observed in *Chelifer* Geof. The variations seem to be greater within the *Pseudobisiinae* Hans. and *Garypidae* Hans. than in the other *Chelonethi* in this organ, as it was in the structure of the flagellum and serrula interior, but in a far less marked degree. It is perhaps worth noticing, that the terminal spine is in all *Chelonethi* with the exception of most *Pseudobisiinae* Hans. and *Garypidae* Hans. only a portion of the serrula (lamina) interior, while it in these two groups is independent, being in the former placed on a lower level than the serrula proper and in the latter on a higher.

Concluding Remarks. It is thus evident that the antennae and especially the organs, with which they are adorned, show remarkable variations in the different forms of the *Chelonethi*, but also that the differences are the greater (in most cases at least), the more the forms stand apart from each other. It seems to be a rule, at least with regard to most of the organs, but especially flagellum and serrula exterior, that their variations are most marked in the *Pseudobisiinae* Hans. and the *Garypidae* Hans., less so in the other groups.

III. Function of the Antennae.

Another question of great interest remains, namely: „what difference in function corresponds to the structural one?”. In order to answer this question in a satisfactory manner, direct observations are necessary, but of these we have very few.

That the false-scorpions are able to spin have been known from of old; *Obisium* Ill. constructs a cocoon to contain the female as long as it has eggs or young ones to protect, as already observed by Hermann(?), Menge (33. p. 20), and later on by Simon (5. p. 13), but especially recently by Godfrey (59. pp. 215—216); Bouvier has in a little valuable treatise described the partly silken nidi of *Garypus saxicola* Wath., to the walls of which the egg-bundles are fastened and which contain the female as long as it has eggs or young ones to protect. *Chelifer cimicoides* F. constructs a cocoon, in which to pass the dangerous course of moulting as well as the cold season, as observed by Menge (33. pp. 20—21) and Simon (5. p. 13), and

Chelifer sculpturatus Lew. passes the course of moulting in a nidus, remarkable by the arrangement and structure of its threads (cf. With, 21. p. 122). In the collections of the British Museum I found a label mounted with a number of species of *Garypus Floridensis* Bks. (1 ♂, 2 young animals and 4 full-grown ♀, of which the two carried an egg-bundle attached to the base of the abdomen), showing that this species constructs similar cocoons, the purpose of which is yet doubtful; the passage on the label reads thus "Mustique Island. June. Sandy sea-shore, under drift wood; each one in a thin round flat silken nidus, about 1/8 inch in diameter, attached to lower side of log close together".

Menge started the theory (33. p. 14), that the *Chelonethi* have spinning glands and spinning organs placed at the base of the abdomen (cf. Simon 5. p. 3 and Hansen 7. p. 109, 9. p. 526). Bertkau (44.) and Croneberg (45.), the former examining *Obisium* Ill., the latter *Chelifer* Geoff., proved that the glands, mentioned by Menge, are not spinning glands, but accessory glands, belonging to the sexual organs, but they pointed out, that a pair of big glands, which debouch on the little terminal elevation or the galea of the movable finger of the antennae respectively, are found in the cephalothorax, and that these glands may probably be regarded as the spinning glands. Hansen has later on examined the manner, in which the terminal ducts of the spinning glands are arranged on the little elevation already alluded to of the movable finger of the antenna in *Obisium muscorum* C. K. (49. pp. 219—220, tab. V, fig. 11), observations, which I have been able personally to confirm. Supino (52. p. 605) has nevertheless recently dismissed Croneberg's conclusion and accepted Menge's old theory, that the spinning apparatus is placed at the base of the abdomen, but he is certainly wrong. The spinning is at least one of the functions of the antennae, but personal observations are of course wished for.

On account of the manner, in which the glands of the cephalothorax debouch, I think like the three above mentioned naturalists. But our principal question remains: „what difference in function corresponds to the difference in structure?" Croneberg says in reference to this subject (45. p. 427): "Die ganze Ausrüstung der Scheere, welche für das Ordnen der Fäden viel besser geeignet erscheint als zu Angriffszwecken, sowie auch die weiche Beschaffenheit der Endpapille scheint mir ebenfalls zu Gunsten dieser Ansicht zu sprechen, und schliesslich wäre auch zu beachten, dass sich für ein Spinnorgan kaum eine unpassendere Stelle gewählt werden könnte, als gerade an der Basis des Abdomens." This quotation refers to *Chelifer cimicoides* Fab., and this naturalist is probably right, that the antennae of this group are not quite well adapted to a predatory function. But if we examine the antennae of a *Chthonius* C. K. or an *Obisium* Ill., we are bound to be struck by the manner, in which their powerful chelae as well as their serrulae, which are always crossing each other like a pair of scissors (at least in *Obisium* Ill., when examined alive), appear fitted for predatory purposes. It seems to me to be at least possible, that the differences in structure of these organs are at least to a certain degree explained, if we accept, that the antennae of the *Cheliferinae* Sim.

are more or less exclusively spinning organs, while those of *Chthonius* C. K. and *Obisium* Ill. have a spinning, but especially a predatory function; if this explanation is a correct one, a difference in habit must be found according to the structure of the antennae not only between a *Chelifer* Geof. and a *Chthonius* C. K., but also between an *Ideoroncus* Balz. and an *Obisium* Ill., a *Garypus Floridensis* Bks. and a *G. irrugatus* Sim., and between the sexes of *Chelifer* Geof. I have set forth this preliminary explanation to stir up those, who have any opportunity for it, to direct observations in nature for the purpose of settling these questions. It must be regarded as pretty certain, that at least the flagellum has a sensory function; but of what nature and in what degree it differs in the different forms, would not be worth the while to speculate on.

Tulk starts in his interesting little treatise (30. p. 56) the very remarkable theory, that the serrulae and the flagellum are used in the cleaning of the maxillar chelae. As his observations are often so remarkably advanced, and as he says, that he has observed *Chthonius orthodactylus* Leach do so several times, I thought it worth while to make direct observations on *Obisium muscorum* Leach., as soon as material was available, to negative or confirm this supposition. I observed to my surprise and pleasure, that specimens of this species would clean its large chelae, as soon as a lump of moist earth had become attached to them, by opening the fingers of their antennae and drawing the fingers of the palps several times between those of the antennae. Bouvier has observed, that *Garypus saxicola* Wath. has a similar, but slightly different manner, in which to clean its maxillar chelae; he writes (51. p. 306): „ils ont notamment l'habitude de nettoyer les doigts de leur pinces en les faisant glisser entre les deux chélicères ou entre les deux branches d'un chélicère." It would be most interesting to observe the manner, in which species of *Chelifer* Geof. clean their maxillar chelae; the structure of the *lamina interior* seems not to be well adapted to such a procedure. Do species of *Chelifer* Geof. perhaps clean their large chelae by drawing their fingers between the two antennae only, and not between their fingers? Is the presence of a lamina exterior in all the *Panctenodactyli* and its absence in most *Hemictenodactyli* to be explained in this way?

3. Maxillae.

Introductory Remarks.

While a good many authors have studied the structure of the antennae, only a few have taken notice of the maxillae and labrum. Menge is the first, who dealt with this question, but his representation is not very good (1855. 33. p. 12). Croneberg gives later on (1880. 38. pp. 290—292) a fairly good description of these organs in "*Chelifer*", as well as in "*Chernes*" (1889. 45. pp. 421—424). H. J. Hansen studied the same organs in *Obisium muscorum* Leach (1884. 7. p. 103), and so did

Bernard (1894. 48. p. 411) but the latter in a very imperfect manner. The last publication on this theme is that of Stschelkanovtzeff (1903. 67. p. 320) of *Chelifer cimicoides* F. Because none of these authors have observed the fundamental differences between the different forms or made any comparison between them, I prefer to compare their studies with mine in each single case. My researches respecting this theme do not go very deep, as I had not material sufficiently well preserved for investigating the minute structures of the labium and sucking organ; my object is only to give a description of the modifications in the main genera, as far as the outer structure is concerned, and where it is possible a comparison between them.

I. *Chthonius* C. K. (Pl. I, figs. 1 e-g, fig. 2 a).

The labrum is as usual placed between the maxillae and dorsally in the middle coalesced with their inner margin. Its front part is a free slightly pointed projection, which is situated on a lower level than the rest and mounted with clear prominences, similar to hairs (Pl. I, figs. 1 e-f). The labrum merges behind into a rounded, posteriorly more narrow projection, as long as the labrum proper (fig. 1 e, *p*). The skin of the labrum is between the maxillae granular and besides in the middle transversely striated. The hindmost projection seems at least in *Chth. Rayi* L. K. to be a simple plate without granulations. A well developed labium as well as a complicated sucking organ is observed, the structure of which I do not treat on here.

The maxillae of *Chth. terribilis* n. sp. is as seen from the upper side, laterally prolonged backwards with the hinder margin curled over upwards (fig. 1 e). They slope moderately laterally and posteriorly, and become narrower between the trochanter and the anterior portion of the labrum, but especially in front of the trochanter (Pl. I, fig. 1 e). The thus established manducatory part is moderately pointed and has the outer margin just behind the tip curled over upwards and provided with two hairs (Pl. I, fig. 1 f). Near to the base of the terminal or manducatory part a membranous clear plate is situated, which is directed forwards and upwards, enlarged distally and mounted with marginal teeth anteriorly; this plate may properly be named *lamina maxillaris superior* (fig. 1 f, *ls*). Along the inner margin of the manducatory part an other membranaceous plate is situated, which is pointed and on a level with the maxilla; this plate is consequently designated *lamina maxillaris inferior* (Pl. I, fig. f, *li*). These two laminae as well as the manducatory portion, have in *Ch. Rayi* L. K. another shape; the lamina superior is pointed, and so is the slightly developed lamina inferior (cf. Pl. I, fig. 2 a, *ls-li*). The maxilla itself is in this species everywhere mounted with plate-shaped granules or more correctly divided into a mosaic of square plates. The maxillae of *Ch. terribilis* n. sp. are, when observed from below, seen to be somewhat longer than broad and has the manducatory part placed on a higher level than the posterior

portion of the maxillae; the lamina inferior is much more distinct than when seen from the upper side (Pl. I, fig. 1 g, *li*).

The maxillae of at least *Ch. Rayi* L. K. are below provided with the usual three or four "fissures" just behind the articular cavity of the trochanter and near to the outer margin, but I was not able to find the circular "lyriform fissures" so well developed in the *Obisiidae* Hans. (cf. below).

II. *Obisium muscorum* Leach. (Pl. I, fig. 3 a and fig. 3 b).

The labrum is very similar to that of *Chthonius* C. K., but shorter and broader. Only one author H. J. Hansen has given a thorough description of this organ; but as this is given in the Danish language and in the popular work "*Zoologica Danica*" (7. p. 103), which is not within easy reach, I think that a translation of his text and a reproduction of one of his figures (tab. VII, 6 f) will be of value, especially when the good quality of this author's representation is taken into consideration; in the following quotation references are made to fig. 3 a (Pl. I) not to Hansen's figure 6 e, and his figure 6 f is identical to fig. 3 b (Pl. I).

"In the front part of the cephalothorax at the top between the root of the antennae a small chitinous plate, pointing downwards, is situated, which as in the harvestmen is most naturally regarded as a clypeus [Pl. I, fig. 3 a-b, *p*]; it is moderately arched, rounded above, but below with a distinct deep notch in the middle. Beneath this plate a big organ, which probably ought to be regarded as a transformed labrum, is found [fig. 3 a-b, *b*]. As seen from the front it is twice as long as the clypeus, as broad, and continued as a large triangle into the above mentioned notch or incision; its lower part is short, moderately pointed and rounded, and the whole labrum is also, to a considerable degree, compressed from the one side to the other. In lateral view [Fig. 3 b, *b*] it forms an angle with the clypeus, so that it is directed moderately downwards, but also and in a considerable degree forwards; the labrum is at the base two thirds as broad as it is long; its front (upper) margin is almost straight, its hinder (lower) margin, which from the base to almost half its length is gradually, but not very much curved outwards and beyond turned suddenly in such a manner, that a prominent, rounded process arises (*e*); afterwards it turns again sharply and goes to the rounded summit in a direction quite converging with the dorsal margin. At the base near to the upper margin we find a tiny chitinous ridge (*c*), which is connected with the above described maxillar lobe. The first curved portion of the lower margin is delicately and densely serrated and forms in reality the one side of the mouth; this, which is placed at the ventral surface of the labrum, is shaped like a long narrow isosceles triangle, the vertex of which is placed in the above mentioned prominent small process (*e*) and the short bottom of which is at the base of the labrum. This orifice is closed by a plate of similar shape, and this plate which acts as a kind of labium (*d*), but is situated in an other position to that of the harvestmen

and spiders, is completely fitted into the mouth. The cavity of the mouth is accordingly dorsally and laterally encompassed by the labrum; in this and just behind it we find several systems of muscles, the courses of which are indicated in the figure, but the detailed activities of which ought probably to be regarded as almost impossible to unravel in the minute Danish species of this order."

To this long quotation I will only add a few suggestions. There seems not to be so sharp a distinction between the „clypeus" and the labrum proper, as stated by Hansen. The chitinous ridges, which are directed backwards and downwards from the base of the labium, are much more complicated in their structure than shown in his figure; their connection with the sucking organ I was not able to unravel. The articular membrane of the antennae is probably fastened to the angular line between the "clypeus" and „labrum"; I think that the latter can be more properly called keeled than compressed.

The maxillae show a similarity to those of *Chthonius* C. K.; their hindmost margin is curled over upwards and their terminal or manducatory part is rounded and bears three hairs in a transverse row (Pl. I, fig. 3 a). The *lamina maxillaris superior* (fig. 3 a, *ls*) is mounted with a few spines, rounded and almost on the same level everywhere; the *lamina maxillaris inferior* is larger and prolonged inwards (fig. 3 a, *li*).

The "lyriform organs" have been described by Hansen (49. p. 208). Near to the inner margin, a little in front of the middle, is found a single strongly curved almost ecliptic fissure, turning the convexity inwards; this fissure is not mentioned by Hansen. "Towards the exterior side about at the middle four large, strongly curved fissures, making together almost a circle" are found according to Hansen. This very remarkable organ is often different in shape at the two sides; in the specimens, which were examined, I could not with accuracy count more than three fissures of unequal length. Besides these there are four fissures near the outmost edge anteriorly. The maxillae of *Blothrus spelaeus* Sch. have a peculiar shape as seen in one of Schiödte's figures (31. tab. I, fig. 2 d); the median circular lyriform organ is found.

III. *Ideoroncus* Balz. (Pl. I, figs. 4 c-f, fig. 5 b).

The labrum of *Ideoroncus Siamensis* n. sp. is very similar to that of *Obisium muscorum* Leach. The anterior free portion is rather short; above in the middle there is a distinct keel and a system of chitinous ridges (Pl. I, fig. 4 c); the posterior free portion (*p*) is short and behind fairly rounded, and has several muscles for the sucking organ attached to the ventral surface.

The maxillae bear similarity to those of *Obisium* C. K. and have like these the hindmost margin curled over upwards; in the middle they are fused with the labrum for a rather long distance; their manducatory part is moderately pointed and bears two hairs. The *lamina maxillaris superior* (*ls*) is longer and more slender

than in *Obisium* C. K.; their limitation inwards I could not follow. The rounded lamina inferior is excessively small (fig. 4 c-d, *li*). The ventral surface of the maxillae bears below a few hairs in addition to the terminal ones.

Corresponding to the single inner marginal fissure of *Obisium muscorum* Leach. a very remarkable one is found in a similar position (Pl. I, fig. 4 e, *i*). This fissure is so strongly curved, that its two pointed tips, which are directed forwards and outwards almost touch each other; the oval-shaped area, limited by the fissure, is thinly-skinned. The median fissure (figs. 4 e, *m*—4 f) is even more peculiar than the corresponding one in *Obisium* C. K.; the organ of the left side (4 e) consists of an inner almost circular, broad fissure; the two outer ones are straighter, only including a portion of the inner one; of these two the most exterior is both shorter and narrower than the median. The inner fissure of the corresponding organ of the right side is less curved and inwards bifurcated; its exterior fissures are shorter, especially the third one (fig. 4 f). Between the two organs four very narrow lines are visible, apparently placed beneath the skin; their axis is perpendicular on the line between the two lyriform organs. Near the outmost anterior margin we find as usual four oblique fissures, of which the inmost one is the longest (fig. 4 d, *f*²). Above in the middle four longitudinal fissures are found, of which the inner is the longest and placed apart from the three others (fig. 4 c, *f*⁴). Both the labrum and the laminae maxillares are more elongated in *Ideoroncus laminatus* n. sp. than in *I. Siamensis* n. sp. Their more detailed structure I could not investigate with the scanty material at my disposal (fig. 5 b); the median circular organ is present, but placed more laterally than in *I. Siamensis* n. sp.

IV. *Garypus irrugatus* Sim. (Pl. I, figs. 6 a-d).

The labrum appears most similar to that of *Chelifer* Geof.; the foremost free portion is rounded and narrow, while the hindmost is broader; the labrum does not project behind the maxillae as in the *Hemictenodactyli* and is laterally covered by the overlapping maxillae as in *Chelifer* Geof. (Pl. I, fig. 6 a). The arrangement of the chitinous ridges at the surface of the labrum as well as of the paired bodies above its hindmost broad portion (fig. 6 a, *h*) bear some similarity to that in the latter genus. Beneath the hindmost portion of the labrum and over the sucking organ a broad chitinous body is found (Pl. I, fig. 6 a, *p*). The maxillae, which are granular with scale-shaped granules along the sides, are pointed and provided with a well developed *lamina maxillaris superior*, but with a very narrow *lamina inferior* (fig. 6 a-b, *ls-li*). The ventral surface bears many short hairs along the inner side; at the outer corner a long pointed one is situated. Just where the maxilla is bent inwards to establish the very narrow manducatory part, a short very strongly curved hair is found (fig. 6 d, *h*); a similar one is placed near to the tip.

The marginal interior fissure (Pl. I, figs. 6 b, *f*²—6 d, *f*) is placed much more in front than usual, is excessively broad and includes a thinly-skinned depressed

area. The structure of the median organ is very difficult to unravel: it seems to consist of two remarkably shaped fissures (Pl. I, fig. 6 c). The posterior one is narrow, shaped like a horse-shoe with the free tips directed forwards. Between the tips of the legs another, narrower fissure is found with a tiny branch directed forwards and inwards. The outer margin of these two fissures are rather chitimized, the inner less so, and the area between them is thinly skinned, a median denser portion excepted. Near to the exterior margin I have only seen two fissures, placed apart from each other (fig. 6 b, f^3); above there are three very short almost longitudinal fissures (Pl. I, fig. 6 a, f^4).

V. *Garypinus nobilis* n. sp. (Pl. I, figs. 7 a-c).

The labrum is very broad in front and is behind a moderate convexity widened out again (Pl. I, fig. 7 a); there is no posterior free portion prolonged at the back of the maxillae. The anterior portion is mounted with two broad ridges (fig. 7 a, a), which almost touch each other in the front but behind are well separated from each other. On each side of these and partly in front of them a narrow short ridge is found (fig. 7 a, c). The median pair of ridges (a) is continued behind into the lateral margin of the labrum (m) and overlapped by the inwards directed wing of the maxillae (fig. 7 a, b). The hinder part of the maxillae, which is placed behind the line where the articulate-membrane of the antennae is fastened (fig. 7 a, l), is more thinly-skinned than the part in front of it. Along the hinder margin of the maxillae a similar, but less complicated system than that of *Chelifer* Geof. is found (figs. 7 a, b and d, cf. fig. 8 a). The paired bodies, which cover the base of the labrum (fig. 7 a, h) are moderately developed. The *lamina maxillaris superior* is rather long and broad (fig. 7 a, ls), while the *lamina inferior* is extremely small (fig. 7 a, li). The manducatory part is well developed but not so distinctly limited as in *Garypus* L. K.

The interior marginal fissure is placed far behind the tip and a little removed from the inner margin (Pl. I, fig. 7 b, f^2); it is rather narrow and includes an almost circular, thinly-skinned area, beneath which a short, hooked and outwards directed body is placed (fig. 7 c). The median organ (fig. 7 b, f^1) seems to consist of at least one almost circular fissure, and appears similar to an articulate-cavity; its minute, as it seems complicated, structure I was not able to unriddle. Near to the exterior margin, just behind the articulate cavity at least two transversely placed fissures are found (fig. 7 b, f^3), and dorsally in the middle two longitudinal ones are placed (fig. 7 a, f^4).

VI. *Chelifer nodosus* Schrank. (Pl. I, fig. 8 a).

The structure of the labrum as well as of the maxillae is much more complicated than in other forms and it is difficult to distinguish the parts of the two

systems from each other. The labrum, the free part of which is rather short and obtusely pointed, becomes broader and broader backwards (Pl. I, fig. 8 a). The anterior portion is provided with a pair of exterior delicate ridges (fig. 8 a, c) and also with a pair of inner strong ones, more and more diverging behind and at least passing over in the lateral margin of the labrum proper, which is probably fused with the inner side of the maxillae (fig. 8 a, a, m). The hindmost portion of the labrum is laterally covered by the overlapping inner portions of the maxillae. The upper surface of these are naturally divided into two areas, a hinder thinly-skinned one, and a foremost one thicker-skinned. The limitation between the two is a fine line, continued over the labrum, to which the delicate membrane between the maxillae and the antennae is probably fastened (fig. 8 a, l). This hindmost portion is provided with a system of ridges, which as seen in the figure, are most complicated along the posterior margin. Croneberg has mentioned the inner portion of this system and writes (38. p. 29, taf. XV, fig. 7) that the base of the rostrum "besteht aus zwei dreieckigen, hinten und oben zusammenstossenden Platten, denen hinten noch zwei kurze Fortsätze angefügt sind"; these "kurze Fortsätze" (fig. 8 a, h) are only the broad hindmost margin of the overlapping portion of the maxillae, which behind seems to be connected with the corresponding one of the other side. Where the sides of the labrum meet the posterior margin of the maxillae at a deep notch (fig. 8 a, n) a strong balk arises, which is directed through the inner cavity of the maxillae and projects with its tip into the articulate-cavity of the trochanter (fig. 8 a, i). The manducatory part is fairly well developed and bears a few hairs. A broad and long lamina maxillaris, with the outer margin serrated and probably homologous with the *lamina superior* of other forms, is present (cf. pl. III, figs. 8 f-g, ls).

The anterior marginal fissure of *Ch. nodosus* Schrank is almost circular, opens outwards and seems to include a depressed area with a body within. The corresponding fissure of *Ch. Murrayi* Poc. is narrow and almost semicircular with the concavity facing outwards; the thinly-skinned area, which is partly included by this fissure, contains in the middle a round body. The anterior fissure of *Ch. lamprosalis* L. K. sp. af. is narrow, almost circular and apparently including a deep cavity. The median organ of *Ch. Murrayi* Poc. consists of an almost circular narrow fissure only open in front, where another shorter fissure appears; the area, included by these, is depressed and similar to an articulate-cavity. The corresponding organ of *Ch. lamprosalis* L. K. sp. af. consists of a narrow, almost circular fissure, only leaving the front open; in the bottom of the deep cavity within another semi-circular fissure(?) is found. Dorsally near the exterior margin just behind the insertion of the trochanter an organ, consisting of four obliquely placed fissures, is found (fig. 8 a, f³); on the exterior side I have found three almost longitudinal fissures, one fairly long and two very short in *Ch. lamprosalis* L. K. sp. af., probably identical with those, described by Hansen (49. p. 206).

Croneberg has both in 1880 (38. pp. 290-292, taf. XV, figs. 7-9) and in 1889

(45. pp. 421-424; taf. X, figs. 5-6) given descriptions as well as drawings both of the maxillae and the labrum in "*Chelifer* Geof." as well as "*Chernes Menge*". I can not agree with him in many details as well as in some interpretations, as is easily seen, when comparing my foregoing descriptions with those of Croneberg; I can affirm that Croneberg's drawings of these organs in "*Chernes Menge*" are very good and exhaustive, while those of "*Chelifer* Geof." in his earlier paper are of less value. Stschelkanovtzeff has recently dealt with the structure of these organs in *Ch. cimicoides* F. (1903. 67. pp. 320—324). Though I disagree with the statements of this author in several questions, I will only deal with a single question here, which falls within the scope of these investigations. On account of the connection between the labrum and the articulate membrane of the antennae he writes (67. p. 322): "Folglich setzt die obere Wand des Rostrums sich keineswegs bis zu den dreieckigen Platten fort, die Croneberg für die paarige Basis des Rostrums hält, und die in Wirklichkeit aber die Dorsalflächen der inneren und hinteren gegen einander stehenden Ecken der Coxalglieder vorstellen." His criticism of Croneberg's triangular plates is according to my investigations (cf. above) partly right, but if my interpretation, that the labrum of *Chelifer* Geof. is continued behind the insertion of the antennae beneath the lateral wings of the maxillae, which is fairly supported by the structure of the labrum in the *Hemictenodactyli*, holds good, the above quoted hypothesis falls to the ground.

VII. Concluding Remarks.

Though my studies of the labrum and the maxillae do not go into the minute details and as a rule only concern the outer appearance, it will by comparing their structure in the different genera easily be realised, in the first place that there is a fundamental difference in structure between these organs in genera like *Chthonius* C. K. and *Chelifer* Geof., which stand widely apart, and in the second place that the gap between the two is at least partly filled by intermediary forms. It is also evident, that the maxillae and labrum, as well as their lyriform organs, become in similarity to the antennae more complicated in structure, going from *Chthonius* C. K. to *Chelifer* Geof. A detailed study of these organs from a systematic as well as from a comparative-morphological view is recommended to future students of the *Chelonethi*.

4. Palps.

Shape. The shape of the palps varies in a considerable degree in the different forms of this group; they usually show differences between the members of the subfamilies, genera and even species on account of an often marked sexual difference. Their shape is only seldom characteristic of the family, as is the case

with the *Chthoniidae* Hans.; forms with vastly differently shaped palps go together in the different subfamilies like *Blothrus spelaeus* Sch. and *Roncus alpius* L. K., *Garypus irrugatus* Sim. and *Garypinus nobilis* n. sp., and like *Chelifer granulatus* C. K. and *Ch. Javanus* Thor. In the present chaotic state of our knowledge of the generic character it is not easy to judge definitively about the systematic value, which ought to be attributed to the shape of the palps. In the one place it seems to be pretty certain, that a genus like *Garypus* L. K. is well characterized by its long and slender palps, but it seems in the other place to be very probable that *Chelifer Hawaiensis* Sim. is closely related to *Ch. cimicoides* F. in spite of the long and slender palps of the former and the rather short and clumsy ones of the latter species. To the specific value of the shape of the palps every description of a species of this order bears testimony; we will scarcely exaggerate in saying, that the palp of one species differs in shape from that of all other species. As far as the sexual difference is concerned, we find, that most forms do not provide any marked differences in the shape of the palps in the sexes, while these differences in a few, f. inst. *Chelifer equester* With, is pushed to an extremity (cf. 21. pl. IX, figs. 1 a-d).

Tactile Hairs. The fingers of the palps always bear dorsally and posteriorly tactile hairs, which are articulated in cavities, several times wider than their narrow bases (cf. Hansen 49. p. 215; tab. V, fig. 14 t). These hairs are rather remarkable in *Chthonius Rayi* L. K., where they are provided with a basal thickened part. Similar hairs are found on the dorsal or posterior surface of the hand in at least most species of the *Pseudobisiinae* Hans. and *Chthoniidae* Hans. These hairs have often been seen and figured by systematic authors like Simon, Thorell and Balzan, but their systematic value was never fully realised. The number and arrangement of these hairs, when they are placed on the fingers, are often characteristic f. inst. in *Chelifer Galathea* n. sp. (Pl. IV, fig. 2 c), *Ideobisium Balzanii* With (21. pl. X, figs. 2 d-e), *I. crassimanum* Balz. (12. pl. 12, fig. 33) and *Ideoroncus Mexicanus* Bks. (21. pl. X, figs. 1 b-c), but these characters are not easily used, because the position of the tactile hairs is not easily investigated. But the number and arrangement of those, which are placed on the hand, provide an excellent and easily accessible character between species and groups of species in the families in which they occur, f. inst. in *Ideoroncus laminatus* n. sp. (Pl. I, fig. 5 c), *I. Mexicanus* Bks. (21. pl. X, fig. 1 b) and *Ideobisium Balzanii* With (21. pl. X, figs. 2 d-e).

It is easily ascertained, that the name "tactile" hairs, which has been given to these organs, is a proper one. If you place two specimens of *Obisium muscorum* Leach in a narrow tube, you will see them searching with their palps in all directions, while they walk around; but if the two palps under the perambulation of their proprietors approach each other so closely, that the distance between them is equal to the length of a tactile hair, the animals will to your surprise suddenly dart backwards away from each other. Add to this, that the chitin of

the palps is very thick and that the tactile hairs are always moving in all directions, to which their insertion in wide articular cups make them perfectly fitted.

Dentation of Fingers. The fingers of the palps bear teeth along their inner margin; the number as well as the shape of these teeth are very dissimilar in the different genera, as well as in the species especially of the *Chthoniidae* Hans., as described thoroughly in Hansen's Danish paper (1884. 9. pp. 524-529) and later on but much shorter by the same author in his "Organs and Characters" (1894. 49. p. 235). Several of the facts, set forth by this naturalist, as well as one of his figures, are included in the following representation. The marginal teeth differ in a considerable degree within the species of *Chthonius* C. K., but are as a rule large and not numerous (cf. Balzan's figures on his tav. XVII (46.) and this paper fig. 11 below). Both fingers of *Blothrus spelaeus* Schiødte bear marginal teeth almost from the base to the tip; the teeth are found in great number viz. about 125 on the immovable and about 90 on the movable finger; they are placed so close in the basal half, where they are rounded, that the margin seems to be crenated; in the distal half they are triangularly pointed and further apart from each other. Both fingers of *Roncus alpinus* L. K. are crenated from base to tip. In *Obisium muscorum* Leach. there is a great difference between the armature of the fingers (fig. 4 a); the teeth of the movable finger are all low and placed close to each other, while the immovable one bears rather high, squarely truncate ones, in addition to a number of basally broader, higher and conically pointed teeth, which alternate with four or five of the others. The teeth of *Ideoroncus Siamensis* n. sp. are poorly developed; behind the well marked terminal hook of the movable finger three distinct small pointed teeth occur, but the margin behind these is crenated and basally undulated; the teeth of the immovable finger are somewhat better marked, and sometimes provided with a tiny secondary tooth in the middle. The movable finger of *Garypus irrigatus* Sim. bears a close row of teeth, which are low and squarely truncate proximally, but pointed distally; the teeth of the immovable finger are pointed and placed more apart; inwards, removed from the margin, a few accessory ones are found; similar pointed accessory teeth to the number of twelve are placed at the inner margin of the immovable finger in *G. elegans* Sim. from near the base to a slight distance from the tip. Both fingers of *Garypinus nobilis* n. sp. are provided with a marginal close row of teeth, those of the movable being squarely-truncate in contrast to those of the immovable, which are at least distally triangularly pointed. The marginal teeth of *Chelifer* Geof. are placed so close, that the margins must be called crenated; in the immovable finger of *Ch. granulatus* C. K. for inst. they are pointed and directed backwards, in the movable only the terminal are pointed, the rest are more squarely truncate. The teeth of *Ch. nodosus* Schrank

Fig. 4 a.

Obisium muscorum
Leach. Fingers of left
palp x 69. (Zool. Da-
nica 7, tab. VII, 6 g).

are fairly high, those of the movable squarely truncate, those of the other finger triangularly pointed.

The armature of the fingers is in *Chelifer cimicoides* F. and related species interesting on account of the presence of an anterior and posterior row of conical, not marginal teeth; this structural feature was noticed and described by Hansen years ago (1884. 9. p. 528), and again set forth by him later on (1894. 46. p. 234, tab. V, fig. 14), but was nevertheless represented as new by Stchelkanovzeff, who deals with their systematic importance in a little paper (1902. 64. pp. 353-354). The latter describes them minutely in three species; I can confirm his observation as far as *Ch. nodosus*. Schranck is concerned, namely that the movable finger bears a single tooth inwards and three outwards, while the immovable has two teeth inwards and four outwards. The number of these teeth seem to be variable in *Ch. Hawaiensis* Sim. (21. pl. VI, fig. 3 a, pp. 105 and 107).

5. Legs.

Introductory Remarks.

The legs of the *Chelonethi* consist of a coxa, a trochanter and a femur, which is only undivided in a single genus, *Chiridium* Menge, but as a rule divided in two more or less developed joints in all other genera, in addition to a tibia and one or two tarsal joints; there is always a marked difference between the two first and the two last pair of legs. When in the following the third and the fourth joint of a *Chthonius* C. K. f. inst. are named the basal and tibial femoral part, it is, because these two joints are homologous to one joint in *Chelifer* Geof., which is a real femur in functions; but it is to be remembered, that no premature interpretation of the real nature of these joints is involved, in using this term.

The coxa and the trochanter have been named in a similar manner by all authors, and so have the joints of the last two pair of legs. But the distal joints of the two first pair of legs have been interpreted in various ways by different authors. As it is upon the explanation of the nature of the femoral parts, that the interpretation of the more distal joints depends, I will briefly set forth the main points of the two principal theories, together with new facts in favour of the one, under the discussion of the variations, which occur in the femora of the two first pair of legs. The modifications of the femora of the fourth pair of legs as well as those of the other joints of the first as well as of the fourth pair, will be discussed in due time. This chapter will be closed with remarks on the variations in the structure of the arolium, claws and hairs of the legs.

I. Coxae.

The shape as well as the position of the coxae sometimes provide features of interest. In the *Panctenodactyli* they are placed more or less on a level with the

maxillae, in the *Hemictenodactyli* they are with a single exception (*Ideoroncus laminatus* n. sp.) placed on a lower level. The variation in shape is not very much marked in the *Hemictenodactyli* (cf. 21. pl. X, figs. 1 a and 2 c), but very considerable in several forms of the *Pauctenodactyli*; in the *Garypidae* Haus. f. inst. we have a well marked difference between the length of the fourth pair of the coxae in *G. Floridensis* Bks. and *Olpium cordimanum* Balz.; the greatest and most interesting variations are found in the *Chetiferinae* Sim., in which we often find a marked sexual character in the shape and structures of the fourth pair of coxae. It is only seldom, that the coxae of the female show marked variations; examples are found in the very broad coxae of the female of *Ch. equester* With., in the female-coxae of *Ch. sculpturatus* Lew., which are prolonged backwards with their hindmost margin (21. pl. VIII, fig. 2 f), but especially in *Pseudochiridium Thorellii* n. sp. in which the hindmost prolongation of the fourth pair covers the base of the abdomen and is much broader than the coxa proper (Pl. IV, fig. 12 d). The coxa of the fourth pair of legs is in the male often of great systematic interest; the whole „*Lophochernes* Sim.” group of the *Cheliferinae* Sim. f. inst. has got its chief characteristics from the structure of the male-coxa and the remarkable coxal sac, placed within it, and even its species are to a certain degree characterized by the differences found in these organs (Pl. III, fig. 1 e-f). The majority of the species of the *Cheliferinae* Sim. have the coxae of the two sexes almost alike; only those species, in which the coxae attain a remarkable development, show sexual differences of interest in this respect f. inst. *Ch. equester* With. (cf. 21. pl. VIII, figs. 3 d), *Ch. sculpturatus* Lew. (cf. 21. pl. VIII, figs. 2 b and 2 f), *Ch. Mortensenii* n. sp. (Pl. III, fig. 1 e-f) and *Pseudochiridium clavigerum* Thor. (cf. below).

The coxae are always provided with hairs of the usual shape, but in at least four species of *Chthonius* C. K. remarkable hairs of peculiar structure are placed near the base of the second and sometimes third coxa (Pl. I, fig. 1 h) (cf. below).

II. Trochanter.

The trochanter of the fourth pair of legs seems always to be longer and more slender than that of the first pair of legs f. inst. in *Chelifer Hawaiiensis* Sim. (21. pl. VII, figs. 1 b-c). As this joint differs in length as well as in shape in the various forms in no mean degree, I should think it worth while to pay some attention to it (cf. figs. 12 e-f of *Pseudochiridium* n. g. pl. IV; figs. 1 c-d of *Garypus* L. K. pl. II; figs. 7 f-g of *Garypinus nobilis* n. sp. pl. II).

III. Femur of First Pair of Legs.

The third joint of the first pair of legs has been designated femur by all authors in *Chiridium* Menge and *Chelifer* Geof., but the third and the fourth joint of *Garypus* L. K. and most other genera have been differently interpreted by the

students of this group. The older of the two principal theories¹⁾, which was established by Simon (1879. 5. pp. 6-7), was accepted by most authors especially Balzan and Gaubert (cf. 49. p. 225); the newer was set forth by Hansen 1884 (9. pp. 518-520) and again 1894 (49. pp. 223-227) and accepted by Börner (68. 300-302), who went a little further. Simon regards the divided femur of *Chelifer* Geof. and the undivided of *Chiridium* Menge as homologous to his undivided femur of *Garypus* L. K., *Obisium* C. K. and all other main genera, the same joint, which Hansen names the basal femoral part; the tarsus of all these genera become consequently two- or three-jointed, and *Chiridium* has as far as the structure of the femur is concerned more similarity to *Garypus* L. K. than to *Chelifer* Geof. Hansen²⁾ regards the femur of *Chelifer* Geof. and *Chiridium* Menge as homologous to the basal + the tibial femoral part of *Garypus* L. K. and the other genera; from this interpretation it follows that the tarsus of the *Garypus* L. K. etc. is one- or two-jointed, never three-jointed and that *Chiridium* Menge is the only genus with an undivided femur; it also follows as a result, that the similarity between the leg I of *Chiridium* Menge and *Chelifer* Geof., which have both undivided tarsi, is greater than that of the former genus and *Garypus* L. K., especially when taken into account, that the division of the femur is more complete in the latter than in *Chelifer* Geof. Hansen has not expressed himself about the possible homology between the trochantin of *Chelifer* Geof. and the basal femoral part of *Garypus* L. K., while Börner (1903. 68. pp. 300—302) seems to regard as well established the homology between these joints. To prove his theory Hansen sets forth several convincing facts especially taken from the shape of the joints, the articulations and the position of the "lyriform" fissures; with regard to this I refer you to his paper (1894. 49. pp. 223—227). A few facts, relating to this subject and taken from the muscles, have been elucidated by Börner. I will add a few observations, which make Hansen's interpretation, if possible, even more secure, and which shows that Börner's opinion, regarding the homology of the trochantin of *Chelifer* Geof. and the basal femoral part of *Garypus* L. K., may be regarded as very probable.

If we examine the first pair of the femora of f. inst. *Chelifer lamprosalis* L. K., we will find the following structure. The trochantin is about as long as the distal femoral part and much deeper; the whole distal surface is obliquely cut off establishing a wide cavity, facing forwards, upwards and outwards, for the insertion of the distal portion; on account of the position of this cavity the ventral posterior portion of the margin is prolonged distally in contrast to the dorsal, anterior one.

¹⁾ Schiödt (1851. 31. p. 24) interprets the legs of *Blothrus spelaeus* Sch. in a manner differing from that of later authors, for he regards the tibial part of the femur as a real tibia, and consequently gets an undivided femur and a two-jointed tibia in the two first pair of legs.

²⁾ Keyserling seems to have shared a similar opinion regarding the interpretation of the femoral part and probably without any knowledge of Hansen's earlier paper; he writes in his description of *Olpium longiventer* Keys. (41. 1885—86, p. 51), that the two first pair of legs have the femora divided into two distinct portions in contrast to the two last pair, the femurs of which are only indistinctly divided.

Both joints are anteriorly near the dorsal margin provided with a tooth-shaped condylus, on each side of which the articulate membrane increases in breadth; the distal portion of the trochantin covers ventrally and posteriorly the base of the distal joint as well as a tooth-shaped condylus. As the condyli of the thus established

Fig. 4b. *Chelifer lamprosalis* L. K.
x 95. Left femur I; a in anterior view,
b in posterior view.

Fig. 5. *Chelifer subruber* Sim. x 95.
Left femur I; a in anterior, b in posterior
view.

hinge-joint are placed obliquely to each other, the main movement is probably a horizontal one (fig. 4b a-b).

The trochantin of *Ch. subruber* Sim. is scarcely half as long as the distal part of the femur; the distal surface is almost perpendicularly cut off, and the articulate cavity consequently faces outwards; the two condyli, each consisting of a marginal tooth on the trochantin, are almost median and opposite to each other (the posterior is placed a little more dorsally), the membranes between the two joints are very narrow and the mobility consequently very limited; the movements are probably a wriggle principally in the horizontal plan (fig. 5 a-b).

The trochantin of *Pseudochiridium Thorellii* n. sp. is one third shorter than the distal femoral part as well as a little deeper, the posterior and the anterior condyli are placed in the middle and almost opposite to each other; the articulate membrane between the two joints is very narrow; I think that the movement is principally a vertical one (fig. 6 a-b).

Fig. 6. *Pseudochiridium Thorellii* n. sp. x 95 in
anterior and posterior view.

In spite of the differences found in the described forms of *Cheliferinae* Sim., there can be no doubt about the homology of their trochantins, for all intermediary forms are found between the extremities; the legs are similar in all other respects and the animals stand nearly related to each other.

If we examine the first pair of femurs of a *Garypinus* Dad., a genus unknown to Hansen, f. inst. *G. nobilis* n. sp. (fig. 7 a-b), we will find its structure very similar to that of *Chelifer subruber* Sim. The basal portion of the femur is about one third of the tibial, and distally, where it is widened out, scarcely deeper.

Fig. 7. *Garypinus nobilis* n. sp.
x 95. Left femur I; a in anterior
view, b in posterior.

Anteriorly there is a very narrow articulate membrane and a median tiny tooth represents the condylus; posteriorly we find no condylus and the margin of the trochanter overlaps that of the tibial part; the limitation between the joints is perpendicular on the longitudinal axis. The two joints form together a femur similar to that of *Chelifer* Geof. with a basal trochantin. The main movement seems to be a very limited wriggle in the horizontal plan especially forwards (fig. 7 a-b). A muscle corresponding to Börners „flexor femoralis” is found. By examining the first pair of legs of a *Garypus* *irrugatus* Sim. f. inst. (figs. 8 a-b), we will find the basal femoral part much longer than the tibial and widened out towards the end, where it is deeper

than the tibial part; the two joints are connected by a hinge-joint with the principal mobility in the vertical plan. The condyli are teeth, of which those of the basal part are best developed and especially the anterior.

Fig. 8. *Garypus irrugatus* Sim.
x 95. Left femur I; a in anterior,
b in posterior view.

In spite of differences in articulation, shape and comparative length between the femurs of the two first pair of legs in *Garypinus* Dad. and *Garypus* L. K., the homology between their divisions is easily proved. The difference in length between the two joints is scarcely of much importance, because we find all intermediary forms between the short basal portion of *Garypinus* Dad. and the long of *Garypus* L. K.; in *Garypinus* sp. from Hawaii for instance we have the basal portion more than half as long as the tibial, and in *Garypinus* sp. from Funafuti as well as in *G. dimidiatus* L. K. the two joints are of equal length. The differences in shape of the basal part are dependent on the differences in length and intermediary forms are found between the extremities; as far as

the variations in the articulation between the two joints are concerned, I have not had the opportunity of examining other species than the two already mentioned, but without doubt intermediary forms occur between the extremities, exhibited by these. A further confirmation of the homology between the two joints is found in the position of a characteristic “lyriform” fissure; we find namely

anteriorly and dorsally near the tip of the basal joint of all the *Garypidae* Hans., whether this joint is long or short, a long fissure, which is directed obliquely forwards (cf. figs. 7-8 a, f) (Pl. II, figs. 1 c, 7 f and 8 f). If the basal joints of f. inst. *Garypinus nobilis* n. sp. and *Garypus irrugatus* Sim. were not homologous, the previously mentioned fissure should have had a different position in the two forms. The position of Börner's „flexor femoris II” in *Garypus* L. K. as well as in *Garypinus* Dad. tells the same story.

If we are thus right in regarding the basal as well as the tibial femoral parts as being homologous in all the *Garypidae* Hans., and if our assumption of the homology of all the trochantins and distal portions of the femurs in the *Cheliferinae* Sim. is true, it will certainly be necessary with Börner to homologize the trochantin of *Chelifer* Geof. with the basal femoral part of all the other genera, and the distal femoral part of that genus with the tibial femoral part of these. The corresponding position of the flexor-muscle of the femoral tibial part in the *Cheliferinae* Sim. as well as in the *Garypidae* Hans. is in favour of this interpretation.

With regard to the differences between the femoral parts and the articulation between them in *Garypus* L. K. and *Chthonius-Obisium* C. K. I refer to Hansen (49. p. 224), who has pointed out, that the tibial femoral part has a tendency to become more and more resembling a tibia in shape as well as in articulation, going from the former of these genera to the latter passing *Ideobisium* Balz. and *Obisium* C. K. The tibial part of *Chthonius* C. K. has really in almost all respects become a tibia.

IV. Femur of Fourth Pair of Legs.

The joints of the fourth pair of legs have not been interpreted in a different way by the authors, because their femora do not provide so striking variations, as those of the first pair do. The femur of the fourth pair is in all genera, but one *Chiridium* Menge, provided with a longer or shorter trochantin, set off from the rest of the femur by a strictum and without any muscles, at least in all genera except *Chthonius* C. K. That the trochantin of the fourth pair of legs is homologous in all the *Chelonethi*, may be regarded as self-evident. The question remains, whether the two portions of the femur of the fourth pair of legs correspond to those of the first pair, or not. Such an identification seems at least to be very probable¹⁾, when we remember, that all the other joints of the legs are “homotype” to each other, that there seems to be a kind of specialized articulation between the two femoral portions in *Chthonius* C. K., and that there is a reduction in the length and development of the trochantin of the fourth pair, corresponding to that of the basal femoral portion of the first pair, if we go from *Chthonius* C. K. to *Garypus-Chelifer*. If one may be allowed to express oneself paradoxically, one can say, that the femur of the fourth pair of legs in *Chthonius* C. K. stands on the

¹⁾ The remarkably well developed articulation between the trochantin and the femur proper of the fourth pair of legs in *Feaella mirabilis* Ell. is strongly in favour of this theory (cf. Ellingsen 72).

same stage of development, as the femur of the first pair in *Chelifer* Geof., and that the femurs of the first as well as of the fourth has attained its final stage in *Chiridium* Menge.

The two last pair of legs of *Chthonius* C. K. are remarkable for their powerfull compressed femurs, to which animals of this genus owe their jumping habits, as well as for the comparatively well developed articulation between the trochantin and the rest of the femur (Pl. I, fig. 1 m, f'). The trochantin is about half as long as the whole femur and ends with an articulate cavity, which faces forwards and outwards; if we follow the articulate membrane between the two joints, it will be seen to be curved towards the base anteriorly, but away from it posteriorly; the mobility is probably very limited, corresponding to the narrow articulate membrane.

The limitation between the trochantin and the distal portion of the femur seems to be a mere strictum in the *Obisiidae* Hans. In *Blothrus spelaeus* Sch. the two portions of the long and slender femur are of almost equal length; the greatest thickness is attained just in front of the articulation. In *Roncus alpinus* L. K. and *Obisium muscorum* Leach the trochantin of the fairly compressed femur is almost half as long as this, and its strictum perpendicular on the longitudinal axis of the femur. In most species of the *Pseudobisiinae* Hans. the trochantin is seldom half as long as, in fact as a rule it is only one third as long as the whole femur or less (21. pl. X, figs. 1 e and 2 g); the articulation is seldom perpendicular on the longitudinal axis, but most often more or less oblique, so that the ventral margin becomes much longer than the dorsal, a structural feature in common with most of the *Panctenodactyli* (Pl. I, fig. 4 i).

The fourth pair of the femurs does not in the *Garypidae* Hans. provide characters of great importance; the exceedingly narrow articulation is always oblique, so that the ventral margin of the trochantin is several times longer than the dorsal one; this joint is seldom as in *Garypinus nobilis* n. sp. (Pl. II, fig. 8 g) in length equal to one third or more of the whole femur, but as a rule 4—5 times shorter (cf. pl. II, fig. 1 d of *Garypus irrigatus* Sim.). The shape of the femur varies according to the relation between the length and the depth. *Garypus bicornis* Bks. has according to Banks (50. p. 9) no trochantin in the fourth pair of legs.

The trochantin of the *Cheliferinae* Sim. is at least in *Chelifer* Geof. in all respects similar to that of the *Garypidae* Hans. by its rather short ventral margin, which is much longer than the dorsal on account of the oblique articulation; the variations in length between the species are scarcely so pronounced as in the foregoing family. In *Pseudochiridium Thorellii* n. sp. (Pl. IV, fig. 12 f) the long stalked femur has a trochantin, which has an almost perpendicular articulation and in length equals more than one third of the whole femur; only the ventral half of the articulate membrane is present, the dorsal is represented by a symphysis. The femur of the fourth pair in *Chiridium* Menge shows no trace of a trochantin, but is four times longer than deep and provided with a long stalk. A "lyriform" fissure probably

homologous to one, which, in at least most species of the *Panctenodactyli*, is placed ventrally just behind the articulate membrane on the anterior surface, makes the conclusion acceptable, that it is only the limitation of the trochantin, which has been abolished, not the trochantin itself (Pl. IV, fig. 14 b).

V. Tarsi.

Tarsus I. The tarsus is the joint, which after the femurs shows the greatest and most interesting variations. The tarsi of the two first pair of legs are one-jointed in the *Chlthoniidae* Hans. and the *Cheliferidae* Hans. and two-jointed in the two other families. The tarsus or the tarsi of the two first pair of legs seem always to be longer and sometimes much longer than the tibia in the *Hemictenodactyli*; it is f. inst. in *Chlthonius terribilis* n. sp. twice longer than the tibia (Pl. I, fig. 1 l), and in *Obisium muscorum* Leach. 1·6 longer than the tibia; but the most marked variations in this respect are to be found in the subfamily of the *Pseudobisiinae* Hans. *Ideoruncus Siameusis* n. sp. has f. inst. the tarsi 1·7 longer than the tibia (Pl. I, fig. 4 h-i), while it is only 1·3 longer in *I. laminatus* n. sp. The tarsus II seems always to be the longer of the tarsal joints, when two are present; in *Blothrus spelaeus* Sch. the second joint is only a trifle longer than the first. In this respect it is also the *Pseudobisiinae* Hans. which provides the most numerous variations; in *Ideoruncus Siameusis* n. sp. f. inst. we have the second tarsal joint 1·4 times longer than the first (Pl. I, fig. 4 h), while in *I. Mexicanus* Bks. the former of these joints is 2·5 longer than the latter (21. pl. X, fig. 1 d).

If the tarsi of the *Garypidae* Hans. are examined, even better marked variations are found; the combined tarsi are sometimes as f. inst. in *Garypus irrugatus* Sim. longer than the tibia (Pl. II, fig. 1 c), sometimes shorter or of equal length f. inst. in *Garypius nobilis* n. sp. (Pl. I, fig. 8 f). The two tarsal joints are sometimes of almost equal length as in *Garypus irrugatus* Sim. (Pl. II, fig. 1 c), and sometimes we have the second joint much longer as in *Garypius nobilis* n. sp. (Pl. II, fig. 8 f) or *Olpium Birmanicum* n. sp. (Pl. II, fig. 7 f) or the basal joint the longer f. inst. *Garypus Floridensis* Bks. and *Olpium* n. sp. from Queensland (fig. 9 a-b). Within the *Cheliferidae* Hans. the variations are as marked as in the last mentioned family. The tarsus of *Chelifer* Geof. seems never to be longer than the tibia, sometimes as long f. inst. in *Ch. Mortensenii* n. sp., but most often shorter f. inst. in *Ch. Indicus* n. sp. (Pl. IV, fig. 10 c); the tarsus of the first pair of legs is in *Pseudochiridium Thorellii* n. sp. (Pl. IV, fig. 12 f) longer than the tibia and so it is in *Chiridium museorum* Leach, but in a less degree (Pl. IV, fig. 14 a).

Fig. 9. *Garypus Floridensis* Bks.,
♀ x 20. Left leg I (a), leg IV (b).

Tarsus IV. The tarsus of the fourth pair of legs are two-jointed in all the forms, but those belonging to the *Cheliferidae* Hans., which have this tarsus one-jointed; as a general rule the tarsi of the fourth pair of legs are shorter than those of the first pair, at least when compared to their own tibia. While the tarsus of the first pair of legs is always longer than the tibia in the *Hemictenodactyli*, it is not so with the tarsus of the fourth pair; the tarsus and the tibia are f. inst. of equal length in *Ideobisium Balzanii* With (21. pl. X, fig. 2 g) and the former joint of *Blothrus spelaeus* Sch. even shorter than the latter. The relation between the length of the two tarsi seems to be the same as in the first pair of legs. The tarsus of the fourth pair of legs is in most forms of the *Garypidae* Hans., in which the tarsus of the first pair of legs is distinctly longer than the tibia, of equal length to or a little longer than the tibia e. g. *Garypus irrugatus* Sim. (Pl. II, fig. 1 d) and *Olpium Birmanicum* n. sp. (Pl. II, fig. 7 h); if the tarsus of the first pair is only a little longer or of equal length to the tibia, we will most often find the tibia of the fourth pair of legs longer and even much longer than the tarsus f. inst. in *Garypinus nobilis* n. sp. (Pl. I, fig. 8 g). This disproportion is especially well marked in *Garypus Floridensis* Bks., in which we have the tarsus of the first pair 1.3 longer than the tibia, while the latter joint of the fourth pair of legs is 1.1 longer than the tarsus (fig. 9 b, p. 41). The tarsus of the fourth pair of legs is in *Chelifer* Geof. always shorter and sometimes much shorter than the corresponding tibia f. inst. in *Ch. equester* With, in which the tibia is 1.5 longer (cf. Pl. IV, fig. 10 d); the tarsus of *Chiridium* Menge is shorter than the tibia of the fourth pair of legs, but a trifle longer in *Pseudochiridium* n. g. (Pl. IV, figs. 12 f and 14 b).

Hansen was the first author, who pointed out, that systematic characters are found in the relation between the length of the tibia and the tarsus, and he proposed to use this character in the definition of his families, "if tibia always is longer than the tarsus in the *Cheliferidae*, shorter than the tarsus in the *Garypidae*" (49. p. 233); this character will as seen from the above scarcely be of value in the identification of these two families, but it will certainly be valuable at least in the characteristics of species and even genera.

Shape of tarsus. It is not only the proportions of the tarsus, which provides systematic interest, but also its shape at least in the males of those species of the *Cheliferinae* Sim., in which a pronounced sexual difference is found in the shape of the tarsus of the first pair of legs. In *Chelifer Socrotensis* With f. inst. it is tapering from the base towards the tip and about 4.5 times longer than deep at the base (21. pl. VII, fig. 4 h) in the female, while the tarsus of the male attains its greatest depth just in front of the base, is as deep terminally as it is basally and only about 3.5 longer than deep (21. pl. III, fig. 4 g). The tarsus of the female of *Ch. lampropsalis* L. K. is as in the female of the species just mentioned, but five times longer than deep, while that of the male is 3.6 longer than deep, deepest just behind the middle and terminally provided with a dorsal, obliquely forwards and upwards directed strong conical tooth (Pl. III, fig. 5 a). The tarsus of the first

pair of the legs of the male of *Ch. granulatus* C. K. is widened out towards the tip, while that of *Ch. Mortensenii* n. sp. is deepest just in front of the base.

VI. Arolium.

The arolium is always provided with a stalk, gradually merging into the sucking cup; the arolium is very long and slender in the *Chthoniidae* Hans., while it is very much enlarged distally with short stalk in f. inst. *Ideoroncus Siamensis* n. sp., but in neither case extending beyond the claws. It is a little longer than these, or to speak more correctly it passes beyond them in *Ideoroncus laminatus* n. sp. and in a good many of the *Garypidae* Hans. f. inst. in *Garypus irrugatus* Sim. (cf. Hansen 49. p. 233), *Garypinus nobilis* n. sp. and *Olpium Birmanicum* n. sp. The two last species have not only the arolium much longer than the claws, but have the stalk bifurcate, so that each tarsus really bears two arolia or at least sucking cups; the mentioned species have these structural features in common with *Olpium biaroliatum* Töm., *O. Ortonedae* Elling. (20. p. 161) and *Garypinus dimidiatus* L. K. (11. tab. IV, fig. 17) (cf. Pl. II, figs. 7 f-g, 8 f-g).

VII. Claws.

The claws of the *Chelonethi* do not as a rule provide structures of any interest, the *Cheliferinae* Sim. excepted; they are sometimes more slender and less curved, sometimes more clumsy and curved. In the *Cheliferinae* Sim. they vary in three different ways.

- 1) The lower margin of the anterior claws and sometimes of both claws are in *Chelifer peculiaris* L. K. according to Daday (11. p. 177) provided with a kind of comb "Kämmchen" (tab. IV, fig. 16).
- 2) Tömösvary writes in his diagnosis of *Ch. quadrimaculatus* Töm. (1882. 40. p. 197) "tarsis unguiculis duobus majoribus et praeterea subtilis pseudonychiis duobus parvis armatis"; his figure (40. tab. II, fig. 3 *uv*) shows that each claw bears near the base a slender forwards directed tooth, which is similar to a moderately curved claw.
- 3) While the structures, mentioned above, only occur in a single species, that, which is to be described now, is characteristic to a whole group of species of *Ghelifer* Geof., and consists in the armature of the claws with a more or less developed anterior tooth. The occurrence of such a tooth was first mentioned by Stecker in his *Ectoceras Helfer* Steck. (1875. 4. p. 515, taf. I, fig. 8), later on by Tömösvary (1882. 40. tab. I, fig. 24) in *Ch. cancroides* L. and by Hansen (1884. 9. p. 521), who observed their variations in several species as well as in the two claws of the same tarsus; Ellingsen has lately (1901. 18. pp. 205-206) dealt with this subject and so has With (1905. 21. pp. 100 and 115-116).

The claws on the fourth pair of legs bear in both sexes in most species of "*Lophochernes* Sim." a more or less developed anterior tooth near the middle; this tooth is wanting in *Ch. lamprosalis* L. K. is small in *Ch. granulatus* C. K., well

developed in *Ch. bifissus* Sim., *Ch. Socotrensis* With, *Ch. Mortensenii* n. sp. (Pl. III, fig. 1 i) and especially in *Ch. superbus* n. sp., in which it is almost as long as the point of the claw. The claws on the first pair of legs in the female have generally the teeth better developed than in the fourth pair; these teeth are big in *Ch. granulatus* C. K., so long as the point of the claws in *Ch. Mortensenii* n. sp., consistently giving these the appearance of being bifurcate, while that of the anterior claw of *Ch. Socotrensis* With is of usual shape in contrast to that of the posterior claw, which has the tooth placed ventrally behind the summit not anteriorly as usual. The claws of the first pair of legs of the male are often remarkably developed; the anterior claw of *Ch. lampropsalis* L. K. has a very indistinct almost obsolete ventral tooth and is rather clumsy, while the posterior, well curved, strongly pointed claw bears a long anterior tooth near the middle (Pl. II, fig. 5 a). The anterior claw of the first pair of legs in *Ch. granulatus* C. K. is moderately curved and pointed without any tooth, while the posterior attains a remarkable development, is dangerously pointed and provided with a fairly long anterior tooth (Pl. III, fig. 4 a, *cex*); in *Ch. Socotrensis* With we have these claws developed in a similar manner, but the anterior toothless claw is more slender, and the posterior bears only an insignificant tooth. The corresponding claws of *Ch. Mortensenii* n. sp. and *Ch. superbus* n. sp. are similar to those of *Ch. lampropsalis* L. K., the ventral tooth of the anterior claw is only much more prominent and the anterior tooth of the posterior claw is almost obsolete (Pl. II, fig. 1 h).

VIII. Hairs.

Usual hairs. The hairs of the legs are pointed and simple in all the *Cheilonethi* with the exception of the *Cheliferidae* Hans. and *Garypus* L. K., in which at least a number of them is clavate or provided with teeth or a single tooth; the hairs of almost all forms increase in length towards the tip, and those of the dorsal surface are as a rule longer than those of the ventral surface with the exception of some of the *Pseudobisiinae* Hans. The ventral surface of the trochanter and trochantin of the fourth pair of legs bear in many species of *Garypus* L. K. and *Chelifer* Geof. a number of very long, slender and pointed hairs (cf. below). The tibia of the fourth pair of legs bears in some of the *Obisiinae* Dad. a dorsal very long and slender hair near the middle, and the second tarsal joint bears a similar one in the middle and a shorter one near the tip, all shorter than the tarsal "tactile" hair; the femur as well as the tibia of many species of *Chelifer* Geof. (cf. below) in the fourth pair of legs bear dorsally a single long and slender hair each.

Tarsal "tactile" hair. Dorsally — as a rule near to the base of the tarsus of the fourth pair of legs — we find in all genera except *Garypus* L. K., *Pseudochiridium* n. gen.(?) and *Chiridium* Menge(?), a long and slender, distinctly pointed hair, which is articulated in a cavity a little wider than those of the other hairs, but not very thin at the base like the tactile hair on the fingers of the palps;

this hair is designated the *tarsal "tactile"* hair. This hair has been mentioned by Thorell in his description of the different species of *Chelifer* Geof. and was observed to stand sometimes nearer to the base and sometimes to the middle (1889. 10. p. 596 and p. 606). This hair is rather variable in length, being sometimes as long as or longer than the tarsus or the tarsi, and sometimes shorter (Pl. I, fig. 1 m, pl. III, fig. 7 g). It is in the *Hemictenodactyli* as well as in those *Garypidae* Hans., in which it occurs, placed near to the base of the basal tarsal joint (Pl. I, figs. 1 m and 4 i); it has in some species of *Chelifer* Geof. f. inst. in *Ch. Indicus* n. sp. a similar position anteriorly at the base of the tarsus of the fourth (and third) pair, but in most species it is placed near to the middle f. inst. in *Ch. subruber* Sim. and *Ch. Mortensenii* n. sp., and in a few near to the tip as in *Ch. granulatus* C. K. This hair seems to be wanting in a few species f. inst. *Ch. cimicoides* F. and *Ch. Hawaiiensis* Sim. (cf. below).

