The Genera and Species of the Order Symphyla.

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With Plates 1—7.

I. Historical Notes.

In 1884 Dr. R. Latzel published the second half of his fine and highly valuable work 'Die Myriopoden der österreichisch-ungarischen Monarchie,' ii, 1884. His treatment of the order Symphyla (pp. 1—18 and Taf. i) is a very important contribution: it contains a rather detailed description of the external structure, abstracts of earlier papers on some of the internal organs, notes on some larval stages, the best descriptions hitherto published of three European species, a sketch of the history of the systematic position of the group, etc. In reality it gives both a considerable addition to our knowledge, and abstracts of or reference to nearly all earlier scientific papers until 1882 touching the subject. I will therefore refer the student to Latzel's book, and confine myself to a very short extract and a few remarks.

We learn that Scopoli in 1763 described the first species of this order, viz. Scutigerella nivea, which he referred to the genus Scolopendria.

In 1839 H. P. Gervais described another species, not a-
cantha, upon which he founded the genus Scolopendrella, and referred it to the family Geophilidae.

In 1844 Newport discovered the common species S. immaculata, and established first the Scolopendrellinae as a sub-family of the Geophilidae, but shortly afterwards as a family near the Lithobiidae.

In 1880 F. A. Ryder made an important step, raising the group to the rank of a separate order, to which he gave the well-chosen name, Symphyla, and in 1882 he divided it into two genera, Scolopendrella, Gerv., and a new one, Scutigerella, Ryder.

From 1873 to 1882 European and American zoologists had established some new species, but in the treatment of Latzel they have all been withdrawn as synonyms of the three species mentioned above. At the end of 1882 not more than three species were known from the whole world, but it must be added that at least one of the species cancelled, S. microcolpa, Muhr (and possibly also S. gratiaæ, Ryder), must be re-established as valid, and that the form described by Latzel as S. notacantha, Gerv., var. munda, is not this species (see the next page). To give a more detailed review, with critical remarks, of the contents of Latzel’s treatment is, in my opinion, not necessary, especially as some points will be mentioned in the following pages.

In 1883 S. Scudder established a new North American species, S. latipes, which certainly is dead-born (see later on).

In 1886 B. Grassi published his important paper, “Morfologia delle Scolopendrelle” (‘Mem. d. Reale Accad. d. Scienze di Torino,’ Ser. 2 a, T. xxxvii, pp. 593—624, Tav. i, ii). The author begins with a description of four Italian species known to him: S. immaculata, Newp., S. nivea, Scop., S. notacantha, Gerv., and a new form, S. Isabellaæ, Grassi. He states correctly that S. notacantha, Gerv., has the first pair of legs “relativamente corto” and simple setæ on the antennæ; furthermore that the species described by Latzel as S. notacantha is not
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referable to that species. He has examined specimens which, in his opinion, belong to S. notacantha, Latz., and on these specimens he establishes his new S. Isabella, which, above all, is distinguished from S. notacantha, Gerv., by having only eleven pairs of legs, whereas twelve pairs are found in the last-named species. In S. Isabellæ he has discovered "una papilla brevissima" furnished with hairs, without claws, and not divided into joints, placed on the latero-ventral part of the first segment of the trunk, and he thinks that its distance from the median line is so long that it cannot easily be considered as homologous with the first pair of legs in S. notacantha, Gerv. But in Scol. Silvestrii, n. sp., described below, the first pair of legs have as many joints as in S. notacantha, Gerv., but they are much shorter and inserted as the "papilla" in S. Isabellæ, and it must be taken as granted that the wart-like protuberance in the last named, and in several other species, is a very reduced leg; it is also present in specimens in which the posterior pairs of legs have not yet been developed. The existence of this pair of wart-like legs separates S. Isabellæ sharply from S. notacantha, Gerv., but I have studied two rather closely allied Italian species which both possess the characters pointed out by Grassi for his S. Isabellæ; in all probability he has examined specimens of both species, and not wishing to suppress the name given by him I have retained it for the largest of the two species, which also seems to be common at Catania.

Grassi spends ten pages on the external and internal anatomy, but I will only mention two points. His treatment of the sense-organs is rather incomplete; in Scut. immaculata and nivea he has seen none of the organs of the antennae described below. His description of the mouth-parts is rather good (the figures unfortunately poor), and it must be emphasised that he points out mandibles, maxillæ, labium (composed "di un semilabbro destro e di uno sinistro"), and a hypopharynx consisting of a ligula and two paraglossæ; a comparison of his interpretations with
those set forth by me in a following chapter will show that I have accepted them as quite correct, with exception of his opinion on the “paraglossae.” His very long discussion (pp. 607—617) on the affinities of the order must be passed by here, but it may be added that he gives a not quite complete list of the papers printed between 1763 and 1885, in which Scolopendrella has been mentioned.

In 1889 Dr. E. Haase published his well-known paper “Die Abdominalanhänge der Insekten, mit Berücksichtigung der Myriopoden” (“Morphol. Jahrb.”, B. xv, pp. 331—435, Taf. xiv, xv), in which he investigates and discusses the appendages at the base of the legs and the ventral saccs.

In 1895 P. Schmidt published “Beiträge für Kenntniss der niederen Myriopoden” (“Zeitschr. f. wiss. Zool.”, Bd. lxi); the morphology of Scolopendrella is dealt with on pp. 461—78 (Taf. xxxvii, figs. 31—45), and some of the anatomical results do not agree with those of Grassi, but the paper contains nearly nothing of any significance to the purpose of the present paper. Schmidt states that he has examined S. immaculata, captured partly near St. Petersburg, and partly in the orangery of the botanical gardens in that town, but I am inclined to suppose that the animals from the orangery belonged to the species described later on as Scut. caldaria, n. sp.

From 1885 to 1900 several zoologists—E. Haase, E. Daday, A. Berlese, C. v. Porat, and C. Graf v. Attems—have redescribed earlier known species of Symphyla collected in the European countries of the respective authors, or published local faunistic lists; and A. S. Packard, R. I. Pocock, and F. Silvestri have indicated new localities out of Europe for Scut. immaculata. In another chapter of this treatise the most interesting localities, stated in some of the papers of these authors, for the last-named species will be discussed, while the other localities and the descriptions need no mention. Since Grassi’s paper (1886) no author has established any species or genus of our order.

It may be proper to conclude with a short review. Of the
order, four European species are at present admitted, but one of them, S. Isabella, is collective; a fifth species, Scol. microcolpa, Muhr, has incorrectly been withdrawn by Muhr himself one year after its erection, and subsequently by Latzel and the other authors. In North America four species have been found, and two of them described as new, viz. S. latipes, Scud., which must be cancelled, and S. gratiae, Ryder, which has been withdrawn by Latzel as synonymous with the European S. nivea, Scop., but I cannot decide if this withdrawing is correct. From other parts of the world no new species has been described. The result is that of the species established from the whole world and admitted as valid by the best authors in papers since 1884 (this year included), only three European species have been described so that they can be recognised with tolerable certainty, and a fourth one is collective. It may, perhaps, be admitted that in the 138 years elapsed since S. nivea was described the progress of our study of the forms of this highly interesting order, which certainly contains at least more than 100 species, has been rather slow.

II. The Material and its Treatment.

The material examined by me is comparatively very rich, consisting of some hundreds of specimens collected in several countries of Europe, in Algeria and the Cape Colony, in Texas, in various countries in South America, as Venezuela, Chile, and southern Brazil to southern Patagonia, in Java, Sumatra, and Siam; twenty-four species are described.1 The major part of the specimens and species belong to the Copenhagen Museum; most of the animals from Europe have been captured by the author, who collected seven species in Calabria in May and June, 1893, and one species besides in

1 Two new species, one from Temuco in Chile and one from the island of Koh Chang (Gulf of Siam), have been omitted; of each I had only one badly preserved specimen.
hothouses in Copenhagen; eight new species have been collected by two other Danish zoologists, viz. three by Dr. F. Meinert in Algeria and Venezuela, and five species by Dr. Th. Mortensen in Siam; it may be added that it was the arrival in 1900 of the fine collection secured by Dr. Mortensen which induced me to study the Palpigradi, Pauropoda, and Symphyla. On my request Dr. F. Silvestri kindly lent me a good collection, especially all the animals described here from the southern countries of South America; furthermore, specimens have been benevolently sent me by the Director, Prof. E. Ray Lankester, from the British Museum, by Prof. E. L. Bouvier from the Museum in Paris, by Prof. Max Weber from the Museum in Amsterdam, by Mr. R. I. Pocock (London), Mr. Carl Börner (Marburg), and Prof. W. M. Wheeler (Austin, Texas). I beg all these gentlemen to accept my sincere thanks for their valuable aid.

The collectors of Symphyla should put the animals in spirit of about 63 per cent., and at most not exceeding 70 per cent. When the specimens are to be examined they must be put in glycerine somewhat diluted with water on the object-glass, and the glass-cover ought to be supported by a small wooden wedge to prevent flattening of the specimens; I have described my method in the paper on the Pauropoda ('Videnskab. Meddelelser fra den Naturh. Forening i Kjøbenhavn' for 1901, published March, 1902), and refer the readers to the chapter in question (pp. 327, 328). The animals must be examined both vertically from above and from the side, and it is often necessary to use a comparatively high magnifying power (200 to 500 times). The real shape and relative length of the claws are often difficult enough to observe, and in order to produce correct drawings I have generally found it necessary to cut off the left leg of the twelfth pair (if this was broken the penultimate leg was chosen) and one of the first pair, if this is well developed: often I also cut off the right leg of the last pair to examine and draw the claws from the inner (the posterior) side as those of the other leg. A glance on the plates will show that of nearly all species I have drawn the
same leg and the same claws in the same position in order to facilitate a direct comparison of the shape, etc., of the parts in question. Furthermore, the legs of the last pair, the legs of the first pair if these are not quite rudimentary, and the cerci have always been drawn with the same degree of enlargement, the claws of the first and the last pairs of legs with a higher degree, which is identical for both figures; the result of these arrangements is that the figures also show the proportions as to length, etc., between the cerci and the legs mentioned of each species. (Of course, it has been impossible to draw the legs and cerci of a small and of a large species with the same degree of enlargement, for the figures of the large species would be enormous if those of the small one should be really useful and not too small.) I should advise future students of this order—and of many other groups—to follow a similar plan when drawing figures.

III. On some Structural Features and Characters.

A. Variation.—It may be practical to begin with some remarks on this topic. During a preliminary study I was induced to think that it would be rather easy to separate and describe nearly all the species of the genus Scutigerella, as they presented several characters, whereas the other genus, Scolopendrella, seemed to be more difficult; but later on I arrived at the opposite result. The species of the last-named genus show several characters, and most of the features which differ from each other in all or nearly all species present only a slight or no variation in specimens with the full number of legs of the same species. In Scutigerella, at least, several species show a special difficulty: specimens of the same species having acquired the full number of legs vary very much in size; this difference can be very large between specimens from the same locality or from different localities, and arises often, most probably, from the age of the individuals; but sometimes it is a real local variation, a remark already set
forth by Latzel on Scut. immaculata in Austria. This variation in size is connected with differences in certain parts presenting specific characters, and two striking examples may be pointed out here. In very large specimens of Scut. immaculata the cerci are about six times, whereas in a small specimen they were only four times longer than deep, thus considerably more slender in large than in small individuals. In large specimens of Scut. angulosa, n. sp., the last pair of legs—and to a little lesser degree the penultimate pair, and to a somewhat lesser degree the antepenultimate pair—are more robust and widened, especially in the proximal portion of their tarsi (Pl. 4, fig. 2 e) in a way which at least very rarely is met with in small specimens (comp. Pl. 4, fig. 2 k, with fig. 3 e, and the explanation of the plate). A similar difference has been observed between the shape of the posterior pairs of legs in a large and in a small specimen of Scut. capensis, while in several other species no such difference has been found. Such variation in structural features, generally but not even always proportionate to the size of the specimens, can be very perplexing, and in some cases it is very difficult or perhaps impossible to distinguish with absolute certainty between variety and species without having a rich and well-preserved material from many localities. The genus Scutigerella has caused me much trouble, and I may advise future students not to establish new species without a very careful and prolonged examination of several forms, and never to establish a species on specimens not having acquired the full number of legs, or on specimens in which the legs of the twelfth pair are not quite as long and do not possess so many setae as those of the eleventh pair.

b. Head.—It is comparatively shorter and broader (and thicker) in Scutigerella than in Scolopendrella, but the proportions between the dimensions in question vary conspicuously between the species of the same genus. While the breadth is easy to measure when the animals are seen from above, the length can often only be measured with accuracy when they are seen from the side; I have often not found it
necessary to give the exact proportion between the length and breadth in the various species, but only an estimate. The length of one pair of lateral setæ as compared with the breadth of the proximal joints of the antennæ is a character in Scutigerella. It is well known that internal linear thickenings of the dorsal integument have been observed in European species; the thickening in the median line I name the central rod; from the anterior and posterior ends of this a pair of branches originate. The major part of this structure is much more easily seen in Scolopendrella than in the other genus, and it presents a few characters used in the descriptions below. The eye-spots have been omitted as nearly valueless.

c. Antennæ.—Latzel especially has pointed out with his usual accuracy that in the three species known to him the number of joints varies very much in specimens of each species, and above all in Scut. immaculata, in which he has found from eighteen to fifty-five joints. The degree of variation is, on the whole, considerably larger in Scutigerella than in Scolopendrella. Notwithstanding this, the number of joints is not quite worthless, as it is considerably higher in some species than in others. The shape of the joints is generally without any significance, as it in reality is rather uniform in nearly all species of the same genus, and besides presents too much difference according to the degree of contraction of the antennæ. Sometimes this contraction is so considerable that the distal part of many joints is concave instead of conically truncate, and in this case the antennæ show a very anomalous appearance, the joints being only half as long as usual, but considerably thicker than in their normal state, much resembling cups arranged in a pile. Only in two species, Scut. crassicornis and Scut. pauperata, the subproximal part of the antennæ has the joints really thickened in proportion to the rest (Pl. 4, fig. 4 a). Each joint, the terminal one excepted, has always a whorl of stiff setæ on the thickest part; the setæ in this whorl, which I name the central one, differ somewhat in length in the different species, and in Scut. crassicornis and S. pauperata the setæ on the inner (anterior)
side (Pl. 4, fig. 4 b) of the thickened joints are very elongate and vertical on the antennal axis. In most species these setae are slender, slightly conical, and naked, but in two species of Scolopendrella (Scut. microcolpa, Muhr, and Scut. antennata, n. sp.) nearly all the setae are much thicker and adorned with very conspicuous branches on all sides (Pl. 5, fig. 4 b, and Pl. 7, figs. 6 a—6 c). In all species at least one secondary whorl of shorter setae has been partly or fully developed behind the central one, at all events in the most distal joints. In most species of Scutigerella and some species of Scolopendrella a third whorl is developed behind the second one or between this and the central one, at least on the lower side of the distal joints, and a rudiment of a fourth can sometimes be found. On the upper side of the distal joints a part or a rudiment of a whorl of fine and short hairs or setae is found in advance of the central one. The degree of development of the whorls on the proximal, middle, and distal parts of the antennæ present specific characters.

In Scutigerella I have discovered various sense-organs on the antennæ. In all species the terminal joint has on its distal surface at least one organ—generally two or three organs,—and these differ often, but not always, considerably in size. An organ of this kind consists of a stalk which is either short or rather long, often gradually increasing in thickness outwards, and from its end originate four fine branches which are slightly convex outwards, subparallel or slightly diverging, and certainly always united by a very thin, clear membrane. A large organ of this kind, a striped organ, placed on a wart-like protuberance in Scut. unguiculata, is shown in Pl. 2, fig. 2 c; fig. 2 b on Pl. 4 (in Scut. angulosata) shows a large organ and a smaller one with the branches feebly developed. Fig. 2 b on Pl. 5 represents the terminal joint of Scut. pauperata with two organs (more magnified in fig. 2 c), one with branches in the membrane, the other thicker, more rounded, without separate stalk, and without branches. Fig. 2 b on Pl. 4 shows not only two striped organs, but between the normal setae subcylindrical rods,
which probably also are a kind of sense-organs, and exist in some and perhaps in all species of the genus. On the upper side of most of the joints, the proximal ones excepted, is generally found a very small organ with the branches mentioned, and at least in one species two organs of this kind. In Scut. crassicornis, n. sp., and Scut. pauperata, n. sp., there is besides on the same joints near the upper organs a single, rather thick, conical rod; in other species this rod is very slender, often not easily discernible from a normal short seta, and in Scut. angulosa some slender sub-cylindrical rods with the end acuminate are found together with the fine setæ mentioned above in advance of the central whorl on the distal joints. The quality and number of all these organs present at least sometimes, and probably always, specific characters to a certain extent. Some points are briefly mentioned in the descriptions below, but a more detailed study than I was able to undertake is needed.