Lateral terminal hair. Schiödte has in his classical description of *Blothrus spelaeus* Sch. mentioned and given a drawing of a long, slender and unilaterally pinnate hair, placed on each side of the claws (1851. 31. tab. I, fig. 2 f). This hair seems to be characteristic of the members of the family of the *Obisiiidae* Hans. as well as of most species of the *Cheliferinae* Sim., for it seems to be wanting in all the other families. This hair is in *Obisium muscorum* Leach. fairly long and slender with a few ventral teeth near to the middle and with a number of teeth near to the tip; there seems to be differences between the anterior and the posterior hair of the same tarsus, as well as between those of the tarsi of the first and the fourth pair of legs. The corresponding hair of *Roncus alpinus* L. K. has an other shape, being provided with a long ventral branch near the middle and a number of teeth beyond. This hair, which may properly be designated the *lateral terminal* hair of the tarsus, shows in the *Pseudobisiinae* Hans. specific differences of some value; it is in *Ideoroncus Siamensis* n. sp. as well as in *I. laminatus* n. sp. fairly long and slender, in the former of these species being bifurcate and in the latter divided into three branches; in *I. Mexicanus* Bks. (21. pl. X, fig. 1 f) and *Ideobisium Balzanii* With (21. pl. X, fig. 2 h) the corresponding hair has the margin serrated distally.

The lateral terminal hair shows in *Chelifer* Geof. a great number of modifications (cf. below); in most species it is only a pointed hair, which is more or less distinctly curved upwards in the middle f. inst. in *Ch. Indicus* n. sp. and *Ch. Hawaiiensis* Sim. (21. pl. VII, figs. 1 d-e); but in species of "*Lophochernes* Sim." it attains its highest development, differing from the one species to the other. The posterior hair is generally slightly curved upwards in the middle, and is dorsally provided with a small tooth, beyond which it becomes fairly slender and is curved downwards with the pointed tip directed upwards and forwards (Pl. III, fig. 1 i, *he*, fig. 6 h); the anterior hair is as a rule shorter and curved upwards from base to tip, whereas the terminal part beyond the small dorsal tooth is straight and directed downwards (Pl. III, figs. 1 h-i, *hi*); a similar structure more simple or more com-

plicated is found in most forms. The posterior hair has f. inst. in *Ch. granulatus* C. K. a small ventral tooth in all the tarsi, while *Ch. lamprosalis* sp. af. only shows this structure in the posterior hair of the first pair of legs in the male (Pl. III, figs. 4 a, *he*; 6 d), in contrast to *Ch. superbus* n. sp., in which it is found in the fourth tarsus of the male; in the two last mentioned species we have accordingly a sexual character in the structure of this hair.

6. Coxal Sac of "Lophochernes Sim."

Introductory remarks. Under my examination of the male of *Chelifer Mortensenii* n. sp. I noticed near the base of the fourth pair of coxae a dark spot; on further examination I found to my astonishment a very remarkable organ, of which no description was found in literature. These two spots with a dark dot in the middle have been figured by Croneberg (1889. 45. taf. X, fig. 4) in *Ch. cancroides* L., but he has scarcely realised their nature, as he does not mention them in the text of his paper. According to private communication, Professor Sidney J. Hickson "saw the Coxal sac years ago, but has not published the observation"; the same gentleman has kindly sent me specimens of a new species, *Ch. superbus* n. sp. for examination, on account of which I ask him to receive my best thanks. During a visit to London I examined in the British Museum a male of *Ch. Socotrensis* With and gave there a description of the coxal sac of this species as a kind of preliminary note (1905. 21. pp. 135—136); the surfaces, designated dorsal and ventral in this paper, seem really to be the anterior and posterior ones, a question which I was not able to settle with a single coxa at my disposal without material for comparison.

The coxal sac, the structures and remarkable variations of which in several forms will be described below, seems always to be present in the males of those species of *Chelifer* Geof., which are naturally referred to the subgenus "*Lophochernes* Sim." (cf. below); this organ, the presence of which is one of the principal characters of this group of *Chelifer* Geof., provides always a sexual character of value and very often specific ones of great importance, even if rather difficult to investigate. A detailed description of its form in *Ch. Mortensenii* n. sp. will first be given, and thereafter the variations of a good many other species.

1. *Ch. Mortensenii* n. sp. (Pl. II, figs. 9 a-c). — If the coxae of the male be examined in their natural position, an almost circular opening is seen, situated near the interio-posterior corner; a tuft of hairs is directed inwards and backwards through this opening, and the surrounding skin is rather thin and transparent (Pl. III, fig. 1 f). If the coxa itself be dissected out and examined from above, we will find, that the hollow of it is partly occupied by an elongated chitinous sac, as long as two thirds of the coxa and half as broad. This sac, which is somewhat flattened and widened out towards its summit, but especially

towards its base, which is the portion connected with the coxa at its interior-posterior corner, is divided into two parts of very unequal size (Pl. II, fig. 9 a, b-d); the basal portion (b), that near to the interior margin of the coxa, is only one third or one fourth as spacious as the distal part (d). These two parts are anteriorly separated from each other by a deep cleft (n), which is continued into two rather shallow depressions on the dorsal and ventral surface, gradually disappearing towards the posterior margins. This cleft is towards the base well limited by a thick chitinous ridge continued dorsally and ventrally near to the posterior margins as the limitation of the afore mentioned shallow depressions there (Pl. II, figs. 9 b-c); the distal limitation of these depressions is also fairly well chitinized, but not so the distal or exterior margin of the anterior cleft; this appears thinly chitinized and is directed inwards and backwards beneath the margin of the basal sac and is here fused with its wall.

The two cavities of the sac blend into each other posteriorly without any limitations, but not so anteriorly; the two portions are here separated from each other in a rather curious manner. Where the walls of the two cavities blend into each other anteriorly, a kind of short funnel-shaped gutter (f) takes its origin; this gutter (fig. 9 c, h²) is broad distally where it is partly fastened, narrower basally, where it passes into the basal (interior) cavity, and open towards the posterior surface of the sac; the posterior free margins of this gutter are thickened and bent towards each other (fig. 9 c). This funnel-shaped organ is divided by longitudinal lines just, as if it had been built of fused tubercles or cones; it is at least terminally mounted with hairs (h³), fairly long, slender and pointed, which converge towards each other and are directed through the round entrance opening (o), by which the coxal sac communicates with the external world; these hairs, which are often bifurcate terminally, form together a gutter open posteriorly and blending into the one, already described, the appearance of which to a funnel, open posteriorly, becomes consequently more complete. The units, by which the wider portion of this funnel are built up, are not all fastened behind, at least a few are free and extend into the distal cavity; the more minute structures of these parts I was not able to investigate. It is thus evident that the two portions of the coxal sac communicate with each other only posteriorly, but are well separated from each other anteriorly.

The anterior and partly the exterior surface of the distal part is beset with subconical, longer and shorter tubercles (about 20), which are directed towards the interior and the base of the sac; these tubercles, which are placed nearly to each other or more apart, are sometimes supported by chitinous ridges (r) and always mounted with a single or seldom two long slender hairs, projecting into the lumen of the cavity in the same direction as the tubercle itself. The tubercles are probably hollow, but no trace of nerves was seen (figs. 9 a-b, h).

2. *Ch. depressus* C. K. (Pl. II, fig. 10 a). — The sac of this species is in the principal points of its structure similar to that of the preceding one, but is never-

theless easily distinguished from it; it is less elongate and comparatively both higher and broader, and as a whole more cylindric in shape. The basal portion of the sac is comparatively much smaller and the anterior cleft better marked (*n*); the funnel (*f*) is not completely straight, but curved slightly backwards in the middle. The number of the subconical tubercles is about 30 and a single (*h'*) is placed posteriorly in the basal portion; at least a single bears three hairs, all well articulated; exteriorly a few ridges to support the tubercles, but nearer to the base apparently none.

3. *Ch. superb**us*, var. n. sp. provides great similarity to *Ch. depressus*, the basal portion only is even smaller, but with the usual anterior cleft and dorsal and ventral grooves or depressions. A great number of cones are situated along the anterior and exterior surfaces, but also anteriorly at the dorsal surface at least; the supporting ridges are only poorly developed. When the coxal sac is observed in its natural position in the coxa, it is observed that the basal portion is placed on a distinctly lower level than the distal, which has a direction obliquely upwards, so that the relative position of the two parts seems not to be the same as in *Ch. Mortensenii* n. sp.

4. *Ch. suberbus* n. sp. provides great similarity to the preceding one, but has also interesting structures of its own. The basal portion is very small, and the anterior cleft is slightly pronounced, while the dorsal and ventral grooves are fairly distinct; the anterior surface of the funnel proper is concave and much longer than the posterior. The anterior as well as the exterior wall of the distal cavity is densely crowded with subconical tubercles, mounted with a single or a few hairs and supported by short ridges, and so are, but in a less degree, the dorsal and ventral sides anteriorly; the skin is everywhere provided with very thin, transverse ridges. The sac of this species is remarkable thereby, that a large portion of the distal and posterior surface is deeply excavated; the limitation of this excavation could not be followed in the single specimen at disposal.

5. *Ch. granulatus* C. K. — The coxal sac of this species of which I have only examined a single partly broken specimen, seems to be more similar to that of *Ch. lamprosalis* L. K. than to those of the previously described species; it is rather long and slender and there is no marked distinction between the two portions exteriorly, as neither anterior cleft, no dorsal and ventral depressions in continuation of it, were traced. The "funnel" is represented by a number of about 30 long, slender and bifurcate hairs, which are placed anteriorly and slightly removed from the base; they converge towards each other and cross each other, just before they arrive at the entrance opening, beyond which they diverge in all directions. The anterior and the exterior surfaces as well as the dorsal and ventral ones posteriorly are up to just in front of the "funnel" densely crowded with subconical tubercles, bearing the usual sometimes bifurcate hairs, as well as with a mesh-work of supporting more or less short and curved, sometimes branched ridges; the anterior surface, where no subconical tubercles are found, bears no hairs.

6. *Ch. lamprosalis* L. K. (Pl. II, fig. 12 a). — The sac is comparatively shorter than that of *Ch. granulatus* C. K., but it is similar to it in the structure of the outer wall, for there is no limitation between a basal and a distal portion. While both portions of the sac seem really present in *Ch. granulatus* C. K., the basal part is probably really wanting in this species, for the “funnel” is placed close to the entrance-opening (Pl. II, fig. 12 a, *f*); this is only poorly developed and represented by about ten hairs, arising from a short plate with indistinct longitudinal lines, and apparently basally fused. The anterior and exterior walls as well as the dorsal and ventral posteriorly bear a number of subconical tubercles, which bear at least a single often bifurcate and sometimes rather short hair each; these tubercles are not so densely crowded as in *Ch. granulatus* C. K., but the posterior wall bears a single one almost in the middle. The supporting ridges scarcely form a meshwork as in the latter species, but they are nevertheless numerous and have in the main a transverse direction (cf. next species); anteriorly just beyond the base these ridges are very short, rather narrow and densely placed. The skin is mounted with, in the main, transverse lines or exceedingly thin ridges, rather indistinct basally, but fairly well pronounced near tip.

7. *Ch. lamprosalidi* sp. af. from Spain (Pl. II, fig. 11 a, pl. III, fig. 6 a-c). — The coxal sac of this species is remarkable by its great length and slenderness, being five times longer than broad, and also that it is distinctly flattened; it is similar to the two foregoing species inasmuch as there is no exterior distinction between a basal and distal part (figs. 6 a-b). The “funnel” provides an interesting modification; it is placed anteriorly near to the entrance-opening in a portion of the cavity, which is at least dorsally(?) marked off by a low wall (fig. 6 c, *w*) projecting into the interior of the hollow; the units, which build up the “funnel”, are of two kinds, viz. short basal subconical tubercles, quite similar to the usual ones, converging towards each other and with their bases, placed in an almost semicircular bow, open towards the posterior, which are sometimes completely free, sometimes more or less fused (fig. 6 c, *h*²) and of long slender hairs, placed terminally, converging towards each other, until they arrive the entrance opening, beyond which they are divergent or parallel (*h*³). The thus described “funnel” provides a marked similarity to that of *Ch. Mortensenii* n. sp., as easily realised by comparing the descriptions (Pl. II, fig. 9 c, pl. III, fig. 6 c). The walls of the distal portion of the cavity are everywhere beset with subconical tubercles, which are always connected by ridges, on the arrangement of which that of the tubercles accordingly depends (*h* and *r*); terminally the tubercles are densely crowded on all surfaces besides the posterior; nearer to the middle they are less abundant especially posteriorly, and basally they are only found anteriorly. These tubercles are sometimes long and slender and sometimes short and clumsy; two or even several are often fused with each other; they bear often a single bifurcate hair, but sometimes several hairs (fig. 11 a). The direction of these hairs are always obliquely towards the interior of the cavity and towards the base of the sac; if the tip be cut off such a sac

and if we examine it from the thus established opening, it is quite bewildering to look into this confusion of hairs, almost filling the hollow. The ridges which adorn the walls of the sac attain a very remarkable development; their principal direction is a transverse one, less visible terminally, where they are densely placed on all surfaces with longitudinal communication between them, but very distinctly so in the middle, where the principal ridges are continued into each other posteriorly giving the whole a ringed appearance; near the base they are only partly extended to the posterior margins of the dorsal and ventral surfaces; the posterior surface has no ridges at all basally. The basal or interior surface is especially behind the funnel provided with short, densely placed ridges (fig. 6 c, r'). The ridges bear at least distally not only subconical tubercles, but also laminae, extending into the lumen of the sac. The skin of the sac is minutely dotted all over.

8. *Ch. Socotrensis* With (21. pp. 135—136, pl. VII, figs. 4 b-f). With regard to the structure of the coxal sac of this species I refer to the description; which is distinguished from all those described here by being so extremely small, only occupying a tenth or a twentieth of the lumen of the coxa. But it is in all other particulars highly developed, providing similarity to that of *Ch. Mortensenii* n. sp. by the well separated and big basal portion with a highly developed "funnel".

Concluding remarks. — What is the function of this remarkable organ? To answer this question will really be difficult. No muscles seem to be fastened to its wall and no glands seem to discharge there; the hairs are possibly connected with nerves. The organ is a comparatively big sac with well chitinized walls only communicating with the outside world through a diminutive opening at the base of the coxa of the fourth pair of legs; for the animal to turn inside out by the pressure of the blood or otherwise may be deemed impossible. This organ is only found in the males of a very limited group of species and provides within this group the most startling variations. It seems to me most probable to regard it as a sense organ of some way related to the sexual life; it will probably be fairly easy to prove, if this conjecture is right or wrong, by applying histological methods on fresh material, which is unfortunately very difficult to obtain. Direct observation in nature gives of course also a chance, even if only small, of coming to an understanding of these problems. Or should there be any relation between the coxal sac and the ram's-horn-shaped organ?

Other questions remain to be answered; how early in the life of the male can this organ be traced; I have only examined it in fullgrown males and in a single specimen of *Ch. Mortensenii* n. sp., which had apparently not yet passed its final moult. To answer this question and eventually to give a description of its embryological development will scarcely prove very difficult when material is available, and should show itself useful from a comparative point of view. To answer the question definitively, whether of the already described forms of coxal sac provide the most primitive characters, the investigation of this organ in a number of species, greater than that, which has been examined here, will surely be necessary;

embryological evidences must here be appealed to and the whole systematic position of the species in question taken into account. As far as our present knowledge goes, the modification of the coxal sac, which is found in *Ch. lamprosalis* sp. aff. from Spain, seems to be a more primitive structure than that of *Ch. Mortensenii* n. sp. f. inst., at least, when the sharp division of the sac into two divisions and the specialized structure of the "funnel", with the basal "tubercles" distinct of the latter species, are considered; the high development of the ridges in *Ch. sp.*, compared with their rather poor development in *Ch. Mortensenii* n. sp., is not in favour of this conjecture, but the well developed tergal keels and teeth of the claws of the latter, compared to the slightly developed ones of the former species, bear out the same story.

7. Classification.

I. Classification of Suborders, Families and Subfamilies.

In spite of the few genera of the *Chelonethi* they have been arranged in a rather different way by the various authors, mainly due to the drawbacks, arising from a wrong interpretation of the femoral parts in the first pair of legs, in the first system worked out in detail, namely that by the able French Zoologist E. Simon. He divided (1879. 5. p. 19) the false-scorpions into three subfamilies, based upon characters taken from the antennae and legs principally; his system was accepted by most authors with the different alterations, made necessary by the discovery of new types and new structural features, f. inst. by Tömesvary (1882. 40. pp. 182-183), Daday (1889. 11. p. 167) and partly Balzan. Another system, based upon a great number of characters, found out by a more thorough examination of the skeleton, was proposed by Hansen (1884. 9. pp. 531-533), who divided the order into two subfamilies, really corresponding to his own and Balzan's two suborders. A similar system was independently set forth by Balzan (1890. 46. p. 406); but the characters upon which he based his system were only taken from the antennae, and in his new system (1891. 12. p. 504), in which he gives his two families the rank of suborders, he divides these into several families and subfamilies, partly new, partly identical to those established by Simon and of very unequal value owing to his wrong interpretation of the femoral parts. This system was accepted by Hansen with a good many rather important alterations (1894. 49. p. 228); instead of discussing each system separately, I prefer to compare them with each other in every particular.

Balzan (1891. 12. p. 509) characterizes his suborder the *Panctenodactyli* in the following manner, "Corpus depressum vel subdepressum. Chelae parvae. Serrula dentium chelarum digito mobili omnino adnexa", and the *Hemictenodactyli* (1891. 12. p. 539) "Corpus plus minusve cylindricum. Chelae magnae. Serrula dentium, digito mobili postice tantum adnexa". The two last of these characters were

accepted by Hansen; the first one was omitted, and we must admit quite correctly, owing to the cylindric shape of the body in at least several species of *Olpium* L. K., one of the *Panctenodactyli*. Besides the two characters mentioned above Hansen sets forth a number of others, the value of which we are now going to discuss, the one after the other.

1) The first of these characters is for the *Panctenodactyli* (1894. 49. p. 230). "The mandibles small, the distance between their exterior hind corner hardly more than half as large as the breadth of the posterior margin of the cephalothorax and mostly much shorter"; and for the *Hemictenodactyli* (p. 231) "The mandibles large; the distance between their exterior hind corner at least as long as $\frac{2}{3}$ of the posterior margin of cephalothorax". This character is quite a good one and seems to be without exceptions, but it is scarcely of paramount importance. The variation in size within each suborder is very marked; the differences in size between the antennae of f. inst. *Chthonius terribilis* n. sp. and *Ideoroncus Siamensis* n. sp., or between a *Chelifer* Geof. and a *Garypus* L. K., are even more pronounced than the differences between those of a *Olpium* and a *Ideoroncus*, though the two last are placed in different suborders.

2) The second character for the *Panctenodactyli* is "Serrula on the movable finger grown fast the whole length and posteriorly broader than anteriorly". And for the *Hemictenodactyli* "Serrula on the movable finger free at the distal end, posteriorly narrower than outside the middle." In the degree of the fusing of the serrula exterior we have a character of great value and as it seems without exceptions; but it is nevertheless not surprising to find, that the relation between the free and the fused portions of the serrulae differs in the genera of the *Hemictenodactyli*. Those genera, which are related to the *Panctenodactyli* f. inst. *Ideoroncus laminatus* n. sp., have only one fifth of their serrula free, while f. inst. *Chthonius terribilis* n. sp., which stands more apart, has two thirds free. The differences found in the shape of the serrulae between the two suborders is less constant; in *Ideoroncus Mexicanus* Bks. f. inst. the basal portion of this organ is scarcely narrower than the distal (1905. 21. pl. IX, fig. 2 c) and in *I. Siamensis* n. sp. only slightly so (Pl. I. fig. 4 b). A difference in the shape of the teeth of the serrula is also found, for they are as a rule more or less squarely-truncate in the *Panctenodactyli*, while they are more or less pointed in the *Hemictenodactyli*; but a good many exceptions from this rule are found.

3) The third character for the *Panctenodactyli* is, "The immovable finger of the mandibles with lamina exterior", and for the *Hemictenodactyli* "The immovable finger of the mandibles without lamina exterior". *Ideoroncus laminatus* n. sp., one of the *Hemictenodactyli*, which has a well developed lamina exterior (Pl. I, fig. 5 a), forms an exception to this rule, which is nevertheless of both practical and probably also real systematic value.

4) The fourth character is for the *Panctenodactyli*, "lamina interior plate-formed, at most with slight incisions", and for the *Hemictenodactyli* "lamina

interior profoundly divided into numerous free comb-teeth, altogether formed as an anteriorly free serrula" (Pl. I, figs. 1 c and 4 a, pl. IV, fig. 4 a). According to my investigations it would scarcely be quite correct to name the lamina interior "plate-formed" in several species of *Garypus* L. K., as its terminal portion is dissolved into dentated lobes and its basal provided with well marked incisions and grooves. Hansen's characteristic of this organ in the *Hemictenodactyli* suits quite admirably to those forms, which he has examined e. g. *Ideobisium crassimanum* Balz. (49. tab. V, fig. 6 b) and *Roncus Rayi* L. Kock (fig. 12 b), but it will not agree with its shape in f. inst. *Ideoroncus Siamensis* n. sp. or *I. laminatus* n. sp. (Pl. I, figs. 4 a and 5 a). This organ is in the latter f. inst. coalesced with the fingers in its whole length, and basally provided with slight incisions and grooves, but distally dissolved into teeth. But even if the definition quoted says too much, we must admit, that there seems to be a real difference between this organ in the two suborders. It can perhaps be expressed in this manner. The lamina interior consists in the *Panctenodactyli* of two as a rule well separated portions, a basal generally plate-formed one, and a distal serruli-formed. The serrula (lamina) interior is in the *Hemictenodactyli* a real serrula, and if not, there is no sharp distinction between its basal and distal portions.

5) The fifth character is for the *Panctenodactyli* "The lower side of the maxillae lying in the same plane as the coxae of the legs"; for the *Hemictenodactyli* "The lower side of the maxillae situated in a higher plane than the coxae, so that its hindmost portion, looked at from below, goes under the coxae of the first pair of legs". *Ideoroncus laminatus* n. sp., in which the coxae and the maxillae are on the same level, forms an exception to this rule, and so do several species of *Garypus*, in which the coxae are not placed quite on a level with the maxillae.

7) The seventh character is for the *Panctenodactyli*, "Cephalothorax considerably narrowed anteriorly, without a median tooth on the anterior margin", and for the *Hemictenodactyli*, "Cephalothorax slightly or not at all narrower anteriorly than posteriorly; the frontal margin with a median tooth" (Pl. I, fig. 1 a and pl. II, figs. 1, 7, 8 a). The character found in the shape of the cephalothorax is quite a good one, taking into account the great variations especially within the *Panctenodactyli*. The last character must necessarily be altered in a slight degree, for several species of the *Chthoniidae* Hans. has no real tooth-shaped epistoma, but only a dentated front margin (cf. below).

8) A character of minor importance is found in the eleventh abdominal segment, which in the *Panctenodactyli* is "mostly plainly divided into tergite and sternite or at least with an indication of such a division", while it in the *Hemictenodactyli* is "forming a ring without any trace of division into tergite and sternite". The two extremities are connected by intermediary forms viz. *Olpium* L. K. and *Ideobisium* Balz. (cf. Hansen 49. p. 221—222).

It is thus evident, that the two "suborders" are well distinguished from each other by a number of more or less important characters, principally taken from

the structure of the antennae; but also, that the cleft between the two (*Chthonius* C. K. and *Chelifer* Geof.) is filled up by a good many intermediary forms. For if we examine a number of organs, we will scarcely find similarity between their structure in *Chelifer* Geof. and *Chthonius* C. K., but intermediary forms will be found by the examination of *Olpium* L. K. and *Ideoroncus* Balz. This is not only the case, as far as the structure of the antennae and the shape of the body is concerned; but we observe the same in the structure of the maxillae and their lyri-form organs (cf. pp. 24-31), in the structure of the stigmata, but especially in the variations of the legs. It appears thus natural to regard *Chthonius* C. K. and *Chelifer* Geof. (perhaps *Chiridium* Menge) as standing most apart from each other in a systematic sense within the whole order of the *Chelonethi*; but also that there is a great affinity between *Olpium* L. K. and *Ideoroncus* Balz., the former belonging to the *Panctenodactyli*, the latter to the *Hemictenodactyli*, perhaps greater than that between either and its more distant relation in its own suborder.

As this is the case, I rather doubt, if it was quite practical and well founded to use a single division in a small group like the *Chelonethi*, in which the only four families are so excellently characterized as those of our order; but I use the division, like Hansen, because it is once established and the most natural (cf. 49. p. 230), if we wish any main division (cf. the foot-note p. 58). Different authors have shared different opinions about the relation of the two suborders to each other; a few, f. iust. Stschelkanovtzeff (1903. 67. p. 326 note), regard the *Panctenodactyli* as the more primitive group, while others like Hansen (49. p. 225) and Börner (1902. 65. p. 451) regard the *Hemictenodactyli* as the more primitive. I believe that more facts and a more detailed investigation of several organs in different forms are necessary before settling definitively this question as well as several others, concerning the systematic position of some genera and subfamilies.

I am now going to discuss the position of the families and other systematic groups in Balzan's and Hansen's systems respectively. The former subdivided his *Panctenodactyli*, which only included one family, the *Cheliferidae* Töm., into two subfamilies, identical to Simon's viz. the *Garypinae* Sim. and the *Cheliferinae* Sim. The main characters of the former group are (12. p. 534) "Oculi duo vel quatuor" and "Pedes ultimi et penultimi trochanterinis praediti"; this group also includes *Chiridium* Menge. The latter group is in the main characterized in the following manner (12. pp. 509—510), "Oculi duo vel nulli" and "Pedum omnia paria trochanterinis instructa". This system is quite natural, if accepting Simon's interpretation of the joints of the legs; but if we follow Hansen, and we are obliged to do so (cf. p. 36 and p. 95), we must necessarily exclude *Chiridium* Meng. from the *Garypinae* Sim. on account of its undivided femur I and II, and its undivided tarsi. The differences between Balzan's two subfamilies become thus according to Hansen, who gives them the rank of families viz. the *Cheliferidae* Hans. (Hag.) and the *Garypidae* Hans. for the former "The femora of the 2 anterior pair of legs undivided or having but a basal trochantin. All tarsi 1-jointed. None or two eyes". And

for the *Garypidae* Hans. "The femora of the 2 anterior pair of legs divided into a longer pars basalis and a shorter pars tibialis. All tarsi 2-jointed. 4 eyes" (49. pp. 231—232). The first of these characters must necessarily be at least modified in the *Garypidae* Hans. on account of the structure of the femora I—II in *Garypinus* Dad., naturally belonging to this family (cf. below); for this genus has the pars basalis and pars tibialis of almost equal length and the definition must according to Ellingsen (1904. 70. p. 2) be altered in the following manner "The femora of the two anterior pairs of legs divided into a longer pars basalis and a shorter pars tibialis, or with a trochantin". If it is quite correct to name the basal portion of femur I in *Garypinus* Dad. a "trochantin" will be discussed later on (cf. below). Hansen divided his *Cheliferidae* Hans. into two subfamilies the *Cheliferinae* Sim. and the *Chiridiinae* Hans., of which the former has a trochantin on the first pair of femurs, while the latter has none (49. p. 232).

This wrong interpretation of the legs have also left other traces on Balzan's system, because he was consequently unable to realize the great differences, found in the number of the tarsi in the leg I—II of a *Chthonius* C. K. and an *Obisium* C. K. He was consequently bound to use the structure and the presence of the galea as his main character. His first family the *Pseudobisiidae* Balz. is, if we omit characters of minor importance, distinguished in the following manner (12. p. 539) "Chelae ante apicem super digitum mobilem processu pellucido subuliformi vel furcilliformi praeditae. Tarsi heteromeri bi- vel triarticulati". He divided this family into two subfamilies, distinguished by minor differences in the structure of the galea, viz. the *Pseudobisiinae* Balz. (p. 539), and the *Microcreagrinae* Balz.; about the value of these two groups, which were abolished by Hansen (49. p. 230) and certainly ought to be so, I refer to the below as well as to Ellingsen (1901. 58. p. 87). His *Obisiidae* Törn. are characterized by "Chelae . . . ante apicem super digitum mobilem processu pellucido haud armatae Tarsi heteromeri, bi- vel triarticulati, vel cuncti biarticulati" (12. p. 545). This family was divided into two subfamilies viz. the *Obisiinae* Balz. (Dad.) and the *Chthoniinae* Balz. (Dad.), of which the former ought to be characterized by the tarsi, being two- or three-jointed, while the latter is marked out by the large chelae, the calyciformed tibia of the palps, and the tarsi, which are always two-jointed (12. p. 545). His third family, the *Tridenchthoniidae* Balz., is characterized by the structure of the galea (12. p. 509).

As the galea is an organ subject to great variations and even wanting in the male of *Ideoroncus* sp. at least according to Banks (1895. 50. p. 11), Balzan is certainly wrong in using it as the principal feature in the definition of his families, especially when we have such an excellent character in the number of the tarsal joints of the two first pair of legs. Hansen consequently divides (49. p. 232) the *Hemictenodactyli* into the *Obisiidae* Hans., characterized by "The tarsus of 2 foremost pairs of legs 2-jointed" and corresponding to Balzan's *Pseudobisiidae* Balz. and *Obisiinae* Dad., and the *Chthoniidae* Hans., characterized by "The tarsus of two foremost pairs of legs 1-jointed" and corresponding to Balzan's *Chthoniinae* Dad. and

Tridenchthoniidae Balz. The *Obisiidae* Hans. are divided into two subfamilies viz. the *Pseudobisiinae* Hans. with a galea and the *Obisiinae* Dad. without a galea; these two subfamilies seem to be very nearly related to each other, the only sharp difference being that found in the presence or absence of the galea; another of less importance can perhaps be taken from the presence or absence of the tactile hairs on the hand of the palps (cf. below). The *Chthoniidae* Hans. are also in other characters but the two-jointed tarsi of the first pair of legs well distinguished from the *Obisiidae* Hans. viz. large antennae (cf. Balz. 12. p. 545), shape of the "epistoma" (cf. Daday 11. p. 189), the calyciformed tibia of the palps (cf. 12. p. 545), the shape of femur IV (cf. Hansen 49. p. 233 and this paper p. 66), and the presence of tactile hairs on the hand of the palps; this family provides in the last character a similarity to the *Pseudobisiinae* Hans. The *Chthoniidae* Hans. are divided into the *Chthoniinae* Dad. without a galea and the *Tridenchthoniinae* Hans. with three galeae. It is easily seen from the above, that I accept Hansen's system in almost all the main points and therefore refer to it as set forth in the preceding exposition. The reader is, as far as the minor points of the characteristics and the arrangement of the genera are concerned, referred to the description of each single group.

N. Banks has recently (1895. 50. p. 2) proposed a new system, in which he uses the transverse sutures of the cephalothorax as the chief distinction between the *Cheliferidae* Bks. and the *Obisiidae* Bks., the former family with one or two sutures and the latter without. He consistently establishes a new subfamily the *Olpiinae* Bks., including *Atemnus* Can. and *Olpium* L. Kock and forming part of his family the *Obisiidae* Bks. on account of the missing transverse suture. Even if the presence or absence of a transverse suture were a sure characteristic, this system was doomed to vanish, because it is not supported by others more important. But if we take into consideration, that it is doubtful, whether a species like *Garypus irrugatus* Sim. has a groove or not, and that many forms of the *Cheliferidae* Hans., which are very similar to *Atemnus* Can., have sometimes almost or completely obsolete sutures, even the foundation for this classification fails.

II. About the Generic and Specific Characters, and the Description of Species.

Generic characters. — As far as the genera are concerned I refer to each single family and subfamily, under which a discussion about their value and a synoptic key of the established genera will be found. Most of the generally accepted genera and subgenera are very badly defined and seem to be based on characters of only minor value. Before we can succeed in getting well defined and natural genera, we will be obliged to take a number of characters, different from those used at the present time, into consideration; the organs, from which such characters may be derived, differ considerably in the various groups. The specific characters will be dealt with under each subfamily or genus; it may already now be noticed, that the structures, from which the best characters are taken, are vastly different

in the families, which stand most apart. In this place I will only set forth a few remarks to explain a few terms, used in the descriptions, and a few features of them.

Explanation of terms. — The transverse lines of the cephalothorax of most of the *Panctenodactyli* are designated lines, stripes or grooves according to their appearance and structure; their breadth is the distance from their anterior to their posterior margin. When the length of a tergal or sternal sclerite is spoken off, the distance from its anterior to the posterior margin is understood; the breadth is that from the one lateral margin to the other. The exceedingly long and slender completely simple hairs or hair, with which the tip of the abdomen in many forms and the tarsi of the two last pair of legs in most forms are adorned, are designated "tactile" hairs, because they show similarity to the real tactile hairs on the fingers of the palps; these two kinds of hairs are generally easily distinguished from each other by the wide cavities, within which the latter kind is situated. The organs, which Hansen (49. p. 218, tab. V, fig. 14 o) discovered on the large chelae of *Chelifer cimicoides* F., and the arrangement of which show a specific difference within the *Cheliferinae* Sim., are designated sense-spots.

Measurements. — I have everywhere under the description of the species given the measurements of cephalothorax, abdomen, sometimes antennae and of the joints of the palps, of the first and the fourth pair of legs; all these measurements were done with the mikrometer. These measurements are given, not because the real length, breadth or depth of any joint of the appendages are thought worth recording for its own sake, but because this way appears the best one, in which to give the relative dimensions in the most concise form. The relation between the measurements of the joints of the appendages has to a great extent been used in the description of species; this was as far as the palps are concerned first proposed by Hansen and used in his good description of Danish species (9; cf. also 49. p. 233). The real measurements have been given, because it will make it possible for future workers to compare the relations between the dimensions of the different joints of the animals described here with those of the animals under their examination, not only those, which have been used in the descriptions here, but also others, which may prove useful in the future with increased knowledge.

Under the heading "Measurements" the figure outside the bracket gives the length of the organ in question, while that within the bracket gives the greatest breadth or depth, as far as the legs are concerned; if two figures are found within the bracket under cephalothorax, the first refers to the breadth of the front margin and the second to that of the hindmost one. The length of the antennae is measured from the base to the tip of the immovable finger; the length of the joints of the palps is that of the posterior margin as far as the femur and tibia are concerned, but that of the anterior in the trochanter; the hand is measured from its base to the base of the movable finger and the latter from the base to the tip, both along the ventral margin. The joints of the legs are measured

along the dorsal margin from base to tip — in tarsus to the insertion of the claws —, with the exception of the trochantin of the fourth pair of legs, which is measured from the base to the articulate membrane ventrally, and that of the first pair, which in *Chelifer* Geof. is measured from the base to the anterior condylus. When the length of the body is spoken of, the length from the front margin of the head to the tip of the abdomen is meant. Care must be taken, that the joint of the palps are as far as possible measured, when placed in a horizontal plane. To get exact measurements of the legs it is necessary to dissect the legs in question (I and IV) off, but if they are put under a glass-cover, care must be taken, that they are not compressed by its weight, f. inst. by putting a tiny piece of wood beneath the glass, as proposed by Hansen. Under my examination of a species I always felt obliged to take off the one antenna as well as one of the first and one of the fourth pair of legs, or else it was quite impossible to study the minute structures of the antennae, the claws and the terminal lateral hairs of the tarsi. I have as far as possible always given drawings of the left antenna, palps and legs.

III. Synopsis of families and subfamilies.¹⁾

1. The antennae large; the distance between their exterior hind corner at least as long as $\frac{2}{3}$ of the posterior margin of cephalothorax. Serrula exterior at least distally free. Tarsi IV two-jointed *Henuictenodactyli* Balz.
2. Tarsi of the first pair are one-jointed *Chthoniidae* Hans.
 3. Antennae without galea *Chthoniinae* Dad.
 3. Antennae with three galeae *Tridenchthoniinae* Hans.
2. Tarsi of the first pair are two-jointed *Obisiidae* Hans.
 4. Antennae without galea *Obisiinae* Dad.
 4. Antennae with galea *Pseudobisiinae* Hans.

¹⁾ Mr.'s Ellingsens establishment of a new genus *Feaella mirabilis* Ell. (72), as the representative of a new family, will make a few modifications in the above synopsis necessary. This new family is most naturally placed under the *Panctenodactyli* between the *Garypidae* Hans. and the *Cheliferidae* Hag., as it has all tarsi one-jointed and four eyes. The structure of the body is most remarkable, as the front margin is divided into six, large rounded eminences, as the two pair of strongly vaulted eyes are situated on lateral productions, and as the first abdominal tergite is most complicated, being independent and covering the base of the cephalothorax; in addition to these features an upper and lower row of 15 and 14 sclerites respectively along lateral margins of the abdomen, are observed, and the eleventh tergite, which is completely fused with its corresponding sternite, is placed ventrally. Antennae as in *Panctenodactyli*, but without a lamina exterior and with a most remarkable galea. The maxillae are very elongated and the palps, the hand of which is extremely short, appear to be very degenerated. The first pair of legs are very similar to that of the *Garypidae* Hans. as far as the shape of the basal femoral part is concerned, but have their long tarsi one-jointed. The fourth pair of legs are remarkable on account of its similarity to the first pair and the well developed articulation between the two femoral parts.

1. The antennae small; the distance between their exterior hind corner hardly more than half as large as the breadth of the posterior margin of the cephalothorax, and mostly much shorter. Serrula exterior grown fast its whole length. Galea always present *Panctenodactyli* Balz.
5. All tarsi two-jointed. Four eyes *Garypidae* Hans.
5. All tarsi one-jointed. Two eyes or none *Cheliferidae* Hag.
6. Femora of the first pair of legs with a trochantin *Cheliferinae* Sim.
6. Femora of the first pair of legs without a trochantin *Chiridiinae* Hans.

II. Systematic part.

Suborder I. *Hemictenodactyli* Balz.

- 1875. *Obisiinae* Stecker (35) p. 160.
- 1879. *Obisiinae* Simon (5) p. 19.
- 1879. *Obisiidae* Hagen ÷ *Garypidae* Hans. (36) p. 400.
- 1882. *Obisiidae* Tömesvary (40) p. 213.
- 1884. *Obisiinae*; Hansen (9) p. 533.
- 1889. *Obisiidae*; Daday (11) p. 167.
- 1890. *Obisiidae*; Balzan (46) p. 407.
- 1891. *Emictenodactyli* Balzan (12) p. 505.
- 1894. *Emictenodactyli*; Hansen (49) p. 231.
- 1895. *Obisiidae* Banks ÷ *Olpiinae* Bks. (50) p. 2.

Serrula exterior distally free; the antennae large; the distance between their hind corner at least as long as $\frac{2}{3}$ of the posterior margin of the cephalothorax; front margin of the cephalothorax with a median tooth or serrated. (Femur of the two first pair of legs always divided into two joints; tarsus of the two last pair of legs consist always of two joints; the serrula interior is a real serrula, and if not there is no sharp distinction between a basal plate-shape and a terminal serruli-formed division.)

With regard to the discussion of the different characters, I refer to pp. 52-54. The characters, which I am going to set forth, are of at least practical value. The lamina exterior is almost always absent; the maxillae are only exceptionally placed on a level with the coxae; the cephalothorax slightly or not at all narrower anteriorly than posteriorly and has never any transverse grooves; the abdomen has seldom a dorsal longitudinal line; the hairs are almost always simple; "the eleventh abdominal segment forms a ring without any trace of a division into tergite and sternite". The second joint of the tarsus is always longer than the first; the combined tarsi of the first pair of legs or the single one is much longer than the tibiae; the tarsi of the fourth pair almost as long as or longer than the corresponding tibiae; the articular membrane of the trochantin of the fourth pair of legs is most often almost perpendicular on the longitudinal axis of the leg (cf. the foot-note under the "Synopsis of families ..." p. 58).

Family I. *Chthoniidae* Hans.

1879. *Obisiinae* Simon pars (5) p. 50.
 1890. *Obisiidae* pars Balzan (46) p. 407.
 1891. *Chlthoniinae* (pars of *Obisiidae* Balz.) + *Tridenchthoniidae* Balzan (12) p. 508.
 1894. *Chthoniidae* Hansen (49) p. 232.

Front margin of cephalothorax serrated or with a median tooth, which is distinctly set off. Tibia of the palps is calice-shaped; the hand of the palps with dorsal tactile hairs. Trochantin of the fourth pair with the articulate membrane differently shaped anteriorly and posteriorly. The tarsi of the two first pair of legs are undivided.

This family is divided into two subfamilies.

Subfamily I. *Tridenchthoniinae* Hans.

1891. *Tridenchthoniidae* Balzan (12) p. 505.
 1894. *Tridenchthoniinae* Hansen (49) p. 232.

The movable finger of the antennae is provided with three galeae.

This subfamily seems, as far as I can judge from Balzan's rather short description (46. p. 450), in most respects to be similar to the following; we can with Hansen characterize its single genus, *Tridenchthonius* Balz. as a "*Chthonius* with a most remarkable galea" (49. p. 230). The galea consist in reality of three the one behind the other (46. tav. 17, fig. 28 a). The front margin of the cephalothorax seems to be serrated as in most of the *Chthoniinae* Dad., and not prolonged into a median "epistoma". The flagellum is composed of several pinnate bristles; the shape of the palps as well as the two dorsal tactile hairs of the hands provide other points of similarity to the *Chthoniinae* Dad.

Subfamily II. *Chthoniinae* Dad.

1889. *Chthoniinae* Daday (11) p. 167.
 1891. *Chthoniinae* (pars of *Obisiidae*) Balzan (12) p. 508.
 1894. *Chthoniinae* Hansen (49) p. 232.
 1895. *Chthonini* Banks (pars of *Obisiinae*) (50) p. 2.

Antennae without galea.

I. Characteristic of Subfamily.

The cephalothorax is most often as broad as it is long or broader, and usually widened out in front (Pl. I, fig. 1 a). *Chthonius Simonii* Balz., in which it is slightly longer than broad and scarcely widened out (12. fig. 35 a), forms an exception to this rule. The front margin of the head is not gradually prolonged into an median pointed "epistoma" as in most *Obisiidae* Hans., but is as a rule straight; *Megathis* Steck. forms an exception in this respect, but this statement is

as most of Steckers in need of further verification, before it can be accepted. The front margin is either and most often serrated as in *Chl. Rayi* L. K. and *C. diophthalmus* Dad. (11. Tab. IV, fig. 21), or provided with a well marked tooth or eminence; this eminence is in *C. Wlassicsi* Dad. (14. tab. XI, fig. 2) placed in the middle of a notch and terminally provided with a small tooth as well as a pair of long slender hairs, while it in *Ch. terribilis* n. sp. bears several small teeth and a hair on each side (fig. 10, p. 70). The eyes are either present in a number of 2—4 or are completely wanting. The abdominal tergites as well as the sternites are never longitudinally divided; the hairs are usually pointed (cf. *Megathis* Steck. 4. p. 522, taf. IV, fig. 4) and at least at the tip of the abdomen of *C. terribilis* n. sp. are very similar to real tactile hairs, being exceedingly long and slender and placed in wide cavities. The genital area has a very complicated structure, and provides the most surprising differences within the species (cf. *C. terribilis* n. sp. pl. I, fig. 1 b and *C. Rayi* L. K., Menge. 33. tab. III, fig. 7 in *Chthonius maculatus* Menge). The stigmata are very different from those of *Chelifera* Geoff., bearing similarity to those of *Obisium* C. K.

The antennae are large, a character which is especially well marked in *C. terribilis* n. sp. (Pl. I, fig. 1 a) in which their size compete with that of *Microcreagris gigas* Balz. (12. pl. 12, fig. 34 a). The flagellum consists of pinnate bristles placed in one or two tufts (Pl. I, fig. 1 c and 49. tab. V, fig. 12 f); they are only simple in *Lechytia* Balz. The serrulae are free in their distal two thirds and composed of rather few teeth (Pl. I, figs. 1 c-d); the galea is represented by a more or less marked little eminence, into which the delicate ducts of the spinning glands discharge. The labrum is provided with a fairly long and slender backwards directed plate-shaped projection (Pl. I, fig. 1 e, p), and the maxillae with a large lamina superior and a smaller lamina inferior (Pl. I, figs. 1 f—2 a, *ls* and *li*). The circular lyriform fissure at the ventral surface seems to be wanting. With regard to the details of the structure I refer to p. 25.

The slender palps are best characterized by their short calyci-formed tibia, and long and slender fingers, armed with distinct teeth (Pl. I, fig. 1 a and fig. 11, p. 71). The hand is almost always provided with one pair of dorsal tactile hairs placed near to the base of the joint as well as to each other (cf. Pl. I, fig. 1 a and L. Balzan's figures 46. tav. XVII, figs. 25—27 as well as 12. pl. 12, fig. 35). I am only aware of one exception to this rule, namely *Chthonius chthoniiformis* Balz., if this species ought really to be referred to this genus¹⁾.

The coxae are placed on a lower level than the maxillae; they are at least in some species provided with a remarkable kind of bristles, placed near the inner corner of the coxae of the second and third pair of legs. These hairs were first discovered and described by Tulk (30. p. 56) in *C. orthodactylus* Leach and had

¹⁾ Balzan describes this species as a *Roncus* (46. p. 445 and tav. XVII, fig. 24), but the shape of the tibia and his remark "I tarsi dei predi sono di due articoli", are not in favour of this determination, and show, that it ought to be referred to the *Chthoniinae* Dad. The hand bears four tactile hairs at least.

according to his opinion the function of cleaning the claws; similar hairs were later on described by Daday (1897. 14. p. 479) in *C. Wlassicsi* Dad., and they are also found in *C. Rayi* L. K. and *C. terribilis* n. sp. (Pl. I, fig. 1 h); with regard to the details I refer to p. 68. The legs are especially remarkable on account of the marked difference, which is found between the anterior and posterior two pair of legs; these are strong and powerfull, those weak and slender. The first pair of legs is remarkable by its rather short, but slender and tibia-shaped tibial part of the femur, and slender, undivided tarsus, which is longer than the basal portion of the femur (Pl. I, fig. 1 l). The fourth pair is provided with a trochantin of a peculiar shape; it is about half as long as the whole femur and ends with an articulate cavity, which faces forwards and outwards; if we follow the articulate membrane between the two joints, it will be seen to be curved towards the base in the middle anteriorly, but away from it posteriorly (Pl. I, fig. 1 m, f'). The tarsus of the fourth pair of legs is distinctly longer than the tibia and divided into two joints, of which the basal is much shorter than the terminal. The claws are long and slender, and so is the arolium, which has a moderately enlarged sucking-cup. Near the base of the first tarsus a long, slender "tactile" hair is placed dorsally (Pl. I, fig. 1 m).

As far as we are able to judge from the available material, it seems to be pretty certain, that the *Chthoniinae* Dad. bear greater similarity to the *Obisiinae* Steck. than to the *Pseudobisiinae* Hans. especially in the structure of the antennae; but if this similarity is more than a superficial one, the time will show. The *Chthoniinae* Dad. seem to have at least one character of no mean value in common with the *Pseudobisiinae* Hans., namely the presence of tactile hairs on the dorsal surface of the hand of the palps (cf. Balzan 12. p. 503).

II. Genera.

The genera of this subfamily are not very well founded; I am now going to set forth their characteristics one after the other and express my doubts about their systematic value. The genus *Heterolophus* Töm. is established on account of a median concavity in the front margin; but as Daday has reexamined Tömesvary's original specimens and found, that the front margin has no inwards median curvature and is serrated as in most species of *Chthonius* L. K. (cf. 11. p. 190), this genus must as he proposed go out. Stecker's genus *Megathis* Steck. (4. p. 521) is described as a *Chthonius* C. K. with large granules, at least in *M. desiderata* Steck.; but as this author's statements are most often very incorrect or too chimeric to be trusted, we can not accept his remarkable genus without further examination (cf. p. 65). *Lechytia* Balz. (12. p. 499) is nearly related to *Chthonius* C. K., but has a flagellum, consisting of a few hairs, placed in a row; this modification in the structure of the flagellum is indeed interesting, but time will show, if it is sufficient to warrant the establishment of a new genus. Balzan subdivides (12. p. 546) *Chthonius* C. K. into three subgenera: *Pseudochthonius* Balz. with two eyes, *Chthonius* Balz.

proper with four eyes, and *Typhlochthonius* Balz. without eyes; the first group has according to Balzan an almost quadrate cephalothorax, and the last has a cephalothorax distinctly widened out in front, while *Chthonius* proper has one, which is sometimes quadrate, sometimes enlarged in front. On account of these characteristics Balzan regards *Chthonius* as standing between the two other subgenera; even if I have not had the opportunity of examining species of all these subgenera, I am inclined to believe that a good many other characters must be taken into consideration, if we wish to get a natural classification.

III. Specific Characters.

Good characters for discerning the species are found everywhere; a good many have already been used by the different authors; the following lines just to show, in which organs the best characters, the old as well as a few new ones, are found. The shape of the cephalothorax, its length compared to its breadth, the number and position of the eyes, but especially the dentation and armature of the front margin (cf. Daday 11. p. 190) provide good as well as easily employed characters. The shape of the abdomen and the arrangement of its hairs are of some value, but the genital area of the male, which varies in an exceptional degree, will certainly prove of great importance. The antennae show specific variations in size, in the marginal dentation of the fingers (cf. Balzan 12. pl. 12, fig. 35 a) as well as in the granulation of the hand (*Chl. terribilis* n. sp. Pl. I, fig. 1 c) and so do their different appendages like the flagellum (cf. Hausen 49. tab. V, fig. 12 f, and pl. I, figs. 1 c-d) and the two serrulae (49. tab. V, figs. 12-13; and pl. I, figs. 1 c-d). Excellent characters, but not easily investigated, are present in the structure of the maxillae, especially in the shape of the lamina maxillaris superior (cf. p. 25) as easily realised when comparing the figure (Pl. I, fig. 1 t) of *Chl. terribilis* n. sp. with the figure (fig. 2 a) of *Chl. Rayi* L. K. The shape as well as the comparative length of the joints of the palps, but especially the armature of the fingers provide valuable characters. The arrangement and structure of the hairs are perhaps worth while noticing; Daday has at least in one species *Chl. Wlassicsi* Dad. (14. tab. XI, fig. 8) observed very long and slender hairs along the front margin of the femoral part, which are wanting in most other species. The number as well as the position of the tactile hairs of the dorsal surface of the hand show specific variations, and so do those of the fingers, but less marked ones. The shape of the tactile hairs is sometimes of systematic interest; in *Chl. Rayi* f. inst. they are remarkable on account of their swollen base.

The second and sometimes the third pair of coxae as well provide systematic characters of no mean value, but unfortunately very difficult to investigate, by the differences, shown in the position and shape of hairs placed near to the inner corner (cf. p. 66). I will mention a pair of short, curved, well articulated hairs placed in the soft membrane, where the four coxae of the two last pair meet, in this connection, as I have only found it in *Chl. Rayi* L. K. As the previously

mentioned coxal hairs show so marked variations in at least three of the four species, in which they have been observed, it will certainly be of value to have the few available facts, concerning this subject, collected; I give in the following a full description of their position and shape in *Cht. Rayi* L. K. and *Cht. terribilis* n. sp., and add a quotation, elucidating their characteristics in *Cht. Wlassicsi* Dad.

1) Concerning the last genus Daday writes (14. p. 479, tab. XI, fig. 9): "coxis pedum secundi paris margine interiori superiori rotundato setis 6—7 clavatis"; these hairs are according to the figure terminally three-branched.

2) *Cht. Rayi* L. K. The second pair of coxae bears near to the inner anterior corner about ten irregularly and rather densely placed, moderately long and curved hairs, which are hooked terminally and provided with two lateral rows of very minute branches, like a feather; the third pair bears near the inner posterior corner about eight rather slender, pinnate straight bristles, arranged in two longitudinal rows, the four median being the longest.

3) *Cht. terribilis* n. sp. Along the ventral margin of the second pair of the coxae posteriorly and near to the inner corner a longitudinal row of hairs is found, which establishes an obtuse angle, open outwards and backwards, with another row placed inwards on the posterior surface and almost continued into the former. The structure of these hairs provide similarity to those described and drawn by Daday. The first hair in the row on the posterior surface, which is nearest the base of the coxa, is rather short, enlarged distally and divided into about five pointed branches (Pl. I, fig. 1 h, i); near its base a very short spine is found; the three following hairs are longer and increasing in length, and terminated in two, three and five branches. The three following, which are shorter, and placed in the other row (fig. 1 h, e), are distally provided with a number of short marginal teeth; the eighth hair is a mere tooth.

The characters found in the relative length of the joints of the legs will probably prove valuable.

IV. Synopsis of Genera.

When the names of the genera or subgenera are placed within a parenthesis, it signifies, that the genus is doubtful.

- 1) Flagellum consisting of a few simple hairs (*Lechythia* Balz.)
- 1) Flagellum consisting of one or two tufts of hairs
- 2. Front margin prolonged into a median tooth (*Megathis* Steck.)
- 2. Front margin not prolonged into a median tooth *Chthonius* C. K.
- 3 a. Four eyes (s. g. *Chthonius* Balz.)
- 3 b. Two eyes (s. g. *Pseudochthonius* Balz.)
- 3 c. No eyes (s. g. *Typhlochthonius* Balz.)

V. Synopsis of Indian Species.

1. Two eyes. Front margin prolonged into a single median tooth *Megathis* Steck.
2. Palps smooth with pointed hairs (4) *M. Kochi* Steck.
2. Palps granular with clavate hairs (5) *M. desiderata* Steck.
1. Four eyes. Front margin not prolonged into a single median tooth *Chthonius* C. K.
3. The eyes are well separated from the front margin, this distance being at least twice their diameter. The distance between them equal to their diameter. The antennae are much shorter than the cephalothorax and scarcely one third as broad. Hand distinctly longer and broader than the tibia of the palps. Long pointed hairs (2) *C. Wlassicsi* Dad.
3. The eyes distant from front margin half their diameter.
4. The antennae are almost as long as the cephalothorax, which is as broad as long, and almost half as broad. The front margin is mounted with a dentated minute median eminence. Distance between eyes equals their diameter. Hand distinctly broader and much longer than the tibia of the palps. Hairs long and pointed (1) *C. terribilis* n. sp.
4. The antennae are much shorter than the cephalothorax, which is distinctly longer than broad, and much narrower. The front margin without any median eminence. Eyes touching each other. Hand scarcely broader and only slightly longer than the tibia of the palps. Hairs short (3) *C. curvidigitatus* Sim.

VI. Description of Species.

Chthonius C. K.

1843. *Chthonius* C. Kock (1) p. 79.

As all other genera of this family, which have been established, are very doubtful, the characteristics of this genus are in the main identical to those of the subfamily.

1. *Chthonius terribilis* n. sp.

(Pl. I, figs. 1 a—1 m, and fig. 10, p. 70, fig. 11, p. 71.)

Two pair of eyes; distance from each other as well as from front margin equal to their diameter. Cephalothorax widened out anteriorly and here broader than long; front margin straight with median serrated eminence. Antennae as long as two thirds

of the cephalothorax and almost half as broad; their chelae interiorly with small spines; hairs of flagellum in a single tuft. Lamina maxillaris superior widened out distally, rounded and marginally dentated. The tibia of the palps only half as long as the femur; the hand is distinctly longer and broader than the tibia, but shorter than the fingers, which bear about 20 rather small marginal teeth. Hand with a dorsal pair of tactile hairs, placed slightly nearer to the base than to the middle.

♀. Cephalothorax (fig. 1 a). — The two pair of well developed eyes, of which the anterior pair is the more lateral, are removed from each other as well as from the front margin a distance about as long as their diameter (fig. 1 a). The

Fig. 10. *Chthonius terribilis* n. sp.
♀; x 240. Front margin of the cephalothorax.

cephalothorax is gradually widened out towards the first pair of eyes; but it becomes in front of this narrower again; behind it is not as broad as long, but it is behind the first pair of eyes, where the greatest breadth is found, much broader than long. The front margin is almost straight, but has in the middle a minute, rather blunt and slightly dentated eminence, on each side of which a long pointed hair is articulated on a moderate elevation (fig. 10). The cephalothorax is almost smooth and bears, at least in front, a few longer or shorter moderately slender hairs.

Abdomen. — The abdomen is about twice as long as the cephalothorax and of almost equal breadth; it is narrower in front than farther behind. Each tergite is at least laterally provided with a pointed, rather long and thick curved hair; the last sternites bear several shorter and longer hairs; the eleventh sternite bears a pair of "tactile" hairs. The genital opening(?) is rhombic and backwards limited by two chitinous ridges, which together establish an obtuse angle.

Antennae (figs. 1 c-d). — The antennae are very large, being as long as two thirds of the cephalothorax and almost half as broad. Their interior margin is convex proximally and terminally, but concave in the middle; the exterior margin has a proximal convexity passing gradually over in a distal concavity. The hand bears a few long pointed hairs and is inwards armed with a number of rather big spines (fig. 1 a and 1 c). The immovable finger is terminated with a moderate hook, and bears behind this a small tooth, which is followed by a row of about ten teeth, decreasing backwards (fig. 1 c). The inner margin of the movable finger bears about 14 teeth between the tip and the insertion of the serrula exterior (fig. 1 d, m). The galea is represented by an exterior, fairly well marked protuberance. The flagellum (fig. 1 c, f) consists of two (three) tufts(?) of hairs; all the hairs are pointed, plumose and enlarged at their base; the first group contains only a single hair, distinctly curved backwards; the second group consists of six longer or shorter, more or less branched hairs, the basal swollen part of which is placed within an oval, smooth common articulate area, surrounded by finely

granular skin; more outwards there seems to be a single, straight hair. The *serrula interior* is only fastened at its base (fig. 1 c, a) and is very long, slender and pointed. The first tooth behind the pointed tip is long, slender and curved slightly backwards; the following seven teeth, which are shorter and obtuse, are directed obliquely outwards, in contrast to the four basal, which are directed more forwards. The *serrula exterior* is fused with the finger in its basal third part, which forms an obtuse angle with the distal part, the serrula is terminated with a long spine, which is moderately curved backwards in the middle. The inner margin of this organ is dissolved into teeth, more than half as long as it is broad; the distal longer of these teeth are on account of the position of the serrula directed backwards and inwards, while the proximal, shorter ones are directed more forwards (fig. 1 d, c).

Labrum (figs. 1 e-g). — The free anterior projection of the labrum obtusely pointed; hindmost prolongation (*p*) as long as labrum proper, narrowed behind and fairly rounded. Anterior projection beset with clear hairlike organs. (With regard to further details I refer to p. 25).

Maxillae (figs. 1 e-g). — The manducatory part of the maxillae is rather blunt and provided with two hairs, where the exterior margin is curled over upwards (fig. 1 f). *Lamina maxillaris superior* (*ls*) is rather short, widened out in the front, anteriorly rounded and serrated, and directed upwards and outwards. The *lamina maxillaris inferior* (*li*) is long and pointed, and extends beyond the tip of the labrum (fig. 1 f)¹. (With regard to details in the structure of these organs I refer to pp. 25—26).

Palps (fig. 1 a and textfigure 11). — The palps are smooth with the exception of the inner surface of the femora, which is provided with low minute granules. The comparatively few hairs are moderately long and slender. The hand bears only a single pair of dorsal tactile hairs, removed from the base a distance about as long as one third of the length of the hand (fig. 1 a, fig. 11); the number and arrangement of the tactile hairs of the fingers are given in the figures (fig. 1 a and fig. 11). The *trochanter* is distinctly longer than broad; its anterior margin is moderately convex, while the posterior is concave. The *femur*, which is four times as long as broad, has a very short stalk and almost parallel sides; its anterior outline is beyond a short basal concavity almost straight; its posterior margin has first a short rather sudden convexity, beyond which it is moderately concave in the middle and at least convex. The *tibia* has the usual calyci-like shape and is enlarged distally to a degree; it is half as long as

Fig. 11. *Chthonius terribilis* n. sp. ♀
× 100. Left tibia and chela in exterior view.

¹) In one specimen (♀ from the Western side of Koh Chang) the dorsal side of the maxillae bears terminally a rounded, inwards and upwards directed projection partly overlapping the labrum.

and slightly broader than the femur; the anterior outline is distinctly concave, while the posterior is moderately convex. The *hand*, which is distinctly broader than the tibia and much longer, is twice as long as broad and much shorter than the finger; the convexity of the anterior side is much better marked than that of the posterior; the immovable finger is provided with about 20 well separated marginal teeth, which begin near to the base; the movable finger has in the first place about ten low and more or less indistinct „teeth” and in the distal half ten others, like those of the immovable finger.

Coxae (fig. 1 h). — At least the second pair of the coxae bears remarkable hairs, arranged in an original manner (cf. p. 68)

Legs (figs. 1 l-m). — The hairs of the legs are long and pointed; near the base of the first tarsal joint of the fourth pair of legs an exceedingly long and slender “*tactile*” hair is found (fig. 1 m); the arolium has a very long stalk, decreasing towards the small sucking cup. The two first pair of legs are very delicate and slender, compared with the much more powerful last pair. The *basal part* of the first pair of femurs is almost twice as long as and much deeper than the *libial* part; the tibia is a trifle longer than the tibial femoral part, but distinctly shorter than the undivided *tarsus*, which is again twice as long as the former and even longer than the basal femoral part. The *femur* of the fourth pair of legs is very powerful and about twice as long as deep; its *trochantin* is half as long as the whole femur; the femur is twice as deep as the tibia, which is again a little longer than the second *tarsal joint*, but much shorter than the two tarsal joints combined; the first of these is scarcely half as long as the second.

Colour. — The antennae and palps are pale yellowish brown, with fingers darker; the cephalothorax is yellowish green with darker lateral margins. The abdomen is more or less pale yellowish with darker greenish sclerites.

Measurements. — Full grown specimen from Lem Ngob. Cephalothorax 0.445 (0.470 (in front) — 0.400 (behind)); abdomen 0.900 (0.445). Antenna 0.340 (0.180) mm.

Palps: trochanter 0.180 (0.100); femur 0.450 (0.115); tibia 0.210 (0.120); hand 0.320 (0.150); finger 0.405 mm.