In Scolopendrella notacantha, Gerv., I have observed two organs of the striped sort on the end of the terminal joint. In Scol. Isabellae organs of a very different kind were present on the same surface, but these organs are so small that an enlargement of 600 times is quite insufficient, and I have been compelled to give up the searching for sense-organs in species of the genus Scolopendrella.

d. Dorsal Scuta.—The tergum belonging to the segment bearing the first pair of legs is rather or very short, and never developed as a real scutum like the following ones; I have therefore found it practical not to include it in the sum of the scuta; when in the descriptions of the species the second scutum is mentioned I mean the second of the large, real scuta. It is well known that in all Symphyla the number of such scuta is a little higher than that of the pairs of legs. In Scutigerella they are very easy to count; fourteen scuta are present in all species; they are sharply defined on the sides and especially behind, where a scutum in somewhat contracted specimens overlaps the most anterior part of the following one. In a very extended specimen of
Scut. capensis I observed that all scuta (the first one perhaps excepted) are divided by a transverse furrow into a very short anterior and a long posterior part; the anterior part is in this species easily distinguished from the articulating membrane in front of it by its surface, which is adorned with short, irregular, somewhat curved, transverse stripes, while the articular membrane wants such stripes, but is finely dotted. In very extended specimens of other species I have found a similar division of the scuta, but the anterior part is here often scarcely distinguishable from the articulating membrane. The species of Scolopendrella possess also fourteen scuta, but the two posterior ones are divided by a transverse stripe of articulating membrane, so that they can easily be counted as four scuta, the anterior part being more than half but scarcely ever quite as long as the posterior one; the anterior parts are setiferous like the others, but are easily distinguished by their shape; all the scuta, the fourteenth one excepted, are posteriorly produced into two lateral triangular plates of considerable size, those of the last one being somewhat smaller, but the hind margin of the anterior part of the two posterior scuta is transverse without any vestige of triangular plates. In very extended specimens of various species it is observed that the first to the twelfth scuta are divided into a long posterior part and an anterior one, which is a little longer than in the other genus, and generally very difficult or impossible to distinguish from the articulating membrane.

In Scolopendrella the shape of the posterior triangular plates and their distance from each other differ after a certain rule in the scuta of the same animal; for instance, the plates of the second scutum are always more narrow in proportion to their length and less distant from each other than those of the third scutum (various figures on PIs. 5—7); the plates of the others are rather similar in shape either to those of the second or those of the third scutum, or form a transition between them. I have found these two scuta to be the most practical to study, and the others are omitted as
rather superfluous in the descriptions of the species. The two scuta present excellent specific characters, being not quite similar in any two species, and differing not only as to shape and distance of the triangular plates, but also in the number of marginal setæ on these plates, in the length of the antero-lateral setæ, etc., while the individual variation seems to be slight in all respects.

In Scutigerella the scuta present several excellent characters, but not as many as in the other genus. The shape of the posterior margin of all the scuta, the last one excepted, of the same specimen is rather similar in the main features; the last scutum differs in the whole order essentially from the others in shape and endowment with setæ. I have found the second and the penultimate scuta to be more different from each other than the intermediate ones, and these two scuta are therefore described in all species. The marginal setæ of the scuta present good characters, but their length shows some individual variation. A pair of antero-lateral setæ are often especially elongate on the anterior scuta or on nearly all scuta; these setæ are always inserted on the most lateral point of the scutum (consequently where this is broadest); on the anterior scuta this point is situated much in front of the middle, on the posterior scuta behind the middle. When these setæ are especially elongate they are at least on the anterior scuta and sometimes also on the posterior scuta directed outwards and less or more forwards. Furthermore, the longest pair of lateral setæ are generally of importance, and some other small features are mentioned in the descriptions of the species. The last scutum presents a very curious structure in two closely allied species, Scut. immaculata (Newp.) and Scut. armata, n. sp.: an oblong median area at the hind margin is so deeply impressed or invaginated that a cavity is formed, the anterior part of which is overlapped by the protruding dorsal wall; around this cavity (Pl. I, fig. 1 c) a belt of the interior tissue shows a peculiar aspect, indicating the existence of an organ which probably is a gland, but a special investigation of the
histological structure has not been undertaken. In two other species, Scut. crassicornis, n. sp., and Scut. pauperata, n. sp., a deep depression is found, but no invagination, and therefore no cavity, has been developed; the interior tissue shows an organ less distinct than in Scut. immaculata. In the other species of Scutigerella a feeble and simple depression is observed; in Scolopendrella the last scutum is simple.

E. Legs. — The legs of the first pair will be treated separately below. They present always essential structural differences from the eleven other pairs, which in all main points are similar to each other, not only in the same animal but in all species of the order. These eleven pairs consist apparently of five joints. But the proximal one of these joints is, in my opinion, the trochanter, and the coxa can easily be seen as a separate portion of the skeleton on the lower surface of the trunk on a specimen cleaned with caustic potash. That the second one of the five joints mentioned is the femur and the last one is the tarsus is, of course, certain, but the interpretation of the two remaining joints is more difficult. The shape of these joints and the presence of only one condylus placed on the dorsal side seem to indicate that the joints must be interpreted as patella and tibia; on the other hand, the essential movement between the joints being a rather strong flexion in the vertical plane, while the movement forwards and backwards around a sub-vertical axis seems to be feeble, leads to the assumption that the joints are respectively tibia and metatarsus. I think that this last interpretation is correct, and it is supported by the shape of the dorsal condylus, which is unusually broad, and seems to be formed by a junction of two condyli placed closely together. The tarsus terminates in a praetarsus 1 with two claws, which are never quite equal in shape, the anterior claw being always broader, generally

1 This name has been introduced by N. J. C. H. de Meijere in his paper "Über das letzte Glied der Beine bei den Arthropoden" (Zoolog. Jahrbücher, Abtheil. für Anatomic, etc., Bd. xiv, 1901, pp. 417—476, Taf. 30—37).
conspicuously longer, and scarcely ever shorter than the other. The anterior is inserted on the distal end of the "präatarsus," the other claw on the posterior side of the same joint; the morphological interpretation of the präatarsus and the two claws is that set forth on similar parts in *Japyx solifugus*, in § 51 of my paper "Zur Morphologie der Gliedmassen und Mundtheile bei Crustaceen und Insekten" ('Zool. Anzeiger,' 1893, Nos. 420 u. 421).

The last pair of the legs mentioned present the specific characters especially well developed; the penultimate and antepenultimate pairs can also be used. The length of the tarsus in proportion to its depth, and the number and length of outstanding dorsal setae both on this joint and on the metatarsus and tibia, present good characters in *Scolopendrella*. In *Scutigerella* the shape of the tarsus is of lesser value, as it sometimes shows variation between large and small specimens, etc. (see above, and also under the descriptions of the species); the number and the length of the setae in the anterior dorsal row on metatarsus and tarsus and the length of a distal seta on the tibia are always valuable, though sometimes also presenting variation to a certain degree. The claws of the posterior pairs are important in *Scutigerella*, but must be studied with caution, as an oblique position of one of the claws under the microscope easily conveys a misleading image. In *Scolopendrella* the claws are less valuable, their difference in various species being generally smaller. It should be emphasised that the last pair of legs must be fully developed, at least quite as large as the preceding pair, and with the number of setae at least as high as on those legs, otherwise the shape of their tarsi and claws and the number of their dorsal setae will give misleading results.

Various names have been given to the well-known moveable, protruding organs at the base of each leg of the ten posterior pairs; I will name them exopods, but must abstain from setting forth here an explanation for the choice of this name. These exopods are very short and difficult to discover in all species of *Scolopendrella* and in *Scutigerella*
pauperata, n. sp., but they are somewhat longer or even rather long in the other species of the last-named genus.

The legs of the first pair are always at least somewhat shorter than the following pair, and instead of tibia and metatarsus only one joint is present between femur and tarsus. In all species of Scutigerella and in Scolopendrella notacantha, Gerv., this first pair are still rather large; in some other species of Scolopendrella they are more reduced in size or even short, but the three protruding joints are plainly seen (Pl. 5, fig. 4 f; Pl. 6, fig. 3 e). In many species of the last-named genus they have been reduced to very small or exceedingly small wart-like protuberances (see, for instance, Pl. 6, figs. 4 e and 6 c), without any vestige of articulation, without claws, and often very difficult to discover. When these legs are divided into joints the tarsi terminate in two claws, of which the anterior one is generally proportionately more slender and less curved than in the following legs, and the relative length of the claws presents a specific character.

In all legs the prætarsus has on the anterior side a single seta, which is much longer than its hairs, and sometimes (Scut. capensis, n. sp.) even longer than the claws (Pl. 3, fig. 5 d); it is here named the front seta. In the first pair of legs it is sometimes very thick and almost claw-like, which is a good character.

Cerci.—Both the shape and the furniture with setæ present good characters. At the distal end they are always cut off obliquely, so that a conspicuous flat area is presented; in Scolopendrella this area turns downwards or outwards, in Scutigerella outwards or partially or wholly upwards; its direction is always a good specific character if the natural position of the cerci has not been disturbed by pressure, which is the case in a small percentage of the specimens. Furthermore, in Scolopendrella the dimension of this area is valuable. In Scutigerella neither the area itself nor the surface opposite to it present any stripes; in Scolopendrella notacantha the area has a number of somewhat
irregular longitudinal stripes (Pl. 5, fig. 3 k), the nature of which is unknown to me; in all the other species of Scolopendrella the terminal surface opposite to it shows several transverse lines, which on each side converge to the base of the area, and each of these stripes consists of many exceedingly small spines arranged in a line (Pl. 6, fig. 4 g); the area is also generally more or less adorned with longitudinal stripes (Pl. 6, fig. 4 h). In all species of Symphyla the cerci terminate in one or two setæ. One is very short or sometimes absent, and has been omitted in the descriptions; the other varies from being rather short to exceedingly long.

In Scolopendrella the length of the cerci in proportion to the last pair of legs, their length in proportion to their depth and sometimes also to their breadth, the density and length of their clothing, and the length of the apical seta present excellent specific characters; in Scutigerella the density of their setæ and the length of the distal setæ are always important, but the proportion between length and depth is sometimes less constant, presenting differences in small and large specimens (see especially on page 30 on Scut. immaculata).

c. Tactile Hairs on the Last Segment.—The essential structure of these organs has been described by earlier authors. Here I shall only direct attention to the rather different shape, etc., of the calicles mentioned below in the diagnoses of the genera. The length of the tactile setæ is scarcely valuable as specific character.

IV. ON THE MORPHOLOGY OF THE MOUTH-PARTS.

It may perhaps be allowed to insert a short chapter on this matter, though it lies outside the scope of the present paper.

I have examined specimens of Scutig. immaculata (Newp.) and Scolop. vulgaris, n. sp., two species very distant from each other.

The best results were obtained from preparations cleaned
with caustic potash; the dorsal part of the head and of the
two anterior segments of the trunk has been cut off and the
lower half put in a cold solution of about 25 per cent., in
which it remained during twenty-four hours, and was then
put in glycerine on an object-glass. The hypopharynx and
the maxillulae have also been examined by dissection of a
head directly taken out of the spirit. The following descrip-
tion is founded almost exclusively on Scutig. immaculata;
some smaller differences between the structure of this species
and of Scolop. vulgaris have been observed, but, with the
exception of one point, I did not find it necessary to mention
them.

The mandibles are two-jointed as in typical Diplopods,
but the interpretation of this curious fact must be postponed,
and shall be dealt with in a paper on the morphology of the
skeleton of some classes of Arthropods. The basal joint
(Pl. 1, fig. 1 a, a.) is narrow when seen from below, but rather
broad when seen from the outer side; to the upper margin
just behind the middle a strong muscle (b.) is attached. The
distal joint (c.) is strongly compressed, its articulation on the
basal joint is well developed, and besides, it has on the upper
side near the basal margin a strongly prominent part, which
seems to be a secondary condylus, a structure difficult to
understand. The oblique distal cutting edge is serrated with
a moderately deep incision at the middle; in this incision is
found a rather small, thin lacinia (fig. 1 c, l.), articulated to
the upper surface of the mandible near the margin of the
incision; this lacinia is distally very irregularly and partly
deply serrated, and has, besides, a narrow, nearly setiform
process, directed inwards above the adjacent part of the
mandible; this lacinia is equally developed both on the right
and on the left mandible. To the inner posterior angle of
the second joint of the mandible a tendon of a very strong
muscle (d.) is attached.

The maxillae (e.) are quite independent of the labium,
united with it only by a belt of articulating membrane. The
"stipes" is long; posteriorly it is bent upwards and ter-
minates there in a short, angular projection, which can be seen from below through the skin; this short, curved part with its angular projection is probably the "cardo" fused with the stipes; a suture between them could not be discovered. As in many insects the two elements forming the stipes have been completely fused; two well-developed lobes proceed from the distal end of the stipes, and a little behind the base of the outer lobe a very short palpus is seen; this palpus (f.) consists in Scutig. immaculata of one very short joint; in Scolop. vulgaris it is twice as long, and consists of two joints. The main points as to shape and quality of the skin of the two lobes can be seen on the figure.

The labium shows a considerable resemblance to that of certain insects. The basal part, the "submentum" in insects, consists of a pair of narrow, well-chitinised plates or rods (h.), encompassed on both sides by membranous skin; near the base of a maxilla each of these rods is articulated to a narrow plate proceeding backwards, and these plates (g.) are the sternum of the segment to which the labium belongs. (The existence of this segment in Orthoptera has been pointed out by me in the paper on Hemimerus ['Entomol. Tidskrift,' Stockholm, Bd. xv, 1894].) The anterior ends of the submentum are articulated to short posterior prominences of the "mentum," a large shield (i.), a little longer than broad, and divided in the median line by a narrow stripe of membranous skin into two halves. The distal margin of the mentum is concave, and bears two pairs of rather small lobes (k.), well separated by membrane both from the mentum and from each other; besides, the mentum has each anterior outer angle produced into a subtriangular plate on the side of the outer lobe.

The hypopharynx and the maxillulae are very interesting; my interpretation is in some respects very different from that of other authors. The hypopharynx (fig. 1 e, h.) protrudes freely in the mouth above the distal part of the labium as a rather thick, subquadratic prominence; its anterior mar-
gin is convex, and on the upper side near the margin a pair of very broad and very short rounded lobes project freely over the antero-lateral margin, and are a little removed from each other at the middle. At the base of the hypopharynx its upper side shows a transverse linear thickening, which is sinuate, showing one unpaired and one pair of more lateral strong curves turning backwards; near the base of each lateral curve is attached a long and strong narrow plate (fig. 1 d, p.) directed backwards, and these two plates are the inner skeleton of the head also met with in lower insects,—for instance, Hemimerus. From each outer angle of the middle curve a chitinous ridge proceeds forward and a little outward supporting the hypopharynx. Outside each of these ridges a maxillula (m.) is articulated in the lateral curve of the transverse ridges; this maxillula, which proceeds forwards and somewhat inwards above the upper side of the hypopharynx, is oblong, nearly equal in breadth, with the distal margin cut off obliquely; its wall is rather firmly chitinised in parts, and the distal inner portion is submembranous, hairy, and on the whole showing a structure like that often observed on a lobe of a paired mouth-limb. I consider it to be absolutely certain that these maxillulae do not belong to the hypopharynx as "paraglossae" (Grassi), but that they are real mouth-limbs homologous with the first pair of maxillae in Crustacea and lower Insecta; in 1893 I have (in "Zool. Anzeiger") given the name "maxillulae" to these mouth-limbs in the classes named.

This not very detailed description of the mouth-parts must be sufficient here; the figures will show several smaller features not mentioned. A special comparison of the mouth-parts of the Symphyla with those in Thysanura, Diplopoda, etc., shall be given in a future paper.
V. On the Geographical Distribution.

The enumeration on p. 5 of the countries in which the animals seen by me have been captured is nearly exhaustive as to our present knowledge of the distribution of the order; only the north-easterly part of the United States, North America, Mexico, and India must be added to the list mentioned. But I venture to state that species of this group can be captured in all countries of the world with exception of the arctic and antarctic regions. I have examined twenty-four species, which is six times as many as accepted by the best authorities in the last sixteen years, but I am convinced that nearly one hundred species, and perhaps a considerably higher number, are still undiscovered. The animals are easy to collect, easy and cheap to preserve, the group is of high systematic value, and our knowledge of its species has hitherto been quite rudimentary.

Under such circumstances it is impossible to say much on the geographical distribution, and very few inferences of tolerable certainty can be drawn. I have described twelve species of each of the two old genera; the genus Scutigerella seems to be distributed a little nearer to the arctic and antarctic regions than Scolopendrella. But the species of the last-named genus are generally smaller, and have, therefore, in all probability been more overlooked by most collectors, and judging from this, and from the good result as to new species of the same genus in my own excursions in Calabria, I am inclined to believe that the genus Scolopendrella contains considerably more species in warmer regions than Scutigerella.

Of several species of both genera I have examined specimens from at least two and sometimes from three or more localities rather distant from each other, but the geographical distribution hitherto known of all species, with the exception of Scutigerella immaculata (Newp.), must be regarded as moderately limited. Scolopendrella vul-
garis, n. sp., is free-living in Europe at least from Scilla in Calabria, and probably from Catania (Sicily) to Marburg; in Denmark specimens have been captured in a garden, but not yet in woods. Specimens of Scol. pusilla, n. sp., from Palmi and Marburg have been examined; Scol. notocantha, Gerv., was established on specimens from Paris, and I have seen specimens from Rome and Calabria; Scutigerella nivea, Scop., established on specimens from Bohemia, has been met with in Russian Poland (Latzel), and southwards at least to Palmi in Calabria, and probably to Catania. Scolop. antennata, n. sp., has been found in the southern part of Brazil, in Paraguay, and Argentina; Scutig. angulosa in Uruguay, and thence to southern Patagonia; Scutig. orientalis, n. sp., in Java, Sumatra, and Siam. The distribution of the other species known to me is considerably more restricted, and needs no special mention. Only Scutig. immaculata (Newp.) is an exception, though the statements of earlier authors on its occurrence in Chile and Sumatra are later on proved to be incorrect. The species is distributed from 60° lat. N. in Sweden through Europe to Algeria; specimens from Buenos Ayres could not be separated from European individuals, but the supposition that it has been imported with plants from Europe to that city is far from improbable. It is, in my opinion, more puzzling that a few species captured near Austin, in Texas, could not be separated by me with absolute certainty from the European form, and Packard could not find differences between specimens from Mexico and Kentucky, and has besides found it in Massachusetts. The species seems, therefore, to be distributed from Massachusetts, in the north-easterly part of the United States, to Mexico, but it must be added that a careful examination of good material from some localities in Mexico, Texas, and the northern United States is still necessary before the question can be finally settled.
VI. Description of the Genera and Species.

The group consists of one single family with two genera.\(^1\) In order to facilitate a comparison of the diagnoses of the genera both are placed here.

Gen. 1. Scutigerella, Ryder, 1882.


The posterior margin of thirteen dorsal scuta (all scuta with exception of the last one) is either slightly convex or emarginate, the lobes on each side of the middle of the emargination often broadly rounded, rarely angular, and in this case several times broader than long.

The head is posteriorly at the middle sharply defined from the neck; the two short rods converging to the posterior end of the central rod are at most moderately developed.

The anterior surface of the posterior pair of legs with a considerable or large number of setæ.

The cerci without stripes on the terminal area, and without transverse lines on the most distal part outside that area.

The sense-calicles near the base of the cerci very irregular, the anterior and lateral parts of its wall being vertical and the posterior part very oblique; a large portion of the margin of the

\(^1\) Some zoologist will perhaps soon establish these genera as families, and divide each of them into two or more genera. In our present state of knowledge I disapprove such proceeding. Many authors are, in my opinion, too liable to subdivide into families and genera, with the result that it is often later on, when many new forms have been discovered, found necessary to establish new and often badly defined genera, etc., in order to bring about equivalence; and it is more easy to establish bad genera than to get them cancelled definitely again.
calicles with many short and generally branched setæ (Pl. 1, figs. 1 f—1 k; Pl. 2, fig. 3 g).

The first pair of legs always well developed and more than half as long as the following pair.

The exopods generally well developed and very conspicuous, rarely very short.

Gen. 2. Scolopendrella, Gervais, 1839.

('Comptes-rendus de l'Académie des Sciences,' T. ix, 1839, p. 532.)

The posterior margin of the thirteen dorsal scuta (all with exception of the last one) produced into a pair of triangular plates, of which several are at most somewhat broader than long and all rather large, with exception of the thirteenth pair.

The head is posteriorly at the middle badly defined from the neck; apparently it is defined by the two short rods converging to the posterior end of the central rod, and these rods are strong and very conspicuous.

The anterior surface of the posterior pairs of legs with few setæ.

The cerci either with stripes on the terminal area or—generally—besides with elevated transverse lines on the most distal part outside this area.

The sense-calicles near the base of the cerci regular, with the wall vertical on all sides; the margin of the calicles quite naked (Pl. 5, fig. 4 h).

The first pair of legs rarely more than half as long as the following pair, often rudimentary, consisting of a small knob-shaped joint without claws.

The exopods always short or even rudimentary.

In these diagnoses I have put forward all the characters which could be rather sharply expressed. The species of
Scutigerella are clothed with a larger number of hairs than those of the other genus; furthermore, the setæ on the antennæ are longer, the branched sense-organs on the last antennal joint are much larger, the central rod in the head is anteriorly less developed and often partly inconspicuous, while it is well developed in Scolopendrella, the fine and short hairs on the legs are somewhat longer and more conspicuous than in the last-named genus. The species of Scutigerella generally acquire a more considerable length than those of Scolopendrella. On the geographical distribution of the genera see above on pp. 21, 22.

Gen. 1. Scutigerella, Ryder.

Conspectus of the Species.

It may be practical first to divide the species into three sharply defined groups, and then to give a conspectus of the species of each group.

A. The last dorsal scutum posteriorly with a very deep and rather large median, anteriorly overlapped cavity. The second scutum with the antero-lateral setæ directed essentially backwards and much shorter than the breadth of the proximal antennal joint. Group I.

B. The last dorsal scutum posteriorly cut off without any median cavity, at most with a simple depression. The second scutum with the antero-lateral setæ directed straight outwards or even somewhat forwards, and at least nearly as long as the breadth of the proximal antennal joint.

a. The setæ on the inner side of the proximal antennal joints directed obliquely forwards, and, at most, nearly one half longer than the setæ on the outer side. The exopods of the posterior legs well developed, as long as or longer than the depth of the tarsi. The last scutum slightly depressed posteriorly along the middle. Group II.

b. Some setæ on the proximal antennal joints nearly vertical to the longitudinal axis of the antennæ and besides
very elongate, the longest of them at least two and a half times longer than the setae on the outer side. The exopods of the posterior legs short or very short, considerably or much shorter than the depth of the tarsi. The last scutum deeply depressed posteriorly along the middle. Group III.

Species of Group I.

a. The femur of the first pair of legs without any process.
   1. S. immaculata (Newp.).

b. The femur of the first pair of legs with a conspicuous, oblong, and distally rounded process on the lower side.
   2. S. armata, n. sp.

Species of Group II.

a. The second scutum with the antero-lateral setae much (generally twice) longer than any of the lateral setae, and these are all directed essentially backwards.

a. The setae on the cerci very numerous, all rather short, and the distal ones not half as long as the depth of the cerci.

§. The posterior pairs of legs with the anterior claw, especially its distal slender part, very elongate, while the other claw is of normal length and very slender.

3. S. unguiculata, n. sp.

§§. The posterior pairs of legs with the anterior claw at most of moderate length, while the other is of normal depth.

x. The central whorl on the antennal joints with the setae rather short and those on the lower side considerably shorter than on the upper. The first pair of legs with the posterior claw a little more than half as long as the other.

4. S. caldaria, n. sp.

xx. The central whorl on the antennal joints with the setae rather long and those on the lower side only a little shorter than on the upper. The first pair of legs with the posterior claw not half as long as the other. 5. S. orientalis, n. sp.
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β. The setæ on the cerci moderately numerous or few; the most distal ones at least about two thirds as long as the depth of the cerci.

§. The cerci with moderately numerous setæ and the distal ones somewhat shorter than the depth of the cerci. The metatarsus of the last pair of legs with four setæ in the anterior dorsal row, and these setæ scarcely half as long as the depth of the joint . . 6. S. plebeia, n. sp.

§§. The cerci with few setæ and some of the distal ones longer than the depth of the cerci. The metatarsus of the last pair of legs (at least in small specimens) with two setæ in the anterior dorsal row, and these setæ only a little shorter than the depth of the joint . 7. S. nivea (Scop.).

b. The second scutum with the antero-lateral setæ not longer, often considerably shorter than a lateral pair, which also are directed outwards and generally besides somewhat forwards.

a. The second scutum with the hind margin slightly convex in its middle half, and without vestige of angles.

§. The metatarsus of the last pair of legs with the distal dorsal setæ long, and one of them at least as long as the depth of the joint; the tarsus with some of the dorsal setæ as long as the depth of the tarsus. The cerci at most five times longer than deep . 8. S. chilensis, n. sp.

§§. The metatarsus and tarsus of the last pair of legs with all setæ rather short. The cerci more than five times longer than deep . . . 9. S. capensis, n. sp.

β. The second scutum with the hind margin rather deeply emarginate, and the lobes on each side posteriorly angular.

10. S. angulosa, n. sp.

Species of Group III.

a. The second scutum with the hind margin deeply emarginate and the emargination angular in the median line; its antero-lateral setæ only nearly as long as the breadth of the proximal antennal joints. The last pair of legs with none
of the dorsal setae half as long as the depth of the metatarsus.

11. *S. crassicornis*, n. sp.

b. The second scutum with the hind margin flatly emarginate, the emargination not angular in the median line; its antero-lateral setae very long, much longer than the breadth of the proximal antennal joints. The last pair of legs with a dorsal seta on the metatarsus two thirds as long as the depth of this joint.

12. *S. pauperata*, n. sp.

**GROUP I.**

1. *Scutigerella immaculata* (Newport). Pl. 1, figs. 1a–1v, 2a–2f, 3a–3h.

1845. *Scolopendrella immaculata*, Newport, 'Transact. Linn. Soc. Lond.,' vol. xix, p. 374, pl. xl, figs. 4a, b, c.


(In this list only the more essential descriptions have been included; Latzel gives a complete synonymy until 1882, and since that year the species has been mentioned or shortly described by several authors.)

**Material.**—Many specimens from several countries in Europe and from Algeria. I have examined also specimens from Buenos Ayres and from Austin, Texas, and these will be treated separately under "Variation."

**Head.**—Moderately broad. The lateral margin rounded
or feebly angular behind the mandible. The seta inserted in
front of the posterior end of the mandible is longer than the
breadth of the basal antennal joint. The central rod is
conspicuous in its whole length, with moderately robust
frontal branches, posteriorly connected with a triangular area,
without distinct oblique rods, at the hind margin of the head.

Antennæ.—According to my own experience the joints
vary from nineteen to fifty; Latzel states the variation to be
even from eighteen to fifty-five. The second whorl begins
on the lower side before or at the end of the first third of the
antennæ, and shortly afterwards on the upper side (fig. 1 i);
on the distal half, or at least the distal third of the antennæ
the secondary whorl is complete on the outer side, and at
least one seta of a third whorl is found on the lower side;
the setae in the whorls are rather long. The terminal joint
with a rather long striped organ, one or two small organs of
the same quality, and some shorter fine hairs among the
common setæ.

Scuta.—The second scutum (fig. 1 k) posteriorly rather
deeply emarginate; the bottom of the emargination not
angular but curved, and the broad posterior lobes rounded
without vestige of any angle; an antero-lateral seta can
often be pointed out, but is always much shorter than the
breadth of the proximal antennal joint and directed essen-
tially backwards; the other marginal setæ vary from rather
to very short. The thirteenth scutum is sometimes shaped
nearly as the second, but often (fig. 1 l) it has a more or less
deep incision into each posterior lobe; in this case the shape
of the twelfth and eleventh scuta presents transition forms
between the penultimate scutum and the anterior scuta
shaped as the second one. The last scutum (fig. 1 l) pos-
teriorly with the characteristic median cavity described above
on p. 13.

Legs.—The last pair (fig. 1 m) has the tarsus somewhat
widened, three and a half to four times longer than deep;
the setæ along the dorsal margin of the tibia, metatarsus,
and tarsus are short, five to six in the outer row on the
metatarsus, and six or seven in the same row on the tarsus; the anterior claw (fig. 1 u) a little or somewhat longer than the other, which is more curved and somewhat more slender, and both claws are elongate. The exopod is long, slightly shorter than the depth of the metatarsus. The first pair (fig. 1 o) with the femur simple, without ventral process; the claws (fig. 1 p) are elongate, subsimilar in shape, somewhat curved, rather slender, and the anterior one somewhat longer than the other; the front seta is rather long and robust, regularly setiform. (In a specimen with the twelfth pair [fig. 1 r] of legs a little smaller than the eleventh [fig. 1 t], the pair named has the tarsus three times longer than deep, the dorsal setae longer, three in the anterior row on the metatarsus, and four on the tarsus, the claws [fig. 1 s] shorter, more robust, subsimilar in shape and length, the first pair of legs with the claws [fig. 1 u] considerably thicker and shorter than in full-grown specimens.)

Cerci (fig. 1 q).—They are adorned with a large number of short and moderately thin setæ; the terminal area is unusually short and looks outwards; the apical seta is rather short, at most half as long as the depth of the cerci. In the largest specimen seen the cerci are six times longer than deep, thus very elongate; in a small but completely developed specimen the cerci are four times, and in all other adult specimens between four and six times longer than deep. (In a specimen with the twelfth pair of legs a little smaller than the eleventh the cerci [fig. 1 r] are scarcely three and a half times longer than deep, the number of their setæ is very moderate, and the terminal area looks upwards.)

Length.—Specimens with the last pair of legs well developed that I have seen vary from 3·2 to 7·5 mm. in length; the specimen with the last pair of legs not quite full-grown measures 2·8 mm. According to Latzel the length varies even between 2·5 and 8 mm.

Locality.—In Denmark the species is common in moderately damp places in forests (in old stumps, under moss, etc.); I have also seen specimens from Sweden (collected by
Dr. A. Stuxberg, England (Devonshire, coll. by Mr. R. I. Pocock), Germany (Marburg, coll. by Mr. C. Börner), Austria (Razzes, in Tyrol, coll. by Dr. F. Meinert), France (Meudon and Arques, coll. by Prof. E. L. Bouvier), Italy (Rome, coll. by Dr. F. Silvestri; Scilla, Palmi, and Aspromonte, in Calabria, coll. by myself), Algeria (Bona, coll. by Dr. F. Meinert; Régions des Dayas, coll. by Mr. F. Lesne). Latzel says he has seen specimens from Russia; C. v. Porat (in 'Entom. Tidskr. Stockholm,' 1887, p. 39, and 1889, p. 48) enumerates several localities in the southern part of Norway and Sweden, northwards to Christiania and Upsala, at about 60° lat. N. The species is evidently common from the southern part of Sweden through the whole of Europe to Algeria.

Variation and Probable Geographical Distribution out of Europe.—A large specimen from Denmark measures 5'4 mm. The specimens from Bona are large, and one of them is the largest individual seen by me, but it is only slightly longer than specimens from Rome; the Algerian specimens agree completely with those from Europe. Fifteen specimens captured by Dr. F. Silvestri, and labelled Buenos Ayres, August 7th, 1898, could not be distinguished with certainty from European individuals. The largest South American specimen measures 5'4 mm. in length; its claws on the first and on the last pairs of legs are shown in figs. 2 b and 2 a; the claws of the same pairs, the twelfth leg, and the cercus of the left side of a specimen measuring 3'5 mm. are shown in figs. 2 c—2 f; the differences between these parts and the same of the European specimens shown in figs. 1 m —1 u are probably casual or originating from local variation. Furthermore, I have examined a few specimens captured by Prof. W. M. Wheeler at Austin, Texas; the largest specimen is 5'7 mm., but the others are rather small. The large specimen differs essentially from European forms by the posterior claw (fig. 3 a) on the last pair of legs being more robust than in these, and besides almost longer than the anterior claw, which is shorter and more curved than in Danish specimens; the claws on the first pair of legs differ
also (fig. 3b), and are more similar to those in subadult specimens; the claws in the smaller specimens from Austin are somewhat shorter (figs. 3e and 3g) than those of the large specimen, but otherwise agreeing with them. I cannot discover other differences worth mentioning between European specimens and those from Texas (the cerci of the large and of a small specimen are shown in figs. 3c and 3h), but my material from the last-named locality is very scanty and not very well preserved, so that I cannot decide with certainty if the differences mentioned in the claws of European specimens and of the well-grown specimen from Texas are of any importance. I think it necessary to consider the specimens from Texas as probably belonging to S. immaculata, but this result may perhaps one day turn out to be wrong.

In 1881 A. S. Packard (op. cit.) stated that specimens taken by him at Salem, Massachusetts, and near the Mammoth Cave, Kentucky, differed from specimens from Bohemia only by "rather longer and slenderer antennæ." In 1886 the same author stated ('Amer. Naturalist,' 1886, p. 383) that specimens from Córdova in Mexico differed from individuals from the United States by being larger (5 mm.) and by having some joints more in the antennæ and the cerci "slightly longer," but otherwise agreeing with these. His specimens from Mexico certainly belong to the same species as my specimens from Texas, but whether the animals from these subtropical countries differ from the specimens living in Massachusetts, etc., or such northern American animals from European specimens, a future student must decide.

Dr. F. Silvestri writes ('Zool. Anzeiger,' 1899, p. 370) that he found S. immaculata abundantly in Chile on his voyage from Temuco to Villa Rica, but specimens captured by him at Temuco and S. Vicente and examined by me belong to Scut. chilensis, n. sp.¹ The specimens captured by Prof. Max Weber in Java and Sumatra, and determined by R. I.