Small specimen from Koh Chang Leg I: pars basalis femoris 0.238 (0.065); pars libialis 0.128 (0.055); tibia 0.132 (0.044); tarsus 0.258 (0.030) mm.

Leg IV: femur 0.400 (0.180), trochantin 0.180; tibia 0.290 (0.080); tarsus I 0.126 (0.060); tarsus II 0.270 (0.036) mm.

♂. Abdomen (fig. 1 b). — The three first tergites, especially the second and third, are shorter than the following; the three first bear apparently only two pair of lateral hairs, the following three or four pair; the eleventh in addition to these a pair of “*tactile*” hairs. The pale inconspicuous sclerites of the three first tergites are almost as long as the tergite proper; those of the following are much shorter than their tergites and the hairs are placed behind their posterior margins. The last (VI—X) sternites are like the corresponding tergites divided into an anterior

darker sclerite, half length and a paler posterior portion, which bears four or five pair of hairs, which are increasing in length towards the tip of the body. The sclerite of the fifth sternite is divided into two triangular portions, almost touching each other with their inwards directed apices; the hinder portion of this sternite bears four short pair of hairs (fig. 1 b, s^5). The sclerite of the fourth sternite is much shorter than the hindmost portion, which bears three pair of hairs; the two lateral portions of the sclerite are connected by a very short almost obsolete inner part, a mere line, which is curved distinctly backwards in the middle (fig. 1 b, s^4).

Genital area (fig. 1 b, a). — In front of the fourth sternite we find a large almost rhombic genital area, which is raised towards the middle and provided with a number of short hairs. In the middle of this plate, a genital opening (g), which is narrow behind and distinctly enlarged in front, is found; on each side of the hindmost narrow portion the margins of the plate are raised like two valves to open or shut this part of the opening (v). In the front, broadest part a dark chitinous body is seen; in front of the sexual area and between the coxae a number of short hairs are situated.

Colour. — The antennae are reddish and the palps yellowish brown. The head and three first tergites are greenish, the former with darker margins. The other abdominal sclerites are yellowish brown, darker than the palps.

Material. — Dr. Th. Mortensen caught two males and two females under stones at the Island of Koh Chang (5/1 1900) and a single female under the stem of a tree on the beach of Lem Ngob.

Remarks. — The interesting little species is in several respects (palps-eyes) different from the two other species, known from the Indian Region.

2. *Chthonius Wlassicsi* Dad.

E. Daday. 1897. (14.) p. 479, tab. XI, figs. 1—4, 8—9.

Two pairs of *eyes*; distance from each other equal to their diameter, while distance from first pair to front margin twice diameter. *Cephalothorax* broader in front and here as broad, as it is long. Front margin with a median rounded eminence, which bears a tooth and a pointed hair on each side. The *antennae* are small, not half as long as the cephalothorax and only one fourth of its breadth broad; the seven long pinnate hairs are according to the description placed on a common stem, a feature which is scarcely consistent with the reality. The *femur* of the palps bears an anterior marginal row of six long slender hairs; the *hand* is much broader and longer than the *tibia*, and shorter than the fingers. Second pair of coxae with six or seven branched hairs (fig. 9); the claws have lower margin crenated. New-Guinea at Friedrich-Wilhelmshafen.

3. *Chthonius curvidigitatus*¹⁾ Sim.

1899. E. Simon. (15.) p. 122.

Two pair of eyes which are "subcontigui", removed from front margin a distance only half their diameter. Cephalothorax distinctly longer than broad, "antice recte sectus, sed in medio leviter depressus"; the skin is delicately coriaceous and a few short hairs are present. Antennae as usual. Tibia of the palps rather long; the hand is a trifle longer, but scarcely broader than the tibia, and a little shorter than the fingers, which are slightly curved. Sumatra. M. Simon writes about this species, that it "deviendra sans doute, dans la suite, le type d'un genre special", on account of "les doigts de sa patte-mâchoire légèrement courbes, ses yeux de chaque côté presque contigus et ses téguments finement coriacés, garnis de soies assez courtes". On account of this possibility I have not changed its name.

Megathis Steck.

1875. A. Stecker (4.) p. 519.

If the front margin of the cephalothorax is really prolonged into a median tooth, as represented in Steckers figures (taf. III, fig. 2 a), the genus must be regarded as natural. If this median prolongation by future students, is demonstrated to be of a similar nature as the eminence in f. inst. *C. Wlassicsi* Dad., *Megathis Kochi* Stk. at least must be regarded as a typical *Chthonius* C. K.; but *M. desiderata* Steck. is always sure to be referred to another genus than the majority of the *Chthoniinae* Dad. on account of the granulation of the palps and their clavate hairs, under the supposition that these among the *Hemictenodactyli* unique characters are real, not chimeric

4. *Megathis Kochi* Steck.

1875. A. Stecker (4.) p. 521, taf. III, figs. 1—6.

Two gigantic eyes, well separated from the front margin. Cephalothorax is distinctly longer than broad; front margin prolonged into a prominent median tooth. The femurs of the palps are smooth and the hairs simple and pointed; the hand is much longer and broader than the tibia. Fingers with five marginal teeth Indian Region.

5. *Megathis desiderata* Steck.

1875. A. Stecker (4.) p. 522, taf. IV, figs. 1—4.

This species differs from the preceding by the clavate hairs of the abdomen and palps and by the large granulations of the femora of these. India.

Family II. *Obisiidae* Hans.1879. *Obisiinae* Sim. pars (5.) p. 50.1882. *Obisiidae* Töm. pars (40.) p. 213.

¹⁾ This name has been used previously by Balzan for a South-American species (1890. 46. p. 449).

1890. *Obisiidae* pars Balzan (46.) p. 407.
 1891. *Obisiidae* ÷ *Chthoniinae* + *Pseudobisiidae* Balzan (12.) p. 508.
 1894. *Obisiidae* Hansen (49.) p. 232.
 1895. *Obisiinae* ÷ *Chthoniini* Banks (50.) p. 2.

Front margin of the cephalothorax prolonged into a median tooth. Tibia of the palps is not calice-shaped. Trochantin of the fourth pair of legs has the articulate membrane alike anteriorly and posteriorly. Tarsi are two-jointed.

While the *Chthoniidae* Hans. is a well circumscribed family, characteristic by a number of characters, the same can not be said about the *Obisiidae* Hans.; the two subfamilies, of which the latter family is composed, have only a single (or two) characters in common, which is not found either in the *Chthoniidae* Hans. or the *Garypidae* Hans., namely the median tooth-shaped prolongation of the front margin and perhaps the presence of a lateral terminal hair on the tarsus (cf. p. 45). This family is distinguished from the *Chthoniidae* Hans. by the two-jointed tarsus of the first pair of legs, by the shape of the tibia of the palps, which is not calyciformed and by the simple articulation between the trochantin and the distal portion of the fourth pair of legs; from the *Garypidae* Hans. it differs especially by the not fusing of the serrula exterior with the fingers, by the general absence of the lamina exterior and by the structure of serrula interior.

The differences between the extreme forms of this family are so great, that it is really difficult to tell, whether a species like *Ideoruncus laminatus* n. sp. is most similar to a species of *Obisium* C. K. or to one of *Olpium* L. K.; when nevertheless Hansen is right in dividing the group, with which we deal now, into two subfamilies instead of like Balzan dividing it into two families, it is because only one character proves sharp by comparison between the species, which stand in the middle, in contrast to a good many, when the extreme forms are compared.

Subfamily I. *Obisiinae* Dad.

1889. *Obisiinae* Daday (11.) p. 167.
 1891. *Obisiinae* Balzan (12.) p. 508.
 1894. *Obisiinae* Hansen (49.) p. 232.
 1895. *Obisiini* (pars of *Obisiinae*) (50.) p. 2.

Antennae without galea and lamina exterior; serrula interior without plate-shaped portion. Hand of the palps without tactile hairs. Articular membrane between the trochantin and the femur proper of the fourth pair perpendicular on the longitudinal axis.

I. Characteristic of Subfamily.

The cephalothorax is distinctly longer than broad and with the front margin prolonged into a distinct median tooth; two, four or none eyes are present; skin smooth with pointed hairs. The tergites of the abdomen are never longitudinally divided. The antennae are moderately large, but never half as broad as the

cephalothorax; the flagellum consists of from seven to twelve, partly pinnate hairs, which are placed in a longitudinal row; lamina exterior is always absent, serrula interior has never any basal plate-shaped portion and serrula exterior has the third distal part free at least. The galea, which is always wanting, is represented by a rounded eminence. The labrum has a long posterior projection f. inst. in *Obisium muscorum* Leach., in which species the maxillae have short broad laminae, and in which the median lyriform organ of the ventral surface of the maxillae is rather poorly developed (cf. p. 27). The coxae are always placed on a lower level than the maxillae. The legs especially those of the first pair are long and slender; their tibial femoral part is always short and fairly similar to a real tibia; the trochantin of the fourth pair of legs is as a rule almost half as long as the whole femur and separated from it by an almost perpendicular strictum. The tarsi, even those of the fourth pair of legs, are always longer, sometimes much longer than the tibiae, and their second joint is always the longer. The tarsi seem as a rule to bear a lateral terminal hair of a peculiar shape; *Blothrus spelaeus* Sch. has a long, slender pinnate hair (31. tab. I, fig. 2 f), and so have *Obisium muscorum* Leach. as well as *Roncus alpinus* L. K. (cf. p. 45). The members of this subfamily are well distinguished from those of the *Pseudobisiinae* Hans., which like *Ideoronus laminatus* n. sp. stand on the border-land of the *Hemictenodactyli*, in several respects; but only a few characters prove constant, if we compare an *Obisiin* with a species like *Ideobisium crassimanum* Balz., namely those found in the galea, in the tactile hairs of the hand and perhaps in the structure of the labrum and lyriform organs of the maxillae. And even from these two main characters exceptions are found, if Banks' observation is right, that the male of *Ideoronus obscurus* Bks. has no galea (50. p. 11), and if the hand of *Ideoblothrus similis* Balz. in reality does not bear any tactile hairs, as set forth by Balzan (12. pl. 12, fig. 32).

II. Synopsis of genera.

1)	No eyes.....	<i>Blothrus</i> Sch.
1)	Eyes	
2.	Two eyes.....	<i>Roncus</i> L. K.
2.	Four eyes.....	<i>Obisium</i> Ill.

Obisium Ill.

1798. Illiger. Verzeichnis der Käfer Preussens.

Cephalothorax provided with four eyes.

The three following species have been described as belonging to this genus, but as the descriptions are very imperfect and as they seem rather singular in several respects, their systematic position ought to be regarded as very doubtful; they will probably be very difficult, if not impossible to identify.

1. *Obisium trifidum* Steck.

1875. A. Stecker (4.) pp. 523—524; taf. IV, figs. 5—8.

Four eyes, well separated from the front margin, which has three projections in the middle, a median shorter, broad and squarely truncate one, and on each side of this a longer and pointed. The trochanter of the palps bears anteriorly a little protuberance. The femur of the palps is widened out towards the end and slightly granular; the hand is twice as broad as the short tibia, and almost as broad as its own length. India.

2. *Obisium longicollae* Frauenfeld.

1867. G. v. Frauenfeld (3.) p. 461.

“Glänzend kastaniebraun, nur der Hinterleib etwas dunkler. Der lange Vorderleib mit ziemlich parallelen, wenig gebauchten Seiten, vorne abgerundet, verschmälert, rückwärts gerade abgestützt. Der längliche Hinterleib kaum etwas länger als der Vorderleib, rückwärts verbreitert, gerundet. Scheerenfüsse lang, nicht sehr derb. Erstes Glied kurz, an der Rückseite mitten mit einem zahnartigen Vorsprung; zweites sehr lang, cylindrisch, mitten kaum dicker; drittens nur halb so lang als der zweite, kolbig und dicker als dieses; viertes mit der Scheere länger als das zweite etwas dicker kolbig als das dritte, die sanft gebogenen Scheerspitzen betragen fast über die Hälfte der ganzen Länge dieses Gliedes, nur an dieser Spitze stehen einige weisse Härchen; das erste Fusspar schlanker als die übrigen. 1·85 mm long. Der Vorderleib 0·9 mm.” Taken in a ship near the Nicobars.

3. *Obisium pusio* Kolen.

1857. F. A. Kolenati (2.) p. 431.

As the description is very short, I give it in full here.

“Roth, nur die Füße gelb, am ganzen Körper und den Füßen fein-gekörnt und schütter gelbborstig, die Borsten am Ende verdickt und fein-hackig, die Scherentaster sehr aufgeblasen, stark glänzend und fein gekörnt, von der Länge des Körpers. 2 mm.” A single specimen was found in Vienna in hay, used as packing from Calcutta. If the original specimen of this very insufficiently described species is not found, it will certainly never be identified, as even its genus is doubtful.

Subfamily II. *Pseudobisiinae* Hans.1891. *Pseudobisiidae* Balzan (12.) p. 508.1894. *Pseudobisiinae* Hansen (49.) p. 532.1895. *Ideobisini* Banks (50.) p. 2.

Antennae provided with a galea. Hand most often with tactile hairs.

I. Characteristic of Subfamily.

The cephalothorax is as a rule longer than broad; only in *Microcreagris gigas* Balz. it is as broad as long (12. pl. 12, fig. 34 a); the front margin is prolonged into

a median tooth, which is well developed in *Microcreagris* Balz. (12. pl. 12 fig. 34 a) and *Ideoroncus Gracilis* Balz. (12. pl. 12. fig. 31), but almost obsolete in *Ideoblothrus similis* Balz. (fig. 32). Two, four or none eyes are present in the different forms. The abdominal tergites are most often undivided; *Ideoroncus laminatus* n.sp. forms an exception to this rule. The skin is smooth and the hairs are pointed; the eleventh segment sometimes with real tactile hairs (cf. p. 57). The antennae are of moderate size in all forms, but *Microcreagris* Balz., which in size surpasses that of all other *Chelonethi* (12. pl. 12, fig. 34); the flagellum varies from being fairly complicated to being very simple. In *Ideobisium crassimanum* Balz. f. inst. it consists of seven, long pinnate hairs placed in a longitudinal row (49. tab. V, fig. 6) and has most similarity to that of *Obisium* Ill.; in *Ideoroncus Siamensis* n.sp. it is composed of four, which are provided with a few teeth, while the number of the hairs in *I. Mexicanus* Bks. is three, which are very short and almost simple (cf. Pl. I, figs. 4-5 a, f; and 21. pl. IX, fig. 2 b). The lamina exterior is absent in all known species but one, *Ideoroncus laminatus* n.sp. (Pl. I, fig. 5 a, b); the serrula interior is sometimes a real serrula as in *Obisium* Ill. f. inst. in *Ideobisium crassimanum* Balz. (49. tab. V, fig. 6) and has sometimes the basal part more or less plate-shaped f. inst. in *Ideoroncus laminatus* n.sp. (Pl. I, fig. 5 a). The serrula exterior has in *Ideoroncus Mexicanus* Bks. the distal third part free (21. pl. IX, fig. 2 c), while most other species have the distal fifth portion or less free (Pl. I, figs. 4 b); the teeth of the serrula are most often squarely truncate. The galea is generally similar to a moderately curved stylet; *Ideoblothrus Strandii* Elling. and *Microcreagris* Balz. have the galea divided into a few terminal branches; the galea is according to Banks absent in the male of *Ideoroncus obscurus* Bks. (50. p. 11).

The hindmost prolongation of the labrum is only short (Pl. I, fig. 4 c, p); the laminae maxillares are fairly long and slender (figs. 4 c-d, 5 b), and the lyriform organs of the maxillae attain at least sometimes a remarkable development (cf. p. 28). The shape of the palps is very variable, but does not provide characters of more general interest; but the presence of tactile hairs on the dorsal and posterior surface of the hand, is highly characteristic; similar hairs is only found in the *Chthoniidae* Hans. The marginal teeth of the fingers of the palps are at least generally poorly developed. The coxae are in all species, but one *Ideoroncus laminatus* n.sp. placed on a lower level than the maxillae. The tibial femoral part of the first pair of legs is rather short and similar to a tibia, but most often more widened out than in *Obisium* Ill.; the articulate membrane of the trochantin of the femur IV is generally a little oblique and the joint itself seldom longer than one third of the whole femur, sometimes less. The tarsi of at least the first pair of legs are always longer than the tibia, but not always to the same degree; the tarsi of *Ideoroncus Siamensis* n.sp. f. inst. are 1.7 longer than the tibia, while those of *I. laminatus* n.sp. are 1.3 longer. The tarsi of the fourth pair of legs are generally longer than the tibiae, but less so than those of the first pair of legs; there is however one exception namely *Ideobisium Balzanii* With, in which the

tarsi and the tibiae are of equal length (21. pl. X, fig. 2 g). The second of the two tarsal joints is always the longer; but their differences in length are not always the same; in *Ideoroncus Siamensis* n. sp. f. inst. the tarsus II of the first pair of legs is 1.3 longer than the tarsus I (Pl. I, figs. 4 h-i), while the former of these joints in *I. Mexicanus* Bks. is 2.5 longer than the latter (21. pl. X, fig. 1 d). The tarsi bear dorsally at the base of the basal joint a "tactile" hair and terminally on each side of the claws a bifurcate or toothed hair.

Balzan as well as Hansen saw in this subfamily a connecting link between the two suborders; the latter of these two naturalists supported this point of view from facts, principally taken from the structures of the antennae, while Balzan laid greater stress on the structure of the legs and writes (1891. 12. p. 502) "Je place ma nouvelle famille entre les *Olpium* et les *Obisiidae*, parce qu'elle se rapproche des *Olpium*, et s'éloigne un peu des *Obisiidae* par les femurs et les tibias des deux premières paires de pattes courts et gros, tandis que dans les vrais *Obisiidae*, ils sont plutôt longs et minces." Both authors are certainly right in their arguments as well as in their conclusions, for according to the above we find in the structure of the front margin of the cephalothorax, of the abdominal tergites, of the antennae, coxae and legs features sometimes borrowed from the *Obisiinae* Dad. and sometimes from the *Garypidae* Hans. In a single character we find a similarity to the *Chlhoniidae*, namely in the tactile hairs of the hand of the palps.

II. Genera.

Balzan subdivided his *Pseudobisiidae* Balz. into two subfamilies viz. the *Pseudobisiinae* Balz. and the *Microcreaginae* Balz. (12. p. 502 and p. 543), the former having a simple galea, an elongated cephalothorax and rather small antennae, the latter significant by its distally divided galea, its quadrate cephalothorax and excessively large antennae; the latter subfamily has also the front margin of the cephalothorax prolonged into a large median tooth; these subfamilies were not accepted by Hansen. Ellingsen has in a little paper (1901. 58. pp. 86—87) shown, that the first of the characters of the *Microcreaginae* Balz. must necessarily be omitted, because *Ideoblothrus Strandi* Elling. has a galea which is divided terminally. The other characters seem too meagre for the foundation of a subfamily; those established by Balzan must consistently go out. But the *Microcreagris* Balz. is nevertheless to be regarded as a very good genus.

The other genus *Ideobisium* Balz. was subdivided into three subgenera according to the number of the eyes; *Ideobisium* Balz. has four eyes, *Ideoroncus* Balz. has two eyes and *Ideoblothrus* Balz. has no eyes; minor differences are found in the shape of the galea and the cephalothorax, the latter being rather elongate in *Ideoroncus* Balz. while it is almost as broad as long in *Ideobisium* Balz. The eyes certainly provide a good and practical character, and so sometimes do the shape of the cephalothorax; but it will beyond a doubt be necessary to use a number of characters to get a natural system. *Ideoroncus pallidus* Balz., *I. Siamensis*

n. sp. and *I. laminatus* n. sp. form a natural group, characteristic by the number of eyes, structure of antennae, shape of palps and number and arrangement of the tactile hairs; *Ideoroncus Mexicanus* Bks. seems to be related to these, while *I. gracilis* Balz. differs from the above mentioned in several respects. *Ideobisium Balzanii* With and *I. crassimanum* Balz. are very nearly related to each other.

III. Synopsis of Genera.

1. Antennae as long as, and half as broad as the quadrate cephalothorax. Galea distally provided with four branches *Microcreagris* Balz.
1. Antennae shorter than cephalothorax, which is more or less elongate, and not half as broad ... *Ideobisium* Balz.
 2. Eyes present.
 3. Four eyes s. g. *Ideobisium* Balz.
 3. Two eyes s. g. *Ideoroncus* Balz.
 2. Eyes absent s. g. *Ideoblothrus* Balz.

IV. Synopsis of Indian Species.

1. Two eyes. Flagellum consisting of four hairs with a few teeth. Palps rather slender with four dorsal tactile hairs on hand *Ideoroncus* Balz.
2. Abdominal tergites not longitudinally divided. Inner margin of the immovable finger of the antennae with a large tooth and several smaller behind; no lamina exterior present. Maxillae not on level with the coxae. Tibia of the first pair of legs scarcely longer than the second tarsal joint; terminal lateral tarsal hair is bifurcate (1) *I. Siamensis* n. sp.
2. Abdominal tergites longitudinally divided. Inner margin of the immovable finger of the antennae with many small teeth; a lamina exterior is present. Maxillae on level with the coxae. Tibia of the first pair of legs much longer than the second tarsal joint; terminal lateral tarsal hair is three-branched (2) *I. laminatus* n. sp.
- 1.¹⁾ No eyes. Flagellum consisting of six, pinnate hairs; palps rather clumsy without dorsal tactile hairs on hand (3) *Ideoblothrus bipectinatus* Dad.

¹⁾ A. Tullgren has described a species from Java *Ideobisium minutum* (226. pp. 44—45, figs. 4 a-c) easily distinguished from the other Indian species by four eyes and broad hand without dorsal tactile hairs.

V. Description of Species.

Ideobisium Balz.

1891. Balzan (12.) p. 531.

Cephalothorax elongate, often longer than broad. Antennae shorter than the cephalothorax and much narrower; their galea as a rule an undivided stylet.

Ideoroncus Balz. subg.

1890. Balzan (46.) p. 443. (genus.)

1891. Balzan (12.) p. 540. (subgenus.)

Two eyes; galea undivided.

1. *Ideoroncus Siamensis* n. sp.

(Pl. I, figs. 4 a-i).

One pair of eyes; distance from front margin smaller than their diameter. Cephalothorax is scarcely longer than broad behind with median prolongation of front margin blunt. Abdominal tergites are undivided. Inner margin of the immovable finger of the antennae with a large anterior tooth and several small ones behind; flagellum consisting of four sparsely toothed hairs; lamina exterior wanting; galea long moderately curved. Femur of the palps is about four times longer than broad and a trifle broader than the tibia, but much longer; the hand is almost twice as broad as the tibia and shorter than the fingers. The four dorsal tactile hairs of the hand of the palps are placed in a square. The coxae are placed on a lower level than the maxillae; the tibia of the first pair of legs is of almost equal length to the second tarsal joint; terminal lateral hair bifurcate.

♀. *Cephalothorax*. — The strongly arched eyes are removed from the front margin a lesser distance than their diameter. The cephalothorax is scarcely longer than broad with the lateral outlines moderately curved outwards in the middle; the sides are suddenly bent inwards just behind the eyes, so that the front margin becomes considerably shorter than the hindmost; the front margin is set off from the hinder portion and strongly chitinated. The median prolongation is fairly distinct but blunt. The skin is smooth or very minutely reticulate; a few short pointed hairs, of which the three pair along the front margin are the most conspicuous, are found.

Abdomen. — The abdomen is distinctly longer than broad, and broadest a short distance behind the middle, so that it becomes almost obovate in shape. The tergites are not *longitudinally divided*. All the tergal sclerites are of about equal length with the exception of the second and third ones which are both shorter and narrower; along the hindmost margin of each tergal sclerite or just behind a row of fairly long pointed hairs are placed, consisting of a few hairs on the first segments and several, about ten, on the last ones. The tenth and the eleventh tergites bear two pair of real tactile hairs, placed in very wide cavities;

the eleventh sternite bears only a single pair. The sternites are not longitudinally divided and bear a transverse row of 10 hairs behind the margin of the sclerites.

(♂). Antennae (figs. 4 a-b). — The antennae are almost half as long as the cephalothorax and one third as broad; they are provided with a good many longer and shorter hairs. The immovable finger is terminated with a moderately curved blunt hook; after this follow dorsally along the inner margin first three very small teeth, rather apart from these a large stout tooth with several smaller ones behind, which decrease backwards at least in most specimens (fig. 4 a). The movable finger is more slender and moderately curved without any pronounced hook; inner margin with seven or eight tiny teeth (fig. 4 b). The *lamina exterior* is wanting; the *flagellum* consists of four hairs of almost equal length, which bear a few short teeth along the front margin (fig. 4 a, f). The *serrula interior* is only free in its distal fifth part and consists of about 20 teeth; the basal of these is longer than the following, squarely-truncate, ones and pointed; the teeth become again longer and more independent towards the tip; the terminal one, which is placed on a level with the preceding, as well as the penultimate are always completely free, pointed and serrated along hinder margin (fig. 4 a, t). The *serrula exterior* has its distal third part free, is almost semilunar in shape and consists of 17 blunt or fairly pointed teeth (fig. 5 a); the galea is long and moderately curved.

Labrum (figs. 4 c-d, l, cf. p. 27). — The anterior portion is rather long and broad with moderately convex sides and fairly rounded in front; it is minutely reticulated above; its hindmost prolongation (p) as long as broad and fairly rounded behind.

Maxillae (figs. 4 e-f, cf. p. 27). — The maxillae have, seen from beneath, their basal portion covered by the first pair of coxae; they are much broader behind than in front and have the sides steep; their manducatory part is short and bears three long pointed hairs. The lamina maxillaris superior is long, obtusely rounded in front and projecting as far as the labrum; the lamina inferior is very short and rounded (fig. 4 d, ls-li). The median lyriform organ beneath is almost circular and very prominent (fig. 4 e, f', cf. p. 28).

Palps (fig. 4 g). — The palps are almost smooth and provided with rather short pointed hairs; the upper surface is in the middle anteriorly provided with four tactile hairs, placed in a square (t); the immovable finger bears a very great number of tactile hairs namely about 20, at least two are placed near the base of the finger posteriorly; the movable finger also bears a great number viz. about 10. The trochanter, which is about 1.5 longer than broad, has a very indistinct stalk; the anterior outline is moderately convex, while the posterior has a basal concavity and a distal convexity. The femur, which is about four times longer than broad, has its stalk very indistinct; the anterior margin is moderately convex from base to tip, while the posterior is slightly concave beyond a short basal elevation; it is a trifle broader than the tibia and much longer. The tibia, which is about three times longer than broad, has a distinct short stalk; anterior margin

is beyond concavity of the stalk moderately convex to the articulate cavity, which occupies at least one third of the anterior surface; posterior margin is moderately convex from base to tip. The hand is a little longer and almost twice as broad as the tibia, and shorter than the fingers; it is scarcely twice as long as broad; the anterior margin is beyond the stalk very strongly convex, while the posterior margin is only moderately convex.

Coxae. — The coxae cover, when seen from below, the hindmost margin of the maxillae, and their own hindmost parts are again covered by the front margin of the following pair. The first pair is as broad inwards as it is long; the two following pair are widened out towards the tip and the second is here almost as broad as the first pair is inwards; the third pair is distinctly narrower than the second; the fourth is again broader and triangularly pointed with the point directed obliquely forwards towards the middle; its inner and hinder margins merge gradually into each other.

(♂). Legs (figs. 4 h-i). — The hairs are rather long and pointed; near the base of tarsus I of the fourth pair of legs a long and slender „tactile” hair is placed dorsally: the *lateral terminal* hair on each side of the claws is divided into two slender branches as long as one third of the whole hair. The arolium has a short stalk, is distinctly widened out distally, and has the margins of the sucking cup fairly serrated. The *basal femoral part* is widened out distally, much broader than the more distal joints and as long as the tarsi; the *libial femoral part* is about half as long as the basal part, moderately enlarged outwards and distinctly shorter than the tibia; the *libia* of the first pair of legs is as long as the *second tarsal* joint, which is again 1.3 longer than the first. The *trochanlin* of the fourth pair of legs has an almost perpendicular articulate membrane and is almost half as long as the whole femur (fig. 4 i, f'); this is distinctly lower towards the extremity.

Colour. — The palps and the antennae are light yellowish brown with the hand and fingers of the palps darker; the cephalothorax and the abdominal sclerites are yellowish brown with a green shade. The coxae, legs and sternites are yellowish green or brown. The articulate membrane between the tergites and sternites is yellowish white.

Measurement. — Cephalothorax 0.550 (0.396—0.550); abdomen 1.960 (1.200). Antennae 0.370 (0.180) mm.

Palps: trochanter 0.280 (0.168); femur 0.750 (0.196); tibia 0.560 (0.180); hand 0.616 (0.350); fingers 0.680 mm.

♂. Abdomen. — The abdomen is much longer and slenderer than in the female. The distinction of the sclerite proper and a shorter, less chitinized portion behind, which bears the hairs, is more marked both in the tergites and sternites. Between the triangular piece, between the fourth pair of the coxae, and the fourth sternite we find at least two sclerites, a hinder one broader and shorter and a foremost one longer and narrower, which are both provided with hairs placed in

transverse rows; between these two the genital aperture is found together with a complicated system of chitinous bars.

Palps. — The palps are perhaps slenderer, especially the hand, which is not twice the breadth of the tibia and which has the anterior margin less suddenly and less strongly convex; the fingers are comparatively longer.

Coxae. — The fourth pair of the coxae are comparatively shorter and broader than in the female.

Measurement. — Specimen from Koh Chang. Cephalothorax 0.532 (0.336--0.520); Abdomen 1.260 (0.616) mm.

Specimen from Klong Salakpet. Palps: trochanter 0.252 (0.140); femur 0.700 (0.178); tibia 0.504 (0.170); hand 0.550 (0.280); finger 0.670 mm.

Leg I: femur I 0.360 (0.072--0.090); femur II 0.180 (0.081); tibia 0.220 (0.060); tarsus I 0.173 (0.050); tarsus II 0.228 (0.036) mm.

Leg IV: femur 0.522 (0.207), trochantin 0.260; tibia 0.360 (0.097); tarsus I 0.189 (0.065); tarsus II 0.323 (0.048) mm.

Material. — Dr. Th. Mortensen has taken one female and two males from under stones in the month of January at Koh Chang; the female had the abdomen strongly dilated with eggs; he collected besides two males in the wood at Klong Salakpet in the month of March.

Remarks. — This species is in several respects similar to *I. laminatus* n. sp., but is easily distinguished from the latter by the shape of antennae, palps and legs f. inst. I have in the above description of the female given the detailed description of the antennae, labrum, maxillae and legs of the male, as the scanty material did not permit a more thorough investigation of these organs in the female; I thought this arrangement more practical, as sexual differences are scarcely found in these organs.

2. *Ideoroncus laminatus* n. sp.

(Pl. I, figs. 5 a—c).

One pair of eyes; distance from front margin greater than their diameter. Cephalothorax distinctly longer than broad behind with median prolongation of front margin pointed. Abdominal tergites longitudinally divided. Inner margin of the immovable finger with several small teeth; flagellum consisting of four sparsely toothed hairs; a lamina exterior present; galea long moderately curved. Femur of the palps almost four times as long as broad, a trifle narrower than the tibia, but a little longer. The hand is almost twice as broad as tibia and shorter than the fingers. The four dorsal tactile hairs of the hand of the palps are placed in a square. The coxae are placed on a level with the maxillae; the tibia of the first pair of legs distinctly longer than second tarsal joint: terminal lateral hair three-divided.

♀. Cephalothorax. — There is one pair of strongly arched eyes, placed on the lateral margin, removed from the front margin to a distance, a trifle longer than their diameter. The cephalothorax is distinctly longer than broad behind

and gradually tapering towards front margin; the median prolongation of the latter is pointed, but not well limited behind and giving the whole margin the appearance of an obtuse angle open behind and with the corner in the middle. Skin smooth with a few short and pointed hairs.

Abdomen. — The abdomen is rather slender and broad in the middle; the sclerites, which are half as long as their tergites, increase in length and in breadth from before backwards, and are *longitudinally divided* with the exception of the first and the two last ones; each tergite bears a transverse row of rather short, pointed hairs. The tenth tergite bears two pair of "tactile" hairs, while the eleventh tergite as well as the corresponding sternite bear a single pair of "tactile" hairs each. The sternites are in other respects similar to the tergites.

Antennae (fig. 5 a). — The antennae are almost half as long as the cephalothorax and one third as broad; they are very long and slender, and provided with longer and shorter hairs. The immovable finger is terminated with a moderately pointed and curved hook; inner margin behind this dorsally with about ten tiny teeth. The movable finger has a rather suddenly but moderately curved hook; in the third fourth part, measured from the base of the finger, and just behind the hook six densely placed marginal teeth are placed dorsally. Four hairs, decreasing backwards, pointed, rather short and with a few marginal teeth constitute the *flagellum*; a narrow, but distinct *lamina exterior* is present (fig. 5 a, b). The *serrula interior* consists of about 20 teeth and is very much elongated (fig. 5 a, a); it is remarkable by a well developed plate-shaped portion, gradually merging into twelve, broad and almost completely fused teeth, beyond which four obtusely pointed and well separated ones follow; the last and in a less degree the last but one are pointed and serrated along hinder margin; apparently in continuation of the already described organ, we have a moderately curved, pointed and behind serrated spine, which really is placed on a lower level (fig. 5 a, t) (cf. p. 19). The *serrula exterior* is scarcely free in its distal third part, and consists of 22 teeth, which are all more or less blunt; the galea is long and moderately curved.

Labrum (fig. 5 b, l). — The anterior prolongation of the labrum is very long and slender; it is broadest in the middle, where the outline is convex, and tapers towards the base and the end as well; the latter is obtusely rounded; the median part is as far as can be seen without dissection provided with a well raised longitudinal keel.

Maxillae (fig. 5 b). — The maxillae are almost placed on a level with the coxae; they are tapering towards the end; their manducatory part is short, well set off and bears three long pointed hairs; the maxillae are granular laterally. The *lamina maxillaris superior* (*ls*) is long and slender, but not projecting as far anteriorly as the labrum; the *lamina inferior* (*li*) is distinctly longer than broad and fairly rounded in front; the median lyriform organ is not so distinct as in *I. Siamensis* n. sp. and placed more laterally.

Palps (fig. 5 c). — The palps are almost smooth and provided with fairly long pointed hairs; the hand bears above the four dorsal tactile hairs, placed in a square; in addition to these four tactile hairs the hand has posteriorly a vertical row of three or four at the base of the hand; both fingers bear several but not so many as in *I. Siamensis* n. sp. The *trochanter*, which is about twice the length of the breadth is provided with a rather distinct stalk; the anterior moderately convex, while the posterior beyond the sudden moderate concavity, has a rather sudden convexity. The *femur*, which is almost four times longer than broad, has a fairly distinct stalk; the anterior outline has first a short concavity and beyond that a moderate convexity to near the tip; the posterior has beyond a low elevation, which marks the stalk off, a very low concavity, which is followed by a more marked distal convexity. The *tibia*, which is slightly shorter and broader than the femur, and three times longer than broad, has a distinct long stalk; the anterior surface is beyond the almost straight margin of the stalk and a low well marked elevation, moderately convex; the posterior outline is slightly convex from base to tip. The hand is scarcely so long as the tibia and 1.6 broader, and much shorter than the finger; it is scarcely twice as long as broad; the anterior margin is beyond the stalk very strongly convex, while the posterior is only slightly so. The fingers have their tips bent suddenly to establish pointed strong hooks.

Coxae. — The coxae are placed on a level with the maxillae and on level with each other; the first pair are as broad as they are long and not widened out towards the extremity; the second pair are longer, moderately widened out towards the extremity and more narrower than first; the third pair are widened out distally in so high a degree, that it appears triangular, and is as long as, but much narrower than the preceding pair; the fourth pair are the longest and have their interior margin as long as that of the first pair, because they are triangularly pointed and have the point directed obliquely forwards towards the middle; the inner and hinder margins merge into each other, as the postero-exterior corner is smoothly rounded.

Legs. — The legs are, compared with the size of the body exceptionally weak and thin. The hairs are moderately long and slender; dorsally at the base of the first tarsal joint of the two last pair of legs we find a "tactile" hair, in length slightly surpassing the second tarsal joint; the *lateral terminal* hair of the tarsi is long, slender curved with three distal branches. The *arolium* extends beyond the claws and is distinctly widened out towards the tip, and the sucking cup has the margin finely serrated. The *basal femoral part* is widened out distally, much broader than the more distal joints and almost as long as the tarsi; the *tibial femoral part* is scarcely half as long as the basal part, moderately enlarged outwards and distinctly shorter than the tibia; this is about 1.3 times longer than the second tarsal joint, which is again 1.4 times longer than the first. The *femur* of the fourth pair of legs is three times longer than deep, not very much raised

basally and consequently only in a slight degree lower towards the extremity; the trochantin has oblique articulation and is not half as long as the femur.

Colour. — The palps, antennae, maxillae and the coxae are light brown with the fingers of the palps darker; the cephalothorax is blackish brown and the abdominal tergites yellowish brown; the legs are pale yellowish green and the remaining portion of the body yellowish.

Measurements. — Cephalothorax 0.784 (0.644); abdomen 2.5 (1.26). Antennae 0.392 (0.182) mm.

Palps: trochanter 0.340 (0.175); femur 0.868 (0.232); tibia 0.784 (0.260); hand 0.750 (0.420); finger 0.896 mm.

♂. **Abdomen.** — The body and especially the abdomen is much longer and slenderer; the latter appears pedicellate, because the first tergite is much narrower than the second and following. The structure of the genital area could not be investigated in the single specimen, but that its structure differs vastly from that of the foregoing specimen, is at least evident.

Colour. — The colour of the palps and the cephalothorax is brighter and more polished; that of the abdominal tergites darker and on that account the longitudinal line more distinct.

Measurements. — Cephalothorax 0.756 (0.616); abdomen 2.38 (0.980) mm. Palps: quite alike those of female.

Leg I: femur I 0.459 (0.084—0.112); femur II 0.234 (0.100); tibia 0.360 (0.070); tarsus I 0.198 (0.056); tarsus II 0.270 (0.042) mm.

Leg IV: femur 0.725 (0.230), trochantin 0.300; tibia 0.524 (0.112); tarsus I 0.260 (0.070); tarsus II 0.364 (0.056) mm.

Material. — Dr. Th. Mortensen collected two specimens (♀ and ♂) from under a stone in the island of Koh Chang in the month of January.

Remarks. — This species is in several respects similar to *I. Siamensis*, but it easily distinguished (cf. p. 84); it is most remarkable, thereby that it in a number of characters provides an astonishing similarity to the *Garypidae* Hans.

Ideoblothrus Balz. subg.

1891. Balzan (12.) p. 541.

No eyes; galea sometimes branched distally.

3. *Ideoblothrus bipectinatus* Dad.

1897. Daday (14.) pp. 478—479; tab. XI, figs. 7, 14—15.

No eyes; cephalothorax much longer than broad; small median process. The *flagellum* is represented as consisting of six distally enlarged pinnate hairs, arising from a common stem, a statement, which cannot be accepted without further investigation; two well developed, elongate almost completely free(?) serrulae; *galea* rather short, moderately curved and simple. *Palps* remarkable by slender femurs with straight margins and about 3.5 longer than broad; by the tibiae which are

of equal length to and about 1.5 broader than femur with the anterior margin almost circular and posterior moderately convex; the hand is excessively broad, 1.5 broader than tibia and of equal length to fingers; the two last joints have very thin stalks, but the femur has no stalk at all (cf. his fig. 15).

Suborder II. *Panctenodactyli* Balz.

- 1875. *Cheliferinae* Stecker (35.) p. 160.
- 1879. *Cheliferinae* + *Garypinae* Simon (5.) p. 19.
- 1879. *Cheliferidae* Hag. + *Garypidae* Hans. Hagen (36.) p. 400.
- 1882. *Cheliferidae* Tömösvary (40.) p. 182.
- 1884. *Cheliferinae* Hansen (9.) p. 531.
- 1889. *Cheliferidae* Daday (11.) p. 167.
- 1890. *Cheliferidae* Balzan (46.) p. 406.
- 1891. *Panctenodactyli* Balzan (12.) p. 504.
- 1894. *Panctenodactyli* Hansen (49.) p. 230.
- 1895. *Cheliferidae* + *Olpiinae* Banks. (50.) p. 2.

Serrula exterior completely fused; the antennae small; the distance between their exterior hind corner hardly more than half as large as the breadth of the posterior margin of the cephalothorax and mostly much shorter; front margin of the cephalothorax without a median tooth.

The antennae always bear a galea and a lamina exterior; the coxae are generally on a level with the maxillae.

With regard to the discussion of the different characters I refer to pp. 52--54; those, which I am going to set forth now are at least of practical value. The cephalothorax bears most often one or two transverse sutures; the abdominal tergites are often longitudinally divided; "the eleventh abdominal segment mostly plainly divided into tergite and sternite, or at least with an indication of such a division"; the hairs are seldom completely simple, most often more or less dentated distally. The marginal teeth of the fingers of the antennae are only slightly developed; the flagellum seems never (cf. p. 14) to consist of more than four hairs, of which only the anterior has more than a few teeth; the lamina interior consists always of a plate-shaped basal and a serruli-formed distal portion as a rule more or less well separated. The labrum seems never to have a hindmost median projection. The legs show almost all variations, but the tibial part of the femur is when present, easily distinguished from a real tibia, and the articulate membrane of the trochantin of the fourth pair of legs is almost always oblique (cf. the footnote under the "Synopsis of families ..." p. 58).

Family III. *Garypidae* Hans.

1875. *Cheliferinae* Stecker pars (35.) p. 160.
 1879. *Garypinae* Simon + *Cheridium* Menge (5.) p. 42.
 1879. *Obisiidae* Hagen pars (36.) p. 400.
 1882. *Garypinae* ÷ *Chiridium* Menge. Tömösvary (40.) p. 208.
 1884. *Cheliferinae* pars Hansen (9.) p. 531.
 1889. *Garypinae* ÷ *Chiridium* Menge + *Garypininae* Daday (11.) p. 167.
 1890. *Cheliferidae* pars Balzan (46.) p. 406.
 1891. *Garypinae* ÷ *Chiridium* Meng. Balzan (12) p. 504.
 1894. *Garypidae* Hansen (49.) p. 231.
 1895. *Garypinae* + *Olpiinae* ÷ *Atemnus* Can. Banks (50.) p. 2.
 1904. *Garypidae* Ellingsen (70.) p. 2.

The femora of the two anterior pair of legs divided into a longer basal part and a shorter tibial part or with a trochantin. All tarsi two-jointed. Four eyes.

I. Characteristic of Family.

The shape of the cephalothorax provides a considerable interest and is more varied than in any other of the families; the number of the eyes is always four, but their position is dependent upon the shape of the front of the cephalothorax; the relation between the length and the breadth of the cephalothorax is also very variable. A form, in which the shape of the cephalothorax is modified in a very slight degree is *Olpium Birmanicum* n. sp. (Pl. II, fig. 7 a); it becomes suddenly narrower and is produced in front of the second pair of eyes; the first pair of eyes are placed in the thus established concavity, and their distance from the front margin is shorter than their diameter. The margin is straight without any incision whatever, bearing a thin and narrow membrane in front; just behind the margin and parallel with it we have a transverse groove, by which a marginal portion is marked out, similar to that found in *Ideoroncus Mexicanus* f. inst. (21. pl. IX, fig. 2 a). This part of the cephalothorax, which is produced in

Fig. 13.
Olpium crassichelatum
Balz.; head;
x 52.

Fig. 12. *Olpium*
n. sp. from Queens-
land; cephalo-
thorax; x 37.

front of the eyes and covers the base of the antennae, may properly be designated the "cucullus". A very similar structure is found in *Garypinus* n. sp. from Hawaii; but the cucullus is shorter and less abruptly set off. And again in *G. nobilis* n. sp. (Pl. II, fig. 8 a), but in this we have a front margin, which is most similar to a very open obtuse angle and which has the marginal portion narrower in the middle. The cephalothorax of an *Olpium* n. sp. from Queensland (fig. 12) is gradually narrower towards the front margin, which has a moderate median incision, and not set off in front of the eyes, the front pair of which is removed a distance equal to their diameter; a similar

structure is found in *Olpium crassichelatum* Balz., but the cucullus is in this well limited behind (fig. 13, p. 89). The cucullus is in *Olpium cordimanum* Balz. gradually merging into hinder portion of the head, but is fairly long, as the front pair of eyes is removed from the front margin a distance, which is distinctly longer than their diameter; a rather deep median incision is found. In *Garypinus* n. sp. from Funafuti (fig. 14) the cucullus is fairly well set off behind, distinctly produced in

Fig. 14.
Garypinus n. sp.
from Funafuti;
cephalothorax;
x 53.

front, and with the median incision so deep, that the front margin appears bilobate; this cucullus is directed downwards in a slight degree similar to that of *Garypus* L. K. (Pl. II, fig. 1 a). The cucullus of *Garypus* L. K. f. inst. of *G. irrugatus* Sim. is fairly well marked off behind, as the outline of the cephalothorax is just behind and beneath the eyes, which are placed a little away from the side on a marked transverse elevation, facing forwards and backwards respectively besides outwards, rather suddenly concave and again convex shortly behind front margin. The eyes are removed from the front margin a distance which is three or four times equal to their diameter; the front margin itself has no marginal part marked out and is provided with a shallow or deep incision

sometimes prolonged into a longitudinal groove backwards, which is extended to near the middle of the cucullus. The eyes are placed on a transverse elevation of the head, which consequently slopes both backwards and forwards towards the front margin; the cucullus thus gets a direction forwards and downwards.

The relation between the length and the breadth of the cephalothorax is not without connection with the shape; in forms in which the head is produced to a long cucullus as in most forms of *Garypus* L. K. and in *Garypinus* n. sp. from Funafuti, the hindmost margin is as a rule as broad as or broader than the cephalothorax is long (Pl. II, fig. 1 a; fig. 14); *Garypus Floridensis* Bks. and *G. saxicola* Wath. form exceptions to this rule. In almost all species of *Garypinus* Dad. and *Olpium* L. K. however we have the cephalothorax longer than wide behind f. inst. in *Garypinus nobilis* n. sp. (Pl. II, fig. 8 a) and *Olpium Birmanicum* n. sp.; in *Ol. Ortonedae* Ell. it is even almost twice the length. In most forms at least the hindmost margin is broader than the cephalothorax in front; but *Olpium* n. sp. from Queensland is broadest in the middle and here as broad as the cephalothorax is long (fig. 12, p. 89). It seems to be a generally accepted view, that *Garypus* L. K. has the cephalothorax divided by a transverse line, while *Olpium* L. K. has none; this opinion is far from being right. Some species of *Garypus* L. K. like *G. latus* Hans. have two distinct sutures; some have the foremost fairly well developed and the hindmost obsolete like *G. minor* L. K., while others have the hindmost the most distinct and the foremost more or less obsolete like *G. saxicola* Wath. and *G. Floridensis* Bks.; but most forms seem to have both transverse sutures more or less obsolete f. inst. *G. personatus* Sim., *G. irrugatus* Sim. and *G. longidigitatus* Rainb. *Garypinus Patagonicus* Ell. and *G. dimidiatus* L. K. have the hindmost transverse

stripe developed, while *G. n. sp.* from Funafuti has no grooves and *G. nobilis n. sp.* (Pl. II, fig. 8 a) has two(?) almost obsolete ones. Most species of *Olpium* L. K. show no trace of transverse stripes; *Ol. Birmanicum n. sp.* and *Olpium Ortonedae*, forms which also in other respects stand apart, have a broad median stripe (Pl. II, fig. 7 a). It ought to be pointed out, that the presence of an indistinct stripe or its complete absence is very difficult to determine; the result seems often to be a matter of taste.

Daday writes (11. p. 179) about the difference between his *Garypinae* Sim. and *Garypininae* Dad. "Der letzteren Unterfamilie [*Garypinae*] ähnelt sie [*Garypininae*] aber auch dadurch, dass von den Abdominalsegmenten die drei ersten auf dem Rücken ungetheilt sind, während bekanntlich bei den *Cheliferinen* jedes Abdominalsegment getheilt ist." Several of the facts, set forth in the passage quoted, are not quite correct; only very few *Cheliferinae* Sim. are found, in which the first abdominal tergite is longitudinally divided; in most forms we find the first and eleventh tergites at least undivided (cf. 46. Balzan's figure of *Ch. segmentidentatus* Balz. tav. XV, fig. 13 ♂). His statements about the longitudinal line in the *Garypidae* is, as will appear from, what follows, not quite correct. All the abdominal tergites except the last one, are longitudinally divided in *Garypinus Palagonicus* Ell. (70. p. 6), and so they are in *G. nobilis n. sp.*, but rather indistinctly and with the exception of the first and last ones; a good many have from the fourth to the tenth tergites more or less distinctly divided by a longitudinal line f. inst. *Garypinus dimidiatus* L. K., *G. n. sp.* from Hawaii and *Olpium Birmanicum n. sp.* Most species of *Olpium* L. K. with the exception of the last mentioned and a few besides have the abdominal tergites undivided. The longitudinal line in species of *Garypus* L. K. is most often broad and indistinct and it is often difficult to determine, if they are divided or not divided; *Garypus latus* Hans. has all the tergites divided but the two last ones, while *Garypus Floridensis* Bks. has from the third to the tenth divided.

The size of the antennae seems to a certain degree to correspond to the development of the cucullus; they are exceedingly small in forms, like the species of *Garypus* L. K. in which the cucullus is well produced and the front margin narrow, while they are larger in most forms of *Olpium* L. K., in which the front margin is fairly broad. The marginal teeth of the fingers are as a rule minute and slightly developed.

As far as the structures and the modifications of the *flagellum*, *lamina interior*, *serrula exterior* and *galea*, organs, which in spite of marked variations within genus as well as species contribute to the characteristics of this family, are concerned, I refer to the general part (pp. 12—22) as well as to several figures on plate II as well as a few textfigures.

The *labrum* and *maxillae* have not so complicated a structure as in *Chelifer* Geof.; the former has no hindmost prolongation as *Obisium* Ill. The median lyri-

form organ of the maxillae seems to be of a complicated structure (Pl. I, fig. 6 c) (cf. pp. 28—29 and Pl. I, figs. 6 a-d and 7 a-c).

The palps of the *Garypidae* vary considerably in the different forms; they are sometimes extremely long and slender f. inst. in *Garypus saxicola* Wath., in which the femurs are about five times longer than broad, and the fingers much longer than both hand and femur; but sometimes these appendages are extremely short and clumsy f. inst. in *Olpium crassichelatum* Balz., in which the femora of the palps are scarcely more than twice as long as broad and, in which the hand is distinctly shorter than the fingers. Two characters seem to be in common for this family, namely that the femur is longer than the tibia and that the hand is as a rule distinctly broader than the tibia.

The coxae of the legs are placed on a level with the maxillae with the exception of a few species of *Garypus* L. K., in which the first pair seems to be

Fig. 15. *Garypus saxicola* Wath.; ♀; × 15.

Fig. 16.
Garypus elegans Sim.; ♀; × 60.

placed on a slightly lower level. In shape they provide differences, which are very remarkable, being more or less elongated; it is especially the fourth pair, which shows the remarkable variations; this pair is in *Olpium Birmanicum* n. sp. about 1.5 longer than broad (Pl. II, fig. 7 g), while it in *Garypus saxicola* Wath. is 3.5 longer than broad; in some species like *G. saxicola* Wath. we have the intero-posterior corner obsolete, giving the whole coxa of the fourth pair a triangular appearance (fig. 15), in other species like *G. elegans* Sim. this corner is very prominent, as the interior and posterior sides establish an obtuse angle with each other, giving the coxa a trapezoidal appearance (fig. 16).

The legs differ to a considerable degree within this family in almost every respect, as far as the relative length of the joints is concerned; but it is especially

the femora of the first pair, which is of interest, because not only the length but also the articulation between its two joints change. The most typical development of the femur of the first pair of legs can be observed in f. inst. *Garypus irrugatus* Sim. or *G. elegans* Sim. and in *Olpium cordimanum* Balz. or *Ol. Birmanicum* n. sp. (Pl. II, figs. 1 c, 7 f and figs. 8 a-b, p. 38); the basal femoral portion is in these distinctly widened out towards the end, about three times longer than the depth, at least 1.5 longer and a little deeper than the tibial part; almost the same proportions between the joints are found in *G. Cuyabanus* Balz. with rather short legs and with femoral basal part only twice as long as deep, as well as in *G. saxicola* Wath. with very long and slender legs and the basal part more than four times as long as the depth. In *Olpium crassichelatum* Balz. and *Olp.* n. sp. from Queensland we find that the basal femoral part is scarcely twice as long as the depth distally, less than 1.5 longer than tibial part. The femur appears in all the forms mentioned to consist of two different joints, connected by a more or less developed hinge-joints, allowing movements in the plane of the joints. It is not so in *Garypinus* n. sp. from Hawaii, *G.* n. sp. from Funafuti, and *G. nobilis* n. sp. (Pl. II, fig. 8 f, and figs. 7 a-b, p. 36), for in these the femur is easily seen to be a whole, and the basal part is similar to a trochantin, as in *Chelifer* Geoff.; there is no hinge-joint between the two parts (cf. p. 38); the basal part of *G.* n. sp. from Funafuti is half as long as the whole femur, while it in the two other species is only one third.

The femora of the fourth pair of legs are always provided with a basal trochantin, which is limited from the distal portion of the femur by an articulate membrane, which is always oblique to the main axis of the femur and consequently is making the ventral margin much longer than the dorsal. The femur is as a rule two or four times as long as the ventral margin of this joint, only in *Garypinus nobilis* n. sp. three times longer and in *Olpium Birmanicum* n. sp. a little more. The trochantin is according to Banks wanting in *Garypus bicornis* Bks. (50. p. 9). The relation between the length and the depth of the femur of the fourth pair of legs is very variable; in *Garypus Floridensis* Bks. the femur is about five times longer than deep, in *G. irrugatus* Sim. it is about three and in most species of *Olpium* L. K. two and a half times as long as broad, while it in *Olpium Birmanicum* n. sp. is even less.

The tarsi of the legs are always two-jointed and in this respect there is a similarity to the *Obisuidae* Hans., but in the fact that the tarsi are seldom much longer than the tibia there is a dissimilarity. The usual difference between the relative length of the tibia and tarsi respectively of the first and fourth pair of legs is very pronounced in most forms of this family. The tarsi of the first pair of legs seem never to be 1.5 times longer than the tibia, but is in several species 1.4 longer f. inst. in *Garypus irrugatus* Sim.; in most species the tarsi are of almost equal length to the tibia or a little longer f. inst. in *Garypinus nobilis* n. sp. (Pl. II, figs. 1 c-d, 8 f-g) only seldom a little shorter as in *G.* n. sp. from Hawaii. The tarsi

of the fourth pair are sometimes longer than the tibia f. inst. in *Garypus irrugatus* Sim. (Pl. II, fig. 1 d), *Olpium Birmanicum* n. sp. (fig. 7 h) or *Olp. cordimanum* Balz., but most often of equal length as in *Garypus Cuyabanus* Balz., or much shorter as in *G. Floridensis* Bks., *Olpium crassichelatum* Balz. and *Garypinus nobilis* n. sp. (Pl. II, fig. 8 f and fig. 9 b, p. 41). While the second tarsal joint in most *Hemictenodactyli* is a great deal longer than the first, we find often, that the opposite is the case, in many of the *Garypidae* Hans. The second joint is almost twice as long as the basal in *Garypinus dimidiatus* L. K. and *Olpium Birmanicum* n. sp. (figs. 7 g-h), distinctly longer (but less so) in *G. nobilis* n. sp. (figs. 8 f—g) and *G. n. sp.* from Hawaii; but it is in most species a little longer or of equal length f. inst. in *Garypus irrugatus* Sim. (figs. 1 c-d), *Olpium cordimanum* Balz. and *Garypinus Palagonicus* Ell. (70. p. 6) or even shorter f. inst. in *Garypus Cuyabanus* Balz. or much shorter as in *G. Floridensis* Bks. or *Olpium crassichelatum* Balz. (figs. 9 a-b, p. 41).

The arolium is sometimes longer and sometimes shorter than the claws; it is in *Olpium Birmanicum* n. sp. divided into two portions (cf. p. 100). The hairs of the legs are like those of the palps most often fairly long, slender and simple with the exception of most species of *Garypus* L. K., in which they are at least partly short and obtuse. The dorsal "tactile" hair at the base of first tarsal joint in the fourth pair of legs seems to be wanting in *Garypus* L. K., but is well developed in the two other genera and sometimes even exceptionally long and slender f. inst. in *Olpium* n. sp. from Queensland, in which it is much longer than the tarsi and as long as the tibia. The *terminal lateral* hairs of the tarsi, which is found in the *Obisiidae* Hans. as well as in most of the *Cheliferidae* Hans., could not be discovered and is scarcely present.

From the above it will easily be realised, how variable the *Garypidae* Hans. are in almost all respects; the differences, found in the structures of the antennae, cephalothorax and legs are greater than those of almost any of the other families. Few are the characters indeed, by which all its members may be distinguished from either the *Pseudobisiinae* Hans. or *Cheliferinae* Sim.; from the former practically only those taken from the serrula exterior, and shape and size of the cephalothorax, from the latter those taken from the two-jointed tarsi and the number of the eyes. Scarcely any character is found common to all the members of this family, neither found in the *Pseudobisiinae* Hans. nor *Cheliferinae* Sim. The family stands between the *Pseudobisiinae* Hans. and the *Cheliferidae* Hans. and connects them in several respects in the most beautiful manner; the forms, belonging to this family often pass into each other without sharp limitation between the genera, except one, and they are not arranged in subfamilies in similarity to the other *Chelonethi*. But it is not to be understood, that the *Garypidae* Hans. only show structural features, a more or less dull imitation, of those found in either of the two families; far from that; many of its forms provide characters in the shape of the cephalothorax and in the structures of the antennae, which are quite unique; f. inst. the form of the galea, flagellum and serrula exterior of *Garypus irrugatus*

Sim. is the most "degraded" arrived at in the whole order. *Garypus* L. K. stands in many respects more opposed to *Chthonius* C. K., than *Chelifer* Geof. does. It is curious to notice, that the *Garypidae* Hans. is the only family, in which the number of the eyes is always constantly four, when we remember how variable this family in other respects is.

II. Genera.

The subfamily the *Garypinae* was first established by Simon to include the genera *Garypus* L. K., *Olpium* L. K. and *Chiridium* Menge (1875. 5. p. 42); the latter was regarded as nearly related to the two other genera on account of an apparent similarity in the structure of the femur of the first pair of legs; Hansen proved that Simon's interpretation of the femoral part was wrong (1884. 9. p. 518) and consequently placed the *Chiridium* Menge in the *Cheliferidae* Hans. as the representative for his *Chiridiinae* Hans. (49. p. 232). Daday established (1889. 11. p. 179) a new genus *Garypinus* Dad. for a form with four eyes, two tarsal joints and a femoral trochantin in the first pair of legs and, as he interpreted the joints of the femora like Simon, he was almost bound to make this genus to the representative of a new family the *Garypininae* Dad. Daday uses in addition to the structure of the legs a few other features, in his characteristics of this subfamily. He writes that it is similar to the *Garypinae* Sim. by the single transverse "groove"; this statement is not quite right as at least *Garypus latus* Hans. has two "grooves" and several forms have none, while several forms of *Chelifer* Geof. has only a single transverse stripe. His next character is taken from the hairs; about this he writes (11. p. 179): "Endlich nähert sie sich der Unterfamilie der *Garypinae* noch dadurch, dass auf dem Körper und auf den Palpen blos einfache, glatte und spitzige Börstchen sind"; but this statement is not correct, as at least most species of *Garypus* L. K. have the hairs short and obtuse. The last character found in the trochantin of the first pair of legs is too insufficient for the definition of a subfamily, if we regard the trochantin and basal femoral part as homologous joints, and this subfamily must as shown by Ellingsen, not be taken into account (1904. 70. p. 2). Banks divided this family into subfamilies according to the presence or absence of a transverse suture and got in this manner *Olpium* L. K. and *Garypus* L. K. in widely separated groups (1895. 50. p. 2; cf. p. 56). The genus *Corosoma* Karsch (1879. 37. p. 95) was by this autor regarded as related to *Garypus* L. K. and its relationship will on this account be discussed here; he writes in the characteristic of the genus: "Die hinten breite Vorderleib verjüngt sich allmählich nach vorn hin und läuft in den Mandibeln fast spitz zu; er ist durch 2 deutliche Querfurchen dreitheilig. Abdomen sehr breit, breiter als lang und besitzt 11 durch eine Längsfurche in der Mitte getheilte Segmenten". The thus described cephalothorax and abdomen seem to be pretty similar to those of *Garypus* L. K. But he writes further in his description of *C. Sellowi* K. "Augen wurden keine wahrgenommen" and about the legs after a few words about trochanter "alsdann ein längliches, nur von

unten her deutlich sichtbares [joint], welches, oben napfförmig ausgehöhlt, das dicke kurze Schienenglied aufnimmt und alsdann zwei, fast gleich lange, schlankere den Tarsalgliedern . . . entsprechend. Die zwei Hinterbeine . . ." If the above description of the legs is correct, they must be quite similar to that of a *Chelifer* Geof. with one-jointed tarsus, as the one of Karsch's two tarsal joints must be regarded as the tibia, his tibia as the tibial femoral part and the "längliches" joint, only visible from beneath as the trochantin. We will consequently be obliged to regard *Corosoma* Karsch as a *Cheliferid* without eyes, with the trochantin of the first pair of legs long and tibial part short and with the head even more produced than in *Garypus* L. K. The genera *Garypus* L. K. and *Olpium* L. K. are by L. Koch characterized in the following manner. *Garypus* has "Cephalothorax vor den Augen lang verschmälert, der verlängerte Theil abwärts gebogen, mit einer Längsfurche. Zwei Paar vom Kopfe weit entfernte Augen. Das bewegliche Zangenglied der Mandibeln in ein Stielchen endend. Elf durch ein Längsline halbirte Abdominal-segmente" (1873. 23. p. 38). Simon has besides a few characters (1879. 5. p. 45) viz. "une seule strie transverse", "Téguments chagrines mats; pubescence simple". *Olpium* L. K. is characterized thus (23. p. 33): "Glänzend. Cephalothorax schmal, lang, vor den Augen abgesetzt kurz verschmälert, sonst gleichbreit, ohne Quersfurchen. — Zwei Paar Augen. Das bewegliche Zangenglied der Mandibeln in ein Stielchen endend. Elf Abdominal-segmente". Simon adds (5. p. 49): „pas de stries longitudinales ni transverses" on cephalothorax; "Téguments du corps et des membres très-lisses, brillants; pubescence simple"; "plaques tergaes non divisées sur la ligne médiane". Most authors have accepted the two genera in the above circumscription only with a few modifications f. inst. Tömösvary, Hansen, who observed that the hairs of the *Garypus* are not all simple, but partly short and obtuse (1884. 9. p. 533 and 550), Balzan and Daday, who laid undue stress on the presence or absence of the transverse suture. And this division must be regarded as a practical one at least and is perhaps also a natural one, as it is supported by the old characters except a few, as well as by some new ones (cf. below).