¹ One of the specimens belongs to a species unknown to me, but the animal is so badly preserved that I did not venture to describe it.
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Pocock as S. immaculata ('Zool. Ergebn. einer Reise in Niederl. Ost-Indien,' herausgeg. von Max Weber, B. iii, 1894, p. 319), belong all to another species, Scut. orientalis, n. sp. Chile, Java, and Sumatra must therefore be omitted from the countries in which S. immaculata has been captured.

Remarks.—The species is easily distinguished from all following species, with exception of S. armata, by the characters pointed out on p. 25 for Group I, by the shape of the second dorsal scutum, and by the short setae and the short terminal area on the cerci.

2. Scutigerella armata, n. sp. Pl. 2, figs. 1 a—1 f.

Material.—Several species, partly well preserved, from various localities.

Description.—The species is so closely allied to S. immaculata, and similar to small or middle-sized specimens of this form, that a few remarks are sufficient. The head and the antennae present no differences; the highest number of antennal joints observed is thirty-one. The scuta as in the preceding species, but the penultimate scutum has its two posterior lobes equally rounded without incision. The last pair of legs about as in S. immaculata; the claws of large specimens (fig. 1 b) with the distal part of moderate length and slender, the anterior claw rather considerably longer than the other. The first pair of legs (fig. 1 c) have on the lower side of the femur a very conspicuous vertical process, which is from one and a half times to more than three times longer than thick (figs. 1 d and 1 e), subcylindrical, or distally somewhat conical with the apex rounded; the claws of these legs (fig. 1 f) essentially as in smaller specimens of S. immaculata. The cerci also as in that species, in the largest specimen four and a half times longer than deep.

Length.—The largest specimen measures 4·8 mm.

Locality.—Algeria: Bona, five specimens among several of S. immaculata (Dr. F. Meinert); Ravin de la Femme Sauvage, end of December, 1892, one specimen; La Bouzarea,
near Algiers, March 19th, 1893, one specimen; Frais Vallon, December 5th, 1892, one specimen; Gorge de la Chiffa, March 5th, 1893, one specimen. The specimens from the four last-named places are all small; they have been collected by Mr. F. Lesne, and belong to the Museum in Paris.

Remarks.—The existence of the process on the femur seems to be the only really sharp character separating this species from S. immaculata, but this process, not met with in any other species known to me, is, in my opinion, an interesting and good character, and I must consider the form possessing it as a valid species.

GROUP II.

3. Scutigerella unguiculata, n. sp. Pl. 2, figs. 2 a—2 k.

Material.—Nearly fifty specimens from one locality.

Head.—Seen from above very broad, with a sharp lateral angle at the base of the mandible; the longest seta in front of this angle about as long as the breadth of the basal antennal joint. The central rod without visible frontal branches; posteriorly it is scarcely visible, or generally terminating at a rather long distance from the hind margin of the head, and a posterior area and oblique posterior rods are not seen.

Antennæ.—The number of joints is generally from thirty to thirty-four (in one specimen one antenna has twenty-one joints, the other is broken.) The setæ on the inner side of the proximal joints not longer than those on the outer side. The secondary whorl begins on the lower side about on the eighth joint; on more than the distal half of the antenna this whorl is well developed on the ventral half of the joints (fig. 2 a), and besides one seta, sometimes two setæ are found above on the same joints; on one or two joints just behind the terminal one a seta is often found below, behind the secondary
whorl. The setae in the central whorl of nearly all joints are long, slightly shorter below than above. The terminal joint (fig. 2 b) with a large and long-stalked striped organ inserted on a conspicuous protuberance, and besides a small and very short-stalked similar organ.

Scuta.—The second scutum (fig. 2 d) with the posterior margin slightly convex; its antero-lateral setae considerably longer than the breadth of the proximal antennal joints, and directed at least a little forwards; two pairs of lateral setae are longer than the others, but scarcely more than half as long as the antero-lateral setae, and directed essentially backwards. The first, third, fifth, sixth, and eighth scuta, each with the antero-lateral setae and two pairs of lateral setae about of the same length and direction as the corresponding setae on the second scutum; a long and outward-directed pair of antero-lateral setae are wanting in the fourth, seventh, and ninth, and following scuta, while they possess a pair of rather long lateral or postero-lateral setae directed backwards. The penultimate scutum is posteriorly conspicuously emarginate, with broadly rounded lobes (fig. 2 e).

Legs.—The last pair (fig. 2 f) with the tarsus slender, nearly five times longer than deep; the metatarsus with five or six, the tarsus with seven setae in the anterior dorsal row; the setae gradually increase somewhat in length on each of these joints from the base towards the end, and the longest of them, the distal seta on the metatarsus, is about half as long as the depth of the metatarsus; none of the joints with any rather long seta. The anterior claw (fig. 2 g) is very long, originating from the circumstance that its distal more slender part is strongly elongate; it is, besides, moderately curved, while the other claw is considerably curved, very slender, but only three fifths as long as the anterior one; the front seta is rather weak. The exopod is slightly shorter than the depth of the metatarsus. The first pair of legs (fig. 2 h) with the anterior claw elongate, slender, and somewhat curved (fig. 2 i); the other claw is very slender, short, at most scarcely reaching the middle of the long claw, and often
terminating at some distance before this point; the front seta is as long as the short claw, and very robust.

Cerci (fig. 2 k).—In larger specimens from a little more than four and a half to five times longer than deep. They are clothed with a large number of stiff, rather short setae, nearly equal in length at the end and before the middle, and none of them half as long as the depth of the cerci. The terminal area looks upwards, and generally a little outwards; it is a little longer than the setae. The apical seta is strong, as long as or somewhat longer than the depth of the cerci.

Length.—3 to 3.6 mm.

Locality.—La Moka, in Venezuela, August 1st, 1891 (F. Meinert).

Remarks.—This species is distinguished from all other forms by the very elongate anterior claw on the posterior pairs of legs. Other useful features have been pointed out in the analytical key.

4. Scutigerella caldaria, n. sp. Pl. 2, figs. 3 a—3 g.

Material.—Many specimens from hothouses. Some South American specimens probably belonging to this species are dealt with in the “Appendix” to the description.

Head.—Seen from above it is proportionately a little narrower, and its lateral angles a little less pronounced than in S. unguiculata; the longest lateral seta is considerably shorter than the breadth of the proximal antennal joints. The central rod without visible frontal branches or posterior rods as in S. unguiculata.

Antennæ.—The number varies generally from twenty-three to twenty-eight. The setæ on the inner side of the proximal whorls not longer than those on the outer side. The secondary whorl begins on the lower side on the seventh or eighth joint, but already at the middle of the antennæ it is completely developed above and on the outer side. On the same distal half at least one seta, often two setæ, are found on the lower side, behind the second whorl (fig. 3 a), and the most distal joints have even four setae behind each other on
the lower margin. The setae in all whorls at least somewhat shorter than in S. unguiculata, and especially the setae on the lower half of the joints considerably shorter than in that species. The terminal joint with one large and long-stalked striped organ on a rather low protuberance, and besides a small and very short-stalked similar organ.

Scuta (fig. 3 b).—As to shape and arrangement and number of setae they do not differ perceptibly from those in S. unguiculata, but the antero-lateral setae are slightly shorter.

Legs.—The last pair (fig. 3 c) is more slender than in S. unguiculata, and the tarsus is five times longer than deep. The metatarsus with five or six, the tarsus with seven spines in the outer dorsal row; the setae increase gradually a little in length from the base to the end of each joint, but the longest setae are decidedly shorter than half the depth of the metatarsus; the dorsal setae on the tibia are short. The anterior claw (fig. 3 d) curved as in S. unguiculata, but less slender and considerably shorter than in that species; the posterior claw is of moderate depth, rather curved, and two thirds as long as the other; the front seta rather short. The exopod long, a little shorter than the depth of the metatarsus. The first pair of legs with the anterior claw (fig. 3 e) elongate, moderately slender, and a little curved; the other is moderately slender, and a little more than half as long as the anterior one. The front seta is shorter than the short claw and moderately robust; not very conspicuous.

Cerci (fig. 3 f).—Nearly as in S. unguiculata both as to shape and clothing, only a little shorter and thicker, being slightly more than four times longer than deep, and the clothing of rather short setae a little more dense. The terminal area looks upwards.

Length.—2·8 to 4 mm.

Locality.—In the tan-bark in hothouses in the royal garden, "Rosenborg Have," Copenhagen, I discovered this species many years ago, and have found it again every time I visited the place. I have also found it in similar bark in a very warm hothouse in the Botanical Garden in Copenhagen.
Furthermore, I have examined four specimens captured in hothouses of the Museum in Paris.

Remarks.—This species is closely allied to *S. unguiculata*, but differs by the claws on the posterior legs, the posterior claw on the first pair of legs, besides by more numerous and shorter setae on the distal half of the antennae, etc.

Appendix.—From three localities in the southern half of South America I have seen four specimens which probably belong to this species. Three of these specimens have acquired the full number of legs, and measure from 2·6 to 3·2 mm.; only one of their antennae has been completely preserved, and it contains nineteen joints. They agree essentially with *S. caldaria*, and the differences observed are small. The setae on the antennal joints are a little longer than in *S. caldaria*, but as to the other features mentioned above quite similar; the last pair of legs with the tarsus a little less slender, four and a half to four times longer than deep, with seven or six dorsal setae in the anterior row, its anterior claw slightly shorter than in the form from the hothouses. I am inclined to consider these South American specimens as belonging to the original form, from which the specimens in the European hothouses have descended; but my American material is scanty, only moderately preserved, and the specimens perhaps not quite full-grown, wherfore I do not venture to decide the question with absolute certainty. The American specimens have been collected by Dr. Silvestri in the following localities:—Guayaquil in Ecuador; Cuyabá, in the province Matto Grosso, Southern Brazil; and Paraguari in Paraguay.

5. *Scutigerella orientalis*, n. sp. Pl. 2, figs. 4 a—4 g; Pl. 3, figs. 1 a—1 f.

Material.—Many specimens from several localities.

Head.—Seen from above (fig. 1 a) it is very broad, with a well-developed lateral angle; the longest seta in front of
this angle is slightly longer than the other setae, and considerably or much shorter than the breadth of the proximal antennal joints. The central rod is scarcely visible in more than half of the normal length, without frontal branches, and terminating behind rather far from the posterior margin, without visible oblique posterior rods or posterior area.

Antennæ.—The number of joints varies essentially, according to the length of the specimens, from twenty-two to forty-one. The setæ on the inner side of the proximal joints are as long as or slightly longer than those on the exterior side (fig. 1 b). The second whorl begins below near the end of the basal third of the antennæ; a little more distant from the base it has a seta on the upper side, but the whorl is only completely developed on the outer side in the most distal joints in large specimens. About the middle of the antennæ (fig. 1 c) a third whorl begins on the lower side, but it contains only one seta, and towards the end of the antennæ two or three setæ. The setæ in the central whorl are long on the upper and only a little or scarcely shorter on the lower side. The terminal joint has a large, long-stalked, striped organ on a conspicuous protuberance, two small, very short-stalked striped organs, besides a subglobular organ without stalk and stripes and some styliform, small sensory setæ.

Scuta.—The second scutum (fig. 1 d) has its posterior margin straight or slightly convex in the middle half; its antero-lateral setæ are directed somewhat forwards, long, somewhat longer than or nearly twice as long as the breadth of the basal antennal joints; of its lateral setæ two pairs are longer than the other, and the postero-lateral pair, being the longest, is only half as long as the antero-lateral pair, and directed essentially backwards. The first, third, fifth, sixth, and eighth scuta each with an antero-lateral seta about as long as that on the second scutum (in one specimen these setæ on the sixth and eighth scuta were considerably shorter than the anterior ones), and one pair or two pairs of lateral setæ developed as on the second scutum; the fourth,
seventh, and ninth to thirteenth scuta without any long and protruding antero-lateral seta, but with one pair or two pairs of lateral setae as long as those on the second scutum and directed essentially backwards. The penultimate scutum posteriorly a little emarginate (fig. 1 e).

Legs.—The last pair (figs. 4 a and 4 e) with the tarsus four and a half to five times longer than deep; the metatarsus with five to six, the tarsus with seven to eight setae in the anterior dorsal row; these setae and the distal dorsal setae on the tibia differ but little in length, and the longest one of them is not half as long, generally only one third as long, as the depth of the metatarsus. The anterior claw (figs. 4 b and 4 f) of moderate length, or even rather short, rather robust; the posterior claw is somewhat more slender, considerably more curved, and somewhat or considerably shorter than the other; the front seta is moderately long and robust. The exopod is of moderate length, about two thirds as long as the depth of the metatarsus. The first pair of legs (fig. 4 c) with the anterior claw (figs. 4 d and 4 g) rather long and feebly curved; the other is small, at most scarcely half as long as the anterior one, and often considerably shorter; the front seta almost claw-like, exceedingly thick, and as long as or a little longer than the short claw.

Cerci (fig. 1 f).—From slightly more than four times (in small specimens) to nearly five times longer than deep, set with a large number of rather short setae; the distal setae are slightly or scarcely longer than those at the middle, none of them half as long as the depth of the cerci, and often slightly more than one third of this dimension. The terminal area looks upwards and a little outwards, and is longer than the lateral setae. The apical seta is as long as or somewhat longer than the depth of the cerci.

Length.—Specimens with the full number of legs vary from 2.3 to 5 mm.

Locality.—Sumatra and Java, where it has been captured by Prof. Max Weber in various localities: Singkarah and Mount Singalang (both in Sumatra), and Tjibodas
(Java). (R. I. Pocock has determined these specimens as *S. immaculata*, and published the result and the localities in the paper mentioned above on p. 33.) Furthermore, the species has been captured on the island of Koh Chang (Gulf of Siam) by Dr. Th. Mortensen; under stones, January 7th, 12th, 15th, 1900; under plants on stones, January 6th, 1900; under an old stem of a tree, March 14th, 1900; in the wood at the river Klong Salskpet, March 15th, 1900,—in all thirty-nine specimens. Finally, five specimens from Bangkok in the Brit. Mus. were collected by Capt. S. S. Flower.

**Remarks.**—This species is rather closely allied to *S. caldaria*, but differs by several small characters; the setae on the distal half of the antennae are less numerous, but especially those in the central whorl are a good deal longer, the penultimate scutum less emarginate, the claws on the posterior legs a little shorter and more robust, the first pair of legs with the posterior claw shorter, and the front seta considerably more robust.

6. *Scutigerella plebeia*, n. sp. Pl. 3, figs. 2 a—2 d.

**Material.**—One badly-preserved specimen with some appendages, and many setae broken off.

**Head.**—Moderately broad with a conspicuous lateral angle; the longest seta in front of the angle seems to be lost,—if not, it is only half as long as the breadth of the proximal antennal joints. The central rod without visible frontal branches, and terminating behind in a very faint triangular area, which touches the posterior margin of the head.

**Antennae.**—The major part of both antennae is lost; of the one thirteen, of the other eleven joints have been preserved. These joints are simple, and their setae in the central whorls are rather short. The secondary whorl begins below on the ninth joint.

**Scuta.**—The second scutum with the posterior margin slightly convex near the middle; the antero-lateral setae
have been broken off, but their insertions are very distinct. In the first scutum one of these projecting setæ has been preserved; it is somewhat longer than the breadth of the proximal antennal joints, and the corresponding setæ on the second scutum were certainly at least as long. Most of the other marginal setæ on the second scutum are also wanting, but judging from their small areas of insertion none of them were more than moderately developed. On the third, fifth, sixth, and eighth scuta the large insertions of the antero-lateral setæ are plainly seen; in the other scuta they are wanting, as in S. orientalis, etc. The penultimate scutum is posteriorly somewhat emarginate, nearly angularly concave in the median line.

Legs.—The last pair and the left leg of the eleventh pair are wanting; the right leg of the eleventh pair differs scarcely from the tenth pair, of which the left leg has been drawn (fig. 2 a), and is described here. The tarsus is four and a half times longer than deep. The metatarsus with four, the tarsus with five setæ in the anterior dorsal row; these setæ differ but little in length from each other, and none of them are quite half as long as the breadth of the metatarsus; the most distal dorsal seta on the tibia is slightly longer than those on the metatarsus. The anterior claw (fig. 2 b) is medium sized, rather curved, and distally somewhat elongate; the posterior claw is slender, considerably curved, and only three fifths as long as the other; a front seta is not conspicuous. The exopod is scarcely two thirds as long as the depth of the metatarsus. The first pair of legs with the anterior claw (fig. 2 c) very long and somewhat curved; the posterior claw is short, not reaching the middle of the other; the seta not longer than the short claw, and moderately slender.

Cerci (fig. 2 d).—A little more than four times longer than deep, set with a rather good number of stiff setæ, gradually increasing considerably in length from the base outwards, and the most distal ones are about two thirds as long as the depth of the cerci. The terminal area about as
long as the distal setae, and looks upwards; the apical seta is wanting in my specimen.

Length.—The specimen measures 3.6 mm.