The character found in the presence or absence of the transverse stripes of the cephalothorax has scarcely any generic value, as species of *Garypus* L. K. have none, one or two, while at least a few species, which in all other respects are more nearly related to *Olpium*, have a transverse stripe (cf. p. 90). Daday is accordingly wrong in referring *Ol. biareolatum* Töm. to *Garypus* L. K. The character found in the absence or presence of the longitudinal abdominal line is scarcely of great value, as it is often indistinct in *Garypus* L. K. and often present in species of *Olpium* L. K. at least in its wider sense (cf. p. 91). The character which is found in the length of the cucullus and in its shallow longitudinal groove in *Garypus* L. K. is certainly very valuable, even if the shape of the cucullus in a species like *Garypinus* n. sp. from Funafuti is alike that of *Garypus* L. K.; but the distance, which the anterior pair of eyes is removed from front margin, scarcely more than equals their diameter in this species, while it is three or four times longer in

Garypus L. K. (cf. pl. II, fig. 1 a and fig. 14, p. 90). The differences between the two genera, which are found in the hairs, which are pointed in *Olpium* L. K. and at least partly short and obtuse in *Garypus* L. K., as well as those found in the polished skin of the former and the granular of the latter seem to be pretty constant. In the structures of the antennae we find no absolute characters, but some of relative value; the galea of *Garypus* L. K. is either a simple stylet or a well branched organ, while it in *Olpium* L. K. is most often threedivided; the serrula of *Garypus* L. K. has either the basal teeth enlarged in a remarkable manner (cf. pl. II, fig. 1 b—2 a) or has the median teeth shortest, increasing gradually in length both towards base or tip (fig. 4 c, pl. II); in the other genus we have only the basal tooth somewhat enlarged and longer, while the remaining are of equal length (cf. p. 17). In the palps no absolute characters are found in the comparative length and breadth of the joints, but it is nevertheless interesting to notice, that the femur is at least three times as long as broad, and that the fingers are longer than the hand in *Garypus* L. K., while the palps of *Olpium* L. K. are sometimes long and slender, sometimes short and clumsy; the femur of the latter genus bears a dorsal „tactile” hair near to the base. The coxae of *Garypus* L. K. are as a rule longer and more slender than those of *Olpium* L. K. While the basal portion of the femur of the first pair of legs always seems to be widened out towards the tip, to be at least twice as long as the depth, a little deeper and one and a half times longer than the tibial part in *Garypus* L. K., the shape of and relation between these joints show in *Olpium* L. K. all kinds of variations; the articulation between the two femoral parts is in the former of these genera always a hinge-joint, while it in the latter is not always so (cf. p. 38). The tarsus of the first pair of legs seems in *Garypus* L. K. never to be shorter than the tibia, while it is often so in *Olpium* L. K. A tarsal “tactile” hair is wanting in *Garypus* L. K. From the above it may be realised, that *Garypus* L. K. is much better characterized than *Olpium* L. K., as many organs show marked variations in their structure in the latter genus, while they are pretty constant in the former. The species of *Garypus* L. K. naturally fall into two groups, the differences between which will be discussed later on; *Olpium* L. K. (in the wider sense) has lately been subdivided into four genera namely the *Olpium* L. K. proper, *Minniza* Sim., *Amblyolpium* Sim. and *Garypinus* Dad.; the value and characteristics of these genera we are now going to discuss.

The genus *Minniza* Sim. is according to Simon characterized in the following manner (1881. 39. p. 14). “Genere *Olpio* affinis, sed cephalothorace multo longiore quam latiore, plano, antice haud convexo, oculis a margine cephalothoracis haud separatis, abdomine longissimo vermiformi, omnino membranaceo”; in the description of *M. vermiformis* Sim. he adds “haud striatus”. The same author gives the following description of *Amblyolpium* Sim. (1898. 52. p. 3). “Voisin des genres *Olpium* et *Minniza*, dont il diffère a première vue par son céphalothorax tronqué droit en avant aux niveaux des yeux, qui occupent ces angles antérieur, tandis que dans les genres citées, le céphalothorax est prolongé en avant des yeux en une sorte de

museau atténué et canaculé". The last of these characters can scarcely be applied to *Olpium* L. K., but very well to *Garypus* L. K.; if *Minniza* Sim. in this respect is similar to the latter, I had no occasion to examine. I think that the margin referred to in the remark about *Minniza* "oculis ab margine cephalothoracis haud separatis" is the lateral margin of the head; for if the front margin is meant, the two statements about this genus do not agree with each other. The two characters taken from the slenderness of the cephalothorax and abdomen, upon which the genus *Minniza* Sim. is based, seem to me too insufficient. Balzan (1891. 12. pp. 501—502) writes about this genus, which he places between *Olpium* L. and *Garypus* L. K. "On me demandera pourquoi j'accepte le *Minniza*, très semblable aux *Olpium* desquels il se distingue par la présence de la ride à la moitié du céphalothorax, ride qui manque aux *Olpium*, tandis que je fais seulement un sous-genre des *Atemnus*; cela est que, entre *Minniza* et *Olpium*, la différence est bien définie, qu'il y ait des rides, ou non"; I believe that the above discussion must be based upon a misconception of Simon, who writes about the type species of this genus (39. p. 14) "haud striatus". This opportunity is taken to correct the above mentioned insignificant mistake in Balzan's important paper, because it might otherwise probably lead to further mistakes, at least authors less acquainted with the literature than f. inst. Ellingsen is (20. p. 161; cf. 71. p. 264).

Simon has only described a single species of *Amblyolpium* Sim. viz. *A. Dollfusi* Sim., but has referred *Olpium longiventer* Keys. to this genus (cf. 1899. 15. p. 121 note); the same author has later on (16, p. 519) identified an undescribed species of *Garypinus* Dad. with this Australasian species and Pocock (17. p. 321) has identified it with one from Funafuti. I had the opportunity of examining both these species in the British Museum, and found in both a short, but well defined cucullus; these facts as well as the variability of the shape of the cucullus taken into consideration, we can scarcely regard *Amblyolpium* Sim. as a natural genus.

The genus *Garypinus* Dad. was established by Daday (1889. 11. p. 179) on account of the structure of the legs; Ellingsen gave later on a further definition of it (1904. 70. p. 5) viz. "4 eyes. Cephalothorax considerably longer than wide, narrowing slightly to the fore extremity, almost truncated in front, one transverse groove, convex and very near to the back margin. The movable finger of the mandibles with a galea. The tergites more or less divided longitudinally. All hairs simple. All the four pair of legs provided with a trochantin and two tarsal articles. The trochanter of the palps pernae-formis. (The two known species have both of them the arolium divided into two branches)." The two species known by the author are *G. dimidiatus* L. K. and *G. Patagonicus* Ell.; in this paper will a single new species *G. nobilis* n. sp. be described; two new species have besides been studied, namely one from Hawaii with the trochantin as long as one third of the whole femur of the first pair of legs in similarity to the other three species, and one from Funafuti with the trochantin about half as long as the femur. *Olpium brevifemoratum* Balz. (46. p. 440) shows a similar structure of the femur of the first

pair of legs (lav. XVI, fig. 21). Let us now consider, if the above quoted definition holds good, when applied to these three species.

The cephalothorax is in *G. n. sp.* from Hawaii only a little longer than broad and in *G. n. sp.* from Funafuti a trifle broader than long, and the front margin of the latter is not truncated, but almost bilobate on account of a median incision (fig. 14, p. 90). The same species as well as *G. n. sp.* from Hawaii has no transverse cephalothoracic stripe; and the stripe or stripes of *G. nobilis n. sp.* are very indistinct, to say the least (Pl. II, fig. 8 a). The longitudinal line of the tergites is at least wanting in *G. n. sp.* from Funafuti. The arolium is simple in the latter species, but two-branched and extending beyond tips of claws in the two others. If we exclude *G. n. sp.* from Funafuti we will get the four other species characterized by two very good structural features and two of less importance, the few omitted, which are in common with most species of *Olpium*; if we do not exclude the species from Funafuti only a single character remains, namely that found in the femur of the two first pair of legs. I have in vain tried to find other characters, which could possibly assist in the defining of this genus; both flagellum, galea and serrula exterior have nothing in common in the three examined species, if not such features, which are found in most species of *Olpium* L. K. The palps are rather short and clumsy in all the species except *G. dimidiatus* L. K., and their femora do not seem to bear a dorsal "tactile" hair near to the base, which at least is often present in species of *Olpium* L. K. The tarsi of the two first pair of legs are, in the three species examined, of almost equal length to tibia, but in *G. dimidiatus* L. K. much shorter; the second tarsal joint is in these four specimens at least a little longer than the basal joint, but in *G. Patagonicus* Ell. a trifle shorter.

The question arises, if *Garypinus* Dad. is a natural genus; if this question is answered in the affirmative, we must ask, whether a species like *G. n. sp.* from Funafuti, which has the trochantin as long as the tibial femoral part and the arolium unbranched, ought to be included or excluded. These questions ought according to our present knowledge to be answered in the affirmative, and the *Garypinus* Dad. is to be defined by the structure of the femurs of the two first pair of legs, being provided with a trochantin, from one third to one half as long as the whole femur and connected with the tibial part by no real hinge-joint, allowing movements in the vertical plane. Species with the structures of the femoral intermediate between that of *Olpium* L. K. and this genus may possibly be discovered and consequently make the systematic position of these species uncertain, but as the genus has at least a practical value and has once been established, it ought to be accepted for the present. By excluding *G. n. sp.* from Funafuti nothing was gained, for the main character of the femurs would lose a good deal of its value, while the character, found in the two-branched arolium would be rather doubtful, owing to the occurrence of a two-branched arolium in *Olpium Birmanicum n. sp. f. inst.*

Ellingsen suggests to establish a new genus for his *Olpium Ortonedae* Ell. and *O. biaroliatum* Töm. and writes (20. p. 161). "Une diagnose générique quant . . . pourrait être établie ainsi: Céphalothorax beaucoup plus long, presque jusqu'à deux fois plus long que large, un peu rétréci en avant des yeux. Les segments dorsaux et ventraux de l'abdomen en partie divisés longitudinalement . . .; deux ventouses, la tige de cet appendice se bifurquant en deux branches, . . . saillant hors des griffes, chaque branche portant une ventouse". All the points, which are also found in the diagnosis of *Olpium* L. K., are omitted in the diagnosis above. This diagnosis is quite adapted to *Olpium Birmanicum* n. sp. from Burma, and the description of *Ol. Ortonedae* Ell. shows, that the two species are similar in most respects but one namely, that *Ol. Birmanicum* n. sp. has a very broad stripe in the middle of the cephalothorax, which is only 1.5 longer than broad, while *Ol. Ortonedae* Ell. has a median very indistinct suture and *Ol. biaroliatum* Töm. has two almost obsolete ones. These three species seem thus to go admirably together; but it seems scarcely obvious to establish a new genus, before the segregation of the species of *Olpium* L. K. into groups has been more advanced. The remarkable species *Garypus bicornis* Bks. must probably be regarded as the representative of a new genus equal in rank to the two old genera, but as it in many respects provides similarity to *Garypus* L. K. more than to *Olpium* L. K. it will be discussed later on.

III. Synopsis of genera.

The genera, the names of which are placed within brackets, are regarded as doubtful.

1. Cephalothorax distinctly produced in front of the eyes removed a distance from front margin three or four times longer than their diameter; median incision and shallow longitudinal groove; granular with short obtuse hairs. Abdominal tergites longitudinally divided. Basal part of femur of first pair of legs at least twice as long as tibial part *Garypus* L. K.
1. Cephalothorax slightly or not at all produced in front of the eyes, removed a distance from front margin, smaller or equal to their diameter; smooth with long, pointed simple hairs.
 2. The basal femoral part of the first pair of legs at least one and a half as long as the tibial part . . . *Olpium* L. K.
 3. Eyes placed apart from front margin of head.
 4. Cephalothorax only slightly longer than broad. Abdomen not vermiforms (*Olpium* L. K.)
 4. Cephalothorax much longer than broad. Abdomen vermiformis (*Minniza* Sim.)
 3. Eyes occupying front margins of the head (*Amblyolpium* Sim.)

2. The trochantin of the first pair of legs of equal length to or shorter than the distal portion of the femur..... *Garypinus* Dad.

IV. Description of Species and Genera.

Garypus L. K.

1873. L. Kock (22.) p. 38.
1879. E. Simon (5.) p. 45.
1891. L. Balzan (12.) p. 534.

Cephalothorax distinctly produced in front of the eyes, the front pair of which is removed from anterior margin a distance of from three or four times longer than their diameter; front margin with median incision, prolonged backwards in shallow longitudinal groove. Body granular and hairs partly short and obtuse. The basal femoral part of the first pair of legs at least twice as long as tibial part; the basal tarsal joint of the fourth pair of legs does not bear any basal "tactile" hair dorsally. Tarsi of first pair of legs longer or of equal length to tibia.

I. Characteristic of Genus.

Most species of *Garypus* L. K. fall naturally into two fairly well defined groups (cf. Balzan 12. p. 534). The first group, of which *G. irrugatus* Sim. and *G. elegans* Sim. may be regarded as the most typical representatives are characterized by the following structural features. The cucullus is sharply set off behind, is very narrow in front, with median incision of front margin and its shallow prolongation behind well marked. Cephalothorax much broader behind, and here as broad or even much broader than the cephalothorax is long. Transverse sutures wanting or indistinct; median most distinct and present, if only one is wanting. The flagellum of the palps consists of a single rather short hair (Pl. II, fig. 1 b); the galea is a simple short stylet without any branches. The serrula, which is composed of rather few only about twenty teeth, has these developed in a curious manner; the two basal are much longer than the following and abnormally enlarged towards the tip; the following are completely fused but the penultimate, which has the pointed tip free and the terminal which is completely free and pointed (Pl. II, figs. 1 b, 2 a; fig. 3, p. 17). The lamina interior consists of rather few, broad, marginally serrated teeth (fig. 3 a). The manducatory part of the maxillae is well limited behind (fig. 16, p. 92). The tibia of the palps bears anteriorly just beyond the stalk a low eminence or short elevation. The coxa are rather short and broad; the fourth pair are only a trifle longer than the third and only twice as long as broad (fig. 16, p. 92). The two tarsal joints of equal length or the second the longer; the tarsi of the fourth pair of legs are not shorter than the tibia (fig. 1 d, pl. II).

To this group belong besides *G. irrugatus* Sim., *G. elegans* Sim. and *G. personatus* Sim. at least *G. longidigatus* Rainbow, of which I have examined Pocock's specimen

from Funafuti (cf. 53, p. 321) and found it different from the the two other species in the structure of the serrula exterior (fig. 3, p. 17) thereby, that the penultimate tooth is not free and pointed, but like the preceding ones. *G. minor* L. K. and *G. nigrimanus* Sim. are probably similar to the already described in all characters of more importance. *G. Cuyabanus* Balz.¹⁾ differs in different respects; the galea of the female is fairly long, clumsy and provided with several teeth distally (46. tav. XVI, fig. 22 a), while that of the male is a pointed, simple fairly short stylet; the basal tarsal joints of the legs are longer than the distal, and the tarsi of the two last pair of legs are a little shorter than the tibia.

The second group, of which *G. saxicola* Wath. and *G. Floridensis* Bks. are the only specimens examined, is characterized in the following manner. The cucullus is not sharply set off behind, fairly broad in front, with median incision of front margin shallow and longitudinal groove behind poorly developed. Cephalothorax a little broader behind than further in front, slightly or even much longer than broad; of the two cephalothoracic stripes the median is wanting or indistinct, while the posterior is very well marked. The flagellum (Pl. II, fig. 4 b—5 a) of the antennae consists of three simple or pinnate hairs; the galea is widened out towards the end with numerous terminal branches in the female (fig. 4 c). The serrula exterior with the median teeth the shortest, increasing in length towards base and tip; the basal tooth is not enlarged distally and the terminal not free and pointed. The lamina interior consists of a great number (about 25) of rather narrow, not marginally serrated teeth (fig. 4 a). The manducatory part of the maxillae gradually merges into the maxillae proper (fig. 15, p. 92). The tibia of the palps bears anteriorly just beyond stalk no low eminence. The coxae are long and slender; the fourth pair is at least 1.3 longer than the third and 3.3 longer than broad. The first tarsal joint is much longer than the second; the tarsi of the fourth pair of legs much shorter than the tibia (figs. 9 a-b, p. 41). It seems pretty sure that at least *G. Beauvoisii* Sav., which is nearly related to if not identical with *G. saxicola* Wath., and *G. littoralis* L. K. in all points of greater interest will show similarity of the two previously mentioned species. *G. meridionalis* Can.(?), *G. Hungaricus* Töm. and *G. Senegalensis* Balz. probably belong to the same group.

G. Canariensis Tull. and *G. latus* Hans. are in some features more like to the first group viz. the presence of a distinct median stripe and an indistinct posterior, but in others more similar to the latter, viz. structure of the galea. As not even the description of *G. granulatus* Bks. is known to me, it is of course impossible to say anything about its systematic position.

The female of *Garypus irrugatus* Sim. bears in similarity to many other species belonging to widely different genera like *Chelifer* Geof., *Pseudochiridium clavigerum* Thor., *Obisium muscorum* C. K. and *Chthonius* C. K. an egg-ball beneath the base of the abdomen; the young embryos take their nourishment from their mother and

¹⁾ A single specimen of this, probably a male, from the West Indies has been examined, in spite of minor differences referred to *G. Cuyabanus* Balz. (46 p. 441).

the egg-ball rapidly grows. *Garypus Saxicola* Wath. differs in a remarkable degree from this universal habit; this has been described in a lucid treatise by Bouvier (51. pp. 304—306). This naturalist had the opportunity of observing females of this species together with their silk-nidi, to the wall of which the egg-ball or egg-balls were fastened, and the gravel, which surrounded the nidus; each egg-ball contained about fifty eggs of an immense size, compared with those of other forms of Pseudoscorpions; this size was accounted for by the fact, that the eggs were not fastened to the body of the female and consequently could not derive any nourishment from their mother. It is natural to conclude, that differences in the development and the structure of the embryos correspond to this difference of habit. If similar procedures should really be characteristic of the species of the *Floridensis* group, it will in a systematic respect be of paramount importance; the female of the latter species carries the egg-ball in the usual way, at least in the first stage (cf. p. 23).

The genus *Garypus* L. K. differs as seen above (p. 95—97) in many respects from *Olpium* L. K.; but if the two groups of the former genus should be proved to be well defined, when applied to all known species, thoroughly examined, the possibility must be taken into account that the genus *Garypus* L. K. is not a natural one, but really made up of two genera, each derived from different species of a third Genus; *G. Floridensis* Bks. seems as a whole to be nearer related to *Olpium* L. K. than *G. irrugatus* Sim. is.

Finally only a few words about *G. bicornis* Bks., which provides structures of interest viz. "Cephalothorax narrow, somewhat triangular, much longer than broad with a high elevated ridge on each side,; each lower antero-lateral angle of the cephalothorax is prolonged into a conic tubercle, or horn, which is slightly longer than broad at base. There is a trace of the posterior suture, but the anterior one is very obscure; . . . Legs about as usual, but no trochantins visible on the posterior pairs" (50. p. 9). This remarkable species must certainly be regarded as the type of a new genus, if really the trochantin of the fourth pair of legs is wanting. Otherwise it seems in many respects more similar to *G. Floridensis* Bks. than to *G. irrugatus* Sim.; it forms also like the former „little cases of silk and earth, in which to pass the moulting period".

II. Synopsis of Indian Species.

1. Cephalothorax distinctly broader behind than long. Anterior curvature of the chela of the palps abruptly convex. Body scarcely granular. (1) *G. irrugatus* Sim.
- 1.¹⁾ Cephalothorax as broad behind as long. Anterior curvature of the chela moderately convex. Body finely granular . . . (2) *G. elegans* Sim.

¹⁾ A third species from Java *Garypus Javanus* Tullg. has recently been described (22 b. pp. 43—44), which is nearly related to *G. elegans* Sim., but differs by much smaller size.

III. Description of Species.

1. *Garypus irrugatus* Sim.

(Pl. I, figs. 6 a-d; pl. II, figs. 1 a-d).

1899. Simon (15.) p. 122.

Distance of front pair of eyes three times greater than their diameter. Cephalothorax much broader behind than long; lateral outline suddenly concave in front of eyes; well defined cucullus with narrow front margin, fairly deep incision, distinct longitudinal groove prolonged backwards. Transverse sutures obsolete. Body with large granules and short hairs. Flagellum consisting of a single pointed hair; serrula exterior with two basal teeth long and enlarged towards extremity; galea is a simple pointed stylet. Trochanter of the palps distinctly longer than broad with anterior outline almost circular; femur with almost parallel sides, four times longer than broad, as broad as tibia; this three times longer than broad, anteriorly near base low eminence. Hand is 1.7 broader than tibia, distinctly shorter than finger with anterior margin abruptly and strongly convex, posterior moderately so. The fourth pair of the coxae is twice as long as broad; the basal femoral part of first pair of legs three times longer than deep; the tarsal joints of almost equal length, and the tarsi of the fourth pairs longer than the tibia.

♀. Cephalothorax (Pl. II, fig. 1 a). — The eyes are apparently of equal size; hinder pair, facing backwards and outwards, almost touching front pair facing forwards and outwards; the former pair are more circular, the latter more oval; the front pair of eyes removed from the anterior margin a distance, equal to three times their diameter. Cephalothorax is much broader behind than long and tapering towards the eyes, but is here suddenly concave, establishing a behind well defined cucullus. This has the antero-lateral corners rounded and a fairly deep median incision, prolonged backwards into a well marked longitudinal groove. The head is most raised at the base of the cucullus, which is directed slightly downwards; the hinder portion of the cephalothorax is almost saddle-shaped. Transverse sutures most often obsolete; a median one, curved backwards in the middle, is sometimes visible; the second is perhaps represented by a jagged line near posterior margin. Skin everywhere coarsely granular, most distinctly in front part of head on account of darker colour; the scarce hairs are very short and blunt; a single longer one at front margin.

Abdomen. — The abdomen is distinctly longer than broad, and broadest a little behind the middle. The tergites are of almost equal breadth, but the three first are a little shorter than the following, which are about six times broader than long. They are granular with scale-shaped granules; granulation of the anterior darker band much more prominent than that of the hinder portion of the tergite. Along hinder margin of each tergite a row of about 16 very short blunt hairs. Sternites are similar to tergites, but granulation is more indistinct and the hairs are longer and pointed.

Antennae (Pl. II, fig. 1 b). — The antennae are extremely small; immovable finger with a number of marginal teeth; movable finger with distinctly marginal hook; the *flagellum* consists of a single hair (*f*). The *lamina interior* consists of a short, basal plateshaped portion (*a*¹) and of about ten more or less free teeth (*a*²), of which the last are marginally serrated; fairly long terminal spine, placed on a higher level (*t*). The *serrula exterior* consists of 18 teeth; two basal ones (*t*¹) much the longer and enlarged distally, penultimate terminally free and pointed and terminal completely free and pointed (*t*²). The *galea* is a stylet, suddenly and dangerously pointed, not extending beyond the suddenly curved terminal hair (*g*).

Maxillae (Pl. I, figs. 6 a-d). — Respecting the more detailed structure of the maxillae and labrum I refer to p. 28 (Pl. I, fig. 6 a). The lower surface of the maxillae is laterally granular and provided with a number of hairs; the well marked antero-lateral corner with a very long one; the *manducatory part* very narrow and very suddenly set off behind; the *lamina maxillaris* well marked and distinctly longer than this part.

Palps (Pl. II, fig. 1 a). — The palps with the exception of the fingers are everywhere granular with rather big prominent granules. The scarce hairs are very small; only the fingers bear long pointed hairs in addition to a number of scarcely much higher than ten *tactile* hairs. The distinctly stalked *trochanter* is 1·6 longer than broad; anterior outline is strongly convex almost circular and posterior is beyond stalk, with which it establishes an obtuse angle almost straight; posteriorly and ventrally a rounded, prominent tubercle is found, not projecting beyond lateral margin, when observed from above. The *femur*, which is provided with a short not well defined stalk, is four times longer than broad, scarcely as broad as the trochanter, almost as broad as, but much longer than the tibia; anterior margin is almost straight and so is the posterior but for a short convexity just beyond the stalk. The *tibia*, which has a moderately long and distinct stalk, is gradually widened out towards the end; the anterior surface is beyond the moderately deep notch of the stalk and the short and low eminence, which bears a number of fissures, almost straight; the rather prominent dorsal condylus of the posterior margin is followed by a moderately deep basal notch, beyond which the outline is slightly convex. The *hand*, which has a short and very well defined stalk, is almost twice as long as the breadth, of almost equal length to the tibia, but 1·7 broader; it is distinctly shorter than the finger; the anterior surface is rather suddenly and strongly convex, but the posterior only moderately so. The small marginal teeth of the *fingers* are placed rather apart; the immovable finger bears in addition to these inwards at least six accessory teeth in the median third of the finger; immovable finger ends with a slightly curved, rather short apparently two-toothed tip, while the terminal hook of the immovable finger is well set off and pointed.

Coxae. — The coxae are almost on level with the maxillae and with each other; the first pair are almost square, distinctly longer than broad and not widened

out towards extremity; the second pair are a little longer and distinctly widened out towards its extremity, where they are as broad as the first pair; the third pair almost as long and broad as the second, but almost triangular, and lastly the fourth pair, which are almost trapezoid, are not distinctly widened out and scarcely broader, but a trifle longer than the preceding pair; they are twice as long as broad and have the interior margin much shorter than the posterior and the angle between them well marked and obtuse. The coxae bear everywhere rather short hairs; a number of long and pointed along hindmost margin of fourth pair.

Legs (Pl. II, figs. 1 c-d; figs. 8 a-b, p. 38). — The legs are granular with scale-shaped granules; hairs on dorsal side of joints except the tarsi short and blunt; those, which are placed more ventrally, fairly long and pointed, increasing in length towards the end; the ventral surface of the trochanter and basal portion of the femur of the fourth pair of legs bear a number of very long and slender hairs. The *basal femoral* part of the first pair of legs, which is distinctly widened out towards the extremity, is about three times longer than deep, about 1.7 longer than the tibial part, and a little deeper than this. The *femur* of the fourth pair of legs is about three times longer than deep, and almost as deep as the trochantin is long beneath. The *tarsi* are much longer than the tibia in the first pair of legs, and distinctly longer in the fourth pair of legs; the *tarsal* joints are of almost equal length or the second joint a trifle longer. The *arolium* extends slightly beyond the claws.

Colour. — The palps, maxillae and foremost part of the head are more or less pronounced dark yellowish brown; remaining part of the body yellowish or light yellowish brown with the exception of a darker band along front margin of each tergite, which twice on each side is widened out to a darker spot, where the muscular spots are found.

Measurements. — Specimen without egg-ball. Cephalothorax 0.700 (0.210—0.925); abdomen 1.736 (1.456) mm.

Palps: trochanter 0.336 (0.224); femur 0.840 (0.200); tibia 0.616 (0.196); hand 0.616 (0.336); finger 0.756 mm.

Specimen with small egg-ball. Leg I: femur I 0.350 (0.130); femur II 0.200 (0.110); tibia 0.250 (0.085); tarsus I 0.180 (0.060); tarsus II 0.190 (0.045) mm.

Leg IV: femur 0.590 (0.190), trochantin 0.180; tibia 0.400 (0.099); tarsus I 0.234 (0.070); tarsus II 0.244 (0.054) mm.

Material. — Dr. Th. Mortensen has collected three females under stones in the Island of Koh Chang in the month of January.

Habits. — The two females out of the three carried an egg-ball beneath the abdomen attached to the genital area between the fourth pair of legs; one of the females was only provided with a little ball, consisting of seven small eggs, and its abdomen was carried in an almost natural position. The ball, carried by the other female, was big and contained twelve large embryos, with the heads directed towards the interior and with the abdomen outwards, and the mother's abdomen was raised and directed obliquely upwards, well removed from the ground. On

account of the large size of the embryos, compared to that of the eggs, the nourishment of the young ones must be supplied from the mother (cf. p. 103).

Remarks. — The species described must be regarded as identical to *G. irrugatus* Sim., though my specimens differ slightly from Simon's description; differences are found in the colour and in the trochanter of the palps, which in the specimens from Sumatra is "latiore quam longiore" according to Simon (15. p. 122). This species is nearly related to *G. elegans* Sim., but easily distinguished by its broad cephalothorax and strongly convex anterior outline of the hand. From *G. personatus* Sim. from Hawaii it seems to differ chiefly in having a more moderate anterior convexity of the tibia of the palps and more marked one of the hand.

2. *Garypus elegans*¹⁾ Sim. nom. nov.
(Pl. II, figs. 2 a-b; fig. 16, p. 92).

1901. *Garypus personatus* Simon (19.) p. 79.

Distance from front margin of front pair of eyes three times larger than their diameter. Cephalothorax as long as broad and broader behind; lateral outline suddenly concave in front of eyes; well defined cncullus with narrow front margin, fairly deep median incision, distinct longitudinal groove prolonged backwards. Transverse sutures obsolete. Body with rather small granules and short hairs. Flagellum consisting of a single pointed hair; serrula exterior with two basal teeth long and suddenly enlarged towards the end; galea is a simple pointed stylet. Trochanter of the palps distinctly longer than broad with anterior outline almost circular; femur with almost parallel sides and about four and a half longer than broad, scarcely as broad as the tibia; this is three times longer than broad, anteriorly near base low distinct eminence. Hand is 1.6 broader than tibia, distinctly shorter than finger with anterior margin moderately convex in similarity to the posterior. The fourth pair of the coxae are twice as long as broad; the basal femoral part of first pair of legs three times longer than deep; the tarsal joints of almost equal length, and the tarsi of the fourth pair of legs longer than the tibia.

♀. Cephalothorax. — The cephalothorax is as broad behind as it is long; no transverse sutures were visible. The skin is everywhere uniformly granular with rather small granules.

Abdomen. — The abdomen is much longer than broad and granular with scale-shaped granules.

Antennae (Pl. II, fig. 2 a). — Immobile finger bears just behind tip two small marginal teeth and behind these three larger as well as a few smaller ones; the terminal spine with three tiny marginal teeth; the flagellum consists of a single simple hair. The serrula exterior consists of 19 teeth (fig. 2 a); the two basal ones are much longer than the following and rather suddenly enlarged towards the tip, as they are provided with an anterior membranous flap; this flap of the basal tooth

¹⁾ As Simon has already earlier (1900. 16. p. 518) applied this name to a different species from Hawaii, the name of this species must consequently be changed.

is elongate and covers the hindmost portion of the second tooth, which has its distal part shorter; the two last teeth are pointed, and the penultimate is partly free, while the terminal is completely so. The *galea* is shaped like a short stylet; a few almost obsolete teeth are sometimes visible distally (fig. 2 a, g).

Maxillae (fig. 16, p. 92). — The shape is as in *G. irrugatus* with a distinct front margin and a very narrow, suddenly set off *manducatory part*; a long *lamina maxillaris* present; the maxillae seem to be granular everywhere beneath, especially laterally and anteriorly; hairs as in the preceding species.

Palps (Pl. II, fig. 2 b). — The palps are granular every-where with the exception of the fingers with rather low granules; short hairs are found in small number in addition to the pointed usual and the *tactile* hairs of the fingers. The distinctly stalked *trochanter* is scarcely 1·5 longer than broad; anterior outline is almost circular, posterior straight and a ventral posterior tubercle is found (cf. p. 105). The *femur*, which is provided with short stalk, is 4·5 longer than broad, and narrower than the trochanter as well as the tibia; the anterior outline is beyond the rather sharp notch of the stalk almost straight, while the posterior is moderately convex beyond the stalk to near the end. The *tibia*, which has a moderately long and distinct stalk, is gradually widened out towards the extremity; the anterior surface is beyond the very shallow notch of the stalk and the rather well pronounced eminence almost straight; the dorsal condylus of the posterior side is followed by a not very deep notch, beyond which the outline is moderately convex. The *hand*, which has a short well defined stalk, is twice as long as broad, of almost equal length to the tibia, but 1·6 broader; it is distinctly shorter than the finger; the immovable finger bears inwards a row of about twelve triangularly pointed accessory teeth.

Coxae (fig. 16, p. 92). — The coxae are scarcely different from those of the preceding species in points of interest.

Legs. — The legs seem scarcely to differ from those of *G. irrugatus* Sim.

Colour. — Palps brownish with darker fingers; body yellowish brown with head blackish.

Measurements. — Cephalothorax 0·700 (0·700); abdomen 1·640 (1·220) mm.

Palps: trochanter 0·280 (0·196); femur 0·760 (0·168); tibia 0·532 (0·175); hand 0·552 (0·270); finger 0·674 mm.

Leg I: femur I 0·342 (0·099); femur II 0·243 (0·090); tibia 0·252 (0·070); tarsus I 0·170; tarsus II 0·170 mm.

Leg IV: femur 0·585 (0·153), trochantin 0·144; tibia 0·387 (0·081); tarsus I 0·216; tarsus II 0·216 mm.

Material. — Simon's original specimens, two females, of which one carried a bundle of eggs, fastened to sexual area, from a thatched house, Kelantan, Malacca, were examined.

Remarks. — This species is very similar to *G. irrugatus* Sim.; on that account I refer to the description of this species in many particulars; about the differences

cf. p. 107. It is also nearly related to *G. longidigitatus* Rainb. (52. p. 321), but differs by the more slender cephalothorax, the differently shaped basal teeth of the serrula exterior, and by the less marked curvature of the hand of the palps.

Olpium L. K.

1873. L. Koch (23.) p. 33.

1879. E. Simon (5.) p. 49.

1891. L. Balzan (12.) p. 536.

Eyes removed from front margin a distance, which is never more than twice their diameter. Body smooth with long simple hairs. The basal femoral part of the first pair of legs at least one and a half times longer than the tibial part. Dorsal „tactile” hair near base of basal tarsal joint of fourth pair of legs.

Regarding the systematic value of this genus I refer to p. 96; a single species, which in many respects differs from most species of this genus, have been described as from India; another very nearly related to this will be described here.

Synopsis of Species.

1. Two indistinct transverse sutures on cephalothorax . . . (3) *O. biareolatum* Töm.
1. One broad median transverse stipe on cephalothorax . . (4) *O. Birmanicum* n. sp.

3. *Olpium biareolatum* Töm.

1884. E. Tömesvary (8.) p. 23, tab. I, figs. 15—18.

1889. *Garypus biareolatus* Töm. E. Daday (11.) p. 182.

“Oblongum, subdepressum valde nitidum, laeve, setulosum, setis simplicibus acutis longis, cephalothorace rufo testaceo, duplo longiore, quam postice latiore, modice attenuato, sulcis transversis obsoletis; oculis . . . , duobus anticis minoribus; . . . , digito . . . galea bifida instructo; palpis corpore aequilongis, rufo testaceis, articulo secundo pernaeformi, articulo tertio dilatato, ubique aequilato, setis longioribus parce vestito, articulo quarto tumido, praecedenti paullo brevior, trunco chelae ovato; digitis . . . trunco aequilongis . . . ; pedibus . . . posticis crassimis, aroliis pedum omnibus binis.”

Tömesvary's description is, as seen from the quotation, which contains everything of interest, probably too insufficient for a sure determination of this species.

4. *Olpium Birmanicum* n. sp.

(Pl. II, figs. 7 a-h).

Front pair of eyes removed a distance from anterior margin as large as their diameter. Cephalothorax is 1.5 longer than broad, has a short well marked cucullus and a straight front margin without any median incision. A median, broad, almost straight transverse stripe; skin completely smooth and hairs pointed. Flagellum consisting of four hairs of which anterior is dentated; serrula exterior with basal tooth

the longest and enlarged distally; galea short with three distal teeth. The trochanter is almost twice as long as broad with anterior outline moderately convex; femur without stalk, with almost parallel sides and almost four times longer than broad; narrower than tibia; this is 2.5 longer than broad with moderately convex sides. The hand is 1.4 times broader than the tibia, a little shorter than the finger with both outlines evenly convex. The basal femoral part of first pair of legs almost three times longer than deep and 1.7 longer than tibial part; the second tarsal joint much longer than first, and the tarsi of the fourth pair of legs much longer than the tibia.

♂(?). Cephalothorax (Pl. II, fig. 7 a). — Two pair of eyes placed at the lateral margin of the head almost touch each other; front larger pair is removed from anterior margin a distance almost as long as their diameter. The cephalothorax is 1.5 longer than broad with slightly convex lateral margins and with a short, but behind distinctly limited *cucullus*. The front margin is straight without any incision and with a distinct marginal portion. Almost in the middle, a little nearer to the front than to the hinder border of the cephalothorax a broad transverse stripe is found; it is almost straight in the middle, but widened out laterally. Skin completely smooth with a few pointed hairs.

Abdomen. — The abdomen is long and slender, more than twice as long as broad; it is the narrowest just behind the cephalothorax and widened out a little in front of the tip. The tergites are of almost equal breadth, but the two first and in a less degree the third are shorter than the following; all the tergites from the fourth to the tenth are longitudinally divided; the third has an hindmost indication of a longitudinal division.

Antennae (Pl. II, figs. 7 b-d). — The antennae are small with a large space left between fingers, when closed; the immovable finger with six smaller and larger marginal teeth just behind tip (fig. 7 c); the *flagellum* (fig. 7 b) consists of four hairs, decreasing backwards, of which the anterior is the broadest and dentated along front margin. The *lamina interior* consists of a large transversely striated plate-shaped portion and of a serruli-formed one, composed of four dentated lobes in addition to the rather short serrated terminal spine, placed on a higher level than the rest (fig. 7 c). The *serrula exterior* (fig. 7 d) consists of 18 almost completely fused and rounded teeth; the basal is distinctly longer than the rest and distinctly enlarged terminally. The *galea* extends beyond the terminal, distinctly curved hair and is provided with three distal teeth (fig. 7 d, g).

Maxillae (Pl. II, fig. 7 f). — The maxillae taper towards the end and gradually merge into the *manducatory part*, surrounded by a fairly broad and in front rounded *lamina maxillaris*, which bears scale-shaped granules; maxillae smooth with a few pointed hairs.

Palps (fig. 7 e). — The palps are smooth and bear a number of long, pointed hairs; the fingers are besides provided with tactile hairs. The indistinctly stalked *trochanter* is almost twice as long as broad with moderately convex anterior margin, and scarcely marked concave posterior one. The *femur*, which has no stalk, is

almost four times longer than broad, and as broad as the trochanter and distinctly narrower than the tibia; it is moderately widened out distally, and the sides are a little convex. The *tibia*, which has a short and indistinct stalk, is about 2.5 longer than broad; anterior outline is beyond the shallow notch of the stalk distinctly convex, while the posterior is moderately so from base to tip. The *hand*, which has a rather distinct stalk, is almost twice as long as broad, 1.4 broader than the tibia and a little shorter than the finger; outlines moderately convex.

Coxae (fig. 7 f). — The coxae are almost on a level with the maxillae and completely with each other. The first pair are as broad as long; the second a little longer than this, but not broader; neither are widened out towards the extremity. The third pair are distinctly widened out towards the extremity. The fourth pair are much longer and broader than the preceding ones and almost triangular, as the interior and posterior margins merge gradually into each other with the corner between them rounded; it is almost twice as long as broad and has the interior margin much longer than the posterior.

Legs (figs. 7 g-h). — The hairs of the legs are pointed and moderately long; a dorsal „*tactile*” hair is placed at the base of the tarsus of the fourth pair of legs. The *basal femoral part* of the first pair of legs, which is moderately widened out towards the extremity, is about three times longer than deep, almost as deep as and 1.7 longer than the tibial part. The *femur* of the fourth pair of legs has the trochantin fairly long and is only 2.3 longer than high. The *tarsi* are much longer than the tibia in every pair of legs; the second tarsal joint is about 1.7 longer than the first; the second tarsal joint of the fourth pair of legs is scarcely as long as the femur is deep. The *arolium* is remarkable thereby, that its stalk is divided into two branches, each provided with a sucking-cup; the arolium extends beyond the claws in a marked degree.

Colour. — The palps are pale yellowish brown with the finger darker; the cephalothorax of a darker, more brilliant hue; the abdominal sclerites of a duller appearance; all parts of the body of a more or less pronounced greenish shade.

Material. — Mr. E. W. Oates collected a single male(?) of this species at Tharrawaddi in Burma in the month of October, now belonging to the British Museum.

Remarks. — This species is nearly related to *O. biareolatum* Töm. as well as to *O. Ortonedae* Ell., but easily distinguished from both by a distinct median transverse stripe (20. p. 161).

Garypinus Dad.

1889. E. Daday (11.) p. 179.

1904. E. Ellingsen (70.) p. 5.

Eyes removed from front margin a distance equal to or smaller than diameter. Body smooth with simple or almost simple hairs. First pair of legs with trochantin half as long or one third of whole femur.

(Cephalothorax often with transverse sutures; abdomen most often with abdominal tergites longitudinally divided; arolium of the tarsi most often longer than claws and bifurcate).

As far as the systematic value of this genus is concerned I refer to the discussion on pp. 98–99.

Garypinus nobilis n. sp.

(Pl. I, figs. 7 a-c and Pl. II, figs. 8 a-g; figs. 7 a-b, p. 38).

Front pair of eyes removed a distance from front margin, smaller than their diameter. Cephalothorax distinctly longer than broad, has a short well marked cucullus and a slightly convex front margin without any median incision. No distinct transverse stripes, but the hinder margin of the cephalothoracic shield is curved backwards in the middle and well removed from the hind margin proper. Skin smooth and the hairs slender and pointed. Tergites of pale and slender abdomen with indistinct longitudinal line. Flagellum consisting of four hairs of which anterior is dentated; serrula exterior with the basal tooth the longest, moderately widened out towards tip, and the terminal partly free and pointed; galea three-branched, longer than terminal hair (♀) or almost simple and shorter than terminal hair (♂). Trochanter of the palps distinctly longer than broad with anterior outline strongly convex; femur with distinct stalk, 2.5 longer than broad, almost as long as tibia and distinctly narrower; tibia is 2.2 longer than broad and strongly convex posteriorly. The hand is 1.3 broader than the tibia and a little longer, but much longer than finger. The trochantin of the first pair of legs is one third of the whole femur; the second tarsal joint is much longer than the first, and the tarsi of fourth pair distinctly shorter than the tibiae. Dorsal „tactile” hair at the base of the tarsus of the fourth pair of legs, and arolium bifurcate longer than claws.

♀. Cephalothorax (Pl. II, fig. 8 a). — Two pair of eyes, placed at the lateral margin of the head and almost touching each other; the anterior pair is removed from front margin a distance distinctly smaller than their diameter. The cephalothorax is distinctly longer than broad and gradually tapering towards second pair of eyes, in front of which the lateral margin is suddenly turned inwards to establish the short, but distinct cucullus; front margin is slightly convex or more correct indistinctly obtuse-angled; anterior marginal part well marked. The cephalothorax is most raised just behind the eyes and again towards the front margin, consequently almost saddle-shaped; an obsolete median, backwards curved transverse line, is sometimes traced. The cephalothorax is remarkable on account of the sharp distinction, which the hinder margin of the darker shield, which is curved backwards in the middle, forms between this and the paler portion behind; the hind-margin proper of the cephalothorax is straight (fig. 8 a; cf. Ellingsen 70. p. 5). Skin smooth with a few rather long pointed hairs, which are perhaps not quite simple.

Abdomen. — The abdomen is long and slender, almost twice as long as

broad; the sclerites are not very pronounced and are all with the exception of the two last indistinctly divided. The sclerites bear along hindmost margin or just behind eight or ten hairs respectively on the first or last segments; these hairs are long and slender, obtusely pointed, but apparently not completely simple; the tenth and eleventh tergites bear in addition to these hairs at least one pair of "tactile" hairs each and so do the corresponding sternites. The tergite and sternite of the eleventh segment are separated by an articulate membrane, wide in the middle and narrow laterally (cf. Hansen 49. p. 222).

Antennae (Pl. II, figs. 8 c-d). — The antennae are almost half as broad as the front margin; the immovable finger has small marginal teeth just behind the tip. The *flagellum* consists of four hairs, of which the anterior is the broadest and with front margin toothed; the next is a little longer and the posterior decreases backwards (fig. 8 c, f). The *lamina interior* consists of a large distinctly striated plate-shaped portion, well separated from the serruli-formed one, which consists of about five teeth and a terminal spine (fig. 8 c, a^1 - a^2). The *serrula exterior* consists of about twenty almost completely fused and squarely-truncate teeth; the basal one is distinctly longer than the rest and gradually widened out towards end and provided with an anterior marginal flap (fig. 8 c, t'). The *galea* (g) is divided into three blunt teeth, as long as the undivided portion; the galea projects beyond terminal hair.

The *labrum* similar to that of *Chelifera* Geof. (cf. p. 29 and Pl. I, fig. 7 a, l).

Maxillae (Pl. I, figs. 7 a-c). — The maxillae taper towards the tip and merge gradually into the *manducatory part*, which is surrounded by a fairly broad, rounded and marginally serrated *lamina maxillaris*; their lower surface is smooth, beset with a few rather long hairs (fig. 7 a-b); with regard to the details I refer to p. 29.

Palps (Pl. II, fig. 8 e). — The palps are completely smooth and provided with longer or shorter pointed hairs; the *tactile* hairs of the fingers seem to be found in a regular number. The *immovable* finger has posteriorly two tactile hairs at the base, the one above the other, a single median and at least one near the tip, anteriorly it bears a number of four tactile hairs at and near the dorsal surface in the proximal third part of the finger. The *movable* finger bears posteriorly three tactile hairs near the base and a single one in the middle. The *trochanter* is distinctly longer than broad with the anterior margin gradually, but distinctly convex beyond well marked stalk and the posterior more suddenly and moderately so. The *femur*, which has a well limited stalk, is about 2.5 longer than broad, almost as long as tibia but narrower than trochanter, but chiefly than tibia; the anterior outline of the femur is beyond the shallow notch of the stalk first moderately convex and finally slightly concave, while the posterior is rounded outwards just beyond stalk, but then almost straight. The *tibia*, which is distinctly and shortly stalked, is about 2.2 longer than broad; the anterior outline is beyond the rather shallow notch, which marks off the stalk, moderately convex; the posterior

side is distinctly convex at the base and towards the tip, but almost straight in the middle, as neither the condylus nor the elevation beyond, which bears a long hair, are pronounced. The *hand*, which has a short and well marked stalk, is about 1.9 longer than broad, 1.3 broader than the tibia and a little longer, but 1.2 longer than the fingers. The teeth of the immovable finger begin near base and extend to the distinctly hooked tip; only the ten distal are triangularly pointed, while the others are more or less squarely truncate; the teeth of the movable finger begin rather apart from the base and are all low, rounded and squarely truncate.

Coxae. — The coxae are almost on a level with the maxillae and with each other. The first pair are distinctly longer than broad and not widened out towards extremity; the second pair are a little longer and broader than the first and moderately widened out towards tip; the third pair are almost as long as broad and distinctly enlarged distally. The fourth pair are distinctly longer and broader than the preceding pair and appear triangular, because the interior and posterior margins are continued into each other without interruption, the corner between them being rounded; they are only 1.5 longer than broad, and have the anterior and posterior margins of almost equal length.

Legs (Pl. II, figs. 8 f-g). — The hairs of the legs are pointed and fairly long and slender. The fourth pair of legs have a very long and slender one placed dorsally near the middle of the tibia as well as one, even longer, dorsally at the base of the first *tarsal joint*. The *trochantin* of the first pair of legs has its articulation with the tibial part very slightly developed (cf. p. 38 and figs. 7 a-b), and is dorsally a little longer than ventrally; it is as long as one third of the whole femur; this is almost three times longer than deep. The *femur* of the fourth pair of legs is about 2.5 longer than deep, and has the ventral margin of the trochantin as long as femur is deep. The *tarsi* of the first pair of legs are of equal length to the tibia, while the tarsi of the fourth pair of legs are much shorter than tibia; the second tarsal joint is always much longer than the first; the second tarsal joint of the fourth pair of legs is much shorter, than the femur is deep. The *arolium*, which extends distinctly beyond the claws, has the stalk bifurcate and each branch terminated with a small sucking-cup.

Colour. — The palps are light reddish brown with hands darker and more polished; cephalothoracic shield dull brown, and coxae and maxillae yellowish brown. The abdomen yellowish with sclerites a little darker.

Measurements. — Big specimen. Cephalothorax 0.800 (0.315--0.610); abdomen 2.380 (1.12) mm.

Palps: trochanter 0.316 (0.234); femur 0.570 (0.224); tibia 0.588 (0.270); hand 0.616 (0.356); finger 0.504 mm.

Smaller specimen. Leg I: femur 0.410 (0.140), trochantin 0.140; tibia 0.260 (0.090); tarsus I 0.100 (0.063); tarsus II 0.150 (0.050) mm.

Leg IV: femur 0.630 (0.240), trochantin 0.230; tibia 0.420 (0.100); tarsus I 0.130 (0.075); tarsus II 0.190 (0.065) mm.

♂. Body. — The male is exceedingly small and slender compared to the female. The genital area is well distinguished from that of the female; complicated system of dark chitinous bars, partly establishing a bow, are visible through the integument.

Antennae (Pl. II, fig. 8 d). — The galea is much shorter than the terminal hair, which extends distinctly beyond it; terminal third is much thinner and well limited from the rest (fig. 8 d).

Colour. — Yellow with the exception of the yellowish brown palps with darker hands; head is more greenish brown.

Measurements. — Cephalothorax 0.560 (0.450); abdomen 1.820 (0.540) mm.

Palps: trochanter 0.260 (0.196); femur 0.475 (0.190); tibia 0.485 (0.230); hand 0.500 (0.308) mm.

Material. — Dr. Mortensen has collected five females and a single male, apparently fullgrown in spite of small size, under stones in the Island of Koh Chang in the month of January.

Remarks. — This species is well distinguished from the two described species of this genus: viz. *G. dimidiatus* L. K. and *G. Palagonicus* Ell., from the former by its clumsy palps, which have the posterior outline of the tibia distinctly convex, and from the latter by its three-branched galea, by the fingers of the palps, which are of equal length to the hand, and by the tarsal joints, of which the distal is the longer.

Family IV. *Cheliferidae* Hagen (Hans.).

- 1875. *Cheliferinae* pars Stecker (35.) p. 160.
- 1879. *Cheliferinae* + *Chiridium* Menge. Simon (5.) p. 19.
- 1879. *Cheliferidae* Hagen (36.) p. 400.
- 1882. *Cheliferinae* + *Chiridium* Menge. Tömösváry (40.) p. 177.
- 1884. *Cheliferinae* pars Hansen (9.) p. 531.
- 1889. *Cheliferinae* + *Chiridium* Menge. Daday (11.) p. 167.
- 1890. *Cheliferidae* pars Balzan (46.) p. 406.
- 1891. *Cheliferinae* + *Chiridium* Menge. Balzan (12.) p. 504.
- 1894. *Cheliferidae* Hansen (49.) p. 231.
- 1895. *Cheliferinae* + *Atemnus* Can. Banks (50.) p. 2.

Femora of the two anterior pair of legs undivided or having but a basal trochantin. All tarsi one-jointed. Two eyes or none. All the hairs of the body never simple.

This family is divided into two subfamilies, viz. the *Cheliferinae* Sim. and the *Chiridiinae* Hans., the former characterized by the presence of a well defined trochantin on the legs and the latter subfamily characterized by their undivided femora. The *Chiridiinae* Hans. are besides remarkable by their broad abdomen,

which has the eleventh tergites invisible from above, characters which they have in common with species of *Pseudochiridium* n. gen. The hairs of the body and the appendages in the members of this family are sometimes almost simple, but all the hairs are never completely so; the hairs of the legs of *Chelifer Javanus* Thor. f. inst. bear a terminal tooth and those of *Chiridium museorum* Leach bear a more median tooth. The number of the eyes is two or none, never four. Scarcely any character, in addition to the mentioned, can be named, which will not also besides easily be applied to some of the *Garypidae* Hans.

Subfamily I. *Chiridiinae* Hans.

1879. *Garypinae* pars Simon (5.) p. 42.

1894. *Chiridiinae* Hansen (49.) p. 232.

Femora of the two anterior pair of legs undivided without trochantin.

This subfamily includes a single genus, *Chiridium* Menge, consisting of two or three European and a single American species, but not one from Asia, and will consequently not be dealt with here.

Subfamily II. *Cheliferinae* Sim.

1875. *Cheliferinae* Simon (5.) p. 19.

1882. *Cheliferinae* Tömösváry (40.) p. 177.

1889. *Cheliferinae* Daday (11.) p. 167.

1891. *Cheliferinae* Balzan (12.) p. 509.

1894. *Cheliferinae* Hansen (49.) p. 232.

Femora of the two first pair of legs with a well defined trochantin.

The two main genera, of which this subfamily is composed, are in many respects so vastly different, that it will scarcely pay to discuss the characteristics of this subfamily at any length here; each genus will be dealt with separately and about the differences I refer to *Pseudochiridium* n. gen.

Synopsis of Genera.

The genera, the names of which are placed within brackets, are regarded as doubtful.

1. The coxae of the fourth pair of legs are excessively large, much broader than long. The trochantins of the legs with slightly developed almost straight articulate-membranes; the tarsus of the fourth pair of legs always longer than the tibia. Only ten abdominal tergites visible from above. No eyes. Hairs clavate *Pseudochiridium* n. gen.
1. The coxae of the fourth pair of legs are not excessively large and longer than broad. The trochantins

- of the femurs with oblique articulate-membrane; the tarsus of the fourth pair of legs never longer than the tibia. Eleven abdominal tergites visible from above.
2. Head distinctly produced in front; the eyes are wanting. Two transverse stripes..... *Corosoma* Karsch. cf. p. 95.
 2. Head not distinctly produced in front..... *Chelifer* Geof.
 3. Two real eyes. Palps and legs rather slender; transverse stripes present..... (*Chelifer* Geof. subg. Balz.)
 4. Claws with teeth. Tergites of males more or less carinate. The coxa of the fourth pair of legs of ♂ with a coxal sac..... "*Lophochernes*" Sim.¹⁾
 4. Claws simple. Tergites of male never carinate. Coxa of fourth pair of legs without coxal sac. Sternites of ♂ sometimes provided with minute spines
(*Chelifer* Geof. subg. Balz. pars.)
 3. No eyes; sometimes two ocular spots. Palps rather clumsy..... (*Chernes* Menge)²⁾
 5. Transverse stripes present. Ocular spots most often wanting..... (*Chernes* Menge subg. Balz.)
 6. Hairs pointed. Skin not granular
(*Lamprochernes* Töm. subg., manip. Balz.)
 6. Hairs clavate. Skin granular
(*Trachychernes* Töm. subg., manip. Balz.)
 7. Claws with teeth..... (*Ectoceras* Steck.)²⁾
 7. Claws simple.... (*Trachychernes* Töm. subg., manip. Balz. pars.)
 5. Transverse stripes wanting. Ocular spots present.
Hairs pointed..... (*Alemnus* Can. subg. Balz.)
 2. (*Pelorus* C. K.)

The value of the different genera and subgenera in which the old genus *Chelifer* Geof. have been divided will be discussed later on (cf. pp. 130—134).

Chelifer Geof.

- 1763. Geoffroy Hist. Ins. II pars.
- 1879. Simon (5.) p. 20.
- 1891. Balzan (12.) p. 510.

¹⁾ Simon's genus *Lophochernes* is according to my opinion quite a natural one, but its name must necessarily be altered, because it includes *Ch. canceroides* L., which is the type of the whole genus *Chelifer* Geof.

²⁾ Daday (11. p. 168) lays in the characteristic of *Chernes* Menge the stress on the clumsy palps and divides it into two subgenera: *Chernes* Menge without ocular spots and *Ectoceras* Steck. with ocular spots.

The cephalothorax is not distinctly produced anteriorly. Two eyes or none. Eleven abdominal tergites visible from above. The coxae of the fourth pair of legs are not excessively large and not broader than long. The trochantins of the femurs with oblique articulate-membranes; the tarsus of the fourth pair of legs is never longer than the tibia.

I. Characteristic of Genus.

Cephalothorax. — The number of the eyes is two or none; they are sometimes well developed with distinctly arched lenses and sometimes mere white ocular spots, indistinctly limited from the rest of the integument, and often they have left no trace whatever. It is in some cases difficult to distinguish between real eyes and ocular spots, but it is even more difficult to see the difference between ocular spots and no trace of eyes at all, at least in spirit-specimens; perhaps sometimes variations in this respect are found within the species (cf. Balzan 12. p. 500). The shape of the cephalothorax differs only slightly; it is never produced anteriorly in a marked degree and tapers usually gradually towards the front; the lateral outlines are most often straight or slightly convex. The cephalothorax is seldom in a very marked degree broader than long, or longer than broad, but usually of almost equal breadth and length. A structure, which often gives the cephalothorax a characteristic appearance is the transverse stripe or stripes; these, which really are the limitations between the head and the first thoracic tergite, and between the first and the second of these tergites, are most often indistinct in species with poorly developed granulation or even wanting, but very distinct in species with coarse granulation. The anterior is generally the better developed and is often found, when the posterior is wanting; the latter is in "*Lophochernes* Sim." generally the most distinct, making the second thoracic tergite completely alike an abdominal one. The integument is most often more or less granular, but sometimes almost completely smooth; besides the granules bigger tubercles are sometimes found as in *Ch. cancroides* L. The hairs are never simple, but always provided with a number of teeth; they are sometimes clavate, being distally as broad as they are long; a row consisting of about four is placed along anterior margin, and rows containing several hairs along hindmost margins of the tergites; the hairs of the head in addition to the above mentioned are arranged without proper order.

Abdomen. — The abdomen is only seldom flattened and almost as broad as long, most often cylindric and distinctly longer, sometimes twice or more, than it is broad; the outlines are most often moderately convex, but sometimes almost straight or strongly convex. The abdomen is sometimes longitudinally keeled in the middle f. inst. in *Ch. carinatus* n. sp.; the lateral margins of the first tergites are in the males of most species of "*Lophochernes* Sim." prolonged into lateral keels or teeth, a structure which will be described later on together with its variations. The tergites of the abdomen are most often longitudinally divided by a narrow

white line; the first and the eleventh tergites are only seldom divided in their whole length; this line is most visible in forms with dark abdomen. The sclerites of the abdomen are seldom completely smooth, most often granular, but their granules are as a rule less prominent than those of the cephalothorax and more similar to scales. Along the hindmost margin of the tergal sclerites or just behind we find a row of hairs, which are never completely simple and in their structure like those of the cephalothorax; the tergites from the fourth to the tenth bear, in addition to this marginal row, a different number of hairs in front of the row; the hairs of the tergites increase in length as well as in number towards the tip of the abdomen. The tenth and eleventh tergites most often bear a single or two pair of "tactile" hairs each. The last eight sternites are in most respects similar to the tergites, but the longitudinal line is very indistinct, the granulation is less marked, and the hairs are more simple, and distinctly longer; the armature of the sternites of a few species with short spines provides sometimes a sexual as well as a specific character of value (cf. p. 129). The membrane between the tergites and sternites show distinctly the limitation between the segments, at least behind. The sexual area of the females seems to be alike to that described by Croneberg in *Ch. cimicoides* F. (45. p. 448), and does not provide marked variations in contrast to that of the males, which is to a degree variable within the different groups and accordingly will be dealt with separately later on (cf. pp. 121–124).

Antennae. — The structures of the antennae are pretty much alike in the different forms, at least compared with those of the *Garypidae* Hans.; the flagellum (Pl. IV, fig. 4 a, f) consists of three or four hairs, decreasing backwards in length as well as in breadth, and simple with the exception of the foremost, which has the anterior margin dentated; only a single species is known in which the other hairs as well bear teeth, namely *Ch. rudis* Balz. (46. tav. 14, fig. 9 a). The lamina interior is the only organ, found in the antennae, which shows a structure of its own, not found completely similar in any of the *Garypidae* Hans. examined in this respect; it is characterized by its wide, transversely striated, plate-shaped portion, which is distally folded in a complicated manner and connected with the serruli-formed part; this latter consists of from three to five dentated lobes, placed obliquely to the axis of the finger, and each covering the anterior margin of the preceding (more proximal) tooth with its own posterior margin (Pl. IV, figs. 4 a-b), as well as of a terminal spine, serrated along margin and fused with terminal lobe (cf. p. 21). The serrula exterior has the basal tooth the longest and widened out terminally, and the terminal partly free and sometimes pointed, or in similarity to the rest more or less obtuse (Pl. IV, figs. 2 a-4 c). The galea of the female is either fairly long or very long, with a few branches or with a number; in the male it is generally shorter and more simple (Pl. III, figs. 8 d-e; pl. IV, figs. 4 c-d).

Maxillae. — The maxillae gradually taper towards the manducatory part, which is fairly long and surrounded by a broad lamina maxillaris. The maxillae show in *Ch. Murrayi* Poc. a systematic as well as a sexual character of great

value (cf. p. 130; pl. III, figs. 8 g-f). As far as the detailed structure of the labrum and the maxillae are concerned I refer to the above description (cf. p. 29—30; pl. I, fig. 8 a).

Palps. — The hairs of the three basal joints of the palps are either clavate or pointed, but never simple (a few hairs excepted); generally those of the hand are almost simple or at least in species with pointed hairs partly completely so, and those of the fingers are with a few exceptions completely simple without any distal teeth. The femur bears posteriorly near the tip and the tibia near to the base in many forms with smooth, clumsy palps a slender, pointed and simple hair much longer than all around; the hand bears sometimes a similar hair, and the fingers bear a probably constant number of tactile hairs. The shape of the joints of the palps and the relation between the different proportions of the same joints and of the joints compared with each other are variable to an extreme degree; scarcely any character can be applied to all the members of this genus. The teeth along the inner margins of the fingers stand close together and are pointed or more or less obtuse (cf. p. 33—34); the fingers bear often in addition to the usual marginal ones accessory teeth, differing in number and arrangement.

Coxae. — The coxae are almost on a level with the maxillae and with each other; they are generally fairly elongate, in less degree those of the first pair, which are almost trapezoid and not much longer than they are broad; the two following pair are distinctly longer than broad and distinctly widened out towards the extremity. The fourth pair are as a rule both longer and broader than the preceding, but are very variable, providing specific and sexual character of importance in many forms; they are most modified in the females of *Ch. equester* With (21. pl. VIII, fig. 3 d, ♀) and *Ch. sculpturatus* Lewis (21. pl. VIII, fig. 2 f), but especially in the males of the "*Lophochernes* Sim." group, in which they always include a coxal sac of remarkable structure and sometimes bear an external clumsy spine as in *Ch. Mortensenii* n. sp. (Pl. III, fig. 1 f).

Legs. — The legs are found in all forms between extremely long and slender and very short and clumsy; the different joints vary in proportions according to those of the whole leg, but not in a perfect manner; the length of the tarsus is comparatively larger in the long-legged than in the short-legged forms. The femur of the first pair of legs is provided with a basal trochantin of somewhat varying length and generally deeper than the tibial part of the femur, where they are connected. The two joints are in most species connected by an articulation, which makes a wide mobility in the horizontal plane possible (cf. p. 37; fig. 4 b, a-b); only in a few *Ch. subruber* Sim. and *Ch. Murrayi* Poc. we find an articulation of another and less perfect nature (cf. p. 37; fig. 5 a-b). The tarsus is always one-jointed, in the fourth pair of legs always shorter than the tibia, but in the first pair of legs at least sometimes of equal length to the tibia f. inst. in *Ch. Mortensenii* n. sp. The shape of the tarsus differs in several species of "*Lophochernes* Sim." from that of the female and provides in many of these species useful systematic

characters. The claws of the tarsi are rather short, clumsy and well curved, generally beyond the arolium; they bear sometimes anterior teeth as in the species of "*Lophochernes*" Sim. and "*Ectoceras*" Steck. (cf. p. 43). The legs bear hairs, which are seldom distinctly clavate, but often provided with teeth or only with a single tooth near to the pointed tip; they are more simple on the ventral than on the dorsal surfaces, and they increase in length and become more simple from the base towards the end of the legs. The tarsus bears almost always in the fourth pair of legs in similarity to most other genera, except *Garypus* L. K., *Pseudochiridium* n. gen.(?) and *Chiridium* Menge, an exceedingly long and slender "tactile" hair; it is f. inst. wanting in *Ch. camicoides* F.; while it in all other genera is placed at the base of the tarsus, this hair has in species of *Chelifer* Geof. a very variable position; it is placed anteriorly near to the base in *Ch. Javanus* Thor. and the large group of species, related to this; in *Ch. subruber* Sim., *Ch. Mortensenii* n. sp. and *Ch. lamprosalis* L. K., it is placed near to the middle and in *Ch. granulatus* C. K. near the tip. *Ch. nodosus* Schranck bears two or even three hairs the one behind the other near to the middle and apparently of this kind. Hairs shorter than these, but like them always simple and distinctly longer than the hairs around, are often found in number on the ventral surface of the trochanter and the trochantin of the fourth pair of legs; a single hair of the same kind is found dorsally near to the tip of the femur as well as of the tibia of the fourth pair of legs; near to the ventral tip of the tibia a pair of similar, but moderately curved hairs are found. On each side near the base of the claws we always find a hair distinctly differing from those around; it is in most forms curved upwards and with the tip directed downwards (f. inst. *Ch. Javanus* Thor.), but it attains a remarkable development and is very variable in species of "*Lophochernes* Sim." and will on that account be dealt with separately (cf. pp. 125—127); a corresponding hair is found in at least most forms of the *Obisiidae* Hans. (cf. p. 45).

II. Genital Area of Male.

The genital area of *Chelifer granulatus* C. K. (*C. cancrroides* L.) and in *Ch. camicoides* F. has been briefly described by Croneberg (1888. 45. p. 448) and later by Stschelkanovtzeff (1903. 67. p. 327); the two authors do not at all agree with each other in their interpretation of the observed details. The preliminary studies published here refer only in a slight degree to the inner structure of the genital apparatus, their only purpose being to point out, that "generic" characters of value are found in the modifications of these organs. In the following the outer appearance of the genital area will be described in a number of forms, which stand more or less apart from each other.

1. *Ch. subruber* Sim. (Pl. III, fig. 7 b). The genital area of this species as well as of *Ch. Murrayi* Poc. seems to be one of the most simple in this genus. The sexual opening is a split (*g*), broadest in the middle, which is placed between two plates an anterior (*a*) and a posterior (*p*); the former is distinctly broader than

long, not well distinguished from the surrounding chitin in front and laterally and mounted with a number of pointed hairs placed in transverse rows along its almost straight hinder margin and limiting the sexual opening in front; a thin membrane, anteriorly provided with longitudinal lines (*m*), is found. The opening is on each side continued into a transverse groove, prolonged just in front of the first pair of the stigmata. The posterior plate is both longer and broader than the anterior (fig. 7 b, *p*), distinctly broader than long and with a row of about five pointed hairs on each side from the side to near the middle; there is no trace of marginal membrane but just behind the margin in the middle an area, mounted with a number of minute pointed granules (*sp'*); club-shaped accessory glands like those of *Ch. granulatus* C. K. are found in great number (*gl*). The area of *Ch. Murrayi* Poc. is almost completely like the one described, but the granulation behind the opening is wanting and a pair of short rounded bodies on each side beneath the posterior plate, and perhaps corresponding to the ram's-horn-shaped organs of *Ch. granulatus* C. K., is found.

2. *Ch. granulatus* C. K. (Pl. III, fig. 1 f). Croneberg has pp. 456—57 given a very good description of the genital apparatus of this species, accompanied by a number of figures (45. taf. XI a, figs. 44-47). The genital area consists of two plates, an anterior (*a*) and a posterior (*p*), between which the transverse sexual opening is placed; the anterior plate is really cup-shaped with the cavity of the cup facing towards the posterior and including a portion of the inner organs; it is only partly visible from below, while its anterior thinly-skinned surface is very well developed. The ventral side of the anterior plate is longest in the middle and here continued into a fairly prominent and rounded tubercle densely crowded with pointed hairs; the hinder margin of the anterior plate is laterally distinctly concave and in the middle convex, but with a slight curvature forwards; the posterior portion of this plate is limited off from the remaining part by a transverse line, has a laterally well defined marginal membrane and a marginal row of pointed well articulated hairs, which in the middle are placed in more than one transverse row and are bifurcate (fig. 1 f). The posterior plate is much longer and broader than the anterior, and distinctly broader than long; it shows, when observed from below, a median longitudinal depression, sloping towards the front margin, with an anterior elevation on each side, corresponding to the hollows, in which the ram's-horn-shaped bodies are placed (fig. 1 f, *p* and *r*). The anterior margin is distinctly concave in the middle corresponding to the median depression, and on each side of this concavity distinctly convex opposite to the concavities of the posterior margin of the other plate. Laterally no marginal membrane is found but a fairly long one at the bottom of the median concavity. If we examine the posterior plate from the upper or inner side, we will in the middle find a kind of gutter, built up by a complicated chitinous apparatus, which emits the discharge of a mass of club-shaped glands (45. fig. 45, *dr*; and pl. III, fig. 1, *f*), near the concave anterior margin; on each side in the middle near to the front margin four dentated hairs are found

articulated in deep hat-shaped cavities. On each side of this apparatus a ram's-horn-shaped body is found lying in a fairly deep cavity, and connected with this as well as with the posterior plate by a system of chitinous membranes; when this organ is protruded, it will pass the margin of the anterior plate, the lateral concavity of which is well fitted to receive them; the anterior plate will probably by this pressure be forced forwards, as it is very movable on account of the thinly skinned anterior surface, which will act as an articulate membrane.

The genital organs show in all species of "*Lophochernes* Sim." an almost identical structure; only *Ch. sculpturatus* Lew., of those examined by me, is different from that already described by the shape of the posterior plate and by the transverse line along the hindmost margin, marking this off from the rest (21. pl. VIII, fig. 2 b, g).

3. *Ch. cimicoides* F. — Croneberg has (45. pp. 450—456) given a valuable description of the inner male-apparatus of this species, but his description of the genital plate is very imperfect (taf. XI a, fig. 1); Stschelkanovtzeff has later on dealt with the same theme, but only very briefly, and found that the sexual opening is a transverse split, not a longitudinal one as stated by Croneberg (67. p. 327, fig. 2). The anterior plate is long and broad, much longer than the posterior one, and broader than long; it is provided with a great number of long, pointed, simple, slightly curved hairs, which converge towards the median line; the hindmost marginal portion of this plate is marked off from the foremost bigger one by a transverse line; this marginal part is wanting in the middle, but is substituted for by a marginal membrane, longitudinally striped and without hairs, and continued as a mere marginal seam laterally; the whole plate appears concave in the middle behind at the first glance. The posterior shorter plate is provided with a well developed marginal membrane, which is much longer in the middle than laterally and here moderately convex; this plate bears a number of hairs apparently placed without proper order, and its anterior portion gradually merges into the base of the lamina, which has densely placed longitudinal lines. Inside under this marginal membrane and at the base of it, seven hairs are articulated in deep cavities on each side of the chitinous apparatus, through which the accessory glands discharge; this structure bears similarity to that of *Ch. granulatus* C. K., but the glands are quite differently developed (cf. 45. taf. XI a, fig. 38, s). The transverse genital opening is situated between these two plates.

The structure of this organ is in *Ch. nodosus* Schranck only slightly different from that found in the preceding species. The anterior plate is distinctly shorter, provided with comparatively few hairs. Behind the distinct transverse line, which is at least in this species placed inside, we find only a clear marginal membrane, which is broadest in the middle and laterally bears a few hairs. The posterior plate is short and has the hindmost portion slightly raised and provided with a transverse row of hairs; the anterior portion slopes towards the front, where a broad marginal membrane is found, which is overlapped by that of the anterior

plate; inside only two hairs are found on each side. The complicated system of inner sexual organs bears great similarity to that of the preceding species, as they were described by Croneberg.

4. *Ch. Birmanicus* Thor. (Pl. III, fig. 10 a). The anterior genital plate is broad as well as long, but very indistinctly marked off laterally and in front; a distinct marginal membrane is found, distinctly convex behind, but not distinguished distinctly from the anterior portion (fig. 10 a), which is gradually raised in the middle and provided with three hairs on each side. The inner copulatory organs are partly visible through the skin and contribute to the characteristics of the anterior plate, even seen from below; on each side near the middle a large, plate-shaped, chitinized body is seen, to which muscles are fastened, and between these two black spots, which really are the tips of a styli-formed organ (fig. 10 a, c, the above mentioned spots not drawn). The hindmost genital plate (*p*) has in the middle two transverse and concave rather short sclerites; the former of these (*b'*) is a mere line in the middle, where it has a fairly long marginal membrane, which as well as the lateral longer parts of this sclerite is overlapped by the anterior plate. The latter of these two sclerites (*b''*) has a similar shape, being like the former shorter in the middle and enlarged towards ends, but is more narrow and is only one third as broad as the whole sternite; this sclerite is connected by and marked off from the first sclerite by an articulate-membrane of its own length. This sclerite is in similarity to the first curved distinctly backwards in the middle, overlaps the anterior portion of the fourth sternite (*s*⁴), when in natural position, and it merges gradually into the other portion of the integuments laterally. The first tergite bears apparently hairs neither outside nor inside, while the second bear four pointed hairs on each side near to the middle. The inner sexual organs of this species seem to differ to a considerable degree from those of the already mentioned forms; accessory club-shaped glands, similar to those of *Ch. granulatus* C. K. are found in considerable number. The genital area of a great number of species, which are nearly related to *Ch. Birmanicus* Thor., is similar to that described here as far as can be judged from the outer appearance only, without dissection.

III. Claws.

As far as the peculiarities in the armature of the claws in *Ch. quadrimaculatus* Töm. and *Ch. peculiaris* L. K. are concerned, I refer to p. 43. The claws of *Ectoceras* Steck., but especially those of "*Lophochernes* Sim.", are in a number of species provided with anterior teeth, which show marked specific as well as sexual variations, and which differ in a high degree from each other in the claws of the first and the fourth pair of legs (cf. pp. 43—44). The tarsi of the fourth pair of legs bear in *Ch. depressus* C. K. claws, which are always provided with an anterior tooth arising near to the distal third and about half as long as the tip proper or even longer; the claws of the first pair of legs bear in the female anterior teeth comparatively bigger than those of the fourth pair, but in the male the two claws are

very different; the anterior claw is distinctly curved terminally and bears a moderately small ventral tooth in the distal half, while the posterior one is long, slender, only slightly curved, and with the tip distinctly curved, but without any tooth. A similar structure is found in the claws of *Ch. superbus* n. sp., but the posterior claw of the tarsi in the first pair of legs in the male is swollen near the middle and with a backwards directed tooth or eminence; *Ch. Mortensenii* n. sp. show in the structures of the claws of the hindmost pair of legs no difference from the previously mentioned (Pl. III, fig. 1 i, c), but in the female the claws of the first pair of legs appear bifurcate on account of the big teeth, while in the male the anterior claw shows the described structure (Pl. III, fig. 1 h, ci) and the posterior differs only by the presence of an indistinct anterior tooth (ce). *Ch. Socotrensis* With shows again an other modification, for the anterior claw of the first pair of legs has in the female a foremost big tooth in contrast to the posterior claw, which bears a long ventral tooth (cf. 21. pl. VII, fig. 4 h), and of the corresponding claws in the male the anterior one is fairly slender and scarcely curved without a tooth, while the posterior claw is much more slender, distally curved and provided with an insignificant anterior tooth. This structure leads directly to that found in *Ch. granulatus* C. K.; the claws of the fourth pair of legs bear in this species small anterior teeth, while those of the first pair of legs bear in the female long and ventral teeth and in the male show a most abnormal structure; the anterior claw of this is rather clumsy and distinctly curved without any distinct tooth (Pl. III, fig. 4 a, ci), while the posterior consists of a basal and a distal portion, almost vertical on each other, and is distinctly and suddenly widened out, where the two portions meet; it is here provided with a distinct anterior, almost dorsal and partly upwards directed tooth and prolonged into the very slender, distinctly pointed and forwards directed tip (ce). The claws of the fourth pair of legs are toothless in *Ch. lamprosalis* L. K. as well as in a bigger species nearly related to it from Spain and so are the claws of the first pair of legs in the female of both these species; the anterior claw of this pair is in the male of the latter species completely toothless, while it in the former shows traces of a ventral tooth (figs. 5 a—6 d, ci); the posterior claw is in both species more slender and much better curved and pointed than the anterior, and provided with a well pointed, but rather small tooth beyond the middle anteriorly (ce). *Ch. lamprosalis* L. K. is besides remarkable by the dorsal terminal conical projection of the tarsus of the first pair in the male as well as by the abnormal shape of the posterior claw in a single specimen (♂), having the anterior tooth projecting beyond dorsal surface of claw and directed upwards (fig. 5 a). The claws of *Ch. sculpturatus* Lewis do not bear any teeth, and in *Ch. Borneonensis* Ell. they are according to Ellingsen also wanting (18. p. 206).

IV. Terminal Lateral Tarsal Hair.

Croneberg has in one of his figures (45. taf. X, fig. 13) representing the fourth pair of legs in *Ch. cimicoides* F. drawn a strongly curved hair, placed laterally

near to the tip of the tarsus; a hair, correspondent to this, is found on each side just behind the bases of the claws in probably all species of *Chelifer* Geof. and may be designated the *terminal, lateral* hair of the tarsus. It is in most forms without much interest, but shows in "*Lophochernes* Sim." modifications, which are valuable in the definition of many species in spite of sexual variations. This hair is in *Ch. Indicus* n. sp. and *Ch. navigator* n. sp. strongly curved, almost broken, in the middle with the pointed tip directed forwards in the fourth pair of legs; in the first pair its curvature is less moderate; it has a similar shape in *Ch. subruber* Sim. and *Ch. Hawaiiensis* Sim., but in the latter we have the anterior hair more slender and less distinctly curved than the posterior (cf. 21. pl. VII, figs. 1 d-e).

The lateral terminal hairs of *Ch. lampropsalis* L. K., one of the species of "*Lophochernes* Sim.", in which they are most simple, show following modifications. The anterior as well as the posterior hair of the fourth pair of legs are only slightly curved upwards with the tip directed forwards and downwards, and are dorsally near the tip provided with a tiny tooth, beyond which it is very slender and tapers towards the point; the posterior (Pl. III, fig. 5 b, *he*) is more slender and less curved than the anterior (fig. 5 b, *hi*). The posterior hair of the first pair of legs is in both sexes fairly long and slender, and from the base moderately curved upwards, but terminally beyond a small dorsal tooth distinctly curved downwards with the tip directed upwards (fig. 5 a, *he*); the anterior hair is in both sexes similar to the hairs of the fourth pair, but is more distinctly curved with the dorsal tooth more prominent (*hi*). In *Ch. lampropsalis* sp. aff. the differentiation goes much farther, for we have in this the posterior hair of the fourth pair of legs in both sexes as well as that of the first pair in the female similar to the posterior hair of the first pair of legs in the preceding species, being fairly long, slender and curved with the terminal part curved downwards with the tip directed upwards beyond the small dorsal tooth (fig. 6 e, *he*; 6 h); the latter hair has in the male another shape, being enlarged towards the end with a long median point and a small dorsal and ventral tooth (fig. 6 f). The anterior hair is short, moderately curved and with an almost obsolete dorsal tooth, which is completely wanting in the fourth pair of legs in the male (fig. 6 g; fig. 6 d, *hi*); the anterior hair of this pair of legs is in the female very slender (fig. 6 e, *hi*).

The posterior hair of the fourth pair has in the female of *Ch. Mortensenii* n. sp. a form similar to that of the preceding species, but the portion beyond the dorsal distinct tooth is almost semi-circular; this lower branch is in the male more moderately curved (fig. 1 i, *he*) and in the first pair of legs in both sexes almost straight. The anterior hair of the fourth pair of legs is slender and curved moderately upwards with tip directed downwards beyond the small dorsal tooth (fig. 1 i, *hi*), while it in the male appears almost broken; the corresponding hair is in the first pair of legs shorter with more distinct tooth (fig. 1 h, *hi*). The terminal lateral hairs show in *Ch. depressus* C. K. a similar structure, but the anterior hair of the fourth pair of legs is less suddenly broken, than

the corresponding hair of the first pair of legs at least in the male. The posterior hair is alike in all the tarsi of *Ch. Socotrensis* With with tiny dorsal tooth and lower branch moderately curved with tip directed upwards; the anterior is broken with a tiny tooth and almost straight beyond that in the fourth pair of legs, but seems to bear several small teeth in the first pair (cf. 21. p. 115).

Ch. superbis n. sp. has the posterior hair very slender, almost straight, and is beyond the tooth moderately curved downwards with tip directed upwards; the tooth is very tiny in the fourth pair of legs, but better developed in the first pair of the female; this hair is in the fourth pair of the male remarkable by a very tiny ventral tooth opposite to the dorsal (cf. *Ch. lamprosalis* L. K. sp. aff.), and in the first pair by being a very slender with scarcely marked tooth. The anterior hair is long and slender in the fourth pair of legs; it is moderately curved with a tiny tooth in the female, but broken and with a well marked tooth in the male; that of the first pair in the female has the terminal part short with obsolete tooth, while it in the male has at least one distinct tooth. The posterior hair of all pair of legs attains in the male of *Ch. granulatus* C. K. an interesting development, it is fairly long and slender, moderately curved upwards in the middle and gradually widened out towards the dorsal tooth; this is only small, while the lower branch is large and moderately curved downwards, first of almost equal depth, but beyond a small ventral tooth tapering distinctly towards the pointed upwards directed tip (Pl. III, fig. 4 a, *he*). The corresponding hair has generally in the female the lower branch more clumsy and apparently bifurcate on account of differently developed ventral tooth. The anterior hair is moderately curved upwards with tiny dorsal tooth in the fourth pair of legs, while it in the first pair of the legs in the male (*hi*) has the dorsal tooth fairly big, and in the female appears almost hooked on account of the short terminal part, which is beyond the distinct dorsal tooth. The posterior hair is in the fourth pair of legs in *Ch. bifissus* Sim.(?) almost straight and distally bifurcate with lower branch the longest; the lower branch is in the first pair of legs slightly curved (21. pl. VI, figs. 1 e-f); the anterior hair is in the fourth pair of legs distinctly curved upwards in the middle with obsolete dorsal tooth and gradually pointed, bearing similarity to that found f. inst. in *Ch. Javanus* Thor.; the anterior hair of the first pair of legs is short with at least three terminal teeth (cf. 21. p. 100).

From the above it may easily be realized that the differences between the anterior and the posterior terminal lateral hair are most often well marked, sometimes better in the first pair of legs and sometimes in the fourth pair. When a sexual difference is found in the development of the hairs, it is generally most marked in the first pair of legs, and the hairs are generally more complicated in the male than in the female, if there is any difference. The structure of the hairs differ in a considerable degree in the different species, and their structure ought to be taken into consideration in the description of the species in spite of the rather difficult investigation, as they seem to provide a character without much variation.

V. Sexual Differences.

The male and the females of *Chelifer* Geof. are generally very easily discerned from each other both by primary and secondary sexual characters.

When a full-grown specimen is observed from beneath, it is generally possible to determine the sex by a superficial investigation of the genital area, because that of the female is less conspicuous than that of the male. But as the sexual apparatus of the male in contrast to that of the female differs so vastly in the different groups of species (cf. pp. 121--124), I think, that a proper knowledge of these variations as well as some practice are to be wished for, before being able to determine the sex in this manner with certainty, if both are not represented. The sexual difference is in this respect as in others most evident in "*Lophochernes* Sim." (Pl. III, fig. 1 f); it is also well marked in *Ch. Birmanicus* Thor., but less so in *Ch. cimicoides* F. and *Ch. subruber* Sim. Respecting this theme I also refer to Croneberg (45. p. 448) and Hansen (49. p. 235).

With regard to the secondary sexual characters it ought to be stated at once, that only a few can be applied to all species; the greatest number is only of value within a smaller or larger group of species, sometimes only in a single species. A character, which is of small value in the not quite full-grown specimens, is often very conspicuous, when the female has the abdomen distended by eggs, namely the shape and the size of this.

Tergal keels. — Simon seems to have been the first, who observed the longitudinal keels, with which the first tergites of a species of *Chelifer* Geof. are adorned; he made it on account of this structural feature to the representative of a new genus and called it *Lophochernes bicarinatus* Sim. (1878. 25. p. 66). Hansen described (1884. 9. p. 521) the well developed keels in the males of *Ch. depressus* C. K. and *Ch. granulatus* C. K., and the almost obsolete ones in *Ch. lampropsalis* L. K. Thorell has observed that the first abdominal tergites of *Ch. hians* Thor. are keeled (1891. 13. p. 355), but seems not to have understood that this character is only a sexual one. Hansen has later on given a figure of the abdomen of the male of *Ch. granulatus* C. K., showing the arrangement of the keels (1894. 49. tab. IV, fig. 12), and Lewis figured a species *Ch. sculpturatus* Lew., in which these keels attain a high degree of development (1903. 69^b. pp. 497-498, pl. XXV and 21. p. 120). Ellingsen has in a small treatise (1901. 18. p. 205) described such keels in his *Ch. Borneonensis* Ell. and made some historical remarks on this theme. These structures are very prominent in *Ch. depressus* C. K., in which teeth or well developed keels are present in the two thoracic as well as the five first abdominal tergites (Pl. III, fig. 2 a, *t*¹⁻⁷) and will as well as those of *Ch. Mortensenii* n. sp. and *Ch. superbus* n. sp. with variety be described under each species respectively.

5. *Ch. granulatus* C. K. (cf. 49. tab. IV, fig. 12). — The first thoracic tergite has neither teeth nor keels, but the second has at least in some specimens the posterio-lateral corner prolonged into a fairly well marked tooth or spine, which is directed

backwards and slightly outwards. The following abdominal tergites bear a similar lateral spine, increasing in length towards the sixth tergite; the corresponding spines of the three following tergites (VII—IX) are smaller and less prominent, that of the tenth scarcely visible. These spines correspond probably to the keels already described of the other previously mentioned forms, even if the sides of the first tergites show low lateral elevations beneath these spines (cf. below).

6. *Ch. lampropsalis* L. K. sp. aff. — The three first abdominal tergites with slightly marked elevations, above which a well developed free backwards directed spine is found; the second thoracic tergite bears a similar one; the lateral elevations beneath these spines are not found in the hindmost tergites, and the spines decrease towards the eighth abdominal tergite, in which it is almost obsolete.

7. *Ch. lampropsalis* L. K. — The lateral margins are slightly raised, but scarcely much more than in most other forms of *Chelifer* Geof.

Other forms like *Ch. Socotrensis* With have the tergites without any keels like *Ch. lampropsalis* L. K. as well as the females of all species with the exception of *Ch. sculpturatus* Lewis, in which the female bears more or less marked lateral projections on the tergites, while the male has the corresponding keels powerfully developed (cf. 21. pp. 117 and 120).

A sexual character of a somewhat different nature is found in the tergites of the males of *Ch. segmentidentatus* Balz., in which the posterior margin of the tergites is serrated (46. p. 428, tav. XV, fig. 13 ♂).

Sternal spines¹⁾. — In *Ch. subruber* Sim. and *Ch. Murrayi* Poc. a very remarkable sexual character is found in the proximal sternites, which are in the male beset with a number of short well articulated spines, arranged in a somewhat different way in the two species; as far as details are concerned, I refer to the description of these species and to pl. III, fig. 8, *sp.*

Galea. — One of the sexual differences, which is of most practical value and which is present in almost all forms, is that found in the size of the galea, compared with the terminal curved hair of the movable finger. Canestrini observed, that the galea is poorly developed in some specimens, but highly developed in others, but he believed that this difference was one of age (42. Fasc. VII). Thorell has also mentioned short and long galeae in the same species f. inst. in *Ch. Javanus* Thor. (1882. 6. p. 38), but seems not to have understood the sexual character of this difference. Balzan (1890. 46. p. 412) saw, that the galea differs according to the sex, but later on (1891. 12. p. 500) he expressed the opinion, that a sexual difference in the galea is only found in species belonging to *Trachychernes* Töm. and *Chelifer* Geof., not in the other subgenera. In this I can not completely agree with him, for in all Asiatic species examined by me a sexual character is found

¹⁾ Ed. Ellingsen has in a paper (72. pp. 13, 14 and 16), of which I received a copy during the printing of this treatise, observed and described sternal spines in a number of African species viz. *Ch. angulatus* Ell., *Ch. Simoni* Balz. and *Ch. tenuimanus* Balz., but has not mentioned the structure of the articulation between the two femoral parts in the first pair of legs.

in this structure, sometimes small indeed, but distinct, while he is right as far as the South-American forms of "*Lamprochernes*" are concerned (cf. Hansen. 49. p. 236). There seems sometimes to be a difference according to sex in the number of the dentated lobes of the lamina interior, for it is in the male of *Ch. Birmanicus* Thor. f. inst. three, but in the female four (Pl. IV, figs. 4 a-b).

Maxillae and Palps. — The shape of the maxillae provide in *Ch. Murrayi* Poc. a valuable sexual character (Pl. III, figs. 8 f-g; cf. description of this species). The palps are often almost alike in the two sexes, but as a rule small differences are found in the relation between the length and the breadth of the joints; the palps of the males are always the most powerful, if there is any difference, f. inst. in *Ch. Murrayi* Poc. (Pl. III, figs. 8 h-i) and *Ch. equester* With (21. pl. IX, figs. 1 a-d). In the gaping of the fingers, when closed, there is as shown by Hansen (9. p. 529 and 49. p. 236). The chelae of the males gape, when they are closed, distinctly in the middle, as the fingers only touch each other at the base and to a small extent at the apex, in *Ch. depressus* C. K. (fig. 2 d) and *Ch. Mortensenii* n. sp. f. inst., more moderately so in *Ch. granulatus* C. K. and scarcely so in *Ch. lampropsalis* L. K. The gaping seems to be very slight in most species of *Chelifer* Geof. outside "*Lophochernes* Sim.", but very marked in a *Ch. nodulimanus* Töm. from Brazil and *Ch. cocophilus* Sim. (cf. below). Simon used the gaping of the fingers in *Ch. bicarinatus* Sim. as one of the characters for his genus *Lophochernes* Sim. (1878. 25. p. 66), and Thorell used the gaping of the fingers as a specific character of importance in his description of *Ch. hians* Thor. (1891, 13. p. 356); both laid too much stress on this structure, as may easily be realised from the above.

Legs. — The shape of the coxae provide sometimes characters of great value in the identification of the sexes, especially in "*Lophochernes* Sim.", in the males of which the fourth pair includes a differently shaped coxal sac (Pl. III, figs. 1 e-f), but also in species of other groups f. inst. in *Ch. equester* With (cf. 21. pl. VIII, figs. 3 d ♀, ♂); in some species, f. inst. the three Asiatic ones, described in this paper, and *Ch. granulatus* C. K. (fig. 1 f, t) the coxa of the fourth pair is provided with an external spine or tubercle, which is wanting in the other species examined by me.

The tarsi of the first pair of legs differ in many species according to sex f. inst. in *Ch. superbus* n. sp. (cf. description) but especially in *Ch. lampropsalis* L. K. sp. aff. (cf. pp. 42—43).

VI. Genera.

The genus *Chelifer* Geof. was established in the year 1783, even if we take it in the restricted sense; it has later on been subdivided in a great number of genera and subgenera, the systematic value of which will presently be discussed. The position of a single genus viz. *Pelorus* C. K. (1843. 1. p. 59, tab. CCCXLII) seems to be doubtful; it is from the description realised, that its legs are in the main similar to those of *Chelifer* Geof., but it has in addition according to the description a cephalothorax, which is pointed in front and provided with four eyes.

Erickson writes about this animal in his Archiv für Naturgeschichte 1844 "Jahresberichte für 1843" (p. 333): "es sind nämlich nicht vier Augen vorhanden, sondern nur zwei, und auch diese nur durch einen hellen Punkt der Hornbedeckung des Vorderleibes angedeutet." Erickson unfortunately does not mention, if his criticism of Kock's description is based upon a reexamination of the typical specimen; if he is right, this genus is only different from *Chernes* Menge by the shape of its cephalothorax. The genus *Chernes* was established by Menge to include species without eyes and with transverse stripes of the cephalothorax (1855. 33. p. 39) and was later on accepted as a subgenus by Balzan (1891. 12. p. 513); in this circumscription the genus is scarcely a natural one, but perhaps in a restricted sense with *Ch. cimicoides* F. as type. This genus was by later authors divided into different subgenera, the value of which will be discussed below.

The next genus of this subfamily, which was established, namely *Ectoceras* Stecker (1875. 4. p. 512; cf. Daday 11. p. 108) is characterized by the large ocular spots, by the distinct transverse stripes of the cephalothorax, granular integument with clavate hairs, clumsy palps and claws, which bear teeth; if Steckers description is correct, this genus may perhaps be accepted as natural, especially on account of the structure of the claws. The genus *Lophochernes* Sim. was established by Simon (1878. 25. p. 66) to include species with the abdominal tergites keeled and the fingers of the palps gaping when closed, both characters only in the males (cf. Hansen 9. p. 521, and Ellingsen 18. p. 206); this genus is quite natural, but its name can not be accepted, because it includes *Ch. cancroides* L., which is the type of the whole genus *Chelifer* Geof.; this generic name ought accordingly to be applied to the "*Lophochernes*" group, if it was separated off (cf. below).

Balzan divides the genus *Chelifer* Geof. into three subgenera namely *Atemnus* Can., *Chernes* Menge, again divided into the manipuli *Lanprochernes* Töm. and *Trachychernes* Töm., and as the third *Chelifer* Geof.; the characters taken from the antennae or the shape of the body as they are not regarded as absolute by the author will not be discussed here.

The last of these subgenera *Chelifer* Geof. (12. p. 528; 40. p. 184) is mainly characterized by the presence of real eyes; these are according to Balzan (12. p. 500) always easily distinguished from ocular spots; perhaps they are. But this character is at least of no great value and too unimportant, as the main-characteristic of a subgenus, for *Ch. subruber* Sim. has eyes with well developed lenses and *Ch. Murrayi* Poc. has only white ocular spots on a level with the integument around and even minutely granular, a dissimilarity which is of small importance, compared to a number of characters, in which these two nearly related species agree. If the subgenus *Chelifer* Geof. is natural or not, can only be determined by taken a greater number of characters in consideration than Balzan did; it falls really into two natural groups (cf. below) at least. The principal difference between the subgenera *Chernes* Menge and *Atemnus* Can. (12. p. 510; 42. Fasc. VII, 9), is found in the absence or presence of transverse stripes on the cephalothorax; but the value of

this character is in many cases nil, for it is sometimes impossible to distinguish if a species has an indistinct stripe or none; and even if we succeed in doing so, we will not be on the safe side, because we have separated nearly related species from each other; *Chelifer Birmanicus* Thor. f. inst. must be referred to *Lamprochernes* Töm., and *Ch. Javanus* Thor. to *Atemnus* Can. in spite of the near relationship they show in many respects. Most species of *Lamprochernes* Töm. and *Atemnus* Can. seem to go naturally together as far as can be judged from the descriptions (cf. p. 133). Now a few words about *Chernes* Menge and its maniples; the main character between *Lamprochernes* (12. p. 513; 40. p. 184) and *Trachychernes* (12. p. 521; 40. p. 184) is found in the shape of the hairs and the granulation; but these features, which are not always well marked, do not count for very much, when other characters are taken into consideration, especially those found in the genital area of the male. According to characters taken from this as well as from other structures we must regard *Ch. nodosus* Schranck, which is a "*Lamprochernes* Töm.", as being nearly related to *Ch. cimicoides* F., which is a typical "*Trachychernes* Töm.", but far distant from *Ch. Birmanicus* Thor., belonging to the same maniple as itself.

From the above it may be easily seen, that the subgenera, established by Balzan, are not well founded and have scarcely any real systematic value, and that the characters, by which they were defined, are of no great importance. But if we do not accept Balzan's system, we are bound to examine, whether all the species of the whole big genus *Chelifer* Geof. pass gradually into each other, or whether they may be arranged in natural and well defined groups. I think, that a natural system is possible, principally based on the genital organs of the males, but only the outlines of such a system will be drawn here, because too few species of the described species are examined to form a definitive classification. These groups will be characterized one after the other.

1. The "*Lophochernes* Sim." or *Ch. cancroides* L. group is characterized in the following manner. Real eyes are present. *Two transverse stripes on cephalothorax, of which posterior sometimes the broader.* The tergites of the male bear generally lateral keel or teeth. Body as a rule granular with at least some of the hairs clavate in most species. *Genital area* (cf. p. 122; pl. III, fig. 1 f) with posterior plate much bigger than anterior; very long ram's-horn-shaped organ present in male. *The coxa* of the fourth pair of legs is in the male always *concave behind* (Pl. III, fig. 1 f), includes always a "*coxal sac*" and is often provided with an exterior spine. The articulation between the trochantin and the femur proper of the first pair of legs very wide and of the usual shape (cf. p. 37). The tarsus of the first pair of legs is generally shorter in the male than in the female, and the claws generally bear accessory teeth, providing a sexual character in the first pair of legs (cf. p. 125). The tarsal "tactile" hair is never basal, but median or terminal, and the *terminal lateral* hairs bear at least a single tooth (cf. p. 126). It is evident, that the enumerated characters are of very unequal value, partly because they are also found

in species, which do not belong to this group, and partly because they are not found in all its species. The most characteristic structure is of course that found in the sexual organs and the coxal sac of the male; others, less important, but more practical, because they are apparently only found in species of this group and probably in both sexes, may be taken from the broad second transverse stripe and from the shape of the terminal lateral hair of the tarsus. Only 20 of those described about 175 species of *Chelifer* Geof. can with security be referred to this group; and these can perhaps be divided into two maniples, of which the first only includes *Ch. sculpturatus* Lew., remarkable by its big granulations, toothless claws, shape of the coxa IV of the female e. l. c. (cf. p. 123; 21. pp. 117—123). *Ch. Mortensenii* n. sp. and *Ch. granulatus* C. K. are representants of groups of minor value.

2. The *Ch. subruber* Sim. group is characterized by the following structures. Real eyes or ocular spots present. Two transverse stripes and skin granular with clavate hairs. *Genital area* of very simple structure and with the posterior plate longer than the anterior (cf. p. 121; pl. III, fig. 7 b); the *sternites* of the male is beset with a large number of short spines (cf. p. 129; pl. III, fig. 8 b). The *articulation* between the trochanlin and the femur proper of the first pair of legs very narrow and differing from that of all other forms (cf. p. 37; figs. 5 a-b). The tarsal "tactile" hair is median. Only two species, *Ch. subruber* Sim. and *Ch. Murrayi* Poc., which differs from each other in many respects, can be referred to this group, which may perhaps be regarded as the central one in the whole subfamily for the simple structure of the genital area and the slightly developed articulation of the first pair of trochantins. I think, that a great many of the species with real eyes, which do not belong to "*Lophochernes* Sim.", may possibly be referred to this group, even if such a character as the armature of the sternites fails.

3. The *Ch. Birmanicus* Thor. group is characterized in the following way. No eyes, but ocular spots often present. Cephalothorax smooth with pointed hairs and without transverse stripes or with indistinct ones. The *genital plates* (♂) of almost equal breadth and length, but the posterior with two in the middle backwards curved sclerites (cf. p. 124 and pl. III, fig. 10 a). The articulation of the femur of the first pair of legs wide and of the usual structure (cf. p. 37), and their tarsi always much shorter than the tibia. The tarsal "tactile" hair is basal. This group seems to be well characterized by the genital area of the male as well as by the basal position of the tarsal "tactile" hair, and includes probably by far the greatest number of species described, embracing all referred to *Atemnus* Can. and many of those belonging to *Lamprochernes* Töm. Most species belonging to this group appear rather uniform and do not provide many striking specific modifications, *Ch. equester* With partly excepted (21. pp. 123—127).

4. The *Ch. cimicoides* F. group is characterized so. No eyes but sometimes ocular spots. Distinct transverse stripes. The fingers of the palps *with accessory* teeth. The *anterior* genital plate longer than the posterior and of peculiar structure

(cf. p. 123). This group, which is probably of less value than the three preceding ones, can naturally be divided into two viz. one with the integument granular and clavate hairs, and without any tarsal "tactile" hairs, and the other with skin smooth, with pointed hairs and with tarsal "tactile" hairs. To the former of these secondary groups belong *Ch. cimicoides* F., *Ch. Hawaiensis* Sim.(?), *Ch. Pacificus* With(?) and *Ch. Australiensis* With(?), and to the latter *Ch. nodosus* Schranck and *Ch. Galathea* n. sp.(?); the position of those species which are marked by an interrogation is doubtful, because I have only had occasion to examine their genital area from below without dissection. *Ch. cocophilus* Sim. seems also to belong to this group, though differing in some respects (cf. below).

By using the characters proposed, especially those taken from the genital area of the male, there seems to be a probability for attaining a natural classification of *Chelifer* Geof.; the main divisions will probably be as proposed, but other groups will possibly be established and some of those proposed perhaps dissolved into several. If future students succeed in dividing the great number of vastly modified species, belonging to the old genus *Chelifer* Geof., into several genera, they will be obliged to encompass these in one new subfamily and establish another for *Pseudochiridium* n. gen.

VII. Synoptic Key of Indian Species.

1. Real eyes. Transverse stripes. "Tactile" hair of tarsus IV median.
2. Claws with teeth.
3. Hand of the palps distinctly broader than the tibia.
4. Trochanter of the palps distinctly longer than broad.
5. Abdominal tergites provided with longitudinal lateral keels. Fingers of the palps scarcely shorter than hand and gape distinctly when closed. Coxae of the fourth pair have posterior margin distinctly concave and are provided with a coxal sac; two claws of first pair of legs very different ♂
6. Palps only slightly longer than body. The posterior claw of first pair of legs without backwards directed tooth; the posterior terminal lateral hair of fourth tarsus bifurcate. Femur of the palps is 3·2 longer than broad, tibia 2·8, and hand 1·5 broader than tibia (1) *Mortensenii* n. sp. ♂
6. Palps much longer than body.
7. The posterior claw of first pair of legs without backwards directed tooth; posterior terminal lateral hair of tarsus IV with two terminal teeth. Femur of the palps 3·7 longer than broad, tibia 3 times, and hand 1·7 broader than tibia (2) *depressus* C. K. ♂

7. The posterior claw of first pair of legs with backwards directed tooth; posterior terminal lateral hair of tarsus IV with three terminal teeth. Femur of the palps 3.4 longer than broad, tibia 2.7, and hand 1.5 broader than tibia (3) *superbus* n. sp. ♂
5. Abdominal tergites without longitudinal lateral keels. Fingers of palps shorter than hand and scarcely gape when closed. Coxae of fourth pair with almost straight posterior margin and without coxal sac; two claws of first pair of legs scarcely different . . . ♀
8. Palps shorter than body. Tergal sclerites distinct. Femur of the palps 3 longer than broad, tibia 2.6, and hand 1.4 longer than finger and broader than tibia (1) *Mortensenii* n. sp. ♀
8. Palps longer than body. Hand is 1.6 broader than tibia and 1.2 longer than finger.
9. Tergal sclerites distinct. Palps much longer than the body. Femur 3.5 longer than broad and tibia 3 (2) *depressus* C. K. ♀
9. Tergal sclerites scarcely visible. Palps a little longer than body. Femur 3.3 and tibia 2.9 longer than broad (3) *superbus* n. sp. ♀
4. Trochanter of the palps scarcely longer than broad (4) *bisulcus* Thor.
3. The hand of the palps not broader than the tibia (5) *bifissus* Sim.
2. Claws without teeth.
10. Hairs not distinctly clavate. Hand 1.5 broader than tibia.
11. Two transverse stripes.
12. Fingers scarcely shorter than hand and distinctly gaping when close in ♂. Posterior transverse stripe as broad as anterior.
13. Cephalothorax minutely granular. Femur of palps 2.5 longer than broad. Tip of the abdomen much darker than anterior portion (6) *hians* Thor.
13. Cephalothorax almost smooth. Femur of the palps 3 longer than broad. Tip of the abdomen not darker than anterior part. Tergites (♂) with lateral keels. . (7) *Borneonensis* Ell.

12. Fingers distinctly (1·5) shorter than hand. Posterior stripe less distinct than anterior. Cephalothorax almost smooth. Femur of the palps 3 longer than broad. Some of the hairs slightly clavate. (9) *Balzanii* Thor.
11. Single transverse stripe, curved backwards in the middle. Cephalothorax minutely granular. The femur of the palps is 3·5 longer than broad. (8) *Hansenii* Thor.
10. Hairs distinctly clavate. Hand less than 1·5 broader than tibia. Cephalothorax distinctly granular with two broad straight stripes. The trochantin of the first pair with slightly developed articulation. The IV—IX sternites (♂) with a number of short spines. (10) *subruber* Sim.
1. No real eyes, but sometimes while ocular spots.
14. Claws with teeth. Ocular spots. Clavate hairs. Short clumsy palps. Distinctly granular.
15. Femur of the palps without a pair of median long and stout tubercles. (13) *Hefferi* Steck.
15. Femur of the palps with a pair of median long and stout tubercles. (14) *bidens* Steck.
14. Claws without teeth.
16. Palps exceedingly long and slender with their femurs 5 or 6 times longer than broad. No ocular spots. Two transverse stripes. The hand of the palps is twice as broad as the tibia. (12) *Sumatranus* Thor.
16. Palps moderately long or short with their femurs 2 or 3 times longer than broad.
17. Distinctly clavate hairs. Transverse stripe.
18. The trochantin of the first pair with slightly developed articulation. Inner margin of the maxillae more or less concave distally; femur 3 longer than broad and hand 1·3 longer than fingers, which have no accessory teeth. Ocular spots distinct; cephalothorax distinctly granular; IV—X sternites with a number of short spines. . . (11) *Murrayi* Poc.

18. The trochantin of the first pair with the articulation of usual shape. Inner margin of the maxillae straight. Fingers with accessory teeth.
19. Hand distinctly longer than finger.
20. No ocular spots. Hairs exceedingly broad
(15) *æquatorialis* Dad.
20. Ocular spots. Hairs moderately enlarged. Cephalothorax granular with indistinct transverse line. Hand of the palps is 1·4 broader than tibia (17) *modestus* n. sp.
19. Hand scarcely longer than finger.. (16) *scorpioides* Herm.
17. Hairs not distinctly clavate, either obtuse or pointed with a few distal teeth.
21. Two first abdominal tergites with a longitudinal depression in the middle; cephalothorax with indistinct transverse line. The femur of the palps is 2·2 longer than broad; the hand is 1·4 broader than the tibia, 1·6 longer than broad, 1·3 longer than deep and 1·4 longer than finger, which has no accessory teeth. The tarsus IV with basal "tactile" hair (23) *concavus* n. sp.
21. Two first abdominal tergites without longitudinal depression.
22. Hand of the palps is only 1·2 longer than deep. Cephalothorax smooth with indistinct transverse line. The femur of the palps is 2 longer than broad; the hand is 1·3 broader than tibia and 1·4 longer than fingers, which possess accessory teeth. "Tactile" hair of tarsus IV is wanting.. (18) *Galathea* n. sp.
22. Hand of palps at least 1·4 longer than deep.
23. Hairs partly a trifle clavate. Cephalothorax almost smooth with two transverse stripes. Femur of the palps 3 longer than broad; hand 1·5 broader than tibia and longer than finger. Distinct ocular spots (9) *Balzanii* Thor.
23. Hairs almost simple; pointed with a few teeth.
24. The "tactile" hair of the tarsus is not basal. Transverse stripe always present. Sexual area (♂) not of "*Birmanicus*" type.
25. A single median transverse stripe. The fingers of the palps do not gape distinctly when closed.

26. No ocular spots. Cephalothorax minutely granular.
27. Hand of the palps is 1.3 broader than tibia and 1.2 longer than fingers, which bear accessory teeth (19) *nodosus* Schranck.
27. Hand of the palps is 1.5 broader than tibia and longer than fingers (20) *megasoma* Dad.
26. Distinct ocular spots. Cephalothorax almost smooth. Hand 1.7 longer than finger. (24) *Thorellii* Balz.
25. Two distinct transverse lines. Fingers (♂) gape distinctly when closed. Distinct ocular spots. Cephalothorax minutely granular.
28. The hand of the palps is 1.5 longer than the finger; the trochanter with dorsal conical tubercle. Upper side of the tibia in the male with a conical protuberance. (21) *nodulimanus* Töm.
28. The hand of the palps scarcely longer than the finger; the trochanter without dorsal conical tubercle. Upper side of the tibia in the male without conical protuberance (22) *cocophilus* Sim.
24. The "tactile" hair of tarsus IV is basal. Sexual area (♂) of "*Birmanicus*" type.
29. Cephalothorax with transverse stripe.
30. Median transverse stripe is almost straight. Distinct ocular spots. Smooth palps have trochanter bigibbose and hand 1.7 longer than finger (24) *Thorellii*
30. Median stripe distinctly curved backwards in middle. Indistinct ocular spots. Palps minutely granular and hand 1.5 longer than finger.
31. Cephalothorax as broad in the middle as behind, as broad as the abdomen, which has no longitudinal line. The hand is 1.1 broader than tibia and deeper than finger is long
(27) *Nicobarensis* n. sp.
31. Cephalothorax not as broad in the middle as behind and narrower than the abdomen, which has an indistinct longitudinal line. The hand is narrower than finger is long.¹⁾

¹⁾ A. Tullgren has recently published a treatise (22 b), in which he mentions *Ch. Birmanicus* Thor. (pp. 39-40, figs. 1 a-f) and gives descriptions of two new species viz. *Ch. Kraepelinii* Tullg. (pp. 40-42, figs. 2 a-d) and *Ch. Waburgii* (pp. 42-43, figs. 3 a-b), which do not seem to be identical to any of the

32. The hand is 1.4 longer than deep and 1.3 longer than finger. The trochanter (♂) with dorsal process blunt and tibia abruptly convex (26) *monitor* n. sp.
32. The hand is 1.7 (♂) or 1.5 (♀) longer than deep and 1.4 longer than finger. The trochanter has the dorsal process fairly pointed and tibia evenly convex (25) *Birmanicus* Thor.
29. Cephalothorax without transverse stripe.
33. Trochanter of the palps without distinct dorsal tubercle. Stalk of the tibia rather short; hand broader than deep, 1.5 broader than tibia and 1.4 longer than finger.
34. Palps smooth with very short tibial stalks and distinctly convex outlines (29) *plebejus* n. sp.
34. Palps "impressi punctati" with moderately long stalk and moderately convex outlines of tibia
(28) *Javanus* Thor.
33. Trochanter of the palps with more or less prominent dorsal tubercle.
35. The hand of the palps is 1.8 longer than finger.
36. The trochanteral tubercles are moderately long; no sharp distinction between reddish brown palps and pale elongate abdomen.
37. Hand almost 2 broader than tibia (30) *orites* Thor.
37. Hand 1.5 broader than tibia (30) *orites* Thor. af. Ell.
36. The trochanteral tubercles are very long, a marked difference in colour between reddish brown palps and pale elongate abdomen. Hand is 1.2 broader than tibia (31) *vermiformis* n. sp.
35. The hand of the palps is not more than 1.5 longer than finger.
38. Palps minutely granular all over.
39. The dorsal tubercle of the trochanter is high and obtusely pointed. Indistinct ocular spots. Femur 2 longer than broad. Short tibial stalk.
(35) *rotundus* n. sp.

Indian species, mentioned in this paper, but apparently are related to *Ch. monitor* n. sp. and *Ch. Birmanicus* Thor. *Chelifer Kraepelinii* Tullg. seems to differ from the just mentioned two species by minor differences in the structure of the palps f. inst. the shorter tibial stalks, while *Ch. Waburgii* Tullg. is easily distinguished by its very short and clumsy femur of the palps, almost circular tibia and the trochanter, which has the posterior outline only slightly convex without any tubercles. This paper had already gone to the printer's, before I received Mr. Tullgren's paper, and I was accordingly not able to pay full attention to his species.

39. The dorsal tubercle is rather low.
40. Distinct ocular spots. Femur 2.5 longer than broad and hand 1.5 longer than finger. Very long tibial stalk. . . . (33) *Indicus* n. sp.
40. Indistinct ocular spots. Femur 2.3 longer than broad and hand 1.3 longer than finger. Moderately long tibial stalk
(26) *monitor* n. sp.
38. Palps almost completely smooth. Trochanteral tubercles are very long and prominent.
41. Small ocular spots. Trochanter of the palps much longer than broad; femur 2.5 longer than broad; extremely long tibial stalk. (32) *navigalar* n. sp.
41. Large ocular spots. Trochanter of the palps scarcely longer than broad; femur scarcely twice as long as broad; moderately long tibial stalk. (34) *articulosus* Sim.

VIII. Description of Species.

1. *Chelifer Mortensenii* n. sp.

(Pl. II, figs. 9 a-c; pl. III, figs. 1 a-i).

Distinct eyes present. Two transverse stripes, straight in the middle and of almost equal breadth; cephalothorax with obtuse hairs and almost smooth. Abdomen with tergal keels (♂), with no hairs but lateral in front of marginal row and with "tactile" hairs on last two segments. Genital area of male of "Lophochernes" type. Palps slightly shorter (♀) or slightly longer (♂) than body and almost smooth; trochanter distinctly longer than broad and its dorsal surface scarcely produced posteriorly; femur about 3 times as long as broad, as long as but distinctly narrower than tibia, which has lateral outlines moderately convex and the basal posterior elevation very indistinct; hand is 1.4 (♀) or 1.5 (♂) broader than the tibia, and 1.4 (♀) longer than or of almost equal length (♂) to fingers. The coxa IV (♂) with distinctly concave posterior margin, including a coxal sac, which has a well defined basal portion, and provided with an exterior spine. Median tarsal "tactile" hair of fourth pair; the tarsus I is as long as the tibia (♀) much shorter (♂), and 5 (♀) or 3 times (♂) as long as deep. Claws with big anterior tooth; anterior claw of first pair of legs (♂) with small ventral tooth and posterior slightly curved without distinct tooth.

♀. Cephalothorax. — Two distinct eyes are present. The cephalothorax is slightly longer than broad behind; two very prominent, broad and dark transverse stripes are found, of which the posterior is a trifle less prominent, and which are almost straight in the middle; the second tergite, which is only half as long as the first, appears completely alike an abdominal tergite and has a longitudinal dark line. The integument appears smooth, but is really reticulate chiefly laterally; short and obtuse hairs are placed on the head and first tergite without proper order, but those of the second, which are longer, along the hinder margin in a transverse row.

Abdomen (Pl. III, fig. 1 a). — The abdomen is elongate-oval and distinctly longer than broad; the third tergite is about 6 times as broad as long; all the tergites, with the exception of the eleventh and to some extent the first, are indistinctly longitudinally divided. The hairs are almost simple with a single or a few terminal teeth (fig. 1 a); those of the first tergites are moderately long and slender, while those of the eleventh f. inst. are very much so; the hairs are placed in a transverse row along or near to hinder margin of the sclerites to a number of about 12; the tergites beyond the second bear on each side a single hair laterally in front of the row. The eleventh tergite as well as the sternite bear a pair of long slender "tactile" hairs.

Antennae (Pl. III, figs. 1 b-c). — The *flagellum* consists of three hairs, of which the anterior bears a few tiny teeth near tip; the *lamina interior* has four dentated lobes; the *serrula exterior* consists of 17 teeth, of which the basal is the longer, and, where it is enlarged terminally, it bears a rounded flap; its terminal tooth is not pointed. The *galea* extends distinctly beyond the terminal hairs and is mounted with about seven distal short branches (fig. 1 b).

Palps (cf. Pl. III, fig. 1 d). — The palps appear smooth, but not polished and are provided with hairs, which are broken and mounted with a single or a few distal teeth on all joints except the fingers; those of the trochanter and femur are a little obtuse in contrast to the pointed ones of the tibia and the hand. The fingers bear a number of *tactile hairs* as well as sense-spots; the immovable one bears posteriorly and dorsally two basal and two distal tactile hairs in addition to six spots, while it anteriorly has three(?); the movable one bears four tactile hairs and four spots. The *trochanter*, which has a distinct stalk, is 1.8 times longer than broad and perhaps a little narrower than femur; the anterior margin is beyond stalk evenly convex and the posterior very slightly so; the dorsal surface is slightly produced posteriorly, but we can not in a proper sense speak about a dorsal posterior tubercle. The *femur*, which has a moderately long and well marked stalk, is three times as long as broad, as long as but distinctly narrower than the tibia, and gradually widened out towards the tip; the anterior side has beyond the notch a scarcely marked convexity extending to near the tip, where a short distinct concavity is found; the posterior is distinctly convex just beyond the stalk, then almost straight and towards the tip convex again. The *tibia*, which is about 4 times longer than the short and distinct stalk, is 2.6 longer than broad and 1.2 broader than the femur; the anterior outline is moderately convex beyond the rather shallow notch of the stalk; the posterior surface has a rather prominent condylus, followed by a low concavity and the basal elevation, which is fairly well defined proximally, but distally merges into the almost straight outline of the joint proper; this is towards the tip distinctly convex. The *hand* is a trifle shorter than the tibia and 1.4 broader; it is almost as broad as the trochanter is long, 1.8 times longer than broad, as broad as it is deep, and 1.4 longer than the finger; both lateral outlines are moderately convex, most suddenly the posterior.

Coxae (Pl. III, fig. 1 c). — The fourth pair are square, slightly enlarged towards the extremity, and about 1.5 longer than broad; the posterior interior corner is very prominent and the posterior margin, which is about 1.5 longer than the interior, is a little concave.

Legs (Pl. III, figs. 1 g-i). — The hairs are long and slender; they are distally broken with one or a few teeth (Pl. III, fig. 1 g); the trochanter and the trochantin have in addition to those ventrally a long, slender, pointed and simple hair each. The „*tactile*” hair of the tarsus IV is placed in the median third, removed from the tip a distance equal to its length and from the base about half its length. The *posterior terminal lateral* hair has in the fourth pair of legs the lower branch beyond the dorsal tooth almost semicircular, while it is in the male almost straight; the anterior one is moderately curved upwards in the middle and beyond the tiny tooth almost straight. The *trochantin* of the first pair of legs are distinctly wider than the femur proper; the *femur* of the fourth pair of legs is 2.5 longer than deep. The *tarsus* of the first pair of legs is a little longer than the tibia, tapering towards the tip, and 5 times as long as deep; the tarsi of the fourth pair of legs are much shorter than the tibia, but 1.5 longer than the femur is deep. The *claws* bear big anterior teeth, which in the first pair of legs are almost as big as the tip itself giving the claw the appearance of being bifurcate (fig. 1 i, c).

Colour. — The palps are reddish brown with proximal joints lighter, and so is the cephalothorax with darker transverse stripes; the abdominal sclerites are a more yellowish brown of dull appearance. Coxae and legs light brown, the former the darker.

Measurements. — Specimen dilated with eggs. Cephalothorax 0.672 (0.588); abdomen 2.044 (1.344) mm.

Palps: trochanter 0.336 (0.185); femur 0.616 (0.196); tibia 0.616 (0.240); hand 0.588 (0.320), depth 0.336; finger 0.420 mm.

Leg I: femur 0.414 (0.140); trochantin 0.090; tibia 0.315 (0.090); tarsus 0.333 (0.063) mm.

Leg IV: femur 0.510 (0.196), trochantin 0.180; tibia 0.486 (0.117); tarsus 0.387 (0.081) mm.

♂. Cephalothorax. — The first transverse stripe, which is the less distinct, is curved moderately forwards in the middle; the second tergite has no longitudinal darker line, but bears a lateral tooth directed backwards and a row of 10 hairs in addition to one lateral in front of row.

Abdomen (Pl. III, fig. 1 f). — The abdomen is more flattened and has the IV—X tergites longitudinally divided. The five first tergites bear lateral wing like expansions or keels, which are most developed in the second, being produced into a posterior tooth not extending beyond margin of next segment to any marked degree, but not into an anterior; the keel of the fifth segment is almost obsolete. The genital area is of the “*Lophochernes*” type (cf. pp. 122—123 and pl. III, fig. 1 f).

Antennae (Pl. III, fig. 1 c). — The *lamina interior* with two dentated lobes only; the *galea*, which has about five almost obsolete distal teeth, does not extend beyond the terminal curved hair.

Palps (Pl. II, fig. 1 d). — The palps are a little longer than the body; the immovable finger bears four anterior-dorsal tactile hairs instead of three. The joints of the palps are as a rule longer and more slender than those of the female and the curvatures of the sides more moderate. The *femur* is 3.2 longer than broad, and the *tibia* is 2.8 longer than broad; the hand is 1.5 broader than the tibia and scarcely longer than the *fingers*, which gape distinctly when closed, because dorsal margin of immovable, but especially of movable, is concave.

Coxae (Pl. II, figs. 9 b-c; pl. III, fig. 1 f). — The fourth pair of coxae are enlarged towards the extremity and bear exteriorly a big spine (fig. 1 f, *t*); the posterior margin is distinctly concave. The coxal sac has the comparatively large basal portion, which does not bear any conical tubercle and hair, well separated from the distal part (cf. pp. 46—47 and pl. II, figs. 9 b-c).

Legs (Pl. III, figs. 1 h-i). — The *lateral terminal* hairs of the tarsi are similar to those of the female, but the posterior has the lower branch less curved and the anterior is more suddenly curved. The tarsus of the first pair of legs is deepest just beyond base and has the lower margin convex; it is only about 3 times as long as deep. The claws bear distinct teeth; those of the first pair of legs are peculiarly shaped; the anterior (*ci*) is moderately curved with a small ventral tooth, while posterior (*ce*) is long and slender, almost straight with an almost obsolete anterior tooth (fig. 1 h, *ci-ce*).

Colour. — The colour is much lighter yellowish brown with the fingers and the cephalothorax more reddish; but the specimen appears, as if it was not yet quite darkened after the ecdysis.

Measurements. — Cephalothorax 0.750 (0.600); abdomen 1.590 (0.840) mm.

Palps: trochanter 0.360 (0.196); femur 0.675 (0.210); tibia 0.675 (0.250); hand 0.625 (0.360), depth 0.360; finger 0.595 mm.

Variation. — An other, young, male, which had probably not yet passed the final moult, had the transverse stripes of the cephalothorax much more distinct, especially the posterior, which was almost half as broad as the second tergite was long; the tergal keels were almost wanting. The sexual area is apparently not different. The proportions of the palps more similar to those of the female, and the fingers gape only a little, when closed. The galea extends beyond terminal hair. The coxae and legs are scarcely different from those of fullgrown male. The colour is darker, but not so dark as in female.

Material. — Dr. Th. Mortensen collected two males and one female of this species under bark in the Island of Koh Chang in the month of January.

Remarks. — This species may be regarded as nearly related to the three following on account of the similarity in the structure of the coxal sac and tarsi of the first pair of legs in the male.

2. *Chelifer depressus* C. K.

(Pl. II, fig. 10 a; Pl. III, figs. 2 a-e).