Locality.—Island Mauritius, "Curepipe." The specimen has been captured by Mr. Chr. Alluaud, and belongs to the Museum in Paris.

Remarks.—The species is allied to *S. orientalis*, but is easily distinguished from this and other species described above by the cerci, the setae of which are less numerous, but the distal ones of them conspicuously longer and stronger than in those species.

7. *Scutigerella nivea* (Scopoli). Pl. 3, figs. 3a—3h.


(In this list papers by Karlinski and Tömösváry have been omitted as unknown to me, and certainly unimportant; they have been mentioned by Latzel, op. cit., pp. 14 and 15. *Scolopendrella gratiae*, Ryder, is uncertain, and has therefore not been included in the list.)

Material.—Five specimens, all small and shrivelled or incomplete. The following description is therefore rather defective.

Head.—Moderately broad, with the lateral margin angular. The longest seta in front of the angle is considerably shorter than the breadth of the basal antennal joint. The central rod is conspicuous in its whole length; at the front end of the basal third it seems to be divided by a transverse suture; the posterior part widens somewhat near the hind margin of
the head, and from its anterior angles just behind the suture a thin branch proceeds obliquely forwards and outwards; the frontal branches of the central rod are faint.

Antennæ.—The highest number of joints observed by me is twenty-one; Latzel states that it varies from twenty to thirty. The proximal joints are scarcely thickened, but the setæ on their inner surface seem to be somewhat longer than the others, which are rather short. A special description cannot be attempted, as the preservation is too bad. The terminal joint has a rather small striped organ with short stalk, and at least one still smaller organ of the same kind besides.

Scuta.—The second scutum (fig. 3 a) with the posterior margin straight or very slightly emarginate in the middle portion; the antero-lateral setæ are directed somewhat forwards, very long, much longer than the breadth of the proximal antennal joints; a lateral seta is slightly more than half as long as the antero-lateral one, and directed essentially backwards; a postero-lateral seta and some of the posterior setæ are of moderate length. The first, third, fifth, sixth, eighth, ninth, eleventh, and twelfth scuta each with a pair of setæ directed essentially outwards, and about as long as the antero-lateral setæ on the second scutum; on the anterior ones of these scuta these setæ are antero-lateral, on the posterior scuta they are inserted more backwards, but always on the most lateral point of the scuta; besides, a lateral seta of moderate length is found on several of the scuta. The thirteenth scutum (fig. 3 b) is posteriorly slightly emarginate, and a long seta directed more or less backwards is inserted at the posterior end of the lateral margin.

Legs.—The last pair of my small specimens have the tarsus four times longer than deep (fig. 3 c), and not widened towards the base; the tibia has two dorsal setæ, one of which is very long, the metatarsus with two similar setæ in the anterior dorsal row, and these setæ are only a little shorter than the depth of the metatarsus; the tarsus in the anterior dorsal row with three setæ, which are a little shorter and
thinner than those on the metatarsus. The claws (in my small specimens) are rather short, and not very different in length (figs. 3d and 3e); the front seta is moderately developed. The exopod is somewhat shorter than the depth of the metatarsus. The first pair of legs with the claws moderately developed in all respects (figs. 3f and 3g), the anterior one much—but not twice—longer than the other; the front seta is long and slender.

Cerci (fig. 3h).—They are proportionately small, and from scarcely four to four and a half times longer than deep, with the distal part produced and curved upwards; they are set with comparatively very few setæ, which increase very much in length from the base of the cerci outwards, and the most distal setæ are from a little to considerably longer than the depth of the cerci; a proportionately long distal portion of the cerci without any setæ. The terminal area is rather long and looks outwards, sometimes somewhat upwards as well. The apical seta is exceedingly long, much longer than the depth of the cerci.

Length.—The adult specimens seen by me measure 1.7 to 2 mm.; according to Latzel the length varies from 2 to 5 mm.

Locality.—Palmi in Calabria, one specimen (the author); four specimens have been captured by Mr. C. Börner either near Palmi or at Catania (Sicily).

Distribution.—Latzel has examined specimens from various parts of Austria-Hungary and from Russian Poland; Muhr records the species from Bohemia. As mentioned above on p. 43, it remains doubtful whether S. gratiae, Ryder, captured at Philadelphia, near Washington, D.C., and in two other localities in the United States, is synonymous with S. nivea, Scop., or belongs to a closely allied species.

Remarks.—This species is easily distinguished from all forms described above by having outstanding long setæ on the ninth, eleventh, and twelfth scuta, and by having comparatively very few setæ but some of them very long on the short cerci. From the two following species it is sharply
distinguished by having only one pair of very long and somewhat forwardly-directed setae on the second scutum.

8. Scutigerella chilensis, n. sp. Pl. 3, figs. 4 a—4 g.

Material.—Several specimens from two localities, but all with at least many of the long setae broken off.

Head.—It is short and very broad, with a very pronounced lateral angle; the longest lateral seta, situated somewhat in front of the angle, is very long, much longer than the breadth of the basal antennal joint. The visible part of the central rod is rather long, and somewhat before the hind margin of the head is connected with the vertex of a large triangle, the sides of which are rather feebly developed oblique rods; the frontal branches could not be observed.

Antennæ.—The number of joints varies from thirty to forty. A rather small number of proximal joints with one or two setæ on the inner side directed much forward and somewhat longer than those on the outer side. The secondary whorl begins below on about the tenth joint, on the upper side on the fifteenth joint, and from this joint begins besides a third whorl on the lower side. The setæ in the central whorl are rather long on the upper and a little shorter on the lower side. The terminal joint is elongate, with a rather large, long-stalked, striped organ placed on a broad protuberance, besides which there are two small organs of the same kind, and some styliform, somewhat sinuate sensory setæ.

Scuta.—The second scutum (fig. 4 a) with the posterior margin flatly convex; the antero-lateral setæ are exceedingly long, more than twice as long as the proximal antennal joints; another seta inserted a little more behind is as long as or even a little longer than the antero-lateral one, and directed outwards and forwards; a pair of setæ on the hind margin is two thirds as long as the lateral pair mentioned, and some other setæ are moderately long. The first scutum is adorned with two pairs of setæ nearly as long as the second one; the third scutum only with one pair of long
setae, but they are even longer than the antero-lateral setae on the second scutum; on the following scuta most of the characteristic setae have been lost, so that it is impossible to produce a description. The penultimate scutum (fig. 4 b) has the posterior margin very slightly convex to very slightly emarginate at the middle; the figure shows that it is adorned with some pairs of longish or long setae, but the posterior lateral pair, which probably are the longest of them all, have been broken off, and are therefore indicated in the figure with dotted lines.

Legs.—The last pair (fig. 4 c) with the tarsus almost four times longer than deep, and scarcely widened towards the base. The tibia with a distal dorsal seta, which is very strong, and nearly as long as the depth of the joint; the metatarsus with four setae in the anterior dorsal row, of which the distal ones are two thirds as long as the depth of the joint; furthermore, behind the distal dorsal seta there is another seta as long as or longer than the depth of the metatarsus; the tarsus with five setae in the anterior dorsal row, partly as long as or a little longer than the depth of the joint. The anterior claw (fig. 4 d) is moderately long, rather robust, and somewhat curved; the posterior claw is somewhat shorter than the other, less robust, and much more curved; the front seta is long and slender. The exopod two thirds as long as the depth of the metatarsus. The first pair of legs (fig. 4 e) with the anterior claw (fig. 4 f) long, slender, and somewhat curved; the posterior claw nearly two thirds as long as, but somewhat more slender and a little more curved than the other; the front seta moderately long and moderately robust.

Cerci (fig. 4 g).—They are from a little more than four and a half to five times longer than deep, set with a moderate number of strong setae, which increase gradually but considerably in length from the base outwards, and the distal ones are a little longer than the depth of the cerci; the distal part of the cerci is more or less produced and without setae. The terminal area looks upwards, and is of medium length or rather long. The apical seta has been lost in my specimens.
Length.—4 to 5 mm.

Locality.—Chile: S. Vicente, April 9th, 1899, nine specimens; Temuco, April 4th, 1899, five specimens (F. Silvestri, coll.).

Remarks.—This species is sharply distinguished from all other forms, with exception of S. capensis, by its second scutum, which has two pairs of very long setæ directed outwards and forwards, and the posterior angles flatly rounded and not produced; from S. capensis it is easily separated by the long setæ on the metatarsus and tarsus of the posterior legs, by the shape of the claws, by its cerci being comparatively thicker, etc.

9. Scutigerella capensis, n. sp. Pl. 3, figs. 5a—5f; Pl. 4, figs. 1a—1e.

Material.—Three specimens, not very well preserved. One specimen is large and adult, another is somewhat smaller, with only eleven pairs of legs, and both have been taken in the same locality. The third specimen, captured in another place, has the full number of legs, but is nevertheless much smaller than the specimen with eleven pairs of legs; it presents besides several minor differences from the two large specimens. I have therefore found it practical to base the following description of this species on the two large specimens, especially on the adult one, and to deal with the third specimen under "variation."

Head.—It is short and very broad, with well-developed lateral angle, and the longest seta in front of this angle is a little longer than the breadth of the proximal antennal joints. The state of preservation did not allow a study of the central rod.

Antennæ.—They are incomplete, but in the adult specimen thirty-seven joints have been preserved in one of them. The whorls (fig. 1a) agree much with those in S. chilensis, with the exceptions that the secondary whorl does not begin on the upper side before about the twentieth joint, that the
setae in the central whorl are a little shorter, and that even some setae belonging to a fourth whorl are present on the lower side of a comparatively long distal part of the antennæ.

Scuta.—The second scutum (fig. 1 b) with the posterior margin very flatly convex; the antero-lateral setæ are turned much forward and somewhat longer than the breadth of the proximal antennal joints. A little more posteriorly a lateral seta is inserted, which is considerably longer than the antero-lateral one, and directed outwards and somewhat forwards. Most of the setæ along the posterior margin are proportionately rather long, and one pair, which are inserted a little farther from the margin, are conspicuously longer than the antero-lateral pair. On the first scutum the antero-lateral pair are not half as long as the lateral pair, which are very long, and a pair inserted at some distance from the posterior margin are only a little shorter than the lateral pair. All following scuta, from the third to the thirteenth, each with at least one pair of lateral long setæ; on the third, fifth, eighth, and eleventh scuta a pair of antero-lateral setæ could be observed, but all incomplete or broken off. The penultimate scutum (fig. 1 c) a little emarginate in the middle of the hind margin, with two pairs of setæ slightly shorter than the long lateral pair.

Legs.—In the adult specimen the last pair of legs (fig. 5 a) are rather long; the tibia on the dorsal side, with some short setæ and a distal, very thick seta, which is two thirds as long as the depth of the joint; the metatarsus nearly twice as long as deep, with six short setæ in the anterior dorsal row; the tarsus is strongly widened towards the base, three times longer than deep, with eight rather short setæ in the anterior dorsal row; the anterior claw (fig. 5 b) is short, with the basal part deep; the posterior claw is proportionately slender, much curved, and more than two thirds as long as the other; the front seta is very long and robust. The tenth pair (fig. 5 c) somewhat shorter, and especially with the two distal joints much more slender than in the twelfth pair, the metatarsus being two and a half times, the tarsus more than four
and a half times longer than deep; the distal dorsal seta on the tibia is moderately short; the posterior claw (fig. 5d) very slender, and considerably shorter than the thick anterior claw, the front seta longer than the anterior claw, and proximally exceedingly robust. (The penultimate pair show a transition stage between the two pairs described.) The first pair of legs (fig. 5e) with a few long or very long setae on the lower side of the femur; the tarsus with the distal setae unusually long, the anterior claw (fig. 5f) proportionately not slender and feebly curved, the posterior claw scarcely half as long as the other, slender and moderately curved, the front seta long and very robust. (In the specimen with eleven pairs of legs the last pair resembles the tenth one in the adult described.)

Cerci (fig. 1d).—Of moderate length, but unusually slender, nearly six times longer than deep. They are set with a moderate number of setae, which increase somewhat in length from the base outwards, and the most distal setae are a little shorter or a little longer than the depth of the cerci. The terminal area looks upwards, and more or less outwards as well; it is rather short. The apical seta is wanting in my specimens.

Length.—The adult and rather contracted specimen is 4.7 mm.

Variation.—A specimen which measures scarcely 3 mm. in length, but possesses the full number of legs, presents some differences from the form just described. On the two anterior scuta the antero-lateral setae are a good deal shorter, but the long lateral pair are somewhat longer than in the specimen figured. The last pair of legs with the distal dorsal spine on the tibia about as long as the depth of the joint; the tarsus is slender, nearly five times longer than deep, with seven dorsal setae, the anterior somewhat longer and conspicuously less robust than in the main form; the cerci (fig. 1e) are a little more than five times longer than deep, with the setae less numerous and conspicuously longer in proportion to the cerci; the terminal area is proportionately longer.
and looks upwards, the apical seta as long as the longest lateral one. In my opinion this small specimen belongs, nevertheless, to the same species as the large form described above; but, my material being too scanty for a really complete characterisation of the species, I have preferred to mention the small specimen separately instead of admitting its features in the description itself.

Locality.—All three specimens have been captured in August, 1894, by Prof. Max Weber in the Cape Colony, the two large specimens at Table Bay and the small one at Constantie, near Cape Town.

Remarks.—This species is rather allied to S. chilensis; the reader is referred to the “Remarks” on that species.

10. Scutigerella angulosa, n. sp. Pl. 4, figs. 2a—2h (and var. figs. 3a—3h).

Material.—Nine specimens from four localities rather distant from each other, and five of them with the full number of legs. Two other specimens from a fifth locality differ in several features, and they have therefore not been taken into consideration in the description of the species, but are dealt with under “Variation.”

Head.—Seen from above it is moderately narrow in proportion to the length; the lateral margin is a little angular or rather flatly rounded; the long seta is inserted somewhat in front of the posterior end of the mandible, and is at least as long as the breadth of the basal antennal joint. The central rod is rather long, without visible frontal branches; posteriorly it is connected with the vertex of a rather large triangle at the hind margin, and the sides of this triangle are oblique rods, which are moderately developed in nearly their whole length.

Antennæ.—In the adults the number of joints varies from twenty-four to twenty-seven. Some few proximal joints (fig. 2a) on the inner side with one or two thin setæ directed much forward and somewhat longer than those on
the outer side. The second whorl begins below on the fifth to seventh joints, and above on the seventh or eighth; at the middle of the antennae not only is this whorl complete, but a seta is inserted below between the two whorls, and on the distal joints three setae are well developed behind each other on the lower margin. The setae in the central whorls are scarcely of medium length, slightly longer above than below. The oblong terminal joint has (fig. 2 b) a moderately large or large and long-stalked striped organ inserted on a protuberance, a rather small and short-stalked organ with feebly developed stripes, and some styliform, slightly curved sensory setae.

Scuta.—The second scutum (fig. 2 c) with the posterior margin rather deeply emarginate; the lobes on each side of this emargination are posteriorly angular, thus forming a kind of triangular plate which is several times broader than long; the antero-lateral setae are directed somewhat forwards and considerably longer than the breadth of the basal antennal joint; a lateral pair of setae are directed essentially outwards, and are as long as or longer than the antero-lateral pair; at each posterior angle a rather long seta is inserted. The scuta, the last one excepted, posteriorly emarginate, and with two angles essentially as in the second scutum; the first, fifth, eighth, eleventh, and thirteenth scuta each with an antero-lateral and a lateral pair of setae (on the thirteenth scutum [fig. 2 d] these are lateral and postero-lateral) partly somewhat longer and partly somewhat shorter than the corresponding two long pairs on the second scutum, and all directed at least much outwards (with exception of the posterior pair on the penultimate scutum); the third, fourth, sixth, seventh, ninth, tenth, and twelfth scuta each with one pair of long or very long protruding setae; all scuta with a pair of rather long or long setae inserted at the posterior angles and directed upwards, and these last setae are present even on the last scutum on each side of a median shallow depression.

Legs.—The posterior pairs present considerable variation
in various respects. In the largest specimen the last pair (fig. 2 e) is exceedingly thick, the metatarsus being only one half longer than deep, and the tarsus, which is strongly widened towards the base, slightly more than three times longer than deep; the tibia has on the upper side some short setæ, and a distal, very thick seta which is slightly shorter than the depth of the metatarsus; the metatarsus with four dorsal setæ, the second of which is rather long, longer than the first and the third, while the fourth is only a little shorter than the long seta on the tibia; the tarsus with five dorsal setæ, the first and the fifth short, the three others rather long. In another adult specimen the twelfth pair (fig. 2 g) is considerably more slender, the metatarsus being twice as long as deep, and the tarsus almost four times longer than deep; the distal seta on the tibia is somewhat shorter, the metatarsus with four dorsal setæ, and three of these as in the large specimen, while the fourth is even somewhat longer than the depth of the joint; the tarsus with four setæ, the second and third rather long. In the large specimen the ninth pair of legs are about as robust as the twelfth pair of the other specimen, and the tenth and eleventh pairs form transition stages to the thick twelfth pair described above. (In a small and immature specimen with eleven pairs of legs the eleventh pair [fig. 2 h] are rather aberrant, the metatarsus being only one third longer than deep, and the tarsus, which is slender at the end, is proximally very broad, and so deep that it is not three times longer than deep; the setæ can be seen on the figure. The posterior pairs of legs decrease gradually in thickness from behind forward, so that the eighth pair are slender. It can be asserted that the specimen does not present any other difference from the typical form.) The anterior claw (fig. 2 f) of the last pair of legs always of medium length, moderately robust and somewhat curved; the posterior claw is a little more slender, and about two thirds as long as the other; the front seta is rather long, but proportionately slender. The exopods are rather long. The first pair of
legs with the anterior claw (fig. 2 h) moderately long and rather curved; the posterior claw is between half and two thirds as long as the other; the front seta as in the last pair of legs.