1843. C. L. Kock (1.) p. 57, fig. 792.

1884. H. J. Hansen (7.) tab. VII, fig. 7.

1884. H. J. Hansen (9.) p. 540.

Two distinct eyes present. Two transverse stripes almost straight in the middle and of almost equal breadth; cephalothorax with obtuse hairs and minutely granular. Abdomen with well developed tergal lateral keels (♂), with no hairs but lateral in front of the marginal row, and with "tactile" on last segment at least. Genital area of male of "Lophochernes" type. Palps much longer than body and almost smooth; trochanter distinctly longer than broad and its dorsal surface slightly produced posteriorly; femur about 3.5 longer than broad, as long as but distinctly narrower than tibia, which has lateral outlines slightly convex and the basal elevation very indistinct; hand is 1.6 (♀) or 1.7 (♂) broader than tibia, and 1.2 longer or of almost equal length to fingers. The coxa IV (♂) with distinctly concave posterior margin, including a coxal sac, which has a well defined basal portion, and provided with a big exterior spine. Median tarsal "tactile" hair of fourth pair; the tarsus I is almost as long as tibia (♀) or much shorter (♂), and 5 times (♀) or 3.7 (♂) longer than deep. Claws with big anterior teeth; anterior claw of first pair of legs with a small ventral tooth, and posterior more slender and curved without tooth.

♀. Cephalothorax. — Two distinct eyes, removed from the front margin a distance, smaller than their diameter. The cephalothorax is scarcely longer than broad behind; two very prominent, broad and dark stripes, of which the anterior, which is scarcely broader than the posterior, is slightly curved backwards in the middle, in contrast to the posterior which is straight or slightly curved forwards. Integument is very minutely granular and provided with short obtuse hairs.

Abdomen. — The abdomen is rather elongate, and of almost equal breadth everywhere, and distinctly longer than broad; it is somewhat depressed; the third tergite is about 8 times as broad as long. All the tergites are raised towards the middle to establish a kind of longitudinal keel and are all divided by a longitudinal line except the last one. About 10 moderately long and obtuse hairs are placed along the hinder margin of the sclerites and in addition to these a single one laterally on each side in front of the row; the eleventh tergite bears one pair of "tactile" hairs at least. The median segments with very prominent muscular spots.

Antennae (Pl. III, fig. 2 b). — The galea is rather short, only to a slight degree extending beyond the terminal hair, and distally provided with about seven short branches.

Palps (cf. pl. III, fig. 2 c). — The palps are much, about 1.3, longer than the body. The granulation even more minute than in the cephalothorax, and the hairs are short and obtuse with the exception of those of the fingers, both usual and tactile hairs (cf. ♂ below). The trochanter, which has a distinct stalk, is 1.9 longer than

broad and a little broader than the femur; the anterior margin is beyond stalk very moderately convex, and so is the posterior margin; the dorsal surface is distinctly produced posteriorly near the tip of the joint but not so much, that we can speak about a posterior dorsal tubercle. The *femur*, which has a short and well marked stalk, is about 3.5 longer than broad, as long as but distinctly narrower than the tibia, and gradually widened out distally; the anterior margin is beyond the very shallow notch of the stalk, which is followed by a very short and low elevation, almost straight to near tip, where a short distinct concavity or incision is found; the posterior is distinctly convex just beyond the stalk, then almost straight and towards the tip convex again. The *tibia*, which is about 4.4 longer than its short and well defined stalk, is 3 times longer than broad and 1.2 times wider than femur; the anterior outline is elongate-convex beyond the rather shallow notch of the stalk; the posterior surface has a slightly marked condylus and a rather long and low basal elevation, which is not well defined proximally, but distally merges into the almost straight outline of the joint proper; this is towards the tip moderately convex. The *hand* is a trifle shorter than the tibia and 1.6 broader, it is almost as broad as the trochanter is long, 1.7 times longer than broad, almost as broad as high, and only 1.2 longer than fingers; both anterior and posterior margins are distinctly and rather suddenly convex, especially anterior.

Coxae. — The fourth pair are square, slightly enlarged towards the extremity, and about 1.5 longer than broad; the postero-interior corner is very prominent, and the posterior margin, which is about 1.5 longer than the interior, is slightly concave.

Legs (Pl. III, figs. 2 e). — The tarsus of the fourth pair of legs bears an almost median dorsal "tactile" hair; the posterior *terminal lateral* hair of the tarsi is provided with a more or less curved lower branch and a small dorsal tooth, while the anterior is beyond small tooth almost straight and directed downwards. The tarsus of the first pair is as long as the tibia, tapering towards its tip and 5 times as long as deep. The claws bear big anterior teeth.

Colour. — The palps are dark yellowish brown with maxillae and chelae light reddish brown; cephalothorax dark reddish brown, especially in front, with blackish transverse stripes; the abdomen and the coxae are light brown.

Measurements. — Cephalothorax 0.840 (0.840); abdomen 1.740 (1.036) mm.

Palps: trochanter 0.476 (0.252); femur 0.825 (0.235); tibia 0.825 (0.280); hand 0.756 (0.450), depth 0.430; finger 0.672 mm.

Variation. — One of the four specimens examined was in many respects different from the one described; it had a more flattened obovate abdomen, almost as broad as long, and palps much more clumsy, having the femur f. inst. only 3.3 longer than broad; this specimen seems not to be quite full-grown. The two other specimens had the body shaped as the described and the palps of intermediate proportions.

♂. Cephalothorax. — Both grooves or *stripes* straight, and posterior both deeper and broader than the anterior. The first thoracic tergite with the posterior-lateral corner produced into a tiny spine or tooth on the left side, but with two small rounded tubercles on the right. Skin with minute granules, a little bigger and flatter than those of the female. The second tergite is completely like an abdominal one and bears a big lateral spine, extending beyond the posterior margin.

Abdomen (Pl. III, fig. 2 a). — The abdomen is depressed to a considerable degree, gradually widened out towards the tip, but distinctly longer than broad. The IV to X tergites are longitudinally divided and the five first bear longitudinal lateral keels, which are directed obliquely upwards and outwards; the keel of the fifth tergite is poorly developed, but very distinct, while those of the second and the third tergites, which in shape resemble a hatchet, produced into a strong tooth backwards and a smaller one forwards (Pl. III, fig. 2 a, t^1 - t^7). The genital area is of the "*Lophochernes*" type (cf. pp. 122—123).

Antennae — The antennae were too badly preserved to be examined.

Palps (Pl. III, figs. 2 c-d). — The palps are longer and more slender than those of the female. The fingers bear a number of *tactile* hairs as well as sense-spots; the immovable finger bears posteriorly two hairs basally, one near to the middle, and one near to the tip, in addition to ten spots in the basal third part; anteriorly it has three(?) tactile hairs placed in a similar manner; the movable finger bears posteriorly two tactile hairs near to the base, one near to the middle and one in the distal third part in addition to three sense spots at the base and two just beyond median hair. The *femur* is 3·7 longer than broad and of much more elongate appearance; the *tibia*, which is 5 times as long as its stalk, is 3·2 longer than broad; the *hand* is 1·7 broader than tibia and only a trifle longer than fingers; both the lateral outlines are much more suddenly convex. The *fingers* gape, when closed, in the proximal three fourths, as the margins of the fingers are here concave, but more distally straight, touching each other; distally, where the margins are straight, they bear a number of pointed teeth, more proximally, where they do not touch each other, they are almost smooth (fig. 2 d).

Coxae (Pl. II, fig. 10 a). — The fourth pair of the coxae are enlarged towards the extremity and bear here in front of the articulate cavity a big stout spine, directed upwards and outwards; the anterior margin is moderately convex, while the posterior is strongly concave. The coxal sac has the comparatively large basal portion, which bears a single conical tubercle with a hair, well separated from the distal part (cf. pp. 47—48; pl. II, fig. 10 a).

Legs. — The femur of the fourth pair of legs is 2·8 times longer than deep. The tarsus of the first pair of legs is much shorter than the tibia and 3·7 longer than deep; it is of almost equal depth in its whole length; the tarsus of the fourth pair of legs is twice as long as the femur is deep. The teeth of the anterior moderately curved claw is placed ventrally in the first pair of legs; the posterior long, slender and almost straight claw has no tooth.

Colour. — The colour is much lighter; the palps are light yellowish brown with darker fingers and maxillae. Body only a little lighter than in female.

Measurements. — Cephalothorax 0.900 (0.840); abdomen 1.600 (1.100) mm.

Palps: trochanter 0.476 (0.252); femur 0.900 (0.240); tibia 0.920 (0.290); hand 0.812 (0.500), depth (0.476); finger 0.756 mm.

Variation. — Two other specimens, probably young ones, differed slightly in the armature of the first thoracic tergites and in the proportions of the palps.

Material. — Of this species I have examined Hansen's specimens (4 ♀ and 3 ♂); most of these rather imperfect specimens have been taken in Denmark with the exception of a single specimen, which was collected by Mr. Budde Lund in a ship with rice, which arrived at Copenhagen from India.

Remarks. — Mr. E. Ellingsen writes (18. pp. 205--206): "M. Hansen est le seul, qui, après C. L. Koch, ait eut la dernière espèce sous les yeux; mais il ne mentionne pas, sur quoi il a fixé l'identité. La seule chose de la description de Koch qui puisse indiquer que les plaques tergaes seraient carénées, c'est que selon lui l'abdomen a "die Schieldringe flach, fast durchziehend". If the last remark is to be regarded as a proof against Hansen's identification, it is not sound, because it only bears out that Koch's specimens were females. But the identification can nevertheless not be regarded as a secure one on account of the insufficiency of the original description. As however the species, described by Hansen, agrees with Koch's description as far as it goes, and as the locality of the type specimen is unknown, there is no reason whatever to establish a new species with a new name and make *Ch. depressus* C. K. to a "nomen nudum".

3. *Chelifer superbus* n. sp.

(Pl. III, fig. 3 a).

Distinct eyes present. Two transverse stripes, almost straight in the middle and of almost equal breadth (♀) or posterior the broader (♂); cephalothorax with obtuse hairs and almost smooth. Abdomen with well developed tergal keels (♂), with no hairs but lateral in front of the row and with "tactile" hairs on two last segments. Genital area of male of "Lophochernes" type. Palps slightly longer (♀) or much longer than body (♂), and almost smooth; trochanter distinctly longer than broad and its dorsal surface slightly produced posteriorly; femur about 3.3 longer than broad, almost as long as, but distinctly narrower than the tibia, which has lateral outlines moderately convex and the basal posterior elevation very indistinct; hand is 1.6 (♀) or 1.5 (♂) broader than tibia, and 1.2 (♀) longer or of almost equal length (♂) to fingers. The coxa IV (♂) with distinctly concave posterior margin, including a coxal sac, which has a well defined basal portion, and provided with an exterior spine. Median tarsal "tactile" hair of fourth pair. The tarsus I is a little (♀) or much shorter than tibia (♂), and is 5.5 (♀) or 4 times longer than deep. Claws with big anterior teeth; anterior claw of first pair of legs (♂) with small ventral tooth; posterior slightly curved, swollen towards the middle with small backwards directed tooth.

♀. Cephalothorax. — Two not very distinct *eyes* are present, removed from the front margin a distance a little longer than their diameter. The cephalothorax is slightly longer than broad behind; two very prominent broad and dark transverse *stripes*, which are almost straight in the middle and very indistinct laterally, are found; the second tergite has an indistinct black longitudinal line. The skin appears smooth, as the granulations are extremely small and low; rather long obtuse hairs are abundant every-where and are along posterior margin of second tergite placed in a transverse row, numbering 16.

Abdomen. — The pale abdomen is moderately long and slender, twice as long as broad and of almost equal breadth throughout; the tergal sclerites are very indistinctly marked, and so is the longitudinal line, by which they with the exception of the first and the eleventh are divided; the muscular spots of the median segments are very prominent. At least 14 hairs, which are rather long and obtuse, placed along the hinder margin of each tergite, and a single lateral one is found in front of the row on each side; no "tactile" hairs observed on terminal segment, but they are probably missing. A pair of almost square black spots seen just in front of vulva, probably of parasitic origin.

Antennae. — The *flagellum* consists of three hairs, of which the anterior bears three marginal teeth near to the tip. The *lamina interior* has three dentated lobes and a long serrated spine; the *serrula exterior* with the basal longer tooth enlarged towards the tip with a rounded flap and the terminal only squarely-truncate like the preceding ones. The *galea* extends a little beyond the terminal hair and bears at least 8 rather short distal branches.

Palps (cf. pl. III, fig. 3 a). — The palps, which are a little longer than the body, appear smooth, as the minute granules are scarcely perceptible, and are provided with a number of long and obtuse hairs. The fingers bear in addition to these a number of *tactile hairs* and *sense-spots*; the immovable one bears anteriorly and dorsally two tactile hairs at the base, a single one near to the middle and one in the distal third in addition to five spots in the basal third; posteriorly and dorsally it bears two basal tactile hairs, a single median and one nearer to the apex in addition to about seven sense-spots, placed between the two basal and the median tactile hairs, and three beyond the latter; the movable finger bears two basal and two more distal tactile hairs as well as five basally placed spots and four placed in a longitudinal row near to the middle. The *trochanter*, which has a distinct stalk, is 1.8 longer than broad and almost as broad as the femur; its anterior margin is beyond stalk moderately convex, and so is the posterior; the dorsal surface is slightly produced posteriorly, but no distinct tubercle is found. The *femur*, which has a moderately long and distinct stalk, is 3.3 longer than broad, as long as, but distinctly narrower than the tibia, and slightly widened out towards the tip; the anterior margin is beyond the shallow notch of the stalk and the following very short convexity almost straight to near the tip, where a slightly marked incision is found; the posterior margin is moderately convex beyond the notch of the

stalk, then almost straight with a scarcely marked terminal concavity. The *tibia*, which is about 4.5 times longer than the short and well marked stalk, is 2.9 times longer than broad and 1.2 times broader than the femur; the anterior outline is beyond the moderately shallow notch of stalk fairly convex; the posterior has a not very prominent condylus, a short and low concavity between this and the basal elevation, which is fairly well defined proximally, but distally merging into the almost straight outline of the joint proper, which becomes distinctly convex towards the end. The *hand*, which is a trifle shorter than the tibia and 1.6 times broader, is a little broader than the trochantin is long; it is 1.7 longer than broad, broader than deep and 1.2 times longer than the finger; both lateral outlines are suddenly and strongly convex, especially the anterior; the fingers gape a trifle in the proximal two thirds, when closed, and their margins are mounted with pointed teeth throughout.

Coxae. — The shape of the fourth pair seems to be more triangular than square, because the postero-interior corner is rounded and not very prominent; it is twice as long as broad, and has the almost straight posterior margin twice as long as the interior.

Legs. — Most hairs are long and slender, but of varying length, most often broken and provided with a few distal teeth; the trochanter as well as the trochantin of the fourth pair of legs bear ventrally a single very long, pointed and simple hair each. The "*tactile*" of the tarsus IV is placed nearer to the base than to the tip, being twice as long as the former distance and only one and a half times longer than the latter. The posterior *terminal lateral* hair is very slender, almost straight and beyond dorsal tooth moderately curved downwards with tip directed upwards; the tooth is better marked in the first than in the fourth pair; the anterior hair is in the fourth pair of legs long and slender with tiny tooth and in the first pair rather short with obsolete tooth. The *trochantin* of the first pair is distinctly wider than the femur proper; the femur of the fourth pair of legs is 2.6 longer than deep. The *tarsus* of the first pair of legs is a little shorter than the tibia and 5.5 longer than deep, tapering towards the tip; the tarsus of the fourth pair of legs is much shorter than the tibia, but almost twice as long as the femur is deep. The claws bear big teeth, biggest in the first pair of legs, which accordingly appears bifurcate.

Colour. — The palps are light brown with chelae and maxillae reddish brown; the cephalothorax is dark reddish brown, most so in front, and with blackish transverse stripes. The abdomen is pale yellowish brown with a trifle darker sclerites and muscular spots; near to the base ventrally a pair of black spots. The coxae are light brown and the legs yellowish.

Measurements. — Cephalothorax 0.840 (0.800); abdomen 2.240 (1.200) mm.

Palps: 0.420 (0.250); femur 0.812 (0.240); tibia 0.812 (0.280); hand 0.770 (0.460), depth 0.430; finger 0.644 mm.

Leg I: femur 0.522 (0.162), trochantin 0.100; tibia 0.396 (0.105); tarsus 0.370 (0.067) mm.

Leg IV: femur 0.639 (0.252), trochantin 0.225; tibia 0.610 (0.140); tarsus 0.477 (0.090) mm.

Variation. — Another, probably a young female, is in a few respects different; the eyes are placed nearer to the front margin; the abdomen flattened obovate in shape. The palps comparatively more slender and with the number and the arrangement of the sense-spots of the fingers slightly differing; the posterior convexities of the tibia and also the lateral ones of the hand more moderate; the hand is only 1.5 times broader than the tibia and 1.8 times longer than broad. The terminal lateral hairs of the legs are slightly modified. The dimensions of the body and the appendages are smaller.

♂. Cephalothorax. — Not very distinct eyes removed from front margin a distance equal to their diameter. The two *stripes*, of which the anterior is very moderately curved backwards in the middle and the posterior is the broadest, are more prominent and broader than in female. Anterior *tergite* is provided with two small eminences behind, one near the lateral corner and shaped like a small spine and another more rounded a little more inwards; the second tergite has the postero-lateral corner produced into a fairly big spine, in front of which a short longitudinal elevation. Along the posterior margin of the latter tergite a row of about 12 hairs with its lateral ones placed on already mentioned spines, and in addition one lateral placed in front of the row on each side on the elevation in front of spine.

Abdomen. — The abdomen is very flattened, broadest in the middle and here not very much broader than long; it has the IV to the X tergites distinctly divided by a thin longitudinal line. The five first tergites are provided with *keels*, which attain their highest development in the second tergite and decrease beyond towards the fifth one. They are directed upwards and outwards, and slightly produced posteriorly and even anteriorly, but their tip is always more or less rounded, not pointed as in *Ch. depressus* C. K. The lateral membrane is not directly connected with the ventral portion of these keels, but the tergites are prolonged beneath the keels as perpendicular, strongly chitinized portions, the one overlapping the other and bearing scale-shaped granulations; these prolongations are convex from above to below and therefore assume, as seen from above, the appearances of low keels or longitudinal elevations beneath the real one, which they support. The following five tergites are very slightly produced posteriorly. All the tergites bear a single lateral hair in front of the row placed on the keel; the first to the eighth tergites bear 16 hairs, but the number is not always the same on each side of the longitudinal line, the ninth and the tenth have only 12, and those of the eleventh are placed in two rows; the eleventh segment bears two

pair of "tactile" hairs and the tenth sternite a single one. The genital area is of the "*Lophochernes* Sim." type.

Antennae. — The galea does not extend beyond the terminal curved hair, and is distally provided with at least eight branches, which are shorter than the galea is thick at its base.

Palps (Pl. III, fig. 3 a). — The palps are much longer, almost 1.35, than body and have the granulation a little better marked than the female; the number of the sense-spots of the immovable finger differs slightly, and it bears dorsally in the middle a distinct one. The *trochanter* is dorsally and posteriorly produced a little better than in the female, and is a trifle broader than the *femur*, which is less slender in appearance and 3.4 times longer than broad; the *tibia* is only 2.7 longer than broad and has the lateral outlines, especially the anterior, more convex; the *hand* is on account of the broad *tibia* only 1.5 broader than the *tibia*, and only a trifle longer than the *fingers*, which gape widely, when closed, in the proximal three fourths, as the margin of the immovable finger is concave and that of the movable is obtuse-angled, while they distally are straight and touch each other being here provided with pointed teeth.

Coxae. — The fourth pair of the coxa is widened out towards the extremity and bears here a moderately big and stout spine; its posterior margin is moderately concave. The coxal sac has a fairly well defined and big basal part (cf. p. 48).

Legs. — The posterior *terminal lateral* hair of the fourth pair of legs is almost straight and is provided with a small ventral tooth in addition to the dorsal, being slightly curved downwards in the middle beyond these; the corresponding hair of the first pair of legs is very slender without distinct tooth; the anterior hair of the fourth pair is straight proximally and broken just under the well developed dorsal tooth, while that of the first pair is almost straight with at least one tooth. The *tarsus* of the first pair of legs is much shorter than the *tibia* and 4 times as long as deep a little in front of the base; its lower outline is moderately convex. The *anterior claw* of the first pair of legs is moderately curved and bears a small ventral tooth behind the tip, while the posterior is slender, scarcely curved and swollen near to the middle, where it bears a small, but distinct, backwards directed tooth.

Colour. — The colour is a little darker than in the female, especially the light brown abdomen.

Measurements. — Cephalothorax 0.880 (0.840); abdomen 1.456 (1.092) mm.

Palps: trochanter 0.460 (0.260); femur 0.868 (0.250); tibia 0.868 (0.310); hand 0.784 (0.476), depth 0.436; finger 0.760 mm.

Leg I: tibia 0.405 (0.126); tarsus 0.350 (0.090) mm.

Variation. — Another male examined is in many respects different from the typical specimen already described, but these differences may perhaps be explained by the fact, that it was not fullgrown. It is much smaller; the posterior transverse groove is much broader than the anterior, almost half as broad as the

second tergite of the thorax is long. The first thoracic tergite has no posterior spine, but the spines or keels of the following tergites bear similarity to those described, but are much less developed. The *galea* extends in a slight degree beyond the tip of the curved terminal hair, and is provided with rather long branches. The *palps* are of a much more slender appearance, and the outlines of the joints, especially the anterior and the posterior of the hand, are much more moderately curved; the femur is 3.6 times longer than broad, the tibia is 2.9 and the hand even twice; the last mentioned joint is only 1.4 times broader than the tibia and 1.25 longer than the fingers, which when closed gape only slightly in similarity to those of the female. The *coxal sac* is not quite like (cf. p. 48) and the coxal exterior spine is less prominent; the terminal lateral hairs of the tarsi are slightly different, especially the posterior of the fourth pair, which has no ventral tooth; the *tarsus* of the first pair of legs seems only to be 3.8 times longer than deep; the *posterior claw* of the first pair of legs without any backwards directed tooth. The colour is a little lighter.

Material. — Professor Sydney J. Hickson kindly sent me four specimens (2 ♀ and 2 ♂), which “were found attached to the membranous wings of one specimen of the Longicorn beetle *Batocera celebiana*” from Celebes. The two females were apparently suffering from a disease, for they carried both the previously mentioned black spots in front of the vulva, and the smaller specimen had also the left leg of the second pair of a rusty brown colour, because they were filled with a brown substance. On the body of all the specimens minute cylindric bodies, similar to spores of fungi, but especially abundant on the last segments of the bigger male; the tergites were provided with groups, containing about 20, while the sternites, f. inst. the eighth, had them arranged in transverse rows, containing a number of about 100.

Remarks. — I have included the male and the female in the same species in spite of the rather unusual differences in the proportions of the palps, because they are similar in most other respects and were found together; the differences between the two females are so insignificant, that they must necessarily go together. The differences between the males are much more striking, and it is only with some hesitation that they are included in the same species; but as the long galea and the slightly gaping fingers of the palps make it probable, that it is not quite fullgrown, it was not deemed right to establish a new species, taking in consideration, how small our knowledge is in the variations due to age.

4. *Chelifer bisulcus* Thor.

1889. T. Thorell (10.) pp. 603—606; tav. V, fig. 9 a-b.

Two *eyes* removed from front margin a distance equal to their diameter; *cephalothorax* distinctly longer than broad behind with two broad almost straight transverse grooves; the integument is polished without distinct granules and with short obtuse hairs. The *abdomen* is ob-ovate with all tergites except the first and

and the eleventh longitudinally divided; along the hindmost margin a transverse row of about 14 rather short obtuse hairs and near to the tip of the abdomen also a few "tactile" hairs. The *galea*, which bears a few distal branches (tav. V, fig. 9 a), is short, scarcely extending beyond the curved terminal tactile hair. The slender *palps*, which are a little longer than the body, appear almost smooth and are provided with short, slender, broken and dentated hairs with the exception of the fingers, which bear simple pointed hairs in addition to the tactile ones. The *trochanter* is, as seen from above, scarcely longer than broad, and "a latere visa supra sub-gibbosa"; the *femur* is scarcely broader than the trochanter and at least three times as long as broad; the *tibia* is almost as long as the femur and distinctly broader with fairly convex outlines; the *hand* which is almost twice as broad as the tibia and about 1.5 longer than the fingers, has the anterior outline moderately, but more distinctly convex than the posterior; it is broader than deep. The *tarsi* of the fourth pair of legs bear besides the usual hairs a long, slender and almost median "tactile" one; the claws are "sat profunde bifidi". The palps are reddish brown with darker fingers. Thorell has examined a single specimen from Bhamó, which is probably a young one; this species, the position of which within the "*Lophochernes* Sim." group may be regarded as beyond a doubt, is remarkable on account of short trochanter and broad hand of the palps.

5. *Chelifer bifissus* Sim.

1899. E. Simon (15.) p. 121.

1900. E. Simon? (16.) p. 517.

1905. C. J. With? (21.) pp. 98—101, pl. VI, figs. 1 a-f.

Two *eyes*; *cephalothorax* longer than broad behind, with two straight rather narrow, but deep grooves, and of a smooth and polished appearance; *abdomen* flattened with transverse rows of "setis tenuibus et acutis" in addition to longer "tactile" ones near to the tip. The *galea* is simple(?). The long and slender *palps* are almost smooth with "setis simplicibus, tenuibus inæqualibus paucis" in addition to the tactile hairs of the fingers; the *trochanter* is longer than broad; the *femur* is long and of almost equal length and breadth to the *tibia*, which is twice as long as broad, and has no stalk; the *hand* is scarcely broader than the tibia and a little longer than the finger. The cephalothorax, abdominal segments and palps are "fusco-olivacea interdum subnigra". This species from Sumatra is according to Simon related to *Ch. bisulcus* Thor., but easily distinguished by its narrow hand "à peine plus large que le tibia". Simon has later on referred a specimen from Olaa Hawaii to this species, but he is probably wrong, for the animal from Hawaii has among other differences "the hand . . . distinctly broader than the tibia and longer than the fingers" (cf. 21. p. 100—101).

6. *Chelifer hians* Thor.

1891. T. Thorell (13.) pp. 355—357.

"Oculum parvum utrinque supra basin palporum, prope marginem, vidisse

videor, supra oculum vero maculam oblongam albicantem." Cephalothorax, which is densely and minutely granular, is distinctly longer than broad behind with two almost straight distinct grooves; the *abdomen* has "scutis paullo anteriora versus fracta" and a row of 10—14 rather short, slender and obtuse hairs along posterior margin of each tergite. The *galea* is short with about four short branches. The *palps* are a little longer than the body, almost smooth and provided with short, slender and obtuse hairs in addition to the tactile ones of the fingers; the trochanter is a little longer than broad; the *femur*, which has a short stalk, is 2.5 longer than broad; the *tibia*, which is as long as, but broader than the femur, is about twice as long as broad and "in latere interiore fortiter, in exteriore latere levius arcuatum". The *hand*, which is distinctly ("non parum") longior and 1.5 broader than the tibia, has the lateral outlines strongly convex, and is scarcely longer than the fingers, which leave a long and rather wide space between them when closed. The *claws* are simple. The head, first thoracic tergite, tip of the abdomen and the palps with the exceptions of the fingers are blackish brown ("nigro-piceus"). The remaining parts are lighter ("sub-fuscus") especially the second thoracic tergite, which is pale ("cinerascenti-testaceus"), a median impressed blackish spot excepted. This odd-coloured species (♂) from Pinang belongs probably to the "*Lophochernes* Sim." group.

7. *Chelifer Borneonensis* Ell.

1901. E. Ellingsen (18.) pp. 206—208.

Two *eyes*; *cephalothorax* a little longer than broad with two almost straight transverse *stripes*, of which the hinder is the deeper, almost smooth with short obtuse hairs. The five (six) *abdominal* tergites bear lateral keels; tergites longitudinally divided with the exception of the first and the last and each with a lateral hair in front of the hindmost transverse row. *Palps* a little longer than the body, almost smooth; the *femur* as broad as trochanter with slightly convex margins and about 3 times as long as broad; the *tibia*, which has a distinct stalk, almost as broad as the femur with moderately convex sides; the *hand* is about 1.5 broader than the tibia and as long as the fingers, which gape distinctly when closed. The *claws* are simple. Borneo.

8. *Chelifer Hansenii* Thor.

1889. T. Thorell (10.) pp. 600—603, tav. V, fig. 8.

Two *eyes*; the cephalothorax is distinctly longer than broad and provided with a single median transverse stripe, which is "forti procurvo (in medio paene recto)"; it is "densissime et subtiliter granulatus et pilis brevibus obtusis parce sparsus". *Abdominal* tergites with row of 12 marginal hairs and its apex with tactile hairs. The *galea* extends only a little beyond the terminal hair and bears at least three short branches. The slender *palps* are smooth or granular and a little longer than the body; the *trochanter* is posteriorly produced into a dorsal

tubercle, which bears a few clavate hairs; the *femur* is at least 3·5 longer than broad and a little narrower than the *tibia*, which has the anterior outline "sat aequaliter et sat leviter ad longitudinem rotundatum". The *hand*, which is at least 1·5 longer than broad, is more than 1·5 broader than *tibia*, about 1·5 longer than fingers. The *tarsi* have simple claws and those of the fourth pair of legs a median "tactile" hair. Bhamó.

9. *Chelifer Balzanii* Thor.

1891. T. Thorell (13.) pp. 352—355.

Distinct *eyes* (?) present; cephalothorax distinctly longer than broad with distinct, almost straight transverse lines, of which the posterior is the less distinct; it is almost smooth and provided with short slender hairs "apice truncatis et paullulo clavatis"; the tip of the abdomen with "tactile" hairs. The *palps* are short and slender, a little shorter than the body, "omnium subtilissime coriacei et sub-nitidi"; the *femur*, which is a little broader than the trochanter, is 3 times as long as broad with almost parallel sides; the *tibia*, which is a little shorter and broader than this, is beyond stalk "angustissime ovatum fere". The *hand* is distinctly ("non parum") longer and almost 1·5 broader than the *tibia*, more than 1·5 broader than long and 1·5 longer than fingers. Claws simple. Thorell writes about this species "*Ch. Birmanico*, Thor. et *Ch. politico*, Sim. valde similis, sed pilis plerisque apice paullo incrassatis, cet., agnoscí potest"; but if his statement about the occurrence of real eyes, not ocular spots, is correct, his remark about its affinity can scarcely be accepted.

10. *Chelifer subruber* Sim.

(Pl. III, figs. 7 a-g; figs. 5 a-b, p. 37).

1879. E. Simon (5.) p. 30.

1884. H. J. Hansen (9.) p. 542.

Distinct *eyes* present; two almost straight distinct transverse stripes present; cephalothorax with clavate hairs and distinctly granular. Posterior abdominal tergites with lateral as well as median hairs in front of transverse row and two last segments with "tactile" hairs. The IV—IX sternites (♂) with great number of short spines. Genital area of the male of "Subruber" type. The distinctly granular *palps* are shorter (♀) or a little longer (♂) than body; the trochanter is distinctly longer than broad and has dorsal surface produced posteriorly into a prominent rounded tubercle; femur about 3 times longer than broad, a little longer, but narrower than *tibia*, which has the lateral margins distinctly convex and posterior basal elevation obsolete (♀) or well marked (♂); hand is 1·3 (♀) or 1·2 (♂) broader than *tibia* and about 1·3 longer than fingers. "Tactile" hair of fourth pair of *tarsi* a little nearer to the apex than to the base; the tarsus of the first pair of legs is a little shorter than the *tibia* and 4·7 longer than deep; claws are simple. The articulation between trochantin and femur I slightly developed.

♀. Cephalothorax. — Distinct convex *eyes* removed from the front margin a distance a trifle shorter than their diameter. The cephalothorax is a little longer than broad in the middle, where it is broadest; the lateral margin is moderately convex in the middle and has a short concavity or an incision opposite to the posterior transverse stripe. Two prominent *transverse*, in the middle almost straight, grooves or *stripes* are found, of which the anterior is very slightly curved forwards in the middle, while the posterior really consists of two lateral forwards curved portions, establishing a median obtuse angle, open towards the front, with each other. The cephalothorax is provided all over with distinct, but rather minute, conical and rounded *granules* as well as with distinctly clavate, fairly long hairs, which are widened out towards the tip, and here as broad as long; along the front margin six longer hairs are found, on the head and first thoracic tergite a good many and on the second thoracic tergite 12 along and in front of the hinder margin.

Abdomen (Pl. III, fig. 7 a). — The abdomen is distinctly longer than broad and all its tergites are longitudinally divided (the first and the last to a certain degree excepted); the three first are very distinctly shorter than the following. All the tergites are covered with scale-shaped granules, only wanting around fissures and articulate cavities of the hairs, which consequently are placed in white spots; the hairs are clavate like those of the cephalothorax, but much more elongate, especially those of the last tergites (fig. 7 a). The three first tergites bear only a marginal row of about 12 hairs; all the following tergites with the exception of the eleventh, which has the few hairs placed without proper order, bears 6 hairs in front of the marginal row; neither is the number of hairs in the latter row quite constant — the fifth having 14 and the tenth tergite only 10 f. inst. —, nor their position along posterior margin, as they are sometimes placed a little in front of it; the number of hairs is not always the same on each side of the longitudinal line — the ninth tergite f. inst. bears five hairs on the right side and six on the left. The eleventh tergite bears a pair of “*tactile*” hairs. The sternite are almost smooth and bear a marginal row of about 18 almost pointed hairs and the two last sternites bear in addition to these a pair of “*tactile*” hairs each.

Antennae (Pl. III, figs 7 d-c). The *flagellum* consists of four hairs, of which the anterior is enlarged towards the tip with two anterior teeth (fig. 7 c). The *lamina interior* has three dentated lobes and a short terminal spine with rather long teeth; the basal of the 20 teeth of the *serrula exterior* is only slightly enlarged distally and the terminal not different from the preceding ones. The *galea* is distally divided into about six teeth and is rather short, but distinctly projecting beyond the terminal hair (fig. 7 c).

Maxillae. — The maxillae are slightly granular laterally, and the interior margin of the manducatory part is straight; the lamina is rather short and broad.

Palps (cf. Pl. III, fig. 7 e). — The palps, which are granular all over with the exception of the smooth fingers, are shorter than body; the stalks, the hand and the lower surfaces are less distinctly granular than the rest. Moderately long or

short hairs are abundant; those of trochanter and femur are slightly clavate in contrast to the slightly obtuse or almost simple ones of the tibia and the hand, and the completely simple and pointed ones of the fingers. These bear in addition to the usual hairs a number of *tactile hairs* and a few sense-spots; the immovable finger bears anteriorly two basal and two more median, while it posteriorly bears at least four more longitudinally placed; the movable finger bears posteriorly four. The *trochanter*, which has a long distinct stalk, is 1.9 longer than broad and almost as broad as the femur; its anterior margin is beyond stalk very gradually and moderately convex; the convexity of the posterior margin is even less marked, but more abruptly beyond stalk: the dorsal surface is posteriorly produced into a rounded prominent tubercle. The *femur*, which has a short and well marked stalk, is 3 times as long as broad, a little longer, but distinctly narrower than the tibia; the anterior surface has just beyond the shallow notch of the stalk a short, rather indistinct convexity or elevation, blending into the almost straight outline of the proper joint, which has a low incision just before tip; the posterior margin is beyond stalk rather abruptly convex and then moderately so to the apex. The *tibia*, which is about 4.5 longer than the rather long and well marked stalk, is about 2.5 longer than broad; the outline is anteriorly beyond rather elongate notch of stalk distinctly convex; the moderately big condylus posteriorly is followed by a very low and indistinct basal elevation, posteriorly merging into the outline of the joint proper, which is first straight and then in the terminal third distinctly convex. The *hand*, which is of almost equal length to the tibia, but 1.3 times broader, is distinctly narrower than the trochantin is long, a little broader than deep, 1.9 times longer than it is broad and 1.3 times longer than the fingers, which gape a trifle when closed and bear pointed marginal teeth; its lateral outlines are just beyond stalk rather abruptly convex and then moderately so.

Coxae. — The fourth pair is of a slender and triangular appearance, as the postero-interior corner is rounded and very slightly marked; it is at least twice as long as broad and its posterior almost straight margin is more than twice as long as the interior one.

Legs (Pl. III, figs. 7 f-g; figs. 5 a-b, p. 37). — The femurs are more or less granular; the hairs are rather short or long and slender, and at least the dorsal hairs of the proximal joints are obtuse or even clavate (fig. 7 f); the trochanter and the trochantin of the fourth pair of legs bear a long, slender and simple hair, and the dorsal "*tactile*" hair of the same pair is placed a little nearer to the tip than to the base, being longer than the former of these distances, and of almost equal length to the latter (fig. 7 g). The terminal lateral hair is simple and slightly curved. The *articulation* between the trochantin and the femur of the first pair of legs is only slightly developed, and the articulate tooth of the posterior side is placed more dorsally than that of the anterior (cf. p. 37; figs. 5 a-b); the *trochantin* is a little deeper than the femur proper; the femur of the fourth pair

is 2.8 longer than deep. The *tarsus* of the first pair of legs is a little shorter than the tibia and 4.7 longer than deep, and that of the fourth pair is almost twice as long as the femur is deep; the *claws* are simple.

Colour. — The palps and the cephalothorax are light brown; the abdominal tergites are lighter, more yellowish brown; the remaining part of the body is pale yellowish.

Measurements. — Female dilated with eggs. Cephalothorax 0.784 (0.672); abdomen 3.320 (1.540) mm.

Palps: trochanter 0.420 (0.224); femur 0.700 (0.240); tibia 0.675 (0.270); hand 0.685 (0.364), depth 0.336; finger 0.514 mm.

Leg I: femur 0.468 (0.170), trochantin 0.135; tibia 0.360 (0.095); tarsus 0.340 (0.072) mm.

Leg IV: femur 0.603 (0.210), trochantin 0.235; tibia 0.558 (0.110); tarsus 0.423 (0.085) mm.

♂. Body (Pl. III, fig. 7 b). — The transverse stripes, which are broader than in the female, and the granulations of the cephalothorax as well as the longitudinal line of the abdomen and the white spots, in which its hairs are placed, are more prominent than in the female on account of the darker colour of the body. The *genital area* is not very prominent with the anterior plate shorter than the posterior, which just behind the opening bears a number of short pointed granules (Pl. III, fig. 7 b, *sp*)¹). Each of the following *sternites* (IV—IX) is provided with a number of short, strong and well articulated spines, varying in number from 40 on the fourth sternite and 60 on the ninth to 100 on those between; the area, which is mounted with the spines, occupies in the median segments on each side the inner posterior part of each sternite, being two thirds as long as the latter and only half as broad. Very short fissures, placed within a round area, are found in considerable number especially on the eleventh tergite as well as on the two last sternites, each bearing about 40.

Antennae. — The *flagellum* consisted in one specimen of four hairs as in the female, but it consisted in another of five hairs, of which the anterior was gradually enlarged towards a little in front of the tip with about six marginal teeth, while the two posterior ones were very short. The *galea*, which is scarcely extended beyond the terminal hair, is slightly broken in its distal third and here provided with a number of very short teeth.

Palps (Pl. III, fig. 7 e). — The palps are longer and more slender than in the female, and a little longer than the body. The *trochanter* has the dorsal posterior tubercle more prominent than in the female; the *femur* has the anterior basal

¹) *Spinous areas* of a similar or not very different structure are found on the median sternites (VII—VIII at least) of the male in a number of South-American species, which show similarity to *Ch. subrubra* Sim. in the structure of the articulation between the trochantin and the femur proper in the first pair of legs as well as in other respects, viz. *Ch. rufus* Balz., *Ch. Canestrinii* Balz., *Ch. longichelifer* Balz. and *Ch. segmentidentatus* Balz. (cf. foot-note on p. 129).

elevation very well marked; the *tibia* is 2.8 longer than broad and has both lateral outlines moderately convex; its posterior basal elevation is elongate, but very distinct. The *hand*, which is much shorter than the *tibia* and only 1.2 broader, is twice as long as broad and of a much more slender appearance; for the whole chela of the male is 3.6 longer than broad, while it is only 3.1 longer than broad in the female. The fingers gape scarcely more than in the other sex when closed.

Coxae. — The coxae of the fourth pair are more slender and with the posterior margin slightly concave.

Colour. — The maxillae, palps and cephalothorax light reddish brown; abdominal tergites are dark brown.

Measurements. — Cephalothorax 0.868 (0.688); abdomen 1.870 (1.036) mm.

Palps: trochanter 0.448 (0.235); femur 0.812 (0.255); *tibia* 0.785 (0.290); hand 0.700 (0.336); finger 0.532 mm.

Material. — I have examined a number of Hansen's specimens, collected in rice-warehouses or in ships with rice from India.

Remarks. — This species is in many characters of importance similar to *Ch. Murrayi* Poc., viz. the structure of the articulation between the trochantin and the femur of the first pair of legs, by the structure of the genital area of the male and the presence of sternal spine in the latter sex e. t. c., but it is nevertheless very easily distinguished from it by its real eyes, maxillae which do not provide any sexual difference, as well as by its less powerful palps f. inst. I have like Hansen identified this species with Simon's *Ch. subruber* Sim., because it does not differ from this species in any features of importance, but as Simon's description is very short, direct comparison between the various specimens is necessary, before their identity can be regarded as safely established. If this proves true, this species will have a very wide range, viz. in Denmark, England, France, North-Africa and India.

11. *Chelifer Murrayi* Poc.

(Pl. III, figs. 8 a-j.)

1900. R. J. Pocock (17.) p. 156, pl. XVI, fig. 1, 1 a.

Ocular spots present; two transverse, in the middle almost straight stripes present, of which the anterior is the more distinct; cephalothorax with clavate hairs, and distinctly, but minutely granular. Posterior abdominal tergites with a single lateral and median hair on each side in front of transverse marginal row and two last segments with "tactile" hairs. The IV—X sternites (♂) with a great number of short spines. Genital area of the male of "Subruber" type. The granular palps are a little shorter (♀) or distinctly longer (♂) than the body; the trochanter is distinctly longer than broad and has posterior margin as well as dorsal surface produced into conical tubercles. The femur is 3 (♀) or 2.7 (♂) longer than broad, distinctly shorter and a little narrower than the *tibia*, which has the lateral outlines distinctly (♀) or moderately (♂) convex and the posterior basal elevation fairly prominent; the hand is 1.4 (♀) or

1.1 broader than tibia and about 1.5 longer than fingers. "Tactile" hair of the fourth tarsus is median; the tarsus of the first pair of legs is a little shorter than the tibia and 5 times longer than deep; the claws are simple; the articulation between the trochantin and femur I slightly developed.

♀. Cephalothorax. — Two rather distinct *ocular spots* present, a little removed from front margin. The cephalothorax is a little longer than broad; it has a rather peculiar shape, as its lateral outlines are distinctly convex in the middle and behind moderately concave. Two transverse stripes, of which especially the posterior is rather indistinct, are present; the anterior appears as though it were curved backwards, but it is really straight in the middle and has the anterior limitation, which is directed outwards and curved backwards as usual, more pronounced than the posterior. The integument is everywhere provided with minute granules, more pointed in front and more rounded behind, as well as with moderately long and distinctly clavate hairs.

Abdomen (Pl. III, figs. 8 a). — The abdomen is moderately long and slender, and all its tergites with the exception of the last ones are longitudinally divided by a very indistinct line; the three first tergites are only a little shorter than the following. The integument of the tergites is printed all over with short transverse raised ridges, which are curved backwards in the middle, the whole resembling scale-shaped granules; distinctly clavate hairs are abundant, which are in the first tergites about 4 times as long as broad terminally, but in the last about 9 (fig. 8 a). The three first tergites with 12 hairs along the hindmost margin, and the following seven bear in addition to these on each side a lateral and a median hair, like the others placed in a white smooth spot; the hairs of the marginal row of the ninth and tenth tergites are placed irregularly, sometimes in front of the row and sometimes in different numbers in each half. The eleventh tergite bears in addition to the usual hairs, which are placed without proper order, at least one pair of "tactile" hairs, and so does the eleventh sternite. The sternites are almost smooth and bear along the hindmost margin about 16 marginal, very long and slender hairs, which are completely simple in at least the first 8 segments; the eighth and the ninth sternites bear on each side in the middle a short spine like those of the male.

Antennae (Pl. III, figs. 8 c-d). — The *flagellum* consists of four hairs, of which the anterior has marginal branches (fig. 8 c). The *lamina interior* with three dentated lobes and a long and slender spine; the *serrula exterior* consists of about 20 teeth, of which the basal is not very much widened out towards the end. The *galea* is fairly long and slender, extends a little beyond terminal hair and bears 6 distal, rather short teeth (fig. 8 d).

Maxillae (Pl. III, fig. 8 f). — The maxillae are only granular laterally; their manducatory part (*ma*) is rather short and with the inner margin moderately concave and surrounded by a long and broad lamina maxillaris (*ls*) which has the exterior margin dentated and the interior a concave one without teeth.

Palps (Pl. III, fig. 8 h). — The palps, which are a little shorter than the body, have the three proximal joints provided with granules, which are fairly distinct and prominent dorsally and laterally, but very flat and indistinct ventrally; the hand is finely reticulate and the fingers are smooth. The three proximal joints bear rather long and distinctly clavate hairs, those of the hand are more slender and slightly obtuse, while the fingers bear pointed and almost simple hairs in addition to the *tactile* ones; the immovable finger bears anteriorly and dorsally two basal and two median, of which the more proximal is placed more dorsally, in addition to one sense-spot; posteriorly it has two basal, one median and one distal tactile hair in addition to seven sense-spots in the proximal third. The movable finger bears anteriorly four sense-spots in the middle, and posteriorly two basal and two median tactile hairs in addition to two proximal sense-spots. The *trochanter*, which has a short and distinct stalk, is 1.7 longer than broad and scarcely as broad as the femur; its anterior surface is beyond stalk evenly and distinctly convex; the posterior margin is in the middle prolonged into a subconical tubercle, and the dorsal surface is posteriorly produced in another, more rounded protuberance, which is marked out below by a longitudinal depression; the trochanter appears consequently bigibbose. The *femur*, which has a short and well marked stalk, is about 3 times as long as broad, and both shorter and narrower than the tibia; anteriorly just beyond stalk a low but abrupt elevation, merging into the almost straight outline of the joint distally, is found, and just before tip a concavity or incision; the posterior as well as the dorsal surface is abruptly convex just beyond stalk and then moderately so. The *tibia*, which is 4.2 longer than the short, but very well defined stalk, is 2.7 longer than broad; anteriorly it is beyond the deep notch of the stalk gradually and distinctly convex; the posterior surface has the rather elongate basal elevation well marked off proximally and limited from the condylus by a shallow notch, but distally blending into the outline of the joint proper, which is first straight and then distinctly convex. The *hand*, which is as long as the femur and a little shorter, but 1.4 broader than the tibia, is as broad as the trochanter is long, a little broader than deep, 1.8 longer than broad and 1.6 longer than fingers; the whole chela is about 3 times as long as broad; the lateral outlines are just beyond the stalk rather abruptly convex, especially the posterior one, and then moderately convex; the fingers scarcely gape when closed.

Coxae. — The fourth pair are enlarged towards the extremity, but are more square than triangular, as the postero-interior corner is obtuse-angled; the interior margin is only a little shorter than the posterior, which is moderately concave; the coxa is 1.5 longer than broad.

Legs (Pl. III, fig. 8 j). — The femurs are more or less granular; the hairs of the proximal joints are at least partly clavate; the tarsus of the fourth pair bears a median "*tactile*" hair, placed a little nearer to the base than to the tip. The *articulation* between the trochantin and the femur of the first pair of legs is only slightly developed and the posterior articulate tooth is placed more dorsally than

the anterior (cf. p. 37); this *femur* is a little lower than its trochantin; the *femur* of the fourth pair is only 2.1 longer than deep. The *tarsus* of the first pair of legs is a little shorter than the tibia and 5 times as long as deep; the *tarsus* of the fourth pair of legs is only 1.3 longer than the femur is deep; the claws are simple.

Colour. — The maxillae and palps light brown with reddish brown palps; the cephalothorax and abdominal tergites more dark brown.

Measurements. — Specimen from Kar Nikobar. Cephalothorax 1.036 (0.896); abdomen 2.660 (1.680) mm.

Palps: trochanter 0.504 (0.305); femur 0.924 (0.325); tibia 0.980 (0.364); hand 0.924 (0.504), depth 0.485; finger 0.588 mm.

Of another specimen from Kar Nikobar. Leg I: femur 0.657 (0.234), trochantin 0.153; tibia 0.477 (0.126); tarsus 0.440 (0.081).

Leg IV: femur 0.828 (0.396), trochantin 0.360; tibia 0.738 (0.198); tarsus 0.522 (0.108) mm.

♂. Body (Pl. III, fig. 8 b). — The transverse *stripes*, of which the anterior seems to be more curved backwards, the granulations of the cephalothorax, but especially those of the abdominal tergites, in which they are real short plates, and the longitudinal line of the abdomen are much more prominent than in the female, and so are the white spots on which the hairs are placed. The *genital area* is not very prominent and has the anterior plate shorter than the posterior, which does not bear short pointed granules behind the opening. Each of the following sternites (IV—X) is provided with a number of short, strong and well articulated spines (fig. 8 b, *sp*), varying in number from 50 on the fourth sternite, 80 on the tenth to 120 and 160 on those between; the area, which is beset with the spines, occupies in the median segments about two thirds of the breadth of the sternite and the half of its length; the two areas of each sternites are in the middle only separated by the longitudinal line. Short fissures in a round area are abundant in the eleventh tergite and the last sternites. The hairs of the sternites are short and only a few are present on each.

Antennae (Pl. III, fig. 8 e). — The *galea* does not extend beyond terminal hair, is suddenly pointed and bears only a few short teeth.

Maxillae (Pl. III, fig. 8 g). — The *manducatory* part of the maxillae is rather short and very well set off behind, and it appears to be directed inwards, because its exterior margin is convex, while the interior is concave, almost semicircular; the margin of the maxilla proper is just behind this notch, placed on a little higher level than the rest and adorned with ten densely placed transverse lines (*r*). The lamina maxillaris is narrow compared with that of the female (*ls*).

Palps (Pl. III, fig. 8 i). — The palps are much longer than in the female and much longer than the body; the *trochanter* has the anterior margin more distinctly convex, and the two posterior protuberances more prominent. The *femur*, which is very powerful and only 2.7 longer than broad, has the basal elevation anteriorly just beyond stalk very well marked distally as well as proximally, and the posterior

margin more abruptly curved outwards beyond stalk. The *tibia*, which is much longer than the femur but only a little broader, is almost 3 times longer than broad and of a much more elongated shape than in the female; both lateral outlines are much more convex. The *hand*, which is a little shorter than the femur and scarcely more than 1.1 longer than the tibia, is much narrower than the trochantin is long, almost twice as long as broad and has the lateral convexities much more moderate; the whole chela is 3.3 longer than broad.

Coxae. — The fourth pair is triangular, as the postero-interior corner is scarcely marked and the interior margin very short.

Colour. — The palps are darker, reddish brown with lighter chelae, and the cephalothorax and tergites are also of a darker hue than in the female.

Measurements. — Specimen from Kar Nikobar. Cephalothorax 0.980 (0.886); abdomen 2.240 (1.400) mm.

Palps: trochanter 0.504 (0.308); femur 1.036 (0.380); tibia 1.176 (0.400); hand 0.952 (0.460), depth 0.448; finger 0.588 mm.

Material. — I have of this species examined a number of not very well preserved specimens brought home from the Nicobars by the Danish Galathea Expedition viz. 2 ♀ and 3 ♂ from the Kar Nikobar, 4 ♀ and 1 ♂ from Pulu Mulu and 1 ♂ from Nankovry; in addition to these Pocock's typical specimens (a male and a female) in the British Museum have been examined, but not compared with those from the Nicobars.

Remarks. — I have referred this species to *Ch. Murrayi* Poc. on account of the similarity in all structures of greater importance in spite of smaller differences. The most important one is perhaps the small number of the sternal spines of the male namely only about 40 on the tenth sternite, apparently none on the fourth and scarcely more than 80 on the median ones; the number of these spines was not always the same on each side; this poor development of the spines is perhaps due the specimen being not quite fullgrown. The original description does not go very deep into the structure and is not quite correct in the details; the remarks "a row of setiferous tubercles along the posterior margin" of the tergal plates, and that the "bristles are simple" lead me originally to regard "*Ch. Murrayi* Poc." as a species well defined from that from the Nicobars; but both statements are really not correct, for my examination of the former of these species showed, that the hairs are of the same structure in both forms.

12. *Chelifer Sumatranus* Thor.

1889. T. Thorell (10.) pp. 599—601.

No *eyes*. *Cephalothorax* almost twice as long as broad with two transverse almost straight "grooves", and provided with short, obtuse hairs; "subtilissime coriaceus". *Abdomen* long and almost obovate, with tergites (I and XI excepted) longitudinally divided and with marginal rows of "pilorum tenuium et brevium . . ., subclavatorum". The *palps* are long, slender and smooth; the *trochanter* is almost

twice as long as broad and has dorsal surface posteriorly produced into "tuberculum magnum humile"; the *femur* which is of almost equal breadth to the trochanter and almost 5 times longer than broad, is widened out towards the end, a little shorter, but scarcely narrower than the *tibia*, which has the lateral outlines almost straight. The *hand*, which is a little shorter than the *tibia*, but twice as broad, is twice as long as broad at least and 1.5 longer than fingers. Another specimen, probably a male, had the palps even more slender, almost twice as long as the body; femur was for instance 6 times longer than broad, and hand 2.5. This remarkable species is from the mountain Singalang on Sumatra.

13. *Chelifer Helferi* Steck.

1875. *Ectoceras Helferi* A. Stecker (4.) pp. 516—517, taf. I, figs. 1—5 and 7—9.

Distinct large ocular spots; cephalothorax with two transverse stripes, of which the anterior is curved forwards in the middle and the posterior backwards, and with big granules. Granular palps short and clumsy with clavate hairs and fingers shorter than hand. The claws are provided with distinct teeth. India.

14. *Chelifer bidens* Steck.

1875. *Ectoceras bidens* A. Stecker (4.) pp. 518—519, taf. I, figs. 10—11.

This species is nearly related to the preceding one and is perhaps the male; it differs principally by the structure of the femur of the palps, which is provided with a pair of median, long and stout tubercles, and by the fingers, which are as long as the hand. India.

15. *Chelifer aequatorialis* Dad.

1897. E. Daday (14.) p. 475, táb. XI, figs. 5—6.

Body elongate and granular with *clavate* hairs. *Galea* big and each of the two branches with several ramifications, extending a long distance beyond terminal hair. *Palps* short and clumsy, as long as body, granular and with long, distinctly clavate hairs; the *femur* is about twice as long as broad and much narrower than *tibia*; the hand is distinctly broader than the *tibia* and longer than the fingers. This very imperfectly described species is from Friedrich-Wilhelmshafen (German New Guinea).

16. *Chelifer scorioides* Herm.

1804. F. J. Hermann. Mémoires aptérologiques; p. 116, pl. V, figs. L, M-N.

1884. H. J. Hansen (9.) pp. 546—548.

1897. E. Daday? (14.) pp. 477—478, táb. XI, figs. 10—13.

Body flattened, slightly granular and provided with clavate hairs; the *galea* is variable, but seems always to be well developed and divided into a number of long ramifications; the palps bear distinctly clavate hairs and their hand is scarcely

longer than the fingers. I think, that a reexamination of Daday's specimens from German New Guinea, in which this species abounds, is necessary to settle the question if they really ought to be referred to *Ch. scorpoides* Herm., which has a male genital area of the "*Cimicoides* F." type and accessory teeth of the fingers of the palps like this, in addition to a remarkable long trochantin of the fourth pair of legs.

17. *Chelifer modestus* n. sp.

(Pl. IV, figs. 1 a-d).

Ocular spots; distinct median transverse suture, laterally curved backwards and directed forwards on cephalothorax, which is distinctly granular with clavate hairs. Posterior margin of first abdominal tergites curved backwards in the middle. The more or less granular palps are as long as the body; the trochanter is distinctly longer than broad and its dorsal surface a little produced posteriorly; the femur is 2.2 longer than broad, a little longer but distinctly narrower than the tibia, which has the lateral outlines moderately convex, and the posterior basal elevation fairly prominent. The hand is 1.4 broader than the tibia and 1.3 longer than the fingers, which bear accessory teeth. Hairs of legs partly clavate and the dorsal "tactile" of the fourth pair of legs placed almost in the middle, but nearer to the tip than to the base; the tarsus of the first pair of legs is a little longer than the tibia and 3.8 longer than deep.

♀. Cephalothorax. — Not very distinct *ocular spots* are present. The cephalothoracic shield is longer than broad, measured to hindmost margin of the second tergite, but not longer than the real breadth in this with eggs dilated female; the lateral margins of the shield establish an obtuse angle just opposite to the transverse line, in front of which the margin is straight and directed forwards and inwards, while it behind is moderately concave and directed backwards. The median transverse *suture* is narrow, but distinct, almost straight in the middle, but laterally curved backwards and directed forwards, giving the posterior margin of the head the appearance of being distinctly convex. No posterior suture is found, but the limitation between the two thoracic tergites is nevertheless distinct on account of the wanting granulation of the second tergite; the hindmost margin of this as well as of the first thoracic tergite is distinctly curved backwards. The head as well as the first thoracic tergite is everywhere granular with large and round granules; those of the second tergite are scarcely visible except on a black median spot, which is granular in the same fashion as the head. The cephalothorax is everywhere provided with moderately long, distinctly clavate hairs; four rather long ones are found along front margin and about ten shorter ones along the hindmost.

Abdomen. — The abdomen is fairly long and slender and almost oval with its greatest breadth somewhat in front of the middle; at least the II--VIII tergites are longitudinally divided by a broad not very distinct longitudinal line; the tergites

are of almost equal breadth, but the second and the third ones at least are distinctly shorter than the rest, and the hindmost margin of these two as well as of the first is distinctly curved backwards in the middle. The tergites are granular all over with more or less round granules, while the longitudinal line is striated; they bear behind the hindmost margins of the indistinct sclerite transverse rows of rather long, but distinctly clavate hairs; the number of these hairs is on each tergite about 10 and a single one is placed laterally in front of the row in median tergites. The eleventh sternite bears a pair of not very long "*tactile*" hairs.

Antennae (Pl. IV, figs. 1 a-b). — The *flagellum* seems only to consist of three hairs, of which the anterior has seven marginal teeth. The *lamina interior* has three dentated lobes and a rather long terminal spine with five teeth; the *serrula exterior* consists of about 20 teeth, of which the basal is slightly enlarged towards end (fig. 1 a). The *galea* extends only slightly beyond the terminal hair and bears about five short terminal teeth (fig. 1 b).

Maxillae. — The maxillae are smooth in the middle, but slightly granular laterally.

Palps (Pl. IV, fig. 1 c). — The palps are almost as long as the body and have their three proximal joints distinctly granular with rounded but rather flat granules laterally and dorsally; the ventral surfaces of these joints as well as of the hand are less distinctly granular, and the fingers are smooth or almost so. The hairs, at least those of the proximal joints, are rather long and distinctly clavate, though in a less degree than those of the abdomen; the hairs of the tibia are more slender than those of the femora, but less so than those of the hand; the fingers bear *tactile* hairs in addition to the usual pointed and almost simple hairs. Immobile finger bears anteriorly and dorsally two basal and one(?) more median tactile hairs in addition to three basal sense-spots; posteriorly it has two basal hairs, one more median and one near to the tip, besides a few basally placed sense-spots. The movable finger bears anteriorly at least one sense-spot, and posteriorly three(?) tactile hairs in a longitudinal row and rather apart from each other in addition to a few basally placed sense-spots. The *trochanter*, which has a rather long, but not well defined stalk, is 1.7 longer than broad; its anterior surface is beyond stalk evenly and moderately convex and its posterior slightly rounded; the dorsal surface is slightly produced posteriorly. The *femur*, which has a very short and fairly well marked stalk, is about 2.2 longer than broad and a little longer, but narrower than the tibia, anteriorly beyond stalk almost straight, as the proximal convexity and distal concavity are only slightly pronounced; the posterior margin is rather abruptly convex beyond stalk, then almost straight and distally slightly convex again. The *tibia*, which is 3.5 times longer than the thick and well defined stalk, is 1.9 longer than broad; anteriorly it is beyond the very deep notch of the stalk, strongly convex; the posterior margin is beyond the rather prominent condylus and the basal elevation, which is well defined behind by a low incision, first moderately convex and then more distinctly so. The *hand*, which is a little

longer than the tibia and almost 1.4 broader, is a trifle broader than the trochanter is long, almost as deep as it is broad, 1.5 times longer than broad and 1.3 longer than finger; the whole chela is 2.5 longer than broad; the lateral outlines are distinctly convex. The fingers bear, in addition to the well pointed marginal teeth, *accessory* ones; the immovable finger has anteriorly at least two teeth distally and posteriorly six at least, arranged from base to tip; the movable finger has at least two median accessory teeth anteriorly and four posteriorly.

Coxae. — The fourth pair are enlarged towards the extremity and appear triangular, as the postero-interior corner is rounded and the inner side much shorter than the almost straight posterior margin; the coxa is 1.5 longer than broad.

Legs (Pl. IV, fig. 1 d). — The dorsal hairs of at least the proximal joints are rather long and distinctly clavate (fig. 1 d); those of the distal joints are more or less simple; the ventral side of the trochantin of the first pair of legs as well as of the trochanter and trochantin of the fourth pair bear besides a very long, slender and simple hair each. The dorsal "*tactile*" hair of the fourth pair of legs is placed between the median and terminal third of the joint, and is shorter than its distance from the base, but longer than that from the tip; the *lateral terminal* hair is moderately curved and simple. The *tarsus* of the first pair of legs is a little longer than the tibia and 3.8 times longer than deep; the *tarsus* of the fourth pair is 1.9 longer than the femur is deep and this is again 2.5 longer than deep. The claws are simple.

Colour. — The maxillae and palps, with the exception of light reddish brown chelae, are pale brown; the head and first thoracic tergite are yellowish brown and the rest of the body is yellowish, with a single median yellowish brown spot on thoracic tergite II and two on the abdominal ones.

Measurements. — Cephalothorax 0.756 (0.800); abdomen 1.596 (1.064) mm.

Palps: trochanter 0.350 (0.210); femur 0.532 (0.238); tibia 0.504 (0.268); hand 0.532 (0.364), depth 0.350; finger 0.420 mm.

Leg I: femur 0.352 (0.145), trochantin 0.081; tibia 0.262 (0.099); tarsus 0.288 (0.077) mm.

Leg IV: femur 0.486 (0.180), trochantin 0.216; tibia 0.414 (0.126); tarsus 0.342 (0.090) mm.

Material. — The Danish Galathea Expedition has brought home a single female from Teressa, one of the Nicobars; it shows in the accessory teeth of the fingers of the palps and its clavate hairs affinity to *Ch. camicoides* F.

18. *Chelifer Galathea* n. sp.

(Pl. IV, fig. 2 a-c).

Indistinct ocular spots; cephalothorax a little longer than broad and indistinct transverse lines; smooth with slender and obtuse hairs. Genital area (♂) of "Camicoides F." type. Palps smooth, shorter than body; trochanter longer than broad, not

produced posteriorly; femur twice as long as broad, as long as and distinctly narrower than tibia, which has lateral outlines strongly convex with posterior basal elevation slightly developed. The hand is much longer than the tibia and 1.3 broader, 1.6 longer than broad, but only 1.2 longer than deep, and 1.4 longer than fingers, which are provided with accessory teeth and anteriorly at the base of the immovable one with 13 densely placed sense-spots. „Tactile” hair of fourth pair of legs is wanting; tibia of the first pair is a little longer than the tarsus, which is 3/4 longer than deep.

♂. Cephalothorax. — Indistinct ocular spots present. The cephalothorax is a little longer than broad with the marginal portion very long and provided with a distinct membrane; an indistinct median *transverse line* is present, which seems to be slightly curved backwards in the middle, and a second is indicated by a row of muscular spots between the dark first thoracic tergite and the pale second. The skin is finely reticulate, and the hairs are fairly long and slender, but obtuse.

Abdomen. — The abdomen is more than twice as long as broad, of almost equal breadth throughout, and consistently of a very slender appearance; the tergites are not longitudinally divided, are of almost equal breadth, but increase in length towards the tenth; on account of this structure, and because the articulate membranes are long between the first tergites, but scarcely visible between the last ones, the abdomen gets a distinctly darker appearance behind. The skin is almost smooth and the long and slender hairs obtuse. The sternites are very similar to the tergites and the *genital area* seems to be similar to that of *Ch. cimicoides* F.

Antennae (fig. 2 a). — The *flagellum* has only three(?) hairs; the *serrula exterior* consists of about 20 teeth, of which the basal one is the longer, almost pointed and scarcely enlarged distally, as the anterior membrane is very narrow. The *galea* is long with three pair of branches, of which the basal one is the longest, and extends distinctly beyond the terminal hair (fig. 2 a).

Maxillae. — The maxillae are almost smooth, and have their manducatory part as well as the lamina maxillaris rather short and broad.

Palps (figs. 2 b-c). — The palps, which are a little shorter than the body, are smooth or almost so; and provided with a number of long, slender and slightly obtuse or simple hairs in addition to the *tactile* hairs of the fingers. The immovable finger bears anteriorly three basal tactile hairs, two proximal the one above the other and a single one more distal, and in the area between these or a little apart 13 bigger and smaller sense-spots close together; posteriorly it has three proximal tactile hairs and two spots and distally a single tactile hair. The movable finger bears anteriorly three big sense-spots in inner third (fig. 2 c), and posteriorly four(?) tactile hairs in a longitudinal row and two sense-spots. The *trochanter*, which has a moderately short and distinct stalk, is 1.4 longer than broad and distinctly narrower than the trochanter; the anterior margin is beyond stalk very moderately convex; the posterior has in the first place a rather abrupt curvature to mark off the stalk and is then almost straight; dorsal surface is not in the

slightest degree produced posteriorly. The *femur*, which has a short, but very well defined stalk, is twice as long as broad and as long as, but distinctly narrower than the *tibia*; the anterior surface has just beyond stalk a short and rather abrupt convexity and is then moderately concave; the posterior surface is beyond stalk very abruptly convex and then moderately convex; the joint is dorsally even better raised than posteriorly. The *tibia*, which is about 3 times longer than the thick and well defined stalk, is 1.7 longer than broad; the outline is anteriorly beyond the deep notch almost circular; the posterior margin is beyond the prominent condylus and the basal elevation, which is fairly well marked proximally, but scarcely distinguished distally, distinctly convex. The *hand*, which is distinctly longer than the *tibia* and 1.3 broader, is much broader than the *trochanter* is long, almost 1.4 broader than deep, 1.6 longer than broad and 1.4 longer than fingers, which are much shorter than hand is high; the whole *chela* is about 2.8 longer than broad. The fingers bear, in addition to the rather low and only partly pointed marginal teeth, a few *accessory* ones both anteriorly and posteriorly on both fingers; the anterior and posterior outlines of the hand are moderately convex, but the ventral and especially the dorsal margin are just beyond stalk very abruptly convex and then moderately so.

Coxae. — The fourth pair are enlarged towards the extremity and almost square; the postero-interior corner is obtuse-angled, but not very distinctly so, and the interior margin is only a little shorter than the straight posterior one; the *coxa* is about 1.5 longer than broad.

Legs. — The hairs are rather slender, pointed and simple or only with a few distal teeth; the *trochantin* of the first pair at least with a distinctly longer and more slender one ventrally; dorsal "tactile" hair of the fourth pair of legs seems to be wanting; the *terminal lateral* hairs are moderately curved and simple. The *trochantin* of the first pair of legs is short, not so deep as the *femur* proper towards the tip, and with the articulate cavity rather poorly developed, having the ventral and posterior articulate head only a trifle more distally than the dorsal; the *femur* of the fourth pair of legs is about twice as long as deep. The *tarsus* of the first pair of legs is only a trifle shorter than the *tibia* and 3.4 longer than deep; the *tarsus* of the fourth pair is only 1.2 longer than the *femur* is deep. The claws are simple.

Colour. — The maxillae and the *trochanter* of the palps are yellowish, the *femur* and the *tibia* are light and the *chela* dark reddish brown. The head and first thoracic tergite are reddish brown, and the tip of the abdomen is dark brown, with the anterior pale brown tergites separated by distinct yellow articulate membranes.

Measurements. — Cephalothorax 0.772 (0.588); abdomen 1.876 (0.784) mm.

Palps: *trochanter* 0.336 (0.205); *femur* 0.560 (0.280); *tibia* 0.560 (0.310); *hand* 0.644 (0.392), depth 0.532; *finger* 0.448 mm.

Leg I: femur 0.423 (0.180), trochantin 0.081; tibia 0.297 (0.117); tarsus 0.279 (0.081) mm.

Leg IV: femur 0.558 (0.261), trochantin 0.243; tibia 0.468 (0.162); tarsus 0.324 (0.108) mm.

Material. — The Danish Galathea Expedition has collected a single specimen (♂) of this species in the island of Nankovry, one of the Nicobars, and it has been called *Ch. Galathea* n. sp. in remembrance of the good work done by this Expedition.

Remarks. — This species, which is so well characterized by its extremely short and clumsy palps, especially the excessively deep hands, by the numerous sense-spots of the inner surface of the immovable finger and by the long galea of the male, is without doubt related to *Ch. nodosus* Schranck; similarity is at least present in the dentation of the fingers of the palps and the genital area of the male.

19. *Chelifer nodosus* Schranck.

(Pl. I, fig. 8 a).

1803. F. Schranck. Faun. Boic. III, p. 246.

1879. E. Simon (5.) p. 33, pl. XVIII, fig. 14.

1884. H. J. Hansen (9.) p. 548.

Eyes or *ocular spots* wanting; *cephalothorax* with a very broad and prominent almost straight transverse stripe; all abdominal tergites except the first and the eleventh longitudinally divided with marginal rows of long and slender obtuse hairs; they bear all except the eleventh, in which the hairs are placed without proper order, a lateral hair on each side in front of the row, and except the first tergite a median pair in front of the row; the eleventh sternite as well as the tergite bear two pair of "tactile" hairs each. The *genital* area (♂) is like that of *Ch. cimicoides* F. The *palps* are partly granular; the *trochanter* is distinctly produced dorsally into a well developed posterior tubercle; the *femur* is twice longer than broad and a little shorter than the *tibia*, which has lateral outlines distinctly convex. The *hand*, which is 1.3 broader than the *tibia*, is 1.6 longer than broad and only 1.2 longer than fingers; the chela is about 3 times as long as broad; the fingers gape a trifle, when closed, and are always provided with *accessory* teeth; the movable one always bears a single one only anteriorly near to the tip. The *tarsus* of the fourth pair of legs bears in the middle two "tactile" hairs the one behind the other; the tarsus of the first pair is as long as the *tibia* and five times longer than deep; the *femur* of the fourth pair is 3.4 times longer than deep and 1.5 lower than the tarsus is long.

This species is distributed all over Europe; it has according to Hansen once been caught in a ship with rice from Indo-China. As this specimen has not been mounted separately, it was impossible to verify or negative this statement.

20. *Chelifer megasoma* Dad.

1897. *Chernes megasoma* E. Daday (14.) p. 476, táb. XI, figs. 16—17.

The body is elongate and somewhat depressed, finely granular; cephalothorax longer than broad. The *galea* without branches slightly extending beyond terminal hair. Palps clumsy and a little shorter than body, granular with almost simple hairs; the *femur* is 3 times longer than broad, as long and as broad as the *tibia*, which has lateral outlines moderately convex; the hand is 1.5 broader than the *tibia* and much longer than the fingers. This species from Friedrich-Wilhelmshafen, German New Guinea, is according to Daday nearly related to *Ch. nodosus* Schranck, the main differences being found in the antennae; to judge of its affinity is quite impossible on account of the very imperfect description; his drawing of the antenna (fig. 17) is incorrect in all details as well as in points of the greatest importance, viz. serrula basally fused, distally free, and flagellum consists of five hairs, of which the median is pinnate.

21. *Chelifer nodulimanus* Töm.

1882. Ö. Tömösváry (40.) p. 244.

1884. Ö. Tömösváry (8.) p. 26, táb. I, fig. 14.

1889. *Ectoceras nodulimanus* E. Daday (11.) pp. 173—174, táb. IV, figs. 3, 9.

1905. *Lamprochernes nodulimanus* E. Ellingsen (22.) pp. 3—6.

Distinct *ocular* spots; scarcely longer than broad with transverse stripes "antrorsum curvatis"; minutely granular with long, slender, almost simple hairs. *Palps* much longer than the body and partly smooth, partly granular; *trochanter* is posteriorly bigibbose, as a prominent dorsal protuberance is found; the *femur*, which is about twice as long as broad, is shorter and narrower than the *tibia*, which on the upper-inner side has a very strong, conical protuberance, somewhat rounded. *Hand*, which is much broader than the *tibia*, is considerably higher than broad and 1.5 longer than finger, which, when closed, gape in a considerable degree.

Daday has identified this species with *Ch. macrochelatus* Töm. and gives his combined *Ch. macrochelatus-nodulimanus* a very wide range, viz. Dalmatia (?), South-America, Aschanti and Sumatra; Ellingsen (1902. 20. p. 154) has pointed out, that the two species are well distinguished from each other; the same author has recently identified a species from Brazil with *Ch. nodulimanus* Töm., and accordingly regards the European locality as a wrong or accidental one (22. p. 5). These circumstances taken into consideration, the statements about the occurrence of this species in Sumatra e. t. c. do not count in the least; Daday's specimen from Asia certainly belongs to another species.

22. *Chelifer cocophilus* Sim.

(Pl. III, figs. 9 a-b).

1901. E. Simon (19.) pp. 79—80.

Distinct ocular spots; cephalothorax almost as long as broad, with two distinct

almost straight transverse grooves; minutely granular with rather long and almost simple hairs. The genital area (♂) of "*Cimicoides F.*" type. The almost smooth palps as long as body; trochanter longer than broad, not produced to a posterior tubercle dorsally; femur 2.5 longer than broad, as long as and broader than the tibia, which has the lateral outlines distinctly convex and posterior basal elevation slightly developed. The hand is as long as but 1.4 broader than the tibia, 1.6 longer than broad, not as broad as deep, and not longer than fingers, which gape, when closed (♂). The "tactile" hair of the fourth pair of legs nearer to the tip than to the base of the tarsus; tibia of the first pair of legs not longer than the tarsus.

♀. Cephalothorax. — Distinct ocular spots present; cephalothorax almost as broad as long and provided with two broad almost straight transverse stripes; the skin is minutely granular and bears a few rather long and almost simple hairs.

Abdomen. — All the tergites with the exception of the eleventh are longitudinally divided; the first have the front margin curved backwards in the middle, the median ones have both margins straight and the last ones have the anterior margin curved forwards. All the tergites are provided with long slender, not quite simple hairs; the eleventh segment seems not to bear any "tactile" hairs.

Antennae — The galea is exceedingly short with a few distal teeth.

Palps (Pl. III, figs. 9 a-b). — The *maxillae* are granular laterally, while the palps are smooth with the exception of the trochanter and anterior side of the femur; long pointed and as a rule not completely simple hairs are found everywhere; the fingers bear besides *tactile* hairs. The *trochanter*, which is a little longer than broad, has the anterior surface gradually convex beyond stalk, while the posterior margin is more abruptly convex; dorsal surface is not produced into a posterior tubercle; the *femur*, which is 2.5 longer than broad, has an almost straight anterior outline, and a posterior, which is abruptly convex just beyond stalk, but then moderately so. The *tibia*, which is as long as but distinctly broader than the femur, is anteriorly beyond stalk distinctly convex and then moderately concave, while the posterior margin is almost straight beyond the slightly marked basal elevation and later on towards the end distinctly convex. The *hand*, which is a little shorter, but 1.4 broader than the tibia, and 1.6 longer than broad, is not as broad as deep and scarcely longer than the fingers, which leave a wide space(?) between them, when closed; the anterior outline is more suddenly and more distinctly curved than the posterior, and so is the dorsal more than the ventral.

Coxae. — The coxae of the fourth pair are square, slightly widened out towards the extremity, and almost twice as long as broad; the antero-interior corner is produced forwards to a point, while the postero-interior is rounded or obtuse-angled; the inner margin is only half as long as the straight posterior one.

Legs. — The hairs of the legs are fairly long and slender and most of them are not completely simple, but provided with a few teeth or a single tooth; on the ventral surface of the tibia terminally and the tarsus basally in the fourth pair of legs a few curiously shaped hairs are found; they are moderately long, very slender,

curved and provided with a single anterior tooth near to their base. The dorsal "tactile" of the fourth pair is placed nearer to the tip than to the base. The femur of the fourth pair of legs is about 3 times longer than deep; the tarsus of the first pair of legs is as long as the tibia and that of the fourth pair of legs is 1.7 longer than the femur is deep.

Colour. — The head and the first thoracic tergite as well as the palps, with the exception of the lighter trochanters and fingers, are blackish brown; the second thoracic tergite is yellowish with a blackish spot in the middle and a white one on each side. The first abdominal tergites are brownish, but the last ones are darker brown; the articulate membranes and rest of the body more or less yellowish.

Measurements. — Cephalothorax 0.784 (0.750 hindmost margin of shield; 0.924 real breadth is specimen dilated with eggs); abdomen 1.562 (1.008) mm.

Palps: trochanter 0.364 (0.210); femur 0.588 (0.235); tibia 0.588 (0.270); hand 0.560 (0.364), depth 0.420; finger 0.540 mm.

Leg I: femur 0.390 (0.144), trochantin 0.180(?); tibia 0.279 (0.090); tarsus 0.279 mm.

Leg IV: femur 0.558 (0.189), trochantin 0.234; tibia 0.405 (0.108); tarsus 0.333 mm.

♂. The genital area seems to be similar to that of *Ch. cimicoides* F. The galea is shorter than in the female. The coxa of the fourth pair is more distinctly widened out towards the end and has the antero-interior corner more pointed.

Material. — I have examined Simon's original specimens, found under bark of cocoa-nut palm (3 ♀ and 1 ♂), Kuala Aring (Kelantan), in the month of September 1899.

Remarks. — I have redescribed this species, though Simon has given a good and concise description of it, because several structures of importance have not been taken into consideration by this naturalist, and because it is my aim to include all facts of importance, published up to the present time, as far as the natural history of the Indian species of this order is concerned, in this paper. This species must certainly be regarded as akin to *Ch. nodosus* Schrank in spite of the wanting(?) accessory teeth of the fingers of the palps.

23. *Chelifer concavus* n. sp.

(Pl. IV, fig. 3 a).

Ocular spots obsolete; cephalothorax much longer than broad with rather indistinct transverse line curved backwards in the middle; skin almost smooth with slender obtuse hairs. Abdomen twice as long as broad, with the three first tergites longitudinally depressed in the middle and the median provided with a distinct narrow longitudinal ridge. Palps minutely granular and shorter than body; the trochanter is longer than broad and produced posteriorly and dorsally; femur 2.2 longer than

broad, as long as but narrower than the tibia, which has both outlines distinctly convex and the posterior basal elevation well marked. The hand is distinctly longer than the tibia and 1.4 broader, 1.6 longer than broad, but only 1.3 longer than deep, and 1.4 longer than finger. Basal "tactile" hair of fourth pair of tarsi; tibia of the first pair as long as the tarsus, which is 5 times longer than deep.

♀?. Cephalothorax. — Ocular spots almost obsolete. The cephalothorax is distinctly longer than broad in the middle, where it is broadest; outline in front moderately convex, tapering towards anterior margin, but behind almost straight. Transverse median line seems to be present and to be curved backwards in the middle, but it is very indistinct; the integument of the first thoracic tergite is smooth, but that of the head and second tergite is apparently reticulated, being printed all over with muscular spots; the hairs are fairly long and obtuse.

Abdomen. — The abdomen is long and slender, twice as long as broad; the tergites slightly increase in breadth towards the tenth, but much more in length. The three first have an odd structure, as they are provided with a descending lateral portion, perpendicular on the dorsal part; the following are regularly convex from the one side to the other. The three first tergites have in addition to the other irregularity the median part longitudinally hollowed with the lateral parts raised; this depression becomes narrower in the following tergites and is in the sixth to the eighth represented by a longitudinal groove with a longitudinal black ridge in the middle. The integument is smooth or minutely reticulate.

Antennae. — The *flagellum* consists of four(?) hairs; the *lamina interior* has three dentated lobes and a long terminal spine with six teeth. The three basal teeth of the *serrula exterior* show a remarkable structure, perhaps an abnormal one; the long basal tooth is directed obliquely forwards and has the lateral margins turned over forwards with its membranaceous part, so that a kind of spoon is formed; the third tooth is distinctly pointed, and so is the second, which is much shorter than this and wedged in between the two others. The *galea* is partly lost in this specimen, but extends beyond terminal hair and is provided with two branches at least.

Maxillae. — The maxillae are smooth in the middle, slightly granular laterally, and have long and slender manducatory parts, which are distinctly longer than the *lamina maxillaris*.

Palps (Pl. IV, fig. 3a). — The palps, which are shorter than the body, are granular with minute and low granules everywhere except on fingers; the hairs seem to be fairly long and provided with a few teeth distally; the fingers bear tactile hairs and spots. The immovable finger bears two basal and two median tactile hairs anteriorly in addition to seven sense-spots, arranged in an irregular longitudinal row in the basal third; posteriorly it bears two basal and a single(?) median tactile hair in addition to six sense-spots in the basal third. The movable finger bears three sense-spots, placed near to each other, establishing a triangle at the base anteriorly, and posteriorly three basal and two(?) median tactile hairs in

addition to five basally placed sense-spots. The *trochanter*, which has a rather short and distinct stalk, is 1.8 longer than broad and distinctly narrower than the femur; the anterior margin is beyond stalk gradually and moderately convex; the posterior margin is just beyond the stalk abruptly and distinctly convex proximally, getting similarity to a ventral tubercle; the dorsal surface is distally produced posteriorly, but we can scarcely speak about a posterior dorsal tubercle in a proper sense. The *femur*, which has a short, but very well defined stalk, is 2.2 longer than broad, as long as but narrower than the tibia; anterior outline is beyond stalk moderately convex and then concave; the posterior surface is beyond stalk abruptly convex and then moderately so. The *tibia*, which is about 3.3 times longer than moderately long and well defined stalk, is about twice as long as broad; the anterior outline is beyond deep notch almost circular; the posterior margin is beyond the prominent condylus and a long, but both proximally and distally well defined basal elevation distinctly convex. The *hand*, which is distinctly longer than the tibia and 1.4 broader, is broader than the trochanter is long, 1.5 longer than broad, 1.3 longer than deep, and 1.4 longer than fingers, which are a little shorter than hand is deep; the chela is 2.5 longer than broad; the lateral outlines are in the first place just beyond stalk rather abruptly convex and then moderately so, while the ventral, but especially the dorsal margins are very abruptly convex and then almost straight.

Legs. — The hairs of the legs are fairly long and slender, simple or with a few distal teeth; a "tactile" hair is found anteriorly at the base of the tarsus of the fourth pair of legs; terminal lateral hair of the tarsus is strongly curved. The femur of the fourth pair is 2.6 longer than deep; the tarsus of the first pair of legs is as long as the tibia and 5 times as long as broad, and the tarsus of the fourth pair is 1.7 longer than the femur is deep.

Colour. — The three proximal joints of the palps are light reddish brown, and the hand and fingers are dark brown; the cephalothorax is pale brown and the abdominal tergites a little darker brown.

Measurements. — Cephalothorax 1.036 (0.840); abdomen 3.080 (1.260) mm.

Palps: trochanter 0.588 (0.336); femur 0.896 (0.392); tibia 0.896 (0.448); hand 0.980 (0.644), depth 0.728; finger 0.672 mm.

Leg IV: femur 0.868 (0.334), trochantin 0.360; tibia 0.756 (0.224); tarsus 0.588 (0.140) mm.

Variation. — The cephalothorax is broadest behind and has scarcely any transverse median stripe; only the two first tergites of the abdomen are depressed in the middle; the longitudinal grooves as well as ridge are less distinct; the basal portion of the serrula is as usual and has an anterior almost triangular flap on the basal longer tooth.

Material. — Of this species, which is easily characterized by the shape of the first abdominal tergites and the deep chelae of the palps, the Danish *Galathea*

Expedition brought home two very mutilated females(?) from the Island of Nankovry, one of the Nicobars.

24. *Chelifer Thorellii* Balz.

1891. *Lamprochernes Thorelli* L. Balzan (12.) pp. 519—520, pl. 10, fig. 11.

Distinct *ocular* spots; *cephalothorax* as long as broad, with distinct, almost straight transverse stripe, not granular, with long pointed, almost simple hair; abdomen elongate with almost parallel sides. The *galea* fairly long and slender with a number of tiny teeth terminally. The smooth palps are rather short and clumsy; the *trochanter* is bigibbose; the *femur* is 2.4 longer than broad, as long as but narrower than the *tibia*, which has lateral margins moderately convex; the *hand*, which is about 1.4 broader than the *tibia*, is 1.7 longer than the fingers. Femur of palps 1.15 (0.480); *tibia* 1.15 (0.545); *hand* 1.25 (0.745); *finger* 0.700. Sumatra. This species is probably related to *Chelifer Birmanicus* Thor., but is remarkable by its very short fingers.

25. *Chelifer Birmanicus* Thor.

(Pl. III, fig. 10 a; pl. IV, figs. 4 a-f).

1889. T. Thorell (10.) pp. 594—597, tav. V, fig. 6.

1905. A. Tullgren (22 b.) pp. 39—40, figs. 1 a-f).

Two almost obsolete *ocular spots*; *cephalothorax* longer than broad with rather distinct transverse stripe, curved backwards in the middle, without granules and with long, almost simple hairs. Abdomen long and slender, with 6 hairs in front of marginal row on the median tergites; tip of abdomen with tactile hairs, and genital area (♂) of "Birmanicus" type (cf. p. 124). The minutely granular palps much shorter (♀) or almost as long as (♂) the body; *trochanter* distinctly longer than broad, with posterior margin abruptly convex and with dorsal surface produced into a conical tubercle; *femur* about 2.3 longer than broad, as long as but narrower than the *tibia*, which has lateral outlines distinctly convex, and posterior basal elevation well developed. The *hand* 1.4 (♀) or 1.2 (♂) broader than *tibia*, about 1.7 longer than broad and 1.5 (♀) or 1.7 (♂) longer than deep, and 1.4 longer than *finger*. "Tactile" hair of the fourth tarsus is placed at base; the *tibia* of the first pair a little longer than the *tarsus*, which is 4.7 longer than deep.

♀. *Cephalothorax*. — *Ocular spots* almost obsolete. The *cephalothoracic shield* is distinctly longer than broad and almost as broad in the middle as behind; a fairly well marked median transverse stripe, which is strongly curved backwards in the middle, is found. The integument has no granules, but only the first thoracic tergite is polished, but not the head and second tergite, because muscular spots are abundant everywhere there; it is only due to this difference in the structure of the skin between the head and the first tergite, that a transverse stripe is visible. The hairs are fairly long and slender with a few terminal teeth; the second tergite bears a transverse row of 8 hairs.

Abdomen. — The abdomen is twice as long as broad with almost parallel sides and consequently of a rather slender appearance; at least the fourth to the tenth tergites are indistinctly longitudinally divided. The almost smooth tergal sclerites bear more or less long and slender terminally toothed hairs; the first and the second bear only hairs placed in a transverse row along posterior margin, consisting of 12 and 14 hairs respectively; the third tergite has 12 in the row and one lateral in front on each side; the following six tergites bear always 6 hairs, placed in large white spots, in front of the marginal row, which consists of 10 hairs only in the fourth tergite, but of 12 or 14 in the others; the tenth tergite bears 8 hairs in front of and 10 in the row. The two last tergites as well as the corresponding sternites bear in addition to the usual hairs simple "tactile" hairs.

Antennae (Pl. IV, figs. 4 a-d). — The *flagellum* consists of four hairs, of which the anterior is terminally bifurcate and provided with four marginal teeth (fig. 4 a, f). The *lamina interior* has four dentated lobes and a long, slender terminal spine (fig. 4 a, a²-t); the *serrula exterior* consists of about 25 teeth, of which the longer basal is moderately widened out towards the end and provided with a triangular flap, while the terminal is pointed, partly free and longer than the preceding ones (fig. 4 c, t). The *galea* extends distinctly beyond terminal hair and has a long branch near to the middle and at least four shorter ones near to the tip (fig. 4 c, g).

Maxillae. — The maxillae are smooth with a long manducatory part and with long and narrow exteriorly dentated *lamina maxillaris*.

Palps (cf. Pl. IV, figs. 4 e-f). — The palps, which are much shorter than the body, are granular with minute and rather low granules dorsally and laterally; the fingers are smooth. They bear a number of hairs, which are rather long and slender, and simple but for a few terminal teeth; the posterior side of the femur is in addition to these posteriorly mounted with a single longer and more slender completely simple hair near to the middle and one at the tip, the tibia with a dorsal and ventral one on the posterior basal elevation, and the hand with one posterior and one at least, placed basally and ventrally. The fingers bear *tactile* hairs and sense-spots, arranged in the following manner; the immovable finger has anteriorly two basal tactile hairs, the distal one the more dorsal, between which about 7 sense-spots are situated, and two more distal ones, of which the more dorsal is almost median, while the other is placed nearer to the tip; the same finger bears posteriorly two tactile hairs at the base and two(?) beyond the middle in addition to five proximal sense-spots. The movable finger has anteriorly four proximal sense-spots in a proximal row and posteriorly two basally placed sense-spots and four tactile hairs, arranged in a longitudinal row from base to a little beyond the middle. The *trochanter*, which has a moderately short and distinct stalk, is 1.9 longer than broad and is distinctly narrower than the femur; its anterior margin is beyond the stalk gradually and moderately convex; the posterior is beyond the stalk so abruptly rounded, that we can speak about a posterior, ventral and proximal eminence; the upper surface is produced into a more distal

conical tubercle, directed upwards and a little backwards. The *femur*, which has a short and well marked stalk, is 2.4 longer than broad, and as long as but distinctly narrower than the tibia; the anterior margin is beyond the stalk moderately convex, but in the distal half moderately concave; the posterior, but much more the dorsal surface is beyond the stalk first abruptly convex and then very slightly so. The *tibia*, which is three times as long as its rather slender and well defined stalk, is 2.1 longer than broad; the anterior margin is beyond the almost circular notch of the stalk evenly and distinctly convex; the posterior surface has a prominent condylus and an elongate basal elevation, which is well defined behind, and is beyond the latter, from which it is separated by a shallow concavity, gradually and moderately convex with the most raised portion in the distal third. The *hand*, which is a little longer than the tibia, but 1.4 broader, is almost as broad as the trochanter is long, 1.6 longer than broad, 1.5 longer than deep and 1.4 longer than fingers; the whole chela is 2.8 longer than broad; the lateral outlines of the hand are beyond the stalk first rather abruptly and then moderately convex, while the ventral and dorsal margins of the joint proper are very abruptly convex, being almost perpendicular on stalk, at the base and then almost straight.

Coxae. — The fourth pair is scarcely enlarged towards the extremity and 1.7 longer than broad; its shape is almost triangular, because the postero-interior corner is rounded; the inner margin is a little longer than the hinder, and both are slightly convex; the antero-interior corner is produced into a point.

Legs. — The hairs are moderately long or very long and most of them are not quite simple, but with a single or a few terminal teeth; the trochanter and the trochantin bear a few very long and simple hairs ventrally. The tarsus of the fourth pair of legs is at the base anteriorly provided with a "tactile" hair, as long as two thirds of the whole tarsus. The *trochantin* of the first pair of legs is distinctly wider than the femur proper; the *femur* of the fourth pair of legs is three times longer than deep. The *tarsus* of the first pair of legs is a trifle shorter than the tibia and 4.7 longer than deep, while the tarsus of the fourth pair of legs is twice as long as the femur is deep. The claws are simple, and only slightly extending beyond the arolium.

Colour. — The maxillae and the trochanter of the palps are light brown, the femur and the tibia are light reddish brown and the hand and fingers are dark reddish brown; the cephalothorax and tergal sclerites are pale brown, and the rest of the body is more or less yellowish.

Measurements. — Specimen of moderate size, dilated with eggs and light coloured. Cephalothorax 1.260 (0.980); abdomen 3.360 (1.680) mm.

Palps: trochanter 0.616 (0.336); femur 0.924 (0.392); tibia 0.952 (0.448); hand 1.008 (0.616), depth 0.672; finger 0.728 mm.

Leg I: femur 0.728 (0.252), trochantin 0.168; tibia 0.588 (0.154); tarsus 0.532 (0.112) mm.

Leg IV: femur 0.952 (0.336), trochantin 0.378; tibia 0.812 (0.210); tarsus 0.672 (0.150) mm.

Variation. — The other four females examined from Burma were not completely like the one described or to each other, one especially differed by having the cephalothorax and tergites dark-brown and palps reddish-brown; the same specimen had the absolute proportions of the joints of the palps one tenth bigger than the one described, but the relations between these proportions were scarcely different; the granulation of the palps was a little more pronounced probably due to darker colour.

♂. Abdomen (Pl. III, fig. 10 a). — The abdomen is longer and more slender, and the number of hairs in the marginal row of the tergal sclerites is smaller; the number of hairs in three first tergites is only 8, not 12 or 14, and the marginal row of all the following except the two last contains 10 hairs only. The tergites have the longitudinal line better marked, and the third shows trace of a division. The *genital area* has the typical shape in "*Atenuus* Can." (Pl. III, fig. 10 a, cf. p. 124).

Antennae (Pl. IV, figs. 4 b-d). — The *lamina interior* (fig. 4 b) has only three dentated lobes, and the *galea*, which is very slender and scarcely extends beyond the terminal hair, has only about four very short distal teeth (fig. 4 d).

Palps (Pl. IV, figs. 4 e-f). — The palps are a little longer than the body and have better marked granulations than in the female; the *trochanter*, which is 1.6 longer than broad, has the dorsal conical tubercle much more developed, for if the joint is observed from in front, the upper margin is really shaped like an acute angle with the point directed towards the extremity of the joint; the corresponding structure in female is much lower and blunt, not pointed. The *femur*, which is 2.3 longer than broad, is more abruptly convex dorsally and posteriorly; the *tibia* has the stalk of a much longer and more slender appearance, because the low concavity, which is just beyond the basal elevation and which marks it off towards the extremity, is much more developed, and the lateral convexities more elongate than in female; the ventral and dorsal outlines are distinctly convex, but not circular. The *hand*, which is 1.2 broader than the tibia, is 1.8 longer than broad, 1.65 longer than deep and 1.4 longer than the finger; the whole chela is 3 longer than broad.

Colour. — The colour is darker with all the joints of the palps reddish brown.

Measurements. — Pale specimen. Cephalothorax 1.188 (0.980); abdomen 3.080 (1.120) mm.

Palps: trochanter 0.644 (0.392); femur 1.092 (0.448); tibia 1.120 (0.532); hand 1.148 (0.616), depth 0.672; finger 0.784 mm.

Variation. — Two kinds of males were found, of which the one paler was smaller with shorter palps, while the other was much darker with the palps almost blackish brown and the dorsal surface of the body more or less dark brown; the latter had besides the palps more distinctly granular and

much more powerful; but the three males like the females were in all other respects alike.

Material. — I have examined seven specimens (4 ♀, 3 ♂) of Thorell's original ones from Bhámo in Burma.

Remarks. — The specimens examined scarcely differ from Thorell's description in any respects but one; he says namely that the palps are "densissime, omnium subtilissime impresso-punctati"; he is certainly wrong and has misinterpreted the low granules.

26. *Chelifer monitor* n. sp.

(Pl. IV, figs. 5 a-b).

Ocular spots wanting; cephalothorax distinctly longer than broad behind with median transverse line, curved backwards in the middle, indistinct (♂) or wanting (♀), without granules and with fairly long and almost simple hairs. Abdomen with 6 hairs in front of the marginal row on median tergites, and at the tip with "tactile" hairs; the genital area is of the "Birmanicus" type. The minutely granular palps are longer (♂) or shorter (♀) than the body; the trochanter is distinctly longer than broad with posterior margin abruptly convex and dorsal surface produced into a conical tubercle; the femur about 2.3 longer than broad, almost as long as, but distinctly narrower than the tibia, which has lateral outlines moderately convex (♀) or almost circular (♂) and posterior basal elevation very prominent. The hand is 1.1 (♂) or 1.35 (♀) broader than tibia, 1.7 (♂) or 1.6 (♀) longer than broad, 1.4 longer than deep and 1.3 longer than fingers. "Tactile" hair of the fourth pair is placed at the base of tarsus; the tarsus of the first pair is 5 longer than deep and distinctly shorter than the tibia.

♂. Cephalothorax. — No ocular spots are visible; the cephalothoracic shield is much longer than broad; a not very well marked median transverse line, which is curved distinctly backwards in the middle, is present. The skin appears to be reticulate and the fairly long hairs are provided with a few teeth.

Abdomen. — The abdomen is scarcely twice as long as broad and fairly depressed; the longitudinal line is very indistinct; the arrangement of the tergal hairs could not be traced in the details, but scarcely differs much from that of *Ch. Birmanicus* Thor.; there is at least 6 hairs in front of the marginal row in the median tergites. The tip of the abdomen bears "tactile" hairs. The genital area is of the "*Chelifer Birmanicus* Thor." type (cf p. 124).

Antennae — The flagellum consists of four hairs, of which the anterior bears four distal branches; the lamina interior with three dentated lobes and long serrated spine; the galea is short with a few minute terminal spines.

Palps (Pl. IV, figs. 5 a-b). — The minutely, but distinctly granular palps are longer than the body; the shape as well as the arrangement of the hairs, usual and tactile ones, as well as of the sense-spots of the fingers are scarcely different from those of preceding species (cf. p. 177). The trochanter, which is 1.5 longer than broad and distinctly narrower than the femur, is beyond stalk moderately

convex anteriorly, but posteriorly abruptly convex and produced to a ventral emittance; the dorsal surface is produced to a conical tubercle, but this is, when seen from in front, blunt, not pointed. The *femur*, which is 2·3 longer than broad and almost as long as but much narrower than the tibia, is anteriorly beyond stalk moderately convex and then concave, but posteriorly very abruptly convex and then moderately so. The *tibia*, the stalk of which has the appearance of being very long and slender, is 1·8 longer than broad; its anterior margin is beyond stalk almost circular, while the posterior outline is almost straight beyond the concavity, which marks the basal elevation off distally, but circular in the distal third; the dorsal and the ventral margins are also very distinctly convex, almost circular, especially the former, which has the convexity more sudden and better marked (fig. 5 b). The *hand*, which is as long as the tibia, but 1·1 broader, is 1·7 longer than broad, 1·4 longer than deep and 1·3 longer than the finger; the chela is 2·7 longer than broad; the lateral outlines of the hands are just beyond stalk abruptly convex and then moderately so; the dorsal and ventral margins are first perpendicular on stalk, and then moderately convex (the former) or almost straight (the latter).

Legs. — The shape and the arrangement of the hairs are as in *Ch. Birmanicus* (cf. this), but the relation between the proportion of the joints differs. The *femur* of the fourth pair is 2·3 longer than deep; the *tarsus* of the first pair is distinctly shorter than the tibia and 5 times longer than deep; the tarsus of the fourth pair of legs is about 1·5 longer than the femur is deep.

Colour. — The palps are dark reddish brown with the trochanter lighter; the dorsal surface of the body is dark brown.

Measurements. — Cephalothorax 1·120 (0·952); abdomen 2·200 (1·204) mm.

Palps: trochanter 0·588 (0·392); femur 1·008 (0·448); tibia 1·036 (0·560); hand 1·036 (0·626), depth 0·728; finger 0·784 mm.

Leg I: femur 0·747 (0·279), trochantin 0·162; tibia 0·594 (0·162); tarsus 0·513 (0·105) mm.

Leg IV: femur 0·990 (0·432), trochantin 0·405; tibia 0·837 (0·216); tarsus 0·630 (0·126) mm.

♀. Body. — The transverse median line of cephalothorax is wanting; the abdomen is exceedingly long and slender.

Antennae. — The anterior hair of the *flagellum* has three terminal and three median teeth; the *lamina interior* has three dentated lobes. The *galea*, which is, to a considerable degree, extended beyond the terminal hair, has three short terminal branches and two much longer just beyond the middle.

Palps. — The granulation is less distinct; the *trochanter* is only 1·6 longer than broad, and its posterior margin is not so abruptly convex as in the male, and this is also the case with the posterior basal convexity of the *femur*; the tibia, which has the stalk less slender and is twice as long as broad, has the lateral as

well as the dorsal and ventral margins more moderately convex in similarity to *Ch. Birmanicus* Thor. The *hand*, which is distinctly longer than the tibia and about 1.35 broader than the tibia, is 1.6 longer than broad, 1.4 longer than deep and 1.3 longer than the finger; the whole chela is 2.6 longer than broad; the lateral as well as the dorsal and ventral outlines seem to be less abruptly convex.

Colour. — The colour is much lighter; the two proximal joints of palps are light brown, while the tibia and hand are reddish brown; the cephalothorax and tergites are pale brown.

Measurements. — Cephalothorax 1.120 (0.924); abdomen 3.640 (1.680) mm.

Palps: trochanter 0.575 (0.364); femur 0.952 (0.420); tibia 0.970 (0.476); hand 1.008 (0.644), depth 0.738; finger 0.784 mm.

Material. — I have examined both a male and female of this species, both labelled “?Sundaislands?” but not mounted together.

Remarks. — It is only with doubts, that I have referred the described male and female to the same species, for there is a remarkable difference in the convexities of the tibia of the palps, which has nothing corresponding in the male and female of *Ch. Birmanicus* Thor.

27. *Chelifer Nicobarensis* n. sp.

(Pl. IV, figs. 6 a-b; fig. 17, p. 183).

♂. *Indistinct ocular spots; cephalothorax not broader behind than in middle, distinctly longer than broad, with prominent, median transverse stripe, which is curved distinctly backwards in the middle; skin without granules and with not quite simple hairs. Abdomen not very long and slender, with longitudinally undivided, minutely reticulate tergites, which have 6 hairs in front of marginal row; tip of the abdomen with “tactile” hairs(?); genital area of “Birmanicus” type. Distinctly granular palps longer than body; the trochanter distinctly longer than broad, with posterior margin abruptly convex and with dorsal surface produced into a pyramidal, obtusely pointed tubercle; femur about 2.1 longer than broad, as long as but distinctly narrower than the tibia, which has lateral outlines almost circular and basal posterior elevation well marked. The hand is 1.1 broader than tibia, 1.6 longer than broad, 1.4 longer than deep and 1.5 longer than fingers. “Tactile” hair of the fourth tarsus is placed at the base; the tibia of the first pair is a little longer than the tarsus, which is 1.8 longer than deep.*

Cephalothorax. — The *ocular spots* are very indistinct. The cephalothorax is distinctly longer than it is broad in the middle, where it is broader than at the hindmost margin; the outline is laterally moderately convex, most distinctly in front, where it has a direction forwards and inwards to establish a well developed cucullus. In the middle a distinct strongly backwards curved transverse *stripe* is found; the integument is almost smooth, but only polished in the first thoracic tergite. Hairs probably moderately long with a few distal teeth.

Abdomen. — The abdomen, which is about twice as long as broad, is of a

moderately slender appearance, depressed and with almost parallel sides. The tergites, which are not longitudinally divided, increase in length towards the tenth, and at least the median ones have their lateral halves slanting towards the sides, thus establishing a median longitudinal keel. The tergites are minutely reticulate or striate and the median ones bear in front of marginal row six hairs, placed in wide lighter spots; the tip of the abdomen seems to possess *tactile* hairs. The sternites have a fairly distinct longitudinal line and the *genital area* are like that of *Ch. Birmanicus* Thor. (cf. p. 124).

Antennae (Pl. IV, fig. 6 a). — The *flagellum* consists of 3 (?) hairs, of which the anterior has a few long teeth; the *lamina interior* possesses three dentated lobes and a long serrated spine; the *serrula exterior* has the basal of the 24 teeth the longest and provided with an almost triangular terminal flap (fig. 6 a). The *galea*?

Maxillae. — The maxillae are only minutely granular laterally, but smooth everywhere else.

Palps (Pl. IV, fig. 6 b; fig. 17). — The palps, which are distinctly longer than the body, are distinctly granular, with moderately big and pronounced granules. The anterior surface of the trochanter, the stalks and the fingers are smooth or almost smooth. The shape as well as the arrangement of the different kinds of hairs will probably not show any marked dissimilarity to those described in *Ch. Birmanicus* Thor. (cf. p. 177). The *trochanter*, which has a short and well defined stalk, is 1.6 longer than broad and distinctly narrower than the femur; its anterior margin is beyond the stalk moderately and evenly convex, while the posterior has beyond the stalk a very abrupt and rounded projection in the proximal half just beyond the stalk; the dorsal surface of the trochanter is produced into an upwards and slightly backwards directed pyramidal tubercle, which, when observed from the front, is obtusely pointed and has the proximal slope distinctly and evenly concave, while the distal is almost obtuse-angled; the trochanter is, measured from tip of tubercle, distinctly (1.2) deeper than broad. The *femur*, which has a short and well marked stalk, is 2.1 longer than broad, as long as the tibia but distinctly narrower; the anterior margin is beyond the stalk moderately convex and then concave; the posterior, but especially the dorsal surface is very abruptly convex just beyond the stalk and then moderately so. The *tibia*, which is three times as long as its well defined stalk, is 1.8 longer than broad; the anterior outline is beyond the deep notch almost circular; the posterior surface is beyond the basal elevation, which is short, prominent and as well defined distally as proximally, distinctly convex, almost circular; the dorsal and the ventral outlines are also strongly convex in a similar way as in *Ch. monitor* n. sp. (cf. pl. IV, fig. 5 b). The *hand*, which is of almost

Fig. 17. *Ch. Nicobarensis* n. sp.; ♂; left trochanter; $\times 48$.

equal length to the tibia and only 1.1 broader, is almost as broad as the trochanter is long, 1.6 longer than broad, 1.4 longer than deep and 1.5 longer than finger; the chela is 2.6 longer than broad; the lateral outlines of the hand are beyond the stalk rather abruptly and then moderately convex, while the ventral and dorsal margins of the joint proper are almost perpendicular on the stalk, and then slightly convex.

Coxae. — The coxae of the fourth pair are slightly enlarged towards the extremity and almost twice as long as broad; they are square, as the posterior-interior corner is almost obtuse-angled; the posterior margin is almost twice as long as the interior, and the antero-interior corner is only slightly pointed.

Legs. — The hairs are like those of *Ch. Birmanicus* Thor. (cf. p. 178); the tarsal „tactile” hair of the fourth pair of legs is placed at the base. The tibia of the first pair of legs is not very much longer than the *tarsus*, which is 4.7 longer than deep; the *tarsus* of the fourth pair of legs is 1.8 longer than the femur is deep, and this is again 2.5 longer than deep.

Colour. — The palps are dark reddish brown; the cephalothorax are darker or lighter brown; the abdominal tergites are blackish with yellowish spots for the hairs; ventral side brownish.

Measurements. — Cephalothorax 1.064 (0.924); abdomen 1.876 (0.900) mm.

Palps: trochanter 0.616 (0.380); femur 0.972 (0.455); tibia 0.952 (0.532); hand 0.970 (0.588), depth 0.672; finger 0.644 mm.

Leg I: femur 0.720 (0.270), trochantin 0.171; tibia 0.576 (0.171); tarsus 0.522 (0.115) mm.

Leg IV: femur 0.873 (0.350), trochantin 0.350; tibia 0.765 (0.216); tarsus 0.630 (0.126) mm.

Variation. — The cephalothorax is not broader in the middle than behind; the abdomen has no longitudinal keel; the palps are shorter.

Material. — The Danish Galathea Expedition brought home two males from Pulu-Mulu, one of the Nicobars; both specimens were only poorly preserved, as hairs and galeae were broken.

28. *Chelifer Javanus* Thor.

1883. T. Thorell (6.) pp. 37—40; tav. V, figs. 20—22.

1900. R. J. Pocock (17.) p. 156.

1901. E. Simon (19.) p. 79.

Distinct *ocular spots*; the smooth *cephalothorax* is a little longer than broad without transverse stripes. Abdomen rather long and slender with the smooth tergites indistinctly divided and with one row of hairs in front of marginal one, with the exception of the first three, which have only a marginal row. The antennae possess a simple pointed *galea*, which in the male (♂) does not extend beyond the terminal hair, but in the female(?) projects distinctly beyond this hair. The *palps* are “nitidissimi, omnium subtilissime impresso-punctati”; the *trochanter*

is longer than broad and posteriorly "fortissime rotundata vel potius gibbosus"; the *femur*, which is a little broader than the trochanter, is a little more than twice as long as broad; the *tibia*, which possesses a rather long and slender stalk, is a little shorter and broader than the femur and beyond stalk "pulchre ovatum". The hand, which is distinctly broader and a little longer than the tibia, is much broader than deep and 1.5 longer than finger. The abdominal tergites are dark-brown ("picea") with lighter spots for the hairs. Thorell's original specimens of this species are from Java.

It seems to differ from *Ch. plebejus* n. sp. by the granulation of the palps, by the less distinctly convex lateral outlines of the tibia as well as by its more slender stalk, and by the darker colour of the abdominal tergites (cf. p. 187); but it is similar to this species and different from the other Indian species of the "*Ch. Birmanicus* Thor." group by the trochanter, the dorsal surface of which is scarcely produced posteriorly. This species has been mentioned by Pocock from Christmas Island; but the specimen, determined by this naturalist as *Ch. Javanus* Thor., is really an undescribed species, differing from the latter by the structure of the trochanter of the palps. Simon calls this species "très répandue en Malaisie", but he is probably wrong in regarding *Ch. Javanus* Thor. as a common form, for the specimens of the Skeat Expedition, which he referred to this species, seem really to belong to another species viz. *Ch. plebejus* n. sp., which has a very wide range (cf. p. 187).

29. *Chelifer plebejus* n. sp.

(Pl. IV, figs. 7 a-b; figs. 18—20, p. 186).

1901. *Chelifer Javanus* E. Simon (nec. Thor.) (19.) p. 79.

Indistinct ocular spots; cephalothorax slightly longer than broad behind, without transverse line, almost smooth with rather long and slender, almost simple hairs. The long and slender abdomen has on the median tergites 6(?) hairs in front of the row and terminally "tactile" hairs. (♂) Genital area of "Birmanicus" type. The completely smooth palps are shorter than the body; trochanter distinctly longer than broad, with posterior margin abruptly convex, and dorsal surface scarcely produced; femur 2.2 longer than broad, scarcely as long as but distinctly narrower than the tibia, which has lateral outlines distinctly convex and posterior basal elevation almost obsolete. The hand is 1.4 broader than tibia, about 1.6 longer than broad, 1.7 longer than deep and 1.4 longer than finger. "Tactile" hair of the fourth tarsus is placed at the base; the tibia of the first pair is a little longer than the tarsus, which is 3.6 longer than deep.

♀. *Cephalothorax*. — Two very indistinct *ocular spots* present. The cephalothorax is a little longer than broad behind, where it is broadest, and shows no trace of transverse division; it is almost smooth and provided with rather long hairs, which bear a few terminal teeth.

Abdomen. — The abdomen is twice as long as broad with parallel sides and of a rather slender appearance; the tergites, at least from the fourth to the tenth,

are more or less indistinctly, seldom completely divided by a longitudinal line. The marginal row of the hairs, which are found on the sclerites, consists of 10 or 12; in addition to these hairs at least a single lateral one is found on each side in front of the row, but none in the middle, as usual, have been discovered. The two last tergites as well as sternites bear "tactile" hairs.

Antennae (Pl. IV, figs. 7 a-b). — The *flagellum* consists of four hairs, of which the anterior is serrated along the front margin (fig. 7 a); the *lamina interior* possesses three dentated lobes and a long terminal spine with four teeth; the basal tooth of the *serrula exterior* has a terminal and anterior triangular flap. The *galea* is distinctly longer than the terminal hair and is provided with about six rather long teeth (fig. 7 b).

Palps (figs. 18—20, p. 186). — The completely smooth palps are shorter than the body; they are provided with a number of rather long hairs, which are

Fig. 18. *Ch. plebejus* n. sp.
(Simon's specimen from Kelantan);
♀; left palp; x 22.

mounted with a few teeth, in addition to long, slender and completely simple ones as shown in figure 18; the fingers bear *tactile* hairs, the number and arrangement of which do not seem quite like to those of *Ch. Birmanicus* Thor., for the movable finger has five(?) tactile hairs posteriorly and ventrally, and the immovable finger four (fig. 19). The *trochanter*, which has a short and distinct stalk, is 1.5 longer than broad and narrower than the femur; its anterior margin is beyond the stalk evenly and distinctly convex, while the posterior is abruptly convex and is produced into a not very prominent tubercle; no dorsal tubercle is found, and the upper surface is scarcely produced, but, when observed from in front, obtuse-angled and blunt (fig. 20). The *femur*, which has a short and distinct stalk, is 2.2 longer than broad, and a little shorter, but distinctly narrower than the tibia; the anterior margin is beyond the stalk moderately convex and then concave; the posterior, but especially the dorsal surface is beyond the stalk first abruptly convex and then moderately so. The *tibia*, which is 3.7 longer than the well defined, but rather short and thick stalk, is twice as long as broad; the anterior margin is beyond the deep notch of the stalk evenly, but very distinctly convex with a slightly marked concavity distally; the posterior margin is beyond the fairly well marked condylus first moderately and

into a not very prominent tubercle; no dorsal tubercle is found, and the upper surface is scarcely produced, but, when observed from in front, obtuse-angled and blunt (fig. 20). The *femur*, which has a short and distinct stalk, is 2.2 longer than broad, and a little shorter, but distinctly narrower than the tibia; the anterior margin is beyond the stalk moderately convex and then concave; the posterior, but especially the dorsal surface is beyond the stalk first abruptly convex and then moderately so. The *tibia*, which is 3.7 longer than the well defined, but rather short and thick stalk, is twice as long as broad; the anterior margin is beyond the deep notch of the stalk evenly, but very distinctly convex with a slightly marked concavity distally; the posterior margin is beyond the fairly well marked condylus first moderately and

Fig. 19.

Fig. 19. *Ch. plebejus* n. sp. (same specimen as fig. 18); right tibia and chela; x 22.

Fig. 20.

Fig. 20. Same specimen as fig. 19; trochanter and femur of right palp; x 22.

then towards the distal third very distinctly convex, and has the posterior basal elevation obsolete or almost so. The *hand*, which is a little longer, but 1.4 broader than the tibia, is 1.2 longer than the trochanter, 1.6 longer than broad, 1.7 longer than deep and 1.4 longer than finger; the chela is 2.6 longer than broad; the lateral outlines of the hand are beyond stalk abruptly convex, most so the posterior one, and then moderately convex; the dorsal and ventral margins are as usual well marked off from the stalk, especially when observed from behind, and very moderately convex.

Coxae. — The fourth pair of the coxae is almost trapezoid and not enlarged towards the extremity, being 1.5 longer than broad; the postero-interior corner is obtuse-angled, and the inner margin is only a trifle shorter than the hinder one, which is slightly concave.

Legs. — The hairs are either moderately long or very long and most of them are not quite simple, but provided with a single or a few distal teeth; the trochanter and the trochantin bear below in addition to these a few very long and extremely slender, completely simple hairs; the "*tactile*" hair of the fourth pair of legs is placed at the base; the lateral terminal hair of the tarsus is moderately curved. The *trochantin* of the fourth pair of legs is distinctly wider than the femur proper and the *femur* of the fourth pair of legs is 2.3 longer than deep; the *tarsus* is a little shorter than the tibia in the first pair of legs and 3.6 longer than deep, while that of the fourth pair is only 1.2 longer than the femur is deep.

Colour. — The maxillae and the three proximal joints of the palps are light brown, while the hand and fingers are reddish brown; the cephalothorax and tergal sclerites are yellowish brown.

Measurements. — Cephalothorax 1.120 (0.960); abdomen 3.080 (1.260) mm.

Palps: trochanter 0.532 (0.364); femur 0.890 (0.405); tibia 0.938 (0.448); hand 1.008 (0.644), depth 0.588; finger 0.700 mm.

Leg I: femur 0.666 (0.270), trochantin 0.135; tibia 0.486 (0.162); tarsus 0.423 (0.117) mm.

Leg IV: femur 0.990 (0.432), trochantin 0.425; tibia 0.756 (0.252); tarsus 0.522 (0.162) mm.

Material. — The Danish Galathea Expedition brought home two not very well preserved females from the Kar-Nikobar Island, one of the Nicobars; I have also examined a number of specimens, most females and young ones (only three males) from Kuala Aring (Kelantan), which by M. E. Simon were identified with *Ch. Javanus* Thor., as well as a large number of females — one with egg-bundel attached to the genital area — and young ones, which were collected at Tarrawaddi — Burma — by Mr. Oates.

Remarks. — It is only with hesitation, that I establish this new species, because it seems to be very nearly related to *Ch. Javanus* Thor. and because it was identified with this species by such an able naturalist as E. Simon, but the following differences seem to me to be too important to discard altogether. *Ch.*

Javanus Thor. has the galea undivided, the palps "impressi-punctati", the tibial part fairly oval with a rather long stalk and the abdomen dark-brown with lighter spots, while *Ch. plebejus* n. sp. has the galea provided with distal branches, the palps completely smooth, the tibia strongly convex with very short stalk, and the abdomen light brown. As the genital area of the male is of the same structure as in *Ch. Birmanicus* Thor., it must be regarded as related to this species. It is easily distinguished from all other species of this group, mentioned here, except *Ch. Javanus* Thor., by its trochanter, which does not possess any dorsal tubercle.

30. *Chelifer orites* Thor.

1889. T. Thorell (10.) pp. 597—599, tav. V, fig. 7.

1901?. E. Ellingsen (18.) pp. 208—209.

Ocular spots present; the almost smooth *cephalothorax* is distinctly longer than broad and without any transverse stripe; the abdomen has almost all tergites longitudinally divided and on all tergites except the three first and the last ones six hairs in front of the row. The *palps*, which are smooth or "impressi-punctati", are as long as the body; the *trochanter*, which is distinctly longer than broad, has posterior margin abruptly convex and dorsal surface produced in a not very high tubercle; the *femur* a little more than twice as long as broad; the *tibia* has the lateral outlines moderately convex. The *hand*, which is almost twice as broad as the tibia, is almost twice as long as the finger. Tarsus of the fourth pair with a basal "tactile" hair. Thorell's original specimens are from Mt. Mooleyit — Burma.

Ellingsen has recently identified a false-scorpion from Madras with *Ch. orites* Thor., and remarks (18. p. 209) that the only difference between the two is found in the granulation of the hand. But as he in his description writes "La main environ une fois et demie plus longue et un peu plus large que le tibia", while Thorell writes "manus brachio plus dimidio, paene duplo latior est", we are obliged to regard this identification as rather doubtful.

31. *Chelifer vermiformis* n. sp.

(Pl. IV, figs. 8 a-b; fig. 21, p. 189).

♂. *Indistinct ocular spots; cephalothorax much longer than broad without transverse line and almost smooth with almost simple hairs; extremely long and slender abdomen without distinct sclerites; genital area of "Birmanicus" type. The partly granular, partly smooth palps are shorter than body; trochanter distinctly longer than broad with posterior margin almost triangularly produced and the dorsal surface provided with a very high rounded tubercle; the femur 2.5 longer than broad, and a little shorter and narrower than the tibia, which has an extremely long stalk, moderately convex lateral outlines and a fairly prominent basal elevation posteriorly. The hand is 1.2 broader than the tibia, about 2.1 longer than broad, 1.9 longer than deep and 1.8 longer than finger. "Tactile" hair of the fourth tarsus is placed at the base; the tibia of the first pair is much longer than the tarsus, which is 4.1 longer than deep.*

Cephalothorax. — The *ocular spots* are very small and indistinct. The cephalothorax is much longer than broad behind, and shows no trace of transverse division, but the "head" is nevertheless well marked out, being much darker than the hinder part of the cephalothorax and more raised. The skin is almost smooth and provided with rather short hairs, which are not quite simple.

Abdomen. — The abdomen has a very characteristic appearance, being pale without distinct sclerites, with almost parallel sides, and 2.5 longer than broad; the longitudinal line is scarcely visible on account of the obsolete sclerites; hairs were not discovered, but certainly occur. The genital area appears similar to that of *Ch. Birmanicus* Thor.

Antennae (Pl. IV, fig. 8 a). — The *flagellum* consists of four hairs, of which the anterior longer one is provided with marginal teeth; the *lamina interior* possesses three dentated lobes and a long serrated terminal spine; the *serrula exterior* consists of about 20 teeth, of which the basal one has an almost triangular terminal flap. The *galea*, which does not extend beyond the terminal hair, has at least a single tiny tooth near to the tip (fig. 8 a).

Maxillae. — The smooth maxillae have very broad, exteriorly distinctly serrated laminae.

Palps (Pl. IV, fig. 8 b; fig. 21, p. 189). — The palps, which are shorter than the body, are partly smooth, partly minutely granular; at least the trochanteral tubercles, the anterior surfaces of the femur and tibia as well as the hand laterally at the base of the finger are granular. The hairs, which are not very abundant, are moderately long, stiff and with a few terminal teeth; those of the trochanteral tubercles are longer than the rest; the long, slender and simple hairs of the tibia, femur e. t. c., which are found in species which are related, are not present — perhaps missing —; the fingers are provided with *tactile* hairs and *sense-spots*, which seem in the main to be arranged in the following way. The immovable finger has anteriorly two basal, one median and one more terminal tactile hair in addition to a number of spots between the two basal hairs; posteriorly two basal, one median and one terminal tactile hair, in addition to which at least two sense-spots are found. The movable finger seems not to bear any sense-spots anteriorly, but has posteriorly at least two basal sense-spots in addition to four tactile hairs, placed longitudinally from the base towards the middle. The *trochanter*, which has a rather long and well defined stalk, is 1.4 longer than broad and narrower than the femur; its anterior margin is beyond the stalk very moderately convex; its posterior is beyond the stalk abruptly produced into a triangular process, which is rounded and more evenly slanting towards the tip than towards the stalk; the dorsal surface is produced into a very high, rounded tubercle, which is directed upwards and backwards, being so high, that the trochanter is distinctly deeper

Fig. 21. *Ch. vermiformis* n. sp.; ♂; left palp from anterior side; x 48.

than broad, measured from the tips of the tubercles to the ventral and anterior margins respectively, and as deep as the femur; the joint is, looked at from in front, from the base of the stalk to near the summit of the tubercle almost circular; it is here distinctly rounded and gradually sloping towards the tip of the trochanter. The *femur*, which has a fairly long, not very well marked stalk, is 2.5 longer than broad and a little shorter and narrower than the tibia; the anterior outline is from the base of stalk in the proximal two thirds slightly convex, almost straight and then a trifle concave; the posterior as well as the dorsal surfaces are not very abruptly convex beyond the stalk and then very slightly so; the joint is distinctly broader in proximal third. The *tibia*, which is 2.8 longer than the extremely long and slender stalk, is 2.3 longer than broad; the anterior margin is beyond the rather shallow notch of the stalk evenly and rather distinctly convex; the posterior margin has, beyond the prominent condylus and separated from it by an incision, a rather low, but elongate basal elevation, which through a shallow concavity blends into the fairly well marked convexity of the joint proper; both the ventral and dorsal margins are beyond the stalk, which is very abruptly defined, almost oval as far as the former is concerned, or circularly convex basally. The *hand*, which is a little longer than the tibia and almost 1.2 broader, is shorter than the trochanter, 2.1 longer than broad, 1.9 longer than deep and 1.8 longer than finger; the chela is 3.2 longer than broad; the lateral outlines are beyond the stalk fairly abruptly convex and then moderately so; the ventral and dorsal ones are perpendicular on the stalk and then almost straight.