Cerci (fig. 2 i).—From a little more than four to five times longer than deep, with the distal part somewhat elongate. They are set with a very moderate number of stiff setæ, which increase gradually but considerably in length outwards, and the distal ones are about as long as the depth of the cerci; a moderately long distal part is without setæ. The terminal area looks upwards or a little outwards as well, and is moderately long. The apical seta as long as one of the distal lateral setæ.

Length.—2·4 to 4·5 mm.

Variation.—A very considerable variation in the shape and adornment of the posterior pairs of legs has been described above. But two specimens which I, after some hesitation, have referred to this species have not been taken into account in the description above; I have preferred to mention them separately here as Scut. angulosa, var. brevicornis, var. nova. Both specimens have been captured in one locality, and they are very similar to each other in all respects. They possess the full number of legs, and one of them measures 3·2 mm. in length, while the other is a little shorter. I will only describe the differences between this variety and the specimens taken as typical. The antennæ contain fifteen and sixteen joints; the secondary whorl (fig. 3 a) begins both below and above on the fifth joint; the terminal joint differs as to the sense-organs; on the part visible from the exterior side (fig. 3 b) it has a pair of styliform setæ, a rather large subglobular organ without stripes, and three striped organs, the largest of which is rather small with a moderately long stalk, while the others are short-stalked. The long setæ on the scuta (figs. 3 c and 3 d) a little shorter than in the typical specimens. The last pair of legs (fig. 3 e) shaped about as in smaller specimens of the typical form, but presenting some differences in the setæ.
and claws; the distal seta on the tibia as long as the depth of the metatarsus; this last joint with three dorsal setae, and the distal one of these somewhat longer than the others, but only a little more than half as long as the depth of the joint; the tarsus with four dorsal setae in the anterior row; the anterior claw (fig. 3f) is rather short and robust, rather curved, and only a little longer than the posterior claw, which is somewhat more slender but scarcely more curved than the other. The first pair of legs with the anterior claw (fig. 3g) rather short and robust, the posterior claw much more slender and nearly two thirds as long as the other, and both claws are moderately curved. The cerci (fig. 3h) slightly more than three and a half times longer than deep, and the setae somewhat more numerous than in the typical form. The experience as to the degree and quality of the variation of Scut. immaculata (Newp.) in Europe has taught me that the animals described here must be considered as a variety of Scut. angulosa, the most essential differences between the typical form and the variety being the claws on the posterior legs and the sense-organs on the terminal joint of the antennae.

Locality.—The southern third of South America, in various localities: Monte Buenos Aires, in Gobern, S. Cruz, southern Patagonia, five specimens, among which are the largest specimens examined; Porto Piramides, Chubut, Patagonia, the two specimens described as the variety brevicornis; S. Pedro, Misiones, Argentina, a typical specimen with the full number of legs, but measuring only 2·4 mm. in length; Posadas, Misiones, Argentina, the immature specimen of which the posterior pair of legs have been mentioned above and shown in fig. 2k; Salto, in Uruguay, two small, immature specimens. All specimens have been captured by Dr. F. Silvestri.

Remarks.—The species is easily recognised from all other forms of the genus by the shape of the second scutum, together with the number and length of its outwards-directed setae and the well-developed exopods at the posterior legs.
11. Scutigerella crassicornis, n. sp. Pl. 4, figs. 4 a—4 c; Pl. 5, figs. 1 a—1 g.

Material.—Eight well-preserved specimens, five of which are adult.

Head.—Seen from above (fig. 1 a) it is moderately narrow, scarcely angular on the sides, and the usual lateral seta is as long as the basal antennal joint. The central rod is not visible anteriorly, terminating apparently in front of the middle in rudiments of two branches; posteriorly it is connected with the vertex of a triangle situated at the hind margin of the head; the sides of this triangle are concave, consisting of rather feeble oblique rods.

Antennæ.—The number of joints varies from twenty-seven to thirty-one. In one case twenty-one joints have been observed in an animal with twelve pairs of legs. The joints from the second to the ninth or tenth (fig. 4 a), and especially the fifth to the eighth, are considerably thickened in the adults—to a less degree in immature specimens,—and on the inner side (fig. 4 b) two or three of the setæ in the central whorl are strongly elongate, the longest three to four times longer than the outer setæ, and nearly vertical on the longitudinal axis of the antennæ. The second whorl begins below on the eighth to the tenth joint, but is quite absent on the upper side of all joints (fig. 1 b). The joints, with exception of seven or eight proximal ones, have a small, conical, robust rod on the upper side in front of the central whorl. The terminal joint with a rather large and long-stalked striped organ inserted on a lower protuberance, one or two small and short-stalked striped organs, and finally a large wart-like protuberance, on which I have never found any organ.

Scuta.—The second scutum (fig. 1 c) with the posterior
margin deeply emarginate, the emargination angular in the middle and limited by lobes, which are broadly rounded or a little angular at the hindmost point. The antero-lateral setae are directed outwards, and nearly as long as the breadth of the first antennal joint. A lateral seta inserted considerably more behind is a good deal shorter, though very conspicuous. All the other marginal setae are short. The first, third, fifth, sixth, eighth, and ninth scuta each with an antero-lateral seta from slightly longer to somewhat shorter than those on the second scutum, but the seta is often directed considerably backwards on the more posterior of these segments. The penultimate scutum posteriorly deeply emarginate, with the lobes somewhat angular behind. The last scutum posteriorly with a moderately large, median, deep depression, which is a little longer than broad; no overlapped cavity has been developed.

Legs.—The last pair (fig. 1d) with the tarsus four times longer than deep. The metatarsus with five and the tarsus with seven setae in the anterior dorsal row; on each joint these setae increase gradually somewhat in length towards the end, but the longest setae on both joints are not half as long as the depth of the metatarsus; a seta of similar length is found near the end of the upper side of the tibia. The anterior claw (fig. 1e) is moderately long, proximally rather robust; the posterior claw is rather slender, strongly curved, and a little to somewhat shorter than the other; the front seta scarcely of middle length and not robust. The exopod is short, considerably shorter than the depth of the tarsus. The first pair of legs (fig. 1f) with the claws (fig. 1g) sub-equal in shape, the posterior one slightly shorter than the other, the front seta short and thin.

Cerci (fig. 4c).—Not quite four times longer than deep, with the distal part somewhat elongate. They are clothed with many setae, which increase somewhat in length from the base outwards, and the distal ones are slightly more than half as long as the depth of the cerci. The terminal area looks outwards and somewhat upwards; it is a little shorter
than the longest lateral setae. The apical seta is slightly longer than the distal lateral ones.

Length.—3 to 4.2 mm.

Locality.—Island Koh Chang (Gulf of Siam), under stones, January 17th, 1900 (Dr. Th. Mortensen).

Remarks.—This species is sharply separated from the following one, S. pauperata, by the characters pointed out in remarks on the last-named species; from the other species of the genus it is easily distinguished by the characters limiting Group III, and put forward above on pp. 25, 26.

12. Scutigerella pauperata, n. sp. Pl. 5, figs. 2 a—2 i.

Material.—Many specimens from a rather small island.

Head.—Seen from above it is moderately narrow in proportion to the length, with the lateral margin rather flatly arched without any angle; the longest lateral setae as long as or a little longer than the breadth of the basal antennal joints. The central rod is rather short, the anterior part with its branches being not visible, and posteriorly it is connected with the vertex of a triangle which is not very conspicuous, and limited on the sides by the oblique rods, which are feebly developed.

Antennæ.—The number of joints varies from nineteen to thirty-two. Seen from the side the basal third of the antennæ, especially the second to the sixth joint, is thickened, but in a somewhat less degree than in Scut. crassicornis; on the inner side of the second to the sixth or seventh joint two or three setæ on the inner side are very elongate, the longest of them two and a half to three times longer than the outer setæ, and besides nearly vertical on the longitudinal axis of the antennæ. The secondary whorl begins below on the seventh or eighth joint, but is developed only on the ventral side of all the following joints (fig. 2 a). The setae in the central whorl are rather long on the upper side and considerably shorter below. Near the distal two thirds of the joints a rather robust, conical, small rod is
found on the upper side in front of the central whorl, as in
S. crassicornis. The terminal joint (fig. 2 b) has the
usual striped sense-organ rather small, with the stalk shorter
than the striped portion, and (fig. 2 c) another organ besides,
which is more or less thick, clavate, and somewhat curved.

Scuta.—The second scutum (fig. 2 d) is posteriorly pro-
duced into a pair of very small, acute processes, and the
margin between these angular projections is flatly concave;
the antero-lateral setae, which are directed outwards and
somewhat forwards, are very long, much longer than the
breadth of the proximal antennal joint. Of the other marginal
setae very few are short, and two of the lateral pairs are even
long; the longest of these pairs are nearly two thirds as long
as the antero-lateral setae, but directed much backwards.
All scuta from the first to the twelfth (both included) each
with a very long pair of setae corresponding to the antero-
lateral one in the second scutum, and, if not disturbed,
directed essentially outwards; on the longer ones of the
scuta at least one pair of long lateral setae are also found.
The penultimate scutum posteriorly emarginate, with the
angular projections very small or scarcely visible, and with a
postero-lateral pair of long setae. The last scutum posteriorly
with an oblong, median, deep depression.

Legs.—The last pair (fig. 2 e) are robust, especially in
large specimens. In these the metatarsus is only one third
longer than deep, and the tarsus, which widens strongly
towards the base, is slightly more than two and a half times
longer than deep. The metatarsus with three and the tarsus
with five setae in the anterior dorsal row; these setae on the
tarsus are rather long, and the two distal ones on the
metatarsus somewhat longer, also a distal dorsal seta is
inserted behind the anterior row on the metatarsus, and
this seta is two thirds as long as the depth of its joint; a
similar long seta is placed distally on the tibia. The anterior
claw (fig. 2 f) is moderately developed in all respects; the
posterior claw is somewhat more slender, more curved, and
reaches to or a little beyond the proximal two thirds of the
other; the front seta is rather short and weak. The exopods are very short, generally nearly impossible to discover. The last pair of legs is a little more robust than the eleventh pair, which are more robust than the tenth; the ninth has the tarsus slender. In small specimens with the full number of legs the last pair of legs are less robust and the tarsus more slender, but scarcely in so high a degree as in the species described above. The first pair of legs (fig. 2 g) with the claws (fig. 2 h) somewhat more slender than those on the posterior legs, otherwise rather similar as to shape and relative length; the front seta is moderately developed.

Cerci (fig. 2 i).—Short and robust, about three times longer than deep, with the distal part somewhat produced (often a little more than in the specimen figured). They are set with a very moderate number of setæ, which gradually but considerably increase in length from the base outwards; the distal ones rather thin, and more than half as long as the depth of the cerci. The terminal area looks outwards, and is a little shorter than the distal setæ. The apical seta is as long as or a little longer than the longest lateral setæ, but more robust towards the base.

Length.—1.9 to 2.7 mm.

Locality.—Isl. Koh Chang (Gulf of Siam): under stones, January 7th and 12th, 1900; under plants on stones, January 6th, 1900. All collected by Dr. Th. Mortensen.

Remarks.—This species is distinguished from all other forms of the genus by the extreme shortness of the exopods. It is rather allied to S. crassicornis, but easily distinguished from it by the very long antero-lateral setæ on the scuta, by the long dorsal setæ on the posterior legs, by the short cerci with a very moderate number of setæ, etc.; in the elongate vertical setæ on the inner side of the proximal antennæ it agrees essentially with S. crassicornis, but differs from the other species of the genus.
Spurious or insufficiently described Species.

1. Scut. gratiae, Ryder.—This name, without description, was given by Ryder in 'The American Naturalist,' xiv, p. 375, 1880; the next year he described and figured the species in 'Proceed. of the Acad. of Natur. Sciences of Philadelphia,' 1881, p. 375. He had captured specimens in "Fairmount Park, Philad.; Havre de Grâce, Md.; Washington, D.C.; Franklin Co., Pa." It is impossible to decide whether it is identical with the European Scut. nivea (Scop.) or a distinct species.

2. Scolopendrella latipes, Scudder ('Proceed. Boston Soc. Nat. Hist.,' vol. xxii, 1882–3, pp. 64, 65).—This species was established on one specimen, which was crushed before the examination had been finished; it had been captured near Boston. The description of the scuta makes it clear that it belonged to Scutigerella, but the author's statement "there are no hairs upon the body" (p. 65) shows evidently that the specimen had been badly preserved, the hairs on the scuta being lost. The statement "seven abdominal joints, each with a pair of legs," seems to indicate that the specimen had possessed in all only ten pairs of legs and was immature; it measured 3 mm. in length. The description and the drawing (fig. 5) of the antennae show clearly that they had been strongly contracted; the description and the drawings (figs. 2 and 3) of the legs can scarcely be understood without assuming that these appendages had been compressed by contraction or shrivelling. It is impossible to discover in the whole description more than one valuable character, viz. the shortness of the "parapodia;" but this is, of course, not sufficient for a recognition of the species, and I think I can pronounce with certainty that it will never be found again. It will therefore be practical to cancel it completely.
Gen. 2. Scolopendrella, Gervais.

The characterisation of this genus has been given above on p. 24, and some supplementary notes have been added immediately after the diagnosis.

Conspectus of the Species.

It may be practical to divide the genus into three groups, and then to produce a key of the species of each group.

A. The first pair of legs contain three free and very distinct joints (the trochanter not included); the tarsus terminates in two conspicuous claws.

a. The scuta have the hind margin between their processes provided with a transverse belt adorned with numerous longitudinal stripes. The cerci without transverse stripes on the most distal part opposite to the terminal area. The head with the central rod interrupted in front of the middle, where there is a pair of very short lateral branches (while the anterior branches are scarcely perceptible). The first pair of legs more than two thirds as long as the second pair, and of normal shape . . . . . Group I.

b. The scuta have the hind margins simple, without any striped belt. The cerci with several transverse elevated lines across the distal part opposite to the terminal area. The head has the central rod without lateral branches in front of the middle. The first pair of legs at most about half as long as the second pair, considerably reduced and deviating from normal legs as to the length and shape of the joints . . . . . Group II.

b. The legs of the first pair rudimentary, each leg being a wart-like protuberance without claws . . . Group III.

Species of Group I.

Three of the characters pointed out in the key, viz. the development of the first pair of legs, the absence of trans-
verse lines on the distal part of the cerci, and the secondary lateral branches from the central rod of the head, are not met with in any other species of the genus; in the two first-named features this group agrees with the genus Scutigerella. Only one species is known . . . 1. S. notacantha, Gerv.

Species of Group II.

a. Nearly all the setae on the antennae are very conspicuously pubescent, and also thick from the base to near the acuminate end . . . 2. S. microcolpa, Muhr.

b. All setae on the antennae naked, slender, and tapering from the base to the end.

a. The legs of the first pair robust, and longer than the tarsus of the last pair. The cerci considerably shorter than the last pair of legs, with rather few setae, and the terminal area nearly as long as their depth . 3. S. subnuda, n. sp.

β. The legs of the first pair rather slender, and shorter than the tarsus of the last pair. The cerci slightly longer than the last pair of legs, with a very large number of setae, and the terminal area nearly three times shorter than their depth . . . . . 4. S. Silvestrii, n. sp.

Species of Group III.

a. All setae on the antennae naked and slender.

a. The last pair of legs with two or three long protruding dorsal setae on the metatarsus, and at least three similar setae in the anterior dorsal row on the tarsus. The terminal area on the cerci looks downwards.

a. The last pair of legs with three long protruding dorsal setae on the metatarsus, and four to five in the anterior dorsal row on the tarsus. The cerci rather large and densely clothed with setae. (The second scutum with its antero-lateral seta considerably or very much shorter than its processes.)

§. The cerci with many of the setae long and protruding in all directions . . . . . 5. S. Isabellae, Grassi.
§§. The cerci with a small number of setae on the lower side long and protruding, while all the other are short.

6. S. texana, n. sp.

β. The last pair of legs with two long protruding dorsal setae on the metatarsus, and three in the anterior dorsal row on the tarsus. The cerci of middle length or rather short, with at most a rather moderate number of setae.