Coxae. — The fourth pair of the coxae are triangular and enlarged towards the extremity, being almost twice as long as broad; the postero-interior corner is rounded, and the hinder margin is almost twice as long as the inner.

Legs. — The hairs seem to be as in *Ch. plebejus* n. sp. (cf. p. 187) and a "tactile" is present at the base of the fourth pair of tarsi; the legs are very short and clumsy. The *trochantin* of the first pair is wider than the femur proper; the *femur* of the fourth pair of legs is 2.2 longer than deep; the tibia of the first pair of legs is much (1.2) longer than the *tarsus*, which is 4.1 longer than deep; the *tarsus* of the fourth pair of legs is only a trifle (1.1) longer than the femur is deep.

Colour. — The palps are reddish brown, and so is the head, but a little lighter; the rest of the body is yellowish.

Measurements. — Cephalothorax 1.008 (0.756); abdomen 2.800 (1.120) mm.

Palps: trochanter 0.476 (0.336); femur 0.900 (0.364); tibia 0.925 (0.392); hand 0.970 (0.448), depth 0.504; finger 0.532 mm.

Leg I: femur 0.594 (0.225), trochantin 0.135; tibia 0.414 (0.135); tarsus 0.333 (0.081) mm.

Leg IV: femur 0.783 (0.360), trochantin 0.333; tibia 0.603 (0.225); tarsus 0.405 (0.108) mm.

Material. — The Danish Galathea Expedition has collected a single male at Nankovry, one of the Nicobars.

Remarks. — This species, which is easily recognized by its very slender palps, especially the hand, with its short fingers, and short clumsy legs together with its characteristic colour, differs from *Ch. orites* Thor. by its very slender hand and from the species, which Ellingsen identified with this, by the long tubercles of the trochanter and its more slender palps; from all other species of the *Ch. Birmanicus* Thor. group except from *Ch. Thorelli* Balz., which has a transverse stripe, by its short fingers.

32. *Chelifer navigator* n. sp.

(Pl. IV, fig. 9 a; fig. 22, p. 192).

♂. Small distinct ocular spots; cephalothorax longer than broad without transverse line, almost smooth with almost simple hairs. Fairly long and slender abdomen with distinct tergal and sternal sclerites, with 6 hairs in front of marginal row in median tergites and with terminal "tactile" hairs; genital area of „*Birmanicus*" type. The partly granular palps almost of equal length to body; trochanter distinctly longer than broad with posterior margin almost triangularly produced and the dorsal surface provided with a very high conical tubercle; the femur is 2.5 longer than broad, a little shorter, but distinctly narrower than the tibia, which has an extremely long stalk, distinctly convex lateral outlines and a long indistinctly marked basal elevation. The hand is 1.1 broader than the tibia, 1.9 longer than broad, 1.7 longer than deep and 1.5 longer than finger. „Tactile" hair of the fourth pair is placed at the base of the tarsus; the tibia of the first pair is much longer than the tarsus, which is 4.3 longer than deep.

Cephalothorax. — Distinct, but small ocular spots are found. The cephalothoracic shield is distinctly longer than broad and almost as broad a little behind the eyes as at the hindmost margin; no transverse lines are visible, but the "head" is indistinctly marked off by being better raised and a little darker; the integument is almost smooth with the exception of that of the head, which appears minutely granulated; the few hairs are short with a few teeth distally.

Abdomen. — The abdomen, which is about twice as long as broad and of a rather elongate appearance, has the tergal sclerites very distinct and in the single specimen arranged in a rather curious way; the fourth to the eighth are placed close together with scarcely marked articulate membranes, while the others are separated from each other by membranes almost as long as the tergal sclerites themselves; they are all, except three viz. the two (three) first and the eleventh, divided by a well marked longitudinal line. The sclerites bear, with the exception of the first three, six hairs in front of the marginal row, of which the four median ones are placed within prominent white spots. The sternal sclerites are very distinct and longitudinally divided with the exception of the eleventh; the eleventh tergite as well as the tenth and eleventh sternites with "tactile" hairs. The structure of the genital area is in the main similar to that of *Ch. Birmanicus* Thor.

Antennae. — The flagellum consists of four hairs, of which the anterior has

about seven long marginal teeth distally; the *lamina interior* has three dentated lobes and a rather long, serrated spine; the basal tooth of the 20, which build up the *serrula exterior*, has a rather small triangular flap terminally. The *galea*, which bears a single minute tooth near to the middle, is very short and does not extend beyond the terminal hair.

Maxillae. — The maxillae are smooth in the middle, minutely granular laterally with a not very long lamina.

Palps (Pl. IV, fig. 9 a; fig. 22). — The palps, which are of almost equal length to the body, are smooth or perhaps very minutely reticulate with the exception of the trochanteral tubercles, the anterior surface of the femur and the tibia and the base of the hand, which are minutely granular. The longer and shorter hairs are stiff and provided with a few distal teeth; of the longer and more slender, completely simple hairs, which are usually found, only the posterior one at the base of the tibia was found in this specimen; the fingers possess *tactile* hairs and sense-spots, which seem in the main to be arranged in the following way. The immovable finger bears anteriorly two basal tactile hairs, one median dorsal and one placed a little in front of and below this, in addition to about ten sense-spots arranged in a longitudinal row between three proximal hairs; posteriorly two basal, one median

Fig. 22.
Ch. navigator
n. sp.; ♂; left
palp in anterior
view; $\times 48$.

and one almost terminal tactile hair in addition to two proximal sense-spots are found. The movable finger has anteriorly no prominent sense-spots, but posteriorly four, placed near to the base, in addition to two basal, three median and a single terminal tactile hair. The *trochanter*, which has a moderately long and well defined stalk, is 1.6 longer than broad and narrower than the femur; its anterior margin is beyond the stalk very moderately convex, almost straight, while the posterior is produced into an obtusely pointed triangular process, almost perpendicular on the stalk, but gradually slanting towards the extremity; the dorsal surface is produced into a very high conical, obtusely pointed tubercle, which is directed upwards and backwards, being so high, that the trochanter is distinctly deeper than broad, measured from the tips of the tubercles to the ventral and anterior margins respectively, and as deep as the femur; the outlines of the trochanter, as looked at from in front, are obtusely acute-angled dorsally with the distal steeper slope longer than the proximal, merging into the shallow concavity of the stalk. The *femur*, which has a long but not very well marked stalk, is 2.5 longer than broad and a little longer but distinctly narrower than the tibia; the anterior and ventral outlines are almost straight from base to tip, while the posterior and especially the dorsal margin are beyond the stalk abruptly convex and then very moderately so. The *tibia*, which is 2.9 longer than the extremely long and slender stalk, is 2.1 longer than broad; it is anteriorly beyond the very shallow notch of the stalk rather abruptly and strongly convex; the posterior margin has beyond the slightly marked condylus a

very elongate, not very well marked basal elevation, which through an elongate concavity blends into the distinctly convex outline of the distal third of joint; the ventral margin is beyond the stalk evenly and moderately convex, while the dorsal is very abruptly so, almost circular. The *hand*, which is 1.1 broader than the tibia, is almost as broad as the trochanter is long, 1.9 longer than broad, 1.7 longer than deep and 1.5 longer than the finger; the chela is three times as long as broad; the lateral outlines are beyond the stalk abruptly convex and then moderately so; the ventral and dorsal margins are perpendicular on the stalk and then almost straight.

Coxae. — The fourth pair are enlarged towards the extremity and appears triangular, as the postero-interior corner is fairly rounded; the coxa is almost twice as long as broad and the inner margin a little shorter than the hinder.

Legs. — The hairs are more or less long and rather stiff with a few distal teeth; the trochanter and the trochantins bear ventrally a few very long, slender and completely simple hairs and the femur of the fourth pair a single ventral in the middle and a dorsal one near the tip; the tibia of the fourth pair of legs bears ventrally a pair of similar strongly curved hairs; a "*tactile*" hair is found near to the base of the fourth tarsus. The lateral terminal hair is moderately curved. The *trochantin* of the first pair of legs is only a little deeper than the femur proper; the *femur* of the fourth pair of legs is 2.3 longer than deep; the tibia of the first pair of legs is much (1.2) longer than the *tarsus*, which is 4.3 longer than deep; the tarsus of the fourth pair is 1.3 longer than the femur is deep.

Colour. — The palps are bright reddish brown; the head is lighter reddish brown; the rest of cephalothorax and the abdominal sclerites are pale brown; coxae and legs yellowish or yellowish brown and interarticulate membranes yellowish white.

Measurements. — Cephalothorax 0.890 (0.700); abdomen 2.240 (1.176) mm.

Palps: trochanter 0.460 (0.295); femur 0.840 (0.336); tibia 0.812 (0.392); hand 0.840 (0.448), depth 0.490; finger 0.540 mm.

Leg I: femur 0.540 (0.198), trochantin 0.135; tibia 0.432 (0.126); tarsus 0.351 (0.081) mm.

Leg IV: femur 0.725 (0.324), trochantin 0.315; tibia 0.594 (0.180); tarsus 0.432 (0.099) mm.

Material. — Mr. Budde Lund has collected a single male in a ship with sugar from India.

Remarks. — H. J. Hansen mentions (9. p. 543) the specimen described of *Ch. navigator* n. sp., but he identifies it with *Ch. politus* Sim.; I do not believe he is right in his identification, for Simon's species seems to be distributed even in the interior of France and has apparently not such a pronounced dorsal trochanteral tubercle (5. p. 35). This species is well distinguished by its very prominent trochanteral tubercles and slender hand.

33. *Chelifer Indicus* n. sp.

(Pl. IV, figs. 10 a-d; fig. 23, p. 195).

♀. Large, distinct ocular spots; cephalothorax much longer than broad without transverse line, smooth with almost simple hairs; abdomen rather long with distinct tergal sclerites. The partly granular palps are of almost equal length to the body; trochanter distinctly longer than broad with the posterior margin abruptly convex and the dorsal surface produced into a fairly high conical tubercle; the femur is 2.5 longer than broad, a little shorter, but distinctly narrower than the tibia, which has a very long stalk, distinctly convex lateral outlines and a fairly well marked basal elevation. The hand is 1.3 broader than the tibia, 1.8 longer than broad, 1.7 longer than deep and 1.5 longer than finger. "Tactile" hair of the fourth pair is placed at the base of the tarsus; the tibia of the first pair is much longer than the tarsus, which is 4.2 longer than deep.

♀. Cephalothorax. — Large and very prominent ocular spots are found. The cephalothorax is much longer than broad behind and here a good deal broader than just behind the "eyes"; no transverse lines are visible, but the "head" is indistinctly marked off by being better raised and a little darker; the skin is almost smooth and the few rather long and stiff hairs possess a few distal teeth.

Abdomen. — The abdomen, which is scarcely twice as long as broad and of a fairly elongate appearance, has the tergal sclerites, of which the fifth to the tenth are indistinctly longitudinally divided, very well marked; the sternal sclerites are fairly well marked and like tergal ones with indistinct longitudinal line. The hairs were missing in the specimen examined.

Antennae (Pl. IV, fig. 10 a). — The *flagellum*, which consists of four hairs, has the six marginal teeth of the anterior one arranged in a curious way, as shown in the figure (fig. 10 a); the *serrula exterior* has the basal tooth of the 24 provided with a rounded terminal flap; the *galea* is wanting in the specimen examined.

Maxillae. — The maxillae are completely smooth but for a few minute granules laterally and provided with a fairly long, but very broad lamina, which is slightly serrated exteriorly.

Palps (Pl. IV, fig. 10 b; fig. 23, p. 195). — The palps, which are of almost equal length to the body, are with the dorsal and the lateral surfaces not very distinctly granular with minute and low granules in the three proximal joints, but everywhere else almost smooth. The long and stiff hairs possess distal teeth; the slender, completely simple ones of femur e.t.c., which are found in species related, are wanting in specimen examined; the fingers are provided with *tactile* hairs and sense-spots, which seem in the main to be arranged in the following way. The immovable finger bears anteriorly two basal tactile hairs, one median dorsal and one placed a little in front and below this, in addition to at least five sense-spots, arranged between the three first hairs; posteriorly two basal, one median and one almost terminal tactile hairs in addition to five, proximally placed sense-spots are

found. The movable finger has anteriorly one basal and one median sense-spot at least, and posteriorly two sense-spots, in addition to two basal and one median tactile hair at least. The *trochanter*, which has a moderately long and distinct stalk, is 1.6 longer than broad and distinctly narrower than the femur; its anterior margin is beyond the stalk only slightly convex, while the posterior is beyond the stalk produced into a rounded process, which is rather low and sloping much more gradually towards tip than towards stalk; the dorsal surface is produced into a high conical blunt tubercle, which is directed upwards and backwards, being so high, that the trochanter is distinctly deeper than broad, measured from the tips of the tubercles to the ventral and posterior margins respectively, and a little lower than the femur; the margin of the trochanter is, when observed from in front, produced into a terminally obtuse, almost truncate process, which has the distal, moderately concave slope shorter than the proximal, which is almost straight and below merging into the moderately concave joint. The *femur*, which has a rather short and well marked stalk, is 2.5 longer than broad and a little shorter, but distinctly narrower than the tibia; the anterior outline is beyond the stalk moderately convex and then concave, while the posterior and dorsal margins are rather abruptly convex beyond the stalk and then moderately so. The *tibia*, which is 2.8 longer than the very long and slender stalk, is 2.1 longer than broad; it is anteriorly beyond the deep notch of the stalk evenly and distinctly convex; the posterior margin has beyond the prominent condylus an elongate, fairly well marked basal elevation, which through an elongate, slightly marked concavity merges into the distinct convexity of the joint proper; the ventral margin is beyond the stalk evenly and moderately convex, while the dorsal is very abruptly so. The *hand*, which is a little longer and 1.3 times broader than the tibia, is a little broader than the trochanter is long, 1.8 longer than broad, 1.7 longer than deep and 1.5 longer than finger; the chela is 2.8 longer than broad; the lateral outlines are beyond the stalk very abruptly convex and then moderately so, while the ventral and dorsal margins are almost perpendicular on the stalk and then slightly convex.

Coxae. — The fourth pair is not enlarged towards the extremity and is almost trapezoid with the postero-interior corner obtuse-angled; it is 1.5 longer than broad and has the inner margin a trifle longer than the hinder.

Legs (Pl. IV, figs. 10 c-d). — The hairs are long and stiff with a few distal teeth; the usual longer and more slender, completely simple ones are also present (cf. p. 193); the "tactile" hair of the fourth pair of legs is placed near to the base; the lateral terminal hairs are very slightly curved. The *trochantin* of the first pair of legs is deeper than the femur proper, and the *femur* of the fourth pair of legs is 2.3 longer than deep; the tibia of the first pair of legs is much (1.2) longer than

Fig. 23.

Ch. Indicus n. sp.;
♀; right palp in
anterior view; $\times 48$.

the *tarsus*, which is 4.2 longer than deep; the *tarsus* of the fourth pair of legs is 1.4 longer than the femur is deep.

Colour. — The palps are dark reddish-brown with the chela darkest and the trochanter distinctly lighter; the head is light reddish brown, and the tergal sclerites are pale-brown; the rest of the body is yellowish.

Measurements. — Cephalothorax 1.288 (1.036); abdomen 2.940 (1.656) mm.

Palps: trochanter 0.644 (0.405); femur 1.148 (0.460); tibia 1.176 (0.560); hand 1.232 (0.700), depth 0.720; finger 0.820 mm.

Leg I: femur 0.792 (0.325), trochantin 0.144; tibia 0.603 (0.185); tarsus 0.486 (0.117) mm.

Leg IV: femur 1.035 (0.450), trochantin 0.450; tibia 0.873 (0.252); tarsus 0.612 (0.153) mm.

Material. — I have examined a single female, collected by the missionary Mr. Löventhal at Vellore near Madras.

34. *Chelifer articulatus* Sim.

1899. E. Simon (15.) pp. 120—121.

Ocular spots; cephalothorax longer than broad, smooth without transverse lines. The palps are smooth with very short hairs; the trochanter, which is scarcely longer than broad, is anteriorly straight and posteriorly "valde et obtusissime bigibboso"; "tibia anguste et sat longe petiolata, dein abrupte et valde ampliata et femore", which is scarcely twice as long as broad, "paulo latiore, superne visa subglobosa, et intus et extus (praesertim intus), valde convexo"; the hand is of almost equal breadth to the tibia and distinctly longer than finger. This species is best characterized by its short trochanter and femur, which is scarcely twice as long as broad; from *Ch. rotundus* n. sp., to which it seems to be nearly related, it differs in having smooth palps and a narrow hand.

35. *Chelifer rotundus* n. sp.

(Pl. IV, figs. 11 a-c; fig. 24, p. 197).

♂. Indistinct ocular spots; cephalothorax much longer than broad, without transverse line, smooth with almost simple hairs; abdomen long and slender with indistinct tergites, with 6(?) hairs in front of row in median segments, and with terminal "tactile" hairs; the genital area of "Birmanicus" type. The partly granular palps are a little longer than the body; trochanter distinctly longer than broad with the posterior margin rather abruptly convex and the dorsal produced into a high, obtusely pointed, conical tubercle; the femur is twice as long as broad, a little shorter, but distinctly narrower than the tibia, which has a fairly long stalk, strongly convex lateral outlines and a fairly well marked basal posterior elevation. The hand is 1.2 broader than the tibia, 1.7 longer than broad, 1.4 longer than deep and 1.5 longer than finger. "Tactile" hair of the fourth pair is placed at the base of the tarsus; the tibia of the first pair is a little longer than the tarsus, which is 4.2 longer than deep.

♂. Cephalothorax. — Indistinct *ocular* spots present. The *cephalothorax* is distinctly longer than broad behind, where it is only a little broader than a little behind the ocular spots; no transverse *lines*, but the darker and better raised "head" is nevertheless marked off; the skin is smooth with rather short distally toothed hairs.

Abdomen. — The abdomen, which is more than twice as long as broad, has the tergal sclerites indistinct, and the median ones are divided by an almost obsolete longitudinal line; the hairs, which are moderately long and slender and with a few distal teeth, are on the three first tergites placed in a marginal row, while the others have at least 6(?) hairs, placed in front of the row; the two last tergites as well as the sternites bear two pairs of "*tactile*" hairs. The structure of the *genital area* is in the main similar to that of *Ch. Birmanicus* Thor.

Antennae (Pl. IV, fig. 11 a). — The anterior hair of the four(?), of which the *flagellum* is composed, with about five marginal teeth; *lamina interior* with three dentated lobes and long serrated terminal spine. The *galea*, which has only a few very tiny teeth distally, does not extend beyond the terminal hair (fig. 11 a).

Maxillae. — The maxillae are smooth, and the rather narrow lamina maxillaris is serrated exteriorly.

Palps (Pl. IV, fig. 11 b; fig. 24, p. 197). — The palps, which are a little longer than the body, are granular all over with minute, low and not very densely placed granules with the exception of the ventral surfaces, the stalks, the anterior surface of the trochanter and the fingers; the dorsal trochanteral tubercle is near to its summit provided with a few pointed bigger granules. The hairs are generally long and stiff with a few teeth; at least one longer and more slender and completely simple is found posteriorly near to the middle of the femur; the *tactile* hairs and the sense-spots of the fingers are arranged in the main so. The immovable finger bears anteriorly two basal tactile hairs, one median dorsal and one placed a little in front of and below this, in addition to at least 7 sense-spots, arranged in a longitudinal row between the three proximal hairs; posteriorly two basal, one median and one almost terminal tactile hair in addition to 6 proximal sense-spots. The movable finger has at least three basal sense-spots arranged in a longitudinal row and placed rather apart from each other anteriorly, and posteriorly two basal sense-spots at least, in addition to two basal and three(?) median tactile hairs. The *trochanter*, which has a rather short but distinct stalk, is 1.6 longer than broad and much narrower than the femur; its anterior surface is beyond the stalk moderately convex; the posterior margin is beyond the stalk produced into a process, which is well defined from the stalk, rather low and sloping gradually towards the tip; the dorsal surface is produced into a high, conical, obtusely pointed tubercle, which is directed upwards and backwards, being so high that the trochanter is distinctly

Fig. 24.

Ch. rotundus n. sp.;
♂; right palp in
anterior view; x 48.

deeper than broad, measured from the tips of tubercles to the ventral and posterior margins respectively, and a little lower than the femur; the outlines of the trochanter is, when observed from in front, almost acute-angled with the distal shorter slope slightly concave and the proximal much longer merging into the concave stalk. The *femur*, which has a short, but distinct stalk, is twice as long as broad; the anterior margin is beyond the distinct, but shallow notch of the stalk moderately convex and then concave; the posterior and especially the dorsal surface is very abruptly convex beyond the stalk, almost perpendicular on it, and then moderately convex; the joint tapers towards its tip. The *tibia*, which is 3.3 longer than the rather short and well marked stalk, is 1.9 longer than broad and a little longer, but distinctly broader than the femur; the anterior margin is beyond the very deep notch very strongly convex; the posterior margin has beyond the very prominent condylus a fairly well marked basal elevation, which through an elongate concavity blends into the almost circular outline of the distal portion; the ventral margin is beyond the stalk evenly convex, while the dorsal is very abruptly so. The *hand*, which is 1.2 broader than the tibia, is a little broader than the trochanter is long, 1.7 longer than broad, 1.4 longer than deep and 1.5 longer than finger; the chela is 2.8 longer than broad; the lateral outlines are beyond the stalk rather abruptly convex and then moderately so, while the dorsal and ventral margins are almost perpendicular on the stalk and then very slightly convex.

Coxae. — The fourth pair are widened out towards the extremity and appear triangular, as the postero-interior corner is only indistinctly obtuse-angled; the coxa is about 1.5 longer than broad and the inner margin only in a slight degree shorter than the moderately concave hinder one.

Legs (Pl. IV, fig. 11 c). — The hairs are long and stiff with a single or a few distal teeth (fig. 11 c); completely simple ones are present as usual; the "tactile" hair of the fourth pair of legs is placed near to the base; the lateral terminal hairs are moderately curved. The *trochantin* of the first pair of legs is distinctly deeper than the femur proper, and the *femur* of the fourth pair of legs is 2.3 longer than deep; the tibia of the first pair of legs is a little (1.1) longer than the *tarsus*, which is 4.2 longer than deep; the tarsus of the fourth pair of legs is 1.4 longer than the femur is deep.

Colour. — The palps are dark reddish brown with trochanter a little lighter; the head is light reddish brown and the rest of the body yellowish.

Measurements. — Cephalothorax 1.008 (0.812); abdomen 2.436 (1.036) mm.

Palps: trochanter 0.532 (0.336); femur 0.868 (0.420); tibia 0.896 (0.476); hand 0.924 (0.560), depth 0.644; finger 0.616 mm.

Leg I: femur 0.603 (0.243), trochantin 0.144; tibia 0.477 (0.153); tarsus 0.432 (0.105) mm.

Leg IV: femur 0.810 (0.360), trochantin 0.351; tibia 0.675 (0.212); tarsus 0.513 (0.126) mm.

Material. — The Danish Galathea Expedition brought home a single specimen (♂) from the Nicobar Minor, one of the Nicobars.

Pseudochiridium n. gen.1889. *Chelifer* Ill. T. Thorell pars. (10.) p. 591.

Cephalothorax distinctly produced towards the front margin. Eyes are wanting. Only ten abdominal tergites visible from above. The coxae of the fourth pair of legs are much broader than long, being produced into a posterior plate, which covers the base of the abdomen together with the genital area. The articulation between the trochantin and the femur proper of the first pair of legs with the articulate-heads of both anterior and posterior sides in the middle; the articulate membrane of the trochantin of the fourth pair of legs is almost perpendicular on longitudinal axis; the tarsi are distinctly longer than the tibia.

I. Characteristic of Genus.

The head is distinctly produced in front and neither eyes nor ocular spots are present, but two very prominent transverse grooves. The abdomen has the sclerites of from the second to the ninth tergites divided by a distinct longitudinal line into two halves, which establish an obtuse angle with each other, open towards the front; the tenth tergite is only partly visible from above and the eleventh not at all; the tergites possess a single transverse row of distinctly clavate hairs, but none in front of the row. The antennae have a *flagellum*, which consists of two more or less dentated hairs, a *lamina interior*, which is provided with three dentated lobes and a serrated terminal spine, and a *serrula exterior*, which has long teeth of almost equal length, but the basal one, which is enlarged towards the extremity, and the terminal partly free and pointed one; their *galea* consists of two divisions, of which the one is unbranched and the other provided with at least three terminal branches (Pl. IV, figs. 12 b-c). The palps are short and clumsy. The coxae of the fourth pair are of a most remarkable shape (Pl. IV, fig. 12 d), being much broader than long, because the posterior surface of the coxa proper is prolonged backwards into a plate, broader than the anterior part of the coxa and covering the base of the abdomen together with the genital area; this plate has its margin behind the articulate cavity prettily rounded, and its ventral surface is granular and provided with pointed hairs, while its dorsal is smooth without hairs; a sexual difference is according to Thorell (10. p. 593) found in the structure of these coxae, for in the female they are as described, while they in the male are "magnae et sub-triangularae spatium triangulum magnum inter se relinquunt"; the egg-bundle, which the female carries attached to the base of the abdomen, is partly covered by the coxal plate. The legs are remarkable in several respects; the trochantin of the first pair of legs is connected with the femur proper by a slightly developed hinge-joint; the two condyli are placed in the middle, and the anterior and posterior are almost opposite to each other; the articulate membrane is very narrow and the mobility is only limited (cf. p. 37; pl. IV, figs. 12 e-f; figs. 6 a-b). The articulation between the trochantin and the femur proper of the fourth pair of legs is almost perpendicular on the longitudinal axis of the joint, and its mem-

brane is only developed below. The *tarsi* of the legs, even those of the fourth pair, are distinctly longer than the tibiae. The tarsus of the fourth pair seems not to bear any tactile hair.

From the above it may easily be realized, that *Pseudochiridium* n. gen. is well characterized from *Chelifer* Geof.; if it in the future will be possible to divide the latter genus into natural genera, it will probably be necessary to establish two new subfamilies, for the genera of the *Cheliferinae* Sim. would in other case be of very unequal value. *Pseudochiridium* n. gen. shows as the name indicates a similarity to *Chiridium* Menge in the position of the eleventh tergite and the shape of the legs. To discuss the relationship of this genus to any of the generic groups of *Chelifer* Geof. is scarcely worth the trouble, before we get a description of the genital area of the male; in the granulation of the body, the shape of the hairs, palps and well developed transverse grooves, as well as in the absence of eyes and "tactile" tarsal hair, it shows a similarity to *Ch. cimicoides* F., while the shape of cephalothorax and the structure of the legs and galea are unique within the *Cheliferinae* Sim. and as far as the latter is concerned even within the *Chelonethi*.

II. Synopsis of Species.

Only two species, which are nearly related to each other, are known of this genus viz. the type *Ps. Thorellii* n. sp. and *Ps. clavigerum* Thor., the main differences of which may be realized from the following synopsis.

1. The cephalothorax has the median transverse groove curved backwards in the middle; the abdomen is longer than broad; the posterior process of the trochanter of the palps is rounded *Ps. Thorellii* n. sp.
1. The cephalothorax has the median transverse groove straight in the middle; the abdomen is broader than long; the posterior process of the trochanter of the palps is triangular and pointed. *Ps. clavigerum* Thor.

36. *Pseudochiridium Thorellii* n. sp.

(Pl. IV, figs. 12 a-g; figs. 6 a-b, p. 37).

♀. Cephalothorax with two broad prominent transverse grooves, slightly curved backwards in the middle, distinctly granular with broad clavate hairs. The elongate egg-shaped abdomen distinctly longer than broad with the two halves, into which the median tergal sclerites are divided by a broad longitudinal line, establishing an obtuse angle with each other; tergites are distinctly granular, only possessing a single transverse row of clavate hairs. The distinctly granular palps of almost equal length to the body; the trochantin is distinctly longer than broad and broader than the femur, with its posterior surface produced into a long rounded process; the femur is 2.6 longer than broad and narrower than the tibia, which has the lateral outlines distinctly convex. The hand is 1.2 broader than tibia, 1.6 longer than broad, 1.6 longer than deep and 1.4 longer than finger. The tarsus of the first pair is 1.3 longer than the tibia and 5.2 longer than deep.

Cephalothorax (Pl. IV, fig. 12 a). — No eyes or *ocular* spots are found. The cephalothorax is a little broader behind than it is long and tapers towards the front margin, which is only one third of the hindmost in breadth; the lateral outline of the cephalothorax is in front of the first groove moderately concave, so that a rather long cucullus is found. The two transverse *grooves* are prominent and very broad, so that their real nature as articulate membranes is unmistakeable; they are moderately curved backwards in the middle and distinctly widened out towards the lateral margin. The skin is everywhere beset with large, more or less pointed granules and with distinctly clavate hairs, which are enlarged towards their tip and here about half as broad as long; six hairs are placed along front margin and the head possesses in addition to those about 20 placed without any proper order; the first thoracic tergite has its hairs arranged in two rows, while the second has a similar median transverse row.

Abdomen (Pl. IV, fig. 12 a). — The abdomen, which is distinctly longer than broad, is almost egg-shaped, having its greatest breadth somewhat behind the middle. It is moderately curved from right to left, or perhaps more correctly from both sides raised towards the middle, so that a low longitudinal keel is found, but distinctly curved from the base towards the apex, so that the last four (VII—X) are indistinctly seen from above and the *eleventh* not at all. The second to the ninth tergites are divided by a not very distinct longitudinal line into two halves, which has the antero-interior corner rounded and the postero-interior produced into a point, establishing an obtuse angle open in front with that of the other side. The tenth tergite is, observed from above, very short, but, when observed from behind, it is of a considerable length; the eleventh tergite is only visible from below, is very short and distinctly shorter than the corresponding sternite, from which it is separated by a distinct articulate membrane. The abdomen is above granular everywhere with distinct granules, which are flatter and generally more densely placed than those of the cephalothorax. The not very well limited sclerites are more distinctly granular than the rest, especially a transverse darker band through the middle. The distinctly clavate hairs, which are articulated within smooth spots surrounded by a circular row of granules, are arranged in a single transverse row, numbering from 14—20 hairs; the eleventh tergite has only ten hairs.

The eleventh sternite, which almost completely surrounds the anus, as the corresponding tergite is much shorter, bears a few rather slender hairs. The preceding six (V—X) sternites, which are of almost equal breadth, but increase in length towards the last, are divided by a longitudinal line, and their granulation is most distinct in a transverse band along the front margin. The sternites bear about 16 hairs placed in a transverse row and the sixth to the ninth have in addition to these about 30 yellow spots along anterior margin, in which hairs are perhaps articulated. In front of the fifth sternite a long plate with a short divided sclerite is found, as well as an undivided very short chitinous piece (third sclerite?),

which is partly covered by the coxae of the fourth pair and curved backwards in the middle.

Antennae (Pl. IV, fig. 12 b-c). — The *flagellum* consists of two hairs, of which the broader and longer anterior one possesses three median marginal teeth, while the posterior has only a single one (fig. 12 b, f); the *lamina interior* has beyond the well developed plate-shaped portion three dentated lobes and a rather short serrated spine; the *serrula exterior* consists of about 14 rather long squarely-truncate teeth in addition to two longer, a basal one, which is widened out towards end, and a terminal pointed one, which is partly free (fig. 12 c). The *galea* (g), which has a most remarkable form, consists of two divisions, which do not even at their base seem to be fused; they diverg and both extend a trifle beyond the terminal hair; the superio-interior division is cylindric and tapering towards its summit, where it is divided into two hair-like, obtusely pointed branches, about one third of the basal part in length; the inferio-interior division is thicker, and near to the base provided with a rather thick branch, while it terminally is divided into three very slender obtusely-pointed branches, a single more dorsal, arising between the bases of the two others more ventral (fig. 12 c, g).

Maxillae (Pl. IV, fig. 12 d). — The maxillae are most raised in the middle, falling gradually towards the apex, but rather steeply backwards and laterally; the anterio-exterior corner is rounded and by a distinct notch separated from the rather short manducatory part, which is surrounded by a suddenly pointed rather narrow lamina maxillaris (ls), rounded interiorly, but almost straight exteriorly, with a few marginal teeth. The maxillae are everywhere provided with big, pointed granules and distinctly clavate hairs except the manducatory part, which is almost smooth with a few pointed hairs (fig. 12 d).

Palps (Pl. IV, fig. 12 a). — The palps, which are almost as long as the body, are distinctly granular with more or less rounded scale-shaped granules, which are slightly developed on the stalks of the different joints and completely wanting on the fingers. The palps are provided with hairs, which are either distinctly clavate or widened out terminally, or with a number of marginal teeth; those of the hand are more simple, and the fingers have in addition to the usual, almost or completely simple hairs a number of *tactile* hairs. The immovable finger bears anteriorly two basal tactile hairs, the one more ventral and the other placed a little more distal near to dorsal margin, as well as a single one just beyond the middle in a dorsal position in addition to three sense-spots; posteriorly it is provided with two basal tactile hairs, one median and one terminal. The movable finger has anteriorly a single basal sense-spot and posteriorly one (two?) basal and three median tactile hairs in addition to a few spots. The *trochanter*, which has a long and well defined stalk widened out towards the base, is 1.5 longer than broad; the anterior margin is beyond the rather deep notch of the stalk distinctly convex; the posterior margin is produced into a long, fairly slender and rounded process, which is almost perpendicular on the stalk, but gradually slopes towards the

extremity; the dorsal surface seems posteriorly to be produced into a rounded tubercle. The *femur*, which has a short and distinct stalk, is 2.6 longer than broad, narrower than the trochanter and almost of equal length to but distinctly narrower than the tibia; anteriorly it is beyond the stalk very slightly convex and then concave, while it is posteriorly rather abruptly convex and then straight. The *tibia*, which is about 4.5 longer than the short and well defined stalk, is 2.1 longer than broad; its anterior margin is beyond the fairly deep notch of stalk moderately convex and towards the end slightly concave; the posterior surface has a rather low condylus, merging gradually into low basal elevation, beyond which the outline is almost straight and then towards apex distinctly convex. The *hand*, which is 1.2 broader than the tibia, is a little shorter than the trochanter, 1.6 longer than broad and deep and 1.4 longer than finger; the whole chela is 2.6 longer than broad; the lateral outlines are beyond the stalk abruptly convex and then moderately so; the dorsal and ventral margins are less abruptly convex and then almost straight.

Coxae (Pl. IV, fig. 12 d). — The coxae are minutely, but distinctly granular all over; the first pair are the shorter and scarcely enlarged towards the extremity; the second and the third pair are much longer and distinctly widened out towards the extremity. The fourth pair are remarkable on account of the plate, into which they are prolonged posteriorly, and are as broad as the three preceding pair together and distinctly broader than long; the interior margin is very moderately concave or straight, only leaving a narrow space between the two coxae, while the posterior and the exterior margins, the latter behind the articulate cavity, are fairly rounded merging gradually into each other (fig. 12 d).

Legs (Pl. IV, figs. 12 e-g; figs. 6 a-b, p. 37). — The legs with the exception of the tarsi are everywhere beset with large more or less squamiform granules in addition to a great number of very small round granules. The hairs of the legs with the exception of those of the tarsi ventrally are more or less distinctly clavate (fig. 12 g); the hairs of the ventral surface of the tarsi are proximally provided with teeth but distally completely simple; the terminal lateral hair is moderately curved, and the tarsal "*tactile*" of the fourth pair of legs is wanting. The joints of the legs with the exception of the tarsi are provided with distinct stalks; in appearance as well as in structure there is no marked difference between the different pair of legs, except a small one in the femurs. The *trochantin* of the first pair of legs is about one third as long as the whole femur and a little deeper; the *femur* of the fourth pair of legs is 2.8 times longer than deep; the tibia of the first pair of legs is 1.3 shorter than the *tarsus*, which is 5.2 longer than deep; that of the fourth pair is scarcely 1.2 shorter than tarsus, which is 2.8 longer than the femur is deep.

Colour. — The palps, cephalothorax and tergal sclerites are reddish brown; the rest of the body is lighter or darker yellowish brown with the exception of a median blackish band transversely on the median sternites.

Measurements. — Cephalothorax 0.660 (0.700); abdomen 1.450 (1.120) mm.

Palps: trochanter 0.308 (0.210); femur 0.504 (0.196); tibia 0.490 (0.238); hand 0.462 (0.290), depth 0.280; finger 0.322 mm.

Leg I: femur 0.360 (0.144), trochantin 0.135; tibia 0.270 (0.099); tarsus 0.360 (0.070) mm.

Leg IV: femur 0.450 (0.169), trochantin 0.216; tibia 0.392 (0.117); tarsus 0.450 (0.075) mm.

Material. — The Danish Galathea Expedition has taken a single, very mutilated female at Nankovry, one of the Nicobars.

Remarks. — It is only with some hesitation, that I have established this new species in stead of referring it to *Pseudochiridium clavigerum* Thor., but it was found most obvious to do so on account of its elongate abdomen, more rounded posterior process of the trochanter and the hand, which is more abruptly convex just beyond the stalk.

37. *Pseudochiridium clavigerum* Thor.

(Pl. IV, fig. 13 a).

1889. *Chelifer claviger* T. Thorell (10.) pp. 591—594, tav. V, fig. 5.

1900. *Trachychernes claviger* R. J. Pocock (17.) p. 156.

Cephalothorax with two broad prominent transverse, almost straight grooves, distinctly granular with broad clavate hairs. The short abdomen is distinctly broader than long with the two halves into which the median tergal sclerites are divided by a broad longitudinal line, establishing an obtuse angle with each other; tergites are distinctly granular, only possessing a single row of clavate hairs. The distinctly granular palps are a little longer than the body; the trochantin is slightly longer than broad and broader than the femur with its posterior surface produced into a long triangular and pointed process; the femur is 2.6 longer than broad, and narrower than the tibia, which has the lateral outlines distinctly convex. The hand is 1.2 broader than the tibia, 1.9 longer than broad and 1.5 longer than finger. The tarsus of the first pair of legs is 1.4 longer than the tibia.

Body. — The cephalothorax is not broader than long, and the transverse grooves are straight. The abdomen is very broad and flat, as it is distinctly broader than long.

Palps (Pl. IV, fig. 13 a). — The palps are a little longer than the body; the trochanter is only 1.2 longer than broad and has the posterior margin prolonged into a very long, somewhat triangular and rather pointed process. The lateral outlines of the tibia are more distinctly convex. The hand, which is 1.9 longer than broad and 1.5 longer than the finger, is less abruptly convex beyond stalk than in *P. Thorellii* n. sp. The femur of the fourth pair of legs is 3.1 times longer than deep and a trifle longer than the tarsus; the tarsus of the first pair is 1.4 longer than the tibia.

Remarks. — I have not given a complete description of this species, but refer in all points of similarity to that of the preceding species, partly because they are very alike, and partly because I had no occasion to compare the two species with each other. Pocock's original specimen, which was examined during a stay in London, seems scarcely to be different from Thorell's specimens from Bhámo — Burma. The example examined of this species, which was collected under the bark of a decaying tree above Flying Fish Cove — Christmas Island — was a female, which carried a small bundle of eggs attached to the base of the abdomen almost completely covered by the coxae of the fourth pair.

Mr James Gilchrist has kindly undertaken the revision of the language of this paper, and I beg him to receive my best thanks for this service.

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Explanation of the plates.

Plate I.

Figure 1. *Chthonius terribilis* n. sp.

- Fig. 1 a. ♀. Anterior portion of body; × 38.
 Fig. 1 b. ♂. Fourth pair of the coxae and foremost part of the abdomen; × 50. *g* genital opening in the middle of *a* plate-shaped area with *v* longitudinal valves along hindmost part of the opening; *s*⁴ and *s*⁵ selerites of the fourth and fifth sternites.
 Fig. 1 c. ♀. Immovable finger of the left antenna in ventral view; × 215. *m* marginal teeth; *f* flagellum; *a* serrula interior; *l* fissure.
 Fig. 1 d. ♀. Movable finger of left antenna; × 217. *m* marginal teeth; *e* serrula exterior.
 Fig. 1 e. ♀. Maxillae and labrum in dorsal view; × 70. *p* posterior plate-shaped prolongation of the labrum; *ls* lamina superior maxillaris; *li* lamina inferior.
 Fig. 1 f. ♀. Terminal portion of the labrum and left maxilla in dorsal view; × 350. *h* hairlike projections on *l* terminal part of labrum; *ls* and *li* as in fig. 1 e.
 Fig. 1 g. ♀. Maxillae in ventral view; × 75. *ma* manducatory part; *ls* and *li* as in fig. 1 e.
 Fig. 1 h. ♀. Hairs of inner side of left coxa IV; × 320. *i* and *e* cf. text (p. 68).
 Fig. 1 l. ♀. Left leg I; × 49. *f*¹ and *f*² basal and tibial parts of femur; *ta* undivided tarsus.
 Fig. 1 m. ♀. Left leg IV; × 49. *f*¹ trochantin; *f*² tibial femoral part; *ta*¹ first tarsal joint.

Figure 2. *Chthonius Ragi* L. K.

- Fig. 2 a. ♀. Terminal part of left maxilla; × 125. *ls* lamina superior; *li* lamina inferior.

Figure 3. *Obisium muscorum* Leach.

- Fig. 3 a. Maxilla and labrum in dorsal view; × 70. *l* labrum; *ls* lamina superior; *li* lamina inferior; *p* plate-shaped posterior prolongation of labrum.
 Fig. 3 b. Labrum; × 47, copied from Hansen's Zoologia Danica (7), tab. VII, fig. 6 b. *p* "elypeus" or posterior prolongation of labrum; *e*, *b*, *d* and *e* cf. p. 26.

Figure 4. *Ideoroncus Siamensis* n. sp.

- Fig. 4 a. Immovable finger of left antenna in ventral view; × 176. *m* marginal teeth; *f* flagellum; *a* serrula interior; *l* terminal spine; *l* fissures.
 Fig. 4 b. Movable finger of left antenna; × 183. *m* marginal teeth; *e* serrula exterior; *g* galea.
 Fig. 4 c. ♂. Maxillae and labrum in dorsal view; × 90. *l* labrum; *p* its posterior prolongation; *ls* lamina superior; *li* lamina inferior; *f*¹ fissures.
 Fig. 4 d. ♂. Maxillae in ventral view; × 75. *l*, *ls* and *li* as in fig. 4 c; *ma* manducatory part; *f*¹ median lyriform organ; *f*² interior marginal fissure; *f*³ exterior marginal organ; *co* coxa of the first pair of legs.
 Fig. 4 e. ♂. Median lyriform organ (*f*¹) and interior marginal fissure (*f*²) of left side; × 375.
 Fig. 4 f. ♂. Median lyriform organ of right side; × 375.
 Fig. 4 g. ♀. Left palp; × 24. *t* tactile hairs of hand.
 Fig. 4 h. ♂. Left leg I. *f*¹ basal femoral part; *f*² tibial femoral part; *ta*¹ first tarsal joint.
 Fig. 4 i. ♂. Left leg IV. *f*¹ trochantin; *f*² and *ta*¹ as in fig. 4 h.

Figure 5. *Ideoroncus laminatus* n. sp.

- Fig. 5 a. Immovable finger of left antenna; × 180. *m* marginal teeth; *a* serrula interior with *t* terminal spine; *b* lamina exterior; *f* flagellum; *l* fissure.

Fig. 5 b. ♂. Maxillae in ventral view; $\times 46$. *l* labrum; *ls* lamina superior; *li* lamina inferior; *ma* manducatory part; *co* coxa of first pair.

Fig. 5 c. ♀. Left palp; $\times 25$. *t* tactile hairs.

Figure 6. *Garypus irrugatus* Sim.

Fig. 6 a. ♀. Labrum and maxillae in dorsal view; $\times 50$. *la* labrum; *p* posterior prolongation(?); *ls* lamina superior; *f*⁴ fissures; *m* lateral margin of labrum; *b*, *l* and *h* cf. text (p. 28) and fig. 8 a.

Fig. 6 b. ♀. Maxillae in ventral view; $\times 49$. *la*, *ls* and *li* as in fig. 6 a; *f*¹ median lyriform organ; *f*² anterior marginal fissure; *f*³ exterior marginal organ.

Fig. 6 c. ♀. Median lyriform organ of left side; $\times 350$.

Fig. 6 d. ♀. Interior marginal fissure (*f*²) and short curved hair at the base of the manducatory part (*h*); $\times 350$.

Figure 7. *Garypinus nobilis* n. sp.

Fig. 7 a. ♀. Labrum et maxillae in dorsal view; $\times$ c. 45. Signature as in figs. 6 a and 8 a.

Fig. 7 b. ♀. Maxillae in ventral view; $\times$ c. 45. Signature as in fig. 6 b.

Fig. 7 c. ♀. Interior marginal fissure; $\times 375$.

Figure 8. *Chelifer nodosus* Schranck.

Fig. 8 a. Labrum et maxillae in dorsal view; $\times 70$. *c* cf. text; *a* chitinous ridge continued in lateral margin *m* of labrum *l*, behind partly covered by lateral wings *b* of maxillae; *h* paired bodies of maxillae; *d*, *i*, *m* and *n* cf. the text (p. 30); *ls* lamina superior; *f*⁴ lyriform organ.

Plate II.

Figure 1. *Garypus irrugatus* Sim. ♀.

Fig. 1 a. Cephalothorax and left palp; $\times 23$.

Fig. 1 b. Antenna — left — in ventral view; $\times 217$. *m* marginal teeth; *f* flagellum; *a*¹ plate-shaped portion of lamina interior; *a*² serruli-formed portion; *t* terminal spine; *b* lamina exterior; *t*¹ basal teeth of serrula exterior; *t*² terminal tooth; *g* galea; *l* fissure.

Fig. 1 c. Left leg I; $\times 45$. *f*¹ basal femoral part; *f*² tibial femoral part; *ta*¹ first tarsal joint; *l* lyriform fissure.

Fig. 1 d. Left leg IV; $\times 45$. *f*¹ trochantin; *ta*¹ first tarsal joint.

Figure 2. *Garypus elegans* Sim. ♀.

Fig. 2 a. Movable finger of left antenna; $\times 290$. *t*¹ basal tooth; *t*² terminal tooth of serrula exterior; *g* galea.

Fig. 2 b. Left palp; $\times 32$.

Figure 3. *Garypus longidigitatus* Rainb.

Fig. 3 a. Immovable finger of left antenna; $\times 275$. Signature as in fig. 1 b.

Figure 4. *Garypus Floridensis* Bks.

Fig. 4 a. ♂. Immovable finger of left antenna; $\times 130$. Signature as in fig. 1 b.

Fig. 4 b. ♀. Flagellum; $\times 220$.

Fig. 4 c. ♀. Movable finger of left antenna; $\times 130$. Signature as in fig. 1 b.

Fig. 4 d. ♂. Galea of left antenna; $\times 130$.

Figure 5. *Garypus saxicola* Wath.

Fig. 5 a. ♀. Flagellum of left antenna; $\times 86$.

Figure 6. *Olpium cordimanum* Balz.

Fig. 6 a. ♀. Immovable finger of left antenna; $\times 355$. Signature as in fig. 1 b.

Fig. 6 b. ♀. Flagellum of left antenna; $\times 355$.

Figure 7. *Olpium Birmanicum* n. sp.

- Fig. 7 a. Cephalothorax; $\times 50$.
 Fig. 7 b. Flagellum of left antenna; $\times 460$.
 Fig. 7 c. Tip of immovable finger; $\times 500$. a^2 four dentated lobes; t terminal serrated spine; m and b as in fig. 1 b.
 Fig. 7 d. Left movable finger; $\times 215$. Signature as in fig. 1 b.
 Fig. 7 e. Left palp; $\times 35$.
 Fig. 7 f. Maxillae and coxae; $\times 50$; ls lamina maxillaris superior; f^1 and f^2 lyriform organs.
 Fig. 7 g. Left leg I; $\times c. 65$. Signature as in fig. 1 c.
 Fig. 7 h. Left leg IV; $\times c. 65$. Signature as in fig. 1 c.

Figure 8. *Garypinus nobilis* n. sp.

- Fig. 8 a. ♀. Cephalothorax; $\times 40$.
 Fig. 8 b. ♀. Immovable finger of left antenna; $\times 205$. Signature as in fig. 1 b.
 Fig. 8 c. ♀. Movable finger of left antenna; $\times 205$. Signature as in fig. 1 b.
 Fig. 8 d. ♂. Tip of left movable finger; $\times 205$.
 Fig. 8 e. ♀. Left palp; $\times 24$.
 Fig. 8 f. ♀. Left leg I; $\times 47$. Signature as in fig. 1 c.
 Fig. 8 g. ♀. Left leg IV; $\times 47$. Signature as in fig. 1 c.

Figure 9. *Chelifer Mortensenii* n. sp. ♂.

- Fig. 9 a. Left coxa with coxal sae seen from above; $\times 132$. t exterior spine; o entrance-opening; b basal and d distal portion of coxal sae; f funnel; n anterior cleft between two parts of sae; h conical tubercles; r ridges.
 Fig. 9 b. Left coxal sae, seen from the anterior surface; the wall of the basal half partly wanting; $\times 200$. Signature as in fig. 9 a and 9 c.
 Fig. 9 c. Left coxal sae seen from posterior side, showing the funnel consisting of a basal wider portion h^2 and of a narrower h^3 with its distal portion m , posteriorly blending into the wall of the distal part of the sae; $\times 364$. n^1 dorsal depression, and n^2 ventral depression, into which the posterior cleft is continued.

Figure 10. *Chelifer depressus* C. K. ♂.

- Fig. 10 a. Left coxal sae, seen from above; $\times 135$. Signature as in fig. 9 a; h^1 tubercle, placed posteriorly in basal part of sae.

Figure 11. *Chelifer lamprosalis* L. K. sp. af. from Spain. ♂.

- Fig. 11 a. Ridges and tubercles of coxal sae; $\times 230$.

Figure 12. *Chelifer lamprosalis* L. K.(?). ♂.

- Fig. 12 a. "Funnel" f and entrance-opening of coxal sae, seen from inner side.

Plate III.

Figure 1. *Chelifer Mortensenii* n. sp.

- Fig. 1 a. ♂. Hairs of tergite XI; $\times 220$.
 Fig. 1 b. ♀. Left galea; $\times 200$.
 Fig. 1 c. ♂. Left galea; $\times 200$.
 Fig. 1 d. ♂. Left palp; $\times 26$.
 Fig. 1 e. ♀. Two last pair of coxae; $\times 64$.
 Fig. 1 f. ♂. Fourth pair of coxae and genital area; $\times 63$. o entrance-opening of coxal sae; t coxal spine; p posterior genital plate; r ram's-horn-shaped organs.
 Fig. 1 g. ♂. Hairs of left tibia IV; $\times 245$.
 Fig. 1 h. ♂. Tip and claws of left tarsus I; $\times 181$. hi anterior terminal lateral hair; a arolium; ci anterior claw; ce posterior claw.

Fig. 1 i. ♂. Tip and claws of left tarsus IV in posterior view; $\times 190$. *he* posterior terminal lateral hair; *hi* anterior; *a* arolium; *c* posterior claw with anterior tooth.

Figure 2. *Chelififer depressus* C. K.

Fig. 2 a. ♂. Thoracic tergites and first five abdominal ones to show lateral keels; $\times 110$. t^1 , t^2 first and second thoracic tergite; t^7 fifth abdominal one.

Fig. 2 b. ♀. Galea; $\times 165$.

Fig. 2 c. ♂. Left palp; $\times 23$.

Fig. 2 d. ♂. Right hand; anterior surface; $\times 32$.

Fig. 2 e. ♀. Dorsal hairs of femur IV.

Figure 3. *Chelififer superbus* n. sp.

Fig. 3 a. ♂. Left palp; $\times 25$.

Figure 4. *Chelififer granulatus* C. K.

Fig. 4 a. ♂. Tip and claws of right tarsus I in anterior view; $\times 225$. Signature as in fig. 1 h-i.

Figure 5. *Chelififer lamprosalis* L. K.

Fig. 5 a. ♂. Tip and claws of left tarsus I in anterior view; $\times 125$. *p* dorsal terminal projection of tarsus; *hi* and *he* anterior and posterior terminal lateral hair; *ci* and *ce* anterior and posterior claw.

Fig. 5 b. ♂. Anterior *h* and posterior *he* terminal lateral hair of right tarsus IV; $\times 175$ (?).

Figure 6. *Chelififer lamprosalis* L. K. sp. af. from Spain.

Fig. 6 a. ♂. Coxal sac — left — in posterior view; $\times 50$.

Fig. 6 b. ♂. Coxal sac — left — in ventral view; $\times 53$.

Fig. 6 c. ♂. Basal portion of coxal sac seen from inner surface, with wall of distal portion, beset with tubercles *h*, seen from the outside; *r* ridges, which support tubercles; r^1 short ridges of anterior(?) wall of basal sac; *w* wall, which partly separate the hollows of the two parts from each other; *f* funnel, h^2 its basal portions and h^3 hairs, extending beyond the entrance opening.

Fig. 6 d. ♂. Tip and claws of left tarsus I in anterior view; $\times 175$; signature as in fig. 5 a.

Fig. 6 e. ♀. Anterior *hi* and posterior *he* hair of left tarsus I; $\times 175$.

Fig. 6 f. ♂. Posterior terminal lateral hair of left tarsus I; $\times 175$.

Fig. 6 g. ♂. Anterior terminal lateral hair of right tarsus IV; $\times 175$.

Fig. 6 h. ♂. Posterior terminal lateral hair of right tarsus IV; $\times 175$.

Figure 7. *Chelififer subrubus* Sim.

Fig. 7 a. ♂. Portion of an abdominal tergite; $\times 210$.

Fig. 7 b. ♂. Genital area and first sternites of abdomen; $\times 39$. *a* anterior genital plate; *p* posterior; *g* genital opening; *m* membrane along hinder margin of *a*; st^1 stigma I; st^2 stigma II; *gl* clavate accessory gland; IV—V fourth and fifth sternites; sp^1 granular area behind sexual opening; *sp* sternal spines.

Fig. 7 c. ♀(?). Flagellum; $\times 166$.

Fig. 7 d. ♀. Galea; $\times 166$.

Fig. 7 e. ♂. Left palp; $\times 22$.

Fig. 7 f. Hairs of left tibia IV; $\times 225$.

Fig. 7 g. "Tactile" hair of left tarsus IV; $\times 225$.

Figure 8. *Chelififer Murrayi* Poc.

Fig. 8 a. ♂. Hairs of fifth abdominal tergite; $\times 150$.

Fig. 8 b. ♂. Abdominal sternite IX with spines *sp*; $\times 70$.

Fig. 8 c. ♂. Flagellum; $\times 250$.

Fig. 8 d. ♀. Galea; $\times 155$.

Fig. 8 e. ♂. Galea; $\times 150$.

Fig. 8 f. ♀. Maxillae in ventral view; x 53. *l* labrum; *ls* lamina superior; *ma* manducatory part; *f*² interior marginal fissure.

Fig. 8 g. ♂. Maxillae in ventral view; x 54. Signature as in fig. 8 f; *r* cf. text (p. 162).

Fig. 8 h. ♀. Left palp; x 19.

Fig. 8 i. ♂. Left palp; x 19.

Fig. 8 j. ♂. Hairs of dorsal side of left femur IV; x 250.

Figure 9. *Chelifer cocophilus* Sim.

Fig. 9 a. ♂. Left palp; x 31.

Fig. 9 b. ♀(?). Right chela in posterior view; x 31.

Figure 10. *Chelifer Birmanicus* Thor.

Fig. 10 a. ♂. Genital area; x 37. Signature as in fig. 7 b; *c*, *b*¹ and *b*² cf. text (p. 124).

Plate IV.

Figure 1. *Chelifer modestus* n. sp.

Fig. 1 a. ♀. Basal part of left movable finger of antenna; x 134. *t*¹ basal tooth.

Fig. 1 b. ♀. Terminal portion of same finger as fig. 1 a with galea *g*; x 134.

Fig. 1 c. ♀. Left palp; x 21.

Fig. 1 d. ♀. Hair of left femur IV; x 400.

Figure 2. *Chelifer Galathea* n. sp. ♂.

Fig. 2 a. Movable finger of left antenna; x 161. *e* serrula; *t*¹ basal and *t*² terminal tooth.

Fig. 2 b. Left palp; x 24.

Fig. 2 c. Left chela, seen from inner side; x 30. *t* tactile hairs; *s* sense-spots; *a* accessory teeth.

Figure 3. *Chelifer concavus* n. sp.

Fig. 3 a. Right palp; x 18.

Figure 4. *Chelifer Birmanicus* Thor.

Fig. 4 a. ♀. Immobile finger of the antenna in ventral view; x 125. *f* flagellum; *b* lamina exterior; *a*¹ plate-shaped portion of lamina interior; *a*² dentated lobes; *t* terminal spine; *m* marginal teeth.

Fig. 4 b. ♂. Serruli-formed part of lamina interior of right antenna, seen from above; x 233. Signature as in fig. 4 a.

Fig. 4 c. ♀. Movable finger of left antenna; x 110. Signature as in fig. 2 a.

Fig. 4 d. ♂. Tip of movable finger of left antenna; x 100.

Fig. 4 e. ♂. Left palp; x 17.

Fig. 4 f. ♂. Left chela e. t. c. in anterior view; x 19.

Figure 5. *Chelifer monitor* n. sp. ♂.

Fig. 5 a. Left palp; x 17.

Fig. 5 b. Left tibia and chela; x 19.

Figure 6. *Chelifer Nieobarensis*. ♂.

Fig. 6 a. Basal portion of left serrula exterior; x 130. *t*¹ basal tooth.

Fig. 6 b. Left palp; x 17.

Figure 7. *Chelifer plebejus* n. sp. ♀. (Kar-Nikobar).

Fig. 7 a. Left flagellum; x 200.

Fig. 7 b. Tip of left movable finger with galea *g*; x 200.

Figure 8. *Chelifer vermiformis* n. sp. ♂.

Fig. 8 a. Tip of left movable finger with galea *g*; x 200.

Fig. 8 b. Left palp; x 20.

Figure 9. *Chelifer navigator* n. sp. ♂.

Fig. 9 a. Right palp; x 20.

Figure 10. *Chelifer Indicus* n. sp. ♀.

Fig. 10 a. Left flagellum; x 154.

Fig. 10 b. Left palp; x 15.

Fig. 10 c. Left leg I; x 23. f^1 trochantin; f^2 distal part of femur; ta tarsus.

Fig. 10 d. Left leg IV; x 23. Signature as in fig. 10 c.

Figure 11. *Chelifer rotundus* n. sp. ♂.Fig. 11 a. Tip of left finger with galea g ; x 225.

Fig. 11 b. Left palp; x 19.

Fig. 11 c. Hair of left femur IV; x 225.

Figure 12. *Pseudochiridium Thorellii* n. sp. ♀.

Fig. 12 a. Animal from above; x 23.

Fig. 12 b. Immovable finger of left antenna; x 212. ar articulate cavity; f flagellum; a^1 plate-shaped and a^2 serruli-formed portion of lamina interior.Fig. 12 c. Left movable finger; x 212. t^1 basal tooth of serrula; g galea.Fig. 12 d. Cephalothorax in ventral view; x 55. ls lamina superior maxillaris; a articulate cavity of trochanter IV; st stigma.

Fig. 12 e. Leg I; x 47. Signature as in fig. 10 c.

Fig. 12 f. Leg IV; x 47. Signature as in fig. 10 c.

Fig. 12 g. Hairs of femur IV; x 126.

Figure 13. *Pseudochiridium clavigerum* Thor. ♀.

Fig. 13 a. Left palp; x 36.

Figure 14. *Chiridium museorum* Leach.

Fig. 14 a. Left leg I; x 71.

Fig. 14 b. Left leg IV; x 71.

101° E. fr. Greenwich

PART
of
GULF of SIAM

10 0 10 20 30 40 50 Sea Miles

NOTE

Soundings in Fathoms.

f.s. = fine sand. m. = mud.

— — — — — signifies 3 Fathoms line

- - - - - " 5 " " "

..... " " dry at low water

1. *Chthonius terribilis* n. sp. 2. *C. Rayi* L. K. 3. *Obistum museorum* Lch. 4. *Ideoroneus Siamensis* n. sp. 5. *I. laminatus* n. sp.
6. *Garypus irrugatus* Sim. 7. *Garypinus nobilis* n. sp. 8. *Chelyfer nodosus* Sch.

1. *Garypus irragatus* Sim. 2. *G. elegans* Sim. 3. *G. longidigitatus* Rainb. 4. *G. floridensis* Bks. 5. *G. saxicola* Walthe. 6. *Ophium corlinianum* Balz.

7. *O. birmanicum* n. sp. 8. *Garypinus nobilis* n. sp. 9. *Chelifer Mortensenii* n. sp. 10. *Ch. depressus* C. K. 11. *Ch. sp.* 12. *Chelampropsalis* L. K.

C. J. With.

T. N. Möller

1. *Chelifer Mortensenii* n.sp. 2. *Ch. depressus* C.K. 3. *Ch. superbus* n.sp. 4. *Ch. granulatus* C.K. 5. *Ch. lampropsalis* L.K. 6. *Ch. sp.*

7. *Ch. sobruheri* Sim. 8. *Ch. Murrayi* Poc. 9. *Ch. cocophilus* Sim. 10. *Ch. Burmanicus* Thor.

1. *Chelifer modestus* n. sp. 2. *Ch. Galathea* n. sp. 3. *Ch. concavus* n. sp. 4. *Ch. Birmanicum* Thor. 5. *Ch. monitor* n. sp.
6. *Ch. Nicobarenensis* n. sp. 7. *Ch. plebejus* n. sp. 8. *Ch. vermiformis* n. sp. 9. *Ch. navigator* n. sp. 10. *Ch. Indicus* n. sp.
11. *Ch. rotundus* n. sp. 12. *Pseudocheiridium* Thorelli n. sp. 13. *Ps. clavigerum* Thor. 14. *Chiridium museorum*. Ich.

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— — Ni Tavler til Oplysning om Hvaldyrenes Bygning m. Forklaring. 69	2. 65
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— Om Bruskens første Dannelse og Udvikling, m. 2 Tavler. 64	" 90
— Iagttagelser over indkapslede Indvoldsorme hos Frøen, m. 2 Tavler. 65	1. "
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