§. The second scutum with the antero-lateral setae a little shorter to a little longer than the processes.

†. The second scutum has the distance between its processes considerably longer than their length; the distance between the processes of the third scutum twice as long as their length.

7. S. vulgaris, n. sp.

††. The second scutum has the distance between its processes from a little to considerably shorter than their length; the processes of the third scutum at most nearly one half longer than their length.

*, The cerci with long setae only on the lower part of the outer side. The antennæ with the secondary whorl complete on more than half of the joints. Rather larger American species.

8. S. neotropica, n. sp.

**, The cerci with some long setae spread on the whole outer surface. The antennæ with the secondary whorl complete only on the joints of their distal third. Small species from Further India.

9. S. simplex, n. sp.

§§. The second scutum with the antero-lateral setae not half as long as its processes.

10. S. pusilla, n. sp.

b. The last pair of legs with only one long protruding dorsal seta on the metatarsus, and two similar setae in the anterior row on the tarsus. The terminal area of the cerci looks outwards.

11. S. brevipes, n. sp.

b. Most of the setae on the antennæ plumose and very thick (the terminal area on the cerci looks outwards).

12. S. antennata, n. sp.
Group I.

1. Scolopendrella notacantha, Gervais. Pl. 5, figs. 3a—3k.


(The animals described by Latzel, Muhr, and Berlese as S. notacantha, Gerv., do not belong to this species.)

Material.—Many specimens from two localities.

Head (fig. 3a)—Moderately long, about one fourth longer than broad. The central rod apparently interrupted a little outside its middle, and here provided with short lateral branches; slightly in front of these branches the rod is again very plain, but more narrow, and the frontal branches are scarcely perceptible.

Antennæ.—They contain fifteen to eighteen joints. All setae in the central whorls naked and tapering from the base to the end; on the five or six most proximal joints the setæ on the inner side are somewhat longer than on the outer side, and directed much forwards. A secondary whorl begins below a little before the middle of the antennæ, but it is not developed on the upper half of any of the distal joints (fig. 3b).

Scuta.—The second scutum (fig. 3c) with the hind margins between the terminal part of the processes nearly semicircular, and adorned with a transverse band with numerous sharp longitudinal stripes; the processes are a little longer than broad at the base, with one rather long seta near each margin besides the subapical one; the antero-lateral setæ are very long, rather considerably longer than the length of

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the processes; all the lateral setæ are proportionately long, and the longest pair are especially elongate and only somewhat shorter than the antero-lateral pair. The third scutum with the striped band as in the preceding; the processes somewhat broader than long, each with three setæ as in the second scutum, and the basal distance between them about twice as long as their length; the antero-lateral setæ as in the second scutum, and the lateral setæ proportionately long, but none of them especially elongate. The striped transverse band is developed on the hind margin of all scuta armed with processes. All scuta, the last one excepted, with one pair of setæ as long as the antero-lateral setæ on the second scutum, and some of them—for instance, the eleventh scutum (fig. 3 d)—besides with a pair of lateral setæ, only somewhat shorter than the antero-lateral pair.

Legs.—The last pair (fig. 3 e) is rather short and robust; the tibia and the metatarsus each with one distal dorsal protruding seta, which is very long, nearly as long as the depth of their joints. The tarsus is scarcely four times longer than deep, with three protruding setæ in the anterior dorsal row, and these setæ are very long, the intermediate one even considerably longer than the depth of the joint. The claws (fig. 3 f) are slender, the posterior one somewhat shorter, but only a little more curved and slender than the other; the front seta is rather short. The first pair (fig. 3 g) are well developed, more than two thirds as long as the second pair; the femur is somewhat longer than deep; the upper margin of the tibia is considerably longer than the depth of the joint, the tarsus more than three times longer than deep; the claws are well developed (fig. 3 h), the anterior rather long and curved, the posterior considerably shorter, besides more curved, more slender, and articulated to the pretarsus in such a way that it diverges extremely from the other claw; the front seta of middle length and rather robust.

Cerci (fig. 3 i).—Of very moderate size, slightly longer than the three distal joints of the last pair of legs, nearly conical, from three and a half times to four times longer
than deep, set with rather few setae, of which two or three near the terminal area are rather long, the others somewhat shorter, and scarcely more than half as long as the depth of the cerci. The terminal area looks obliquely upwards and outwards; it is rather long, more than two thirds as long as the depth of the cerci, and adorned with a system of partly irregular longitudinal lines (fig. 3 k); the terminal surface outside this plan without transverse lines. The apical setae as long as or a little longer than the terminal plan, and robust at the base.

Length.—3 to 3.4 mm.

Locality.—Rome, fifteen specimens (Dr. F. Silvestri); Aspromonte in Calabria, in a forest about 4500 feet above the level of the sea, twelve specimens (the author).

Distribution.—Judging from the length of the first pair of legs on the fig. 16 in 'Ann. d. Sc.' referred to above, it must be this species which has been drawn and described by Gervais; it can be added that he writes that the antennae of his animals could contain more than fourteen joints, "vingt même dans l'état complet," and this last statement strengthens the opinion that it is our S. notacantha, and not the species established later on by Muhr as S. microcolpa, which he has examined. He had collected his specimens mentioned in a garden in Paris, and in the environment of the same town. Grassi states (p. 596) that he has captured the species at Rovellasca (in the province of Como), near Lecco; at Sparranisi, near Capua; and at Catania. On p. 594 he mentions the setae which I have named the antero-lateral pair, and this statement proves that at least the animals especially examined by him have belonged to S. notacantha, and not to S. microcolpa. All other localities out of Italy mentioned in the literature are uncertain or incorrect, and in the present state of knowledge it is impossible to say more on the distribution of this species.

Remarks.—This very interesting species is easily distinguished from all other forms hitherto known by the characters set forth in the analytical key for the groups.
The length of the antero-lateral setæ separates it also from all other European species of this genus.

Group II.

2. Scolopendrella microcolpa, Muhr. Pl. 5, figs. 4 a—4 h; Pl. 6, figs. 1 a, 1 b.


Material.—Six specimens from one locality, all with the full number of legs.

Head (fig. 4 a).—Moderately long, about one fourth longer than broad. The central rod with a sharp transverse suture at the middle, without vestige of lateral branches, but the frontal branches are strongly developed.

Antennæ.—They were complete in two specimens, and contained respectively twenty-three to twenty-five, and twenty-six to twenty-seven joints. The setæ in the central whorls (fig. 4 b) are thick and subcylindrical nearly to the acuminate and somewhat produced end, besides they are very conspicuously pubescent; on the inner side of the eight or ten proximal joints two or three naked and slender setæ are inserted in each central whorl instead of the thick setæ. The thick setæ on the proximal joints twice as long as those on the most distal joints (fig. 4 c). The joints in the distal half of the antennæ with one seta to three setæ on the lower side as a rudiment of a secondary whorl; these setæ are similar in shape, but not half as long as those in the central whorl; the terminal joint has its distal half set with a number of pubescent and thick setæ.

Scutæ.—The second scutum (fig. 1 a) with the hind margin nearly straight between the inner base of its processes, and without any striped band; the processes scarcely as long as broad, with three to four moderately short setæ along each margin, and the distal seta inserted a little from
the apex; the distance between the processes as long as their length. The antero-lateral setae are rather short, not half as long as the processes; one of the lateral setae a little shorter than the antero-lateral pair. The third scutum (fig. 1 a) with the hind margin as in the second; the processes one half broader than their length, with the same number of setae at the margins; the antero-lateral setae subsimilar to those on the preceding scutum; the distance between the processes is a little shorter than their breadth. The other scuta present nothing of special interest.

Legs.—The last pair (fig. 4 d) present characteristic features. The tibia with two, the metatarsus with three protruding dorsal setae, which at most are a little more than half as long as the depth of their joints; the tarsus is elongate, unusually slender, nearly six times longer than deep, with five protruding setae in the anterior dorsal row, and most of them about as long as the depth of the joint. The anterior claw (fig. 4 e) moderately slender and rather curved, the posterior slightly more slender, and only a little shorter than the other; the front seta rather short and thin. The first pair (fig. 4 f) scarcely one third as long as the second pair, and considerably shorter than the tarsus of the last pair; femur and tibia each a little deeper than long; the tarsus nearly twice as long as deep, terminating in two claws (fig. 4 g), the anterior of which is a little longer than the other, and both are rather curved and distally slender; the front seta rather short and thin.

Cerci (fig. 1 b).—Rather long, only a little shorter than the last pair of legs, somewhat more than four times longer than deep, clothed with a large number of setae differing considerably in length; the long setae are rather numerous, and spread on the outer surface both above and below; they are protruding, and not quite half as long as the depth of the cerci, while the other setae are rather depressed and considerably shorter. The terminal area is short, half as long as the depth of the cerci, and looks outwards (and slightly downwards); on the opposite side the surface has seven to
ten fine thickened transverse lines. The apical seta is short, scarcely as long as the terminal area.

Length.—The largest one of my few specimens is considerably extended, and measures 3·2 mm. in length; the shortest specimen, which has all pairs of legs well developed, is rather contracted, and measures 1·7 mm.

Locality.—Palmi in Calabria, where the specimens have been captured in May, 1893, by the author, in a wood of olive trees.

Distribution.—The only locality previously known is Prague in Bohemia, where Muhr collected the animals on which he established the species. His description and figures are far from good, but he says on the joints of the antennae that they are "mit einigen kreisförmig angeordneten, kurzen, steifen Borsten besetzt, die selbst wieder ihrer ganzen Länge nach mit Spitzen versehen sind;" and this last feature is not met with in any other European species known to me; besides, he mentions the first pair of legs in a way which agrees well with my specimens. According to Latzel (op. cit.), Muhr withdrew his new species (in a paper unknown to me) as synonymous with S. notacantha, Gerv., one year after he had established it, but it was necessary to re-establish it.

Remarks.—By the setae of the antennae this species is easily separated from all other European forms. The shape of the second and third scuta and their setae, the tarsus of the last pair of legs, the first pair of legs, and the cerci present other excellent characters.

3. Scolopendrella subnuda, n.sp. Pl. 6, figs. 2 a—2 g.

Material.—Six adult specimens from two countries.

Head.—A little more narrow in proportion to its length than in S. microcolpa; the central rod as in that species, but the frontal branches are scarcely visible.

Antennæ.—They contain from fifteen to twenty joints. The setae in the central whorls are all slender and tapering
from the base, rather short on the proximal and very short on the most distal joints; in the distal half of the antennæ two or three minute setæ (fig. 2 a) are found on the lower side behind each central whorl, and only on the subapical joint a single seta of this rudimentary secondary whorl has been developed on the upper side.

Scutæ.—The second scutum (fig. 2 b) with the posterior margin between the processes feebly curved and without any striped band; the processes are narrow and distally produced, considerably longer than broad; a single short seta is found on each side slightly in front of each process which has no setæ along the lateral margins, while the subapical seta is inserted rather near the end. The distance between the processes is one half longer than their length. Each lateral margin of the scutum with four setæ in all, of which the antero-lateral one is about half as long as the processes and the other short. The third scutum (fig. 2 b) rather similar to the second: the processes are somewhat longer than broad, the three setæ in front of their base and near the end as in the preceding scutum, the basal distance between the processes twice as long as their length; each lateral margin with two setæ in all, one of which is near the process, and the other, the antero-lateral one, is a little shorter than that on the second scutum.

Legs.—The last pair (fig. 2 c) is rather robust. Tibia and metatarsus each with a distal dorsal protruding seta, which is somewhat shorter than the depth of the last-named joint. The tarsus is a little more than three times longer than deep, with a dorsal protruding seta, a little longer than the depth of the joint, inserted at the middle, and with this in the anterior row only a single subapical seta which is somewhat shorter than the other. The claws (fig. 2 d) are rather slender, the posterior one nearly as long as the other; the front seta is short. The first pair (fig. 2 e) about half as long as the second and somewhat longer than the tarsus of the last pair. The femur is about as long as deep, the tibia a little longer than deep and as long as the tarsus, which is nearly twice as
long as deep; the anterior claw is rather robust and much
curved (fig. 2 f), considerably longer than or nearly twice as
long as the other.

Cerci (fig. 2 g).—Rather short, somewhat shorter than the
last pair of legs, from a little more than three times to four
times longer than deep, and decreasing slightly in depth from
the base to the terminal area; they are set with rather
few setae, somewhat unequal in length, and the longest distal
ones somewhat shorter than the depth of the cerci. The
terminal area is long, only a little shorter than the depth of
the cerci, and looks downwards; the surface above the area
with about seven coarse transverse lines (consisting as usual
of minute spines). The apical seta is as long as or somewhat
longer than the depth of the cerci.

Length.—The largest specimen is extended, and measures
1.75 mm., a small but adult specimen 1.2 mm.

Locality.—Palmi, Calabria, four specimens captured (by
the author) together with S. microcolpa, and a fifth speci-
men was taken (by Mr. C. Börner) at Catania or at Palmi,
besides one specimen from Marburg, Germany (Mr. C.
Börner).

Remarks.—This small species is easily separated from the
other species of the group by the very few setae at the
margins of the scuta, by the shape of the cerci and their few
setae, finally by the legs.

4. Scolopendrella Silvestrii, n. sp. Pl. 6, figs. 3 a—3 g.

Material.—Three adult specimens, and one specimen with
eleven pairs of legs.

Head.—Elongate, nearly one half longer than broad.
The central rod interrupted at the middle, its most anterior
part and the anterior branches evanished.

Antennæ.—The number of joints in four complete antennæ
varies from seventeen to twenty-two. The setæ in the
central whorls (fig. 3 a) are all slender, tapering from the
base and naked, moderately short on the proximal and short
on the distal joints. A second whorl begins below about at
the middle of the antenna, and nearly on the distal third of
the appendages a seta is found near the upper margin, but
the whorl is not complete on the outer side of any of the
joints.

Scuta.—The second scutum (fig. 3 b) with the hind margin
between the processes nearly straight and without any striped
band; the processes are narrow and distally exceedingly
produced, nearly one half longer than broad, with two setae
at the basal part of the outer margin, one subbasal seta at
the inner margin, and the usual distal seta inserted very far
from the end. The distance between the processes slightly
shorter than their length. Each lateral margin of the scutum
with about seven setae in all; the antero-lateral one is several
times shorter than the processes, and the other setae are
short. The third scutum with the processes somewhat
shorter, a little longer than broad, the distance between
them somewhat longer than their length, six setae in all
(the distal one as usual not included) along each lateral mar-
gin, otherwise essentially as the second scutum.

Legs.—The last pair, which is similar to the penultimate
pair (fig. 3 c), is moderately robust. The tibia with a distal
dorsal seta about half as long as the depth of the joint;
metatarsus with two similar setae in the anterior dorsal row.
The tarsus a little more than three times longer than thick;
in the anterior row three protruding setae as long as or
slightly longer than the depth of the joint. The anterior
claw (fig. 3 d) moderately short and robust, a little longer
than the other; the front seta is short. The first pair (fig.
3 e) not one third as long as the second, and somewhat
shorter than the tarsus of the last pair of legs; femur and
tibia shorter than deep, the tarsus somewhat longer than
thick (fig. 3 f); the claws are well developed, much curved,
and subequal in length.

Cerci (fig. 3 g).—They are even longer than the last pair
of legs, very robust, and nearly four times longer than deep,
decreasing much in depth in the distal third. They are
rather densely clothed with setae, the major part of which are rather short and depressed, while many are strongly protruding in all directions, considerably longer than the others and in some cases half as long as the depth of the cerci. The terminal area is very small, nearly three times shorter than the depth of the cerci, and looks outwards and a little downwards; the surface on the opposite side with some few transverse lines. The apical seta is exceedingly short, even much shorter than the terminal plan.

Length.—An extended specimen measured 1.8 mm.; the two other adult specimens are nearly of the same length.

Locality.—S. Ana, Misiones, Argentina, July 27th, 1900, three specimens (F. Silvestri); Tacurù Pucù (Alto Paranà), Paraguay, July 6th, 1900, one immature specimen (F. Silvestri).

Remarks.—This species is sharply separated from the other forms by the shape of the second scutum, shape and clothing of the cerci, and the first pair of legs. The name has been chosen in honour of Dr. F. Silvestri, who has collected not only this and some others of the species described in this paper, but, besides, several interesting small forms of Palpigradi and Pauropoda, thereby lending a valuable assistance to me.

GROUP III.

5. Scolopendrella Isabellæ, Grassi. Pl. 6, figs. 4 a—4 h.


Material.—Many specimens, adults and young ones, from three localities in Southern Italy.

Head.—Rather elongate, not quite one third longer than broad. The central rod is interrupted in the middle, without lateral branches; its anterior part and the frontal branches are strongly developed.

Antennæ.—They contain from seventeen to twenty-one
joints. The setæ in the central whorl are all naked, slender and tapering from the base, moderately long on the proximal joints, but not half as long on the most distal joints. About at the end of the basal third of the antennæ the secondary whorl begins below (fig. 4 a); on the distal half of the antennæ it is also developed on the upper side, and at least on the most distal joints a seta of a third whorl protrudes from the lower margin. All the joints, with exception of a few proximal ones, with a number of clear, circular small spots on the outer side (fig. 4 a); in these spots a minute seta seems always to be inserted, but it is often so short that it is exceedingly difficult to discover.

Scuta.—The second scutum (fig. 4 b) with the hind margin between the processes nearly straight, and without striped band. The processes are rather large, nearly regularly triangular, scarcely broader than long, with about four setæ along each margin and the usual distal seta near the end. The distance between the processes is much shorter than their length. The antero-lateral setæ are about of middle length, at least somewhat shorter than processes; among the other moderately numerous lateral setæ two pairs are of moderate length. The third scutum (fig. 4 b) has the processes somewhat shorter than broad, but they are only half as long as the distance between them, with about three setæ along each margin; the antero-lateral setæ as those on the second scutum.

Legs.—The last pair (fig. 4 c) are proportionately rather long. The tibia with two dorsal protruding setæ slightly more than half as long as the depth of the joint; the metatarsus with three rather similar setæ in the anterior dorsal row, all somewhat or considerably shorter than the depth of the joint. The tarsus rather long, four and a half times longer than deep, generally with five, and at least with four protruding setæ in the anterior dorsal row, and the setæ at most a little longer than the depth of the joint. The anterior claw (fig. 4 d) is rather long, moderately robust and curved, somewhat longer and thicker than the other; the front setæ of
middle length. The first pair (fig. 4e) are oblong, irregularly shaped knobs, with hairs and very few long setae.

Cerci (fig. 4f).—They are rather long, slightly shorter than the last pair of legs, about four and a half times longer than deep, densely clothed with setae, many of which are protruding in all directions and almost half as long as the depth of the cerci, while the others are considerably shorter and depressed. The terminal area is a little more than half as long as the depth of the cerci, and looks downwards, the surface above it (fig. 4g) with about ten sharply prominent lines. The apical seta as long as or a little longer than the area.

Length.—2.3 to 3.5 mm.

Locality.—Calabria: Scilla, four specimens taken (by the author) in June, 1893, in a copse about 1000 feet above the level of the sea; Aspromonte, in a forest about 4500 feet above the level of the sea (the author). Furthermore, a good number of specimens have been secured (by Mr. C. Börner) either at Palmi in Calabria or, more probably, Catania in Sicily.

Remarks.—This species is rather allied to S. vulgaris, n. sp., with which it certainly has been confounded by Prof. Grassi. The differences between these two species will be pointed out in the remarks to the last-named form.

From all species with the first pair of legs rudimentary it is separated by the clothing and shape of the cerci, and, S. exana excepted, besides by the number of dorsal setae on the two distal joints of the posterior legs.

It may be possible that some of the specimens collected by Latzel, v. Attems, etc., and referred by them to S. notacantha, in reality belonged to this species, and not to S. vulgaris, n. sp. (see below), but on this topic nothing can be said with the slightest degree of certainty. Furthermore, it is impossible to state with absolute certainty if the animals upon which Grassi established his S. Isabellae in reality belonged to our species with this name or to S. vulgaris or to both combined, but the last-named circum-
stance is the most probable. When Grassi (p. 596) states that he has captured S. Isabella at Rovellasca (near Como), near Lecco, near Capua, and at Catania, it can be taken as certain that he has had specimens of both species. I have referred the name S. Isabella to the species described above, as it seems to be common at Catania. Mr. Börner, who has captured many specimens of this species, but very few of S. vulgaris, has labelled his animals "Catania, Palmi," but I have not found it at Palmi, and suppose, therefore, that Mr. Börner has captured his specimens of S. Isabella near Catania.

6. Scolopendrella texana, n. sp. Pl. 6, figs. 5a—5e.

Material.—Two adult specimens.

Head.—Rather elongate, not quite one third longer than broad. The central rod as in S. Isabella, interrupted at the middle, and having the anterior part and the frontal branches strongly developed.

Antennae.—They contain nineteen to twenty-two joints. The central whorl nearly as in S. Isabella; a second whorl begins below on the fifth or sixth joint, and a little before the middle of the antennæ it is complete on the outer surface and above; the joints in nearly the distal half of the antennæ (fig. 5a) possess besides some setæ of one or two other whorls on the lower outer part between the two complete whorls, so that the lower half of the outer side has a rather considerable number of short setæ, and the distance between the central and the secondary whorl is unusually long.

Scuta.—The second scutum (fig. 5b) with the hind margin between the processes straight, and without striped band; the processes are large, slightly longer than broad, with about four setæ along each margin, and the usual distal seta near the end. The distance between the processes is considerably shorter than their length. The antero-lateral setæ are rather short, not half as long as the processes, the lateral setæ from the antero-lateral pair to the end of the processes
rather numerous and short. The third scutum with the processes considerably broader than long, the distance between them about equal to their length, and the setae nearly as on the preceding scutum.

Legs.—The last pair (fig. 5 c) are proportionately rather long. The tibia with two, the metatarsus with three protruding setae in the anterior dorsal row, none of them quite as long as the depth of the tarsus. The tarsus is rather long, about five times longer than deep, with four protruding dorsal setae in the anterior row, and the longest seta about as long as the depth of the joint. The anterior claw (fig. 5 d) is elongate, moderately robust and rather curved; the posterior claw is considerably more slender, more curved, and nearly one third shorter than the other; the front seta long and rather thick. The first pair are exceedingly small rounded knobs with some short setae.

Cerci (fig. 5 e).—Robust and rather long, somewhat longer than the last pair of legs, slightly more than four times longer than deep, and about as broad as deep. They are set with many setae, of which about seven on the lower side are strongly protruding, moderately long, yet nearly two and a half times shorter than the depth of the cerci; all other setae are considerably shorter and depressed. The terminal area is scarcely half as long as the depth of the cerci, and looks downwards; the striped surface above it is very short, with six or seven thickened lines. (The apical setae are wanting in my specimens.)

Length.—2.8 mm.

Locality.—Austin, in Texas (collected by Prof. W. M. Wheeler).

Remarks.—The species is allied to S. Isabella, Grassi, but easily separated by the cerci, especially by the complete want of longer and protruding setae on the upper two thirds of their outer surface.
7. Scolopendrella vulgaris, n. sp. Pl. 6, figs. 6 a—6 d; 
Pl. 7, fig. 1 a.


Material.—Many specimens from various countries.

Head.—In all respects as that of S. Isabellæ.

Antennæ.—They contain fifteen to twenty-one joints. As to the central whorls, they differ scarcely from those of S. Isabellæ, but the secondary whorl begins at the middle of the antennæ, and only on a few distal joints is it developed on the upper side; on these distal joints three setæ can be seen on the lower margin. The joints present very few clear circular spots on the outer side.

Scuta.—The second scutum (fig. 1 a) with the hind margin between the processes straight and without transverse band; the processes are of moderate size, a little longer than broad, along the inner margin with two setæ, one of which is inserted even just in front of the base, and three setæ at the outer margin, while the distal seta is seen near the end. The distance between the processes is somewhat longer than their length. The antero-lateral setæ nearly as long as or a little longer than the processes; from the antero-lateral seta to the apical one there are six or seven moderately or rather long setæ. The third scutum (fig. 1 a) has the processes a little shorter than broad, with two or three setæ along each margin, the distance between the processes at least twice as long as their length; the antero-lateral setæ as on the second scutum.

Legs.—The last pair (fig. 6 a) a little shorter than in S. Isabellæ. The tibia and metatarsus each with two protruding dorsal setæ, and the longest seta at most nearly as long as the depth of the metatarsus. The tarsus not quite four times longer than deep, with three protruding setæ in the anterior dorsal row, and these setæ are about as long as
those on the preceding joint. The claws do not present any character distinguishing them from those in S. Isabellæ; sometimes they are shaped as in that species, and sometimes they are shorter and less acuminate (fig. 6 b). The first pair (fig. 6 c) are minute knobs with at least one long seta and some shorter setæ or hairs.

Cerci (fig. 6 d).—They are of middle size, rather considerably shorter than the last pair of legs, slightly more than four times longer than deep. They are set with a moderate number of setæ, of which three or four at the lower margin are strongly protruding and only a little shorter than the depth of the cerci, while the others are considerably shorter, slightly or not more than half as long as the depth of the cerci, oblique, or rather depressed. The terminal area about two thirds the depth of the cerci, looking downwards; the surface above it of medium length, with seven or eight very pronounced lines. The apical seta about as long as the ventral protruding setæ.

Length.—One of the largest specimens (from Calabria) measures 3.3 mm. in length, but most adult specimens are between 2.5 and 3 mm.

Locality.—Italy: Scilla, about 1000 feet above the level of the sea, in a copse, June 24th, 1893, six specimens (the author); Aspromonte, in a forest, about 4500 feet above the level of the sea, June 25th, 1893, ten specimens (the author); Palmi or Catania, four specimens (Mr. C. Börner). Helvetia: Luzern, in a wood, July 12th, 1893 (the author). Germany: Tübingen, one specimen (Dr. F. Meinert); Marburg, two immature specimens (C. Börner). Denmark: Copenhagen, in the Royal Garden, "Rosenborg Have," under large flower-pots which had been buried in the earth to the upper margin, July 16th, 1901, several specimens (the author).

Remarks.—This species is allied to S. Isabellæ, but is sharply distinguished by three characters: the last pair of legs have two protruding dorsal setæ on the metatarsus and three in the anterior row on the tarsus, while the correspond-
ing joints in S. Isabellæ have respectively three and four or five setæ; the cerci have only half as many setæ as in S. Isabellæ, and only a few of them at the lower margin are long and protruding, while in S. Isabellæ a good number of rather long setæ protrude in all directions; the distance between the processes of the second scutum is somewhat longer than the processes, while it is much shorter than these in S. Isabellæ; some minor differences can be derived from the descriptions. Of both species I have examined specimens which had not acquired the full number of legs, and it was not difficult to separate them with absolute certainty. Most European specimens mentioned in the literature as S. notacantha, Gerv., and some of the specimens considered by Grassi as S. Isabellæ (see above), certainly belonged to this species, which seems to be so common and so widely distributed in Europe that the name S. vulgaris will probably be deemed appropriate.

8. Scolopendrella neotropica, n. sp. Pl. 7, figs. 2a—2g.

Material.—Two adult specimens, and a third one in which the last pair of legs have not been developed.

Head.—Only a little or very little longer than broad. The central rod is interrupted at the middle; its anterior part is conspicuous but narrow; the frontal branches are thin.

Antennæ.—In the two adult specimens they contain eighteen and twenty-one joints. The setæ in the central whorls are naked, slender, and tapering from the base, rather long on the proximal joints (fig. 2a), and scarcely half as long on the most distal joints; the setæ on the inner side of the second, third, and fourth joints are about twice as long as those on the outer side. The secondary whorl begins on the lower half of the outer side on the fifth or sixth joint; on the eighth or ninth joint it is completely developed on the upper half (fig. 2a, representing the seventh joint, shows
a transition stage), and on the distal half of the antennæ the setæ in the second whorl are slightly shorter than those in the central one. Setæ belonging to a third whorl have not been observed with certainty on the most distal joints.

Scuta.—The second scutum (fig. 2b) with the hind margin between the processes straight, without striped band; the processes are large, a little broader than long, with three or four rather long setæ along each margin and the distal seta near the apex. The distance between the processes is much shorter than their length. The antero-lateral setæ are long, as long as or a little longer than the processes; between the antero-lateral and the apical setæ seven or eight setæ are inserted, of which two pairs are long and one of them even only slightly shorter than the antero-lateral pair, while all the other marginal setæ are rather long, longer than in any other species described here. The third scutum (fig. 2b) with the processes large and much broader than long, the distance between their base subequal to their length; the setæ nearly as on the second scutum.

Legs.—The last pair (fig. 2c) about as long and thick as in S. vulgaris. The tibia with two dorsal protruding setæ, the proximal one about half as long as the other, which is nearly as long as the depth of the joint; the metatarsus with two very protruding setæ in the anterior dorsal row, and both almost as long as or a little longer than the depth of the joint. The tarsus scarcely four times longer than deep, with three protruding setæ in the anterior dorsal row; the distal seta somewhat shorter than the two others, which are a little or rather considerably longer than the depth of the joint. The anterior claw (fig. 2d) is rather long and robust, the posterior moderately slender, and nearly one third shorter than the other; the front seta of middle length. The first pair (fig. 2f) are small knobs, a little longer than thick, with some hairs and two long setæ.

Cerci (fig. 2g).—Rather small, about as long as the sum of the three distal joints of the last pair of legs, at most four times longer than deep, and about as broad as deep. They
are clothed with a moderate number of setae, of which six or seven on the lower half of the outer surface, and especially at the lower margin, are strongly protruding, and about two thirds as long as the depth of the cerci, while all the others are rather depressed and considerably or much shorter. The terminal area about two thirds as long as the depth of the cerci and looking downwards; the surface above it of medium length, with seven or eight very pronounced lines. The apical seta is a little shorter than the area.

Length.—The largest of the specimens measures 3 mm.

Locality.—Rio Catonche, near Caracas (Venezuela), July 9th or 10th, 1892 (Dr. F. Meinert).

Remarks.—This species is rather closely allied to the European S. vulgaris, but is easily distinguished by the second scutum, the processes of which are considerably larger and much closer to each other than in S. vulgaris; besides, its setae are conspicuously longer. The third scutum presents also good differences, and the antennæ, legs, and cerci present additional characters of less importance.

9. Scolopendrella simplex, n. sp. Pl. 7, figs. 3a—3e.

Material.—Nine specimens, most of them with the full number of legs, and all from one locality.

Head.—Moderately long, scarcely one fourth longer than broad. The central rod is interrupted at the middle, without lateral branches, the anterior part is moderately narrow, and the frontal branches very thin.

Antennæ.—They contain from eighteen to twenty-two joints. The setæ in the central whorls are naked, slender and tapering from the base, moderately or rather long on the proximal joints, and somewhat shorter on the distal ones. The setae on the inner side of the joints in the proximal half of the antennæ are longer than those on the outer side, in large specimens more or less vertical to the longitudinal axis, and especially on the third to the fifth or sixth joint they are elongate, nearly twice as long as on the outer side. A little
before the middle begins the secondary whorl on the lower margin, and on the distal third of the antenna it is developed on the upper margin; the setae of this whorl are only a little shorter than those in the central one.

Scuta.—They differ only in some rather small particulars from those of S. neotropica. The second scutum (fig. 3a) with the processes rather large, as broad as or a little broader than long, in large specimens with three, in small specimens with two setæ along each margin, and the distal seta near the apex. The distance between the processes a little or rather considerably shorter than their length. The anterolateral setae as long as or a little shorter than the processes; the lateral setae somewhat shorter than in S. neotropica, but yet some of them of considerable length. The third scutum (fig. 3a) with the processes rather large and somewhat broader than long; the distance between them somewhat or considerably longer than their length; the setæ nearly as in the second scutum.

Legs.—The last pair (fig. 3b) agree as to the number and length of the dorsal protruding setæ on the three distal joints and as to the depth of the tarsus so much with those in S. neotropica, that a reference to the figure and to the description of the species named is sufficient; only the claws (fig. 3c) differ rather considerably: they are proportionately slender, the posterior strongly curved and slightly shorter than the other, and the front seta is rather short. The first pair (fig. 3d) are small oblong knobs, with some hairs and two setæ, one of which is long.

Cerci (fig. 3e).—They are somewhat shorter than the last pair of legs, slightly more than four times longer than deep, and scarcely broader than deep. They are set with a moderate number of setæ, of which eight to ten on the whole outer surface are longish or long, one on the upper side nearly as long even as the depth of the cercus, and strongly protruding downwards, outwards, or upwards; the other setæ are moderately short and depressed. The terminal area at least two thirds as long as the depth of the cerci; the surface
above it moderately long, with about eight fine lines; the apical seta is a little shorter than the area.

Length.—From 1.75 to 2.5 mm.

Locality.—Island Koh Chang, Gulf of Siam, under stones, January 12th, 1900 (Dr. Th. Mortensen).

Remarks.—The species is closely allied to *S. neotropica*, from Venezuela, but is distinguished by a number of rather small characters. The cerci have protruding setae near the upper margin, the claws are more slender and nearly equal in length, the second scutum with the setae a little shorter, the secondary whorl complete only on the distal third of the antennae, etc.

10. Scolopendrella pusilla, n. sp. Pl. 7, figs. 4 a—4 c.

Material.—One specimen with the full number of legs.

Head.—Moderately long, scarcely one fourth longer than broad. The central rod interrupted at the middle, without lateral branches, its anterior part and the frontal branches well developed.

Antennae.—One antenna is complete, and contains twenty-seven joints. The setae in the central whorls are naked, slender, and tapering from the base, rather short on the proximal and short on the distal joints. The secondary whorl begins below on the fourteenth joint, but it has scarcely been developed on the upper side even on the most distal joints.

Scuta.—The second scutum (fig. 4 a) has the hind margin between the processes straight, without striped band; the processes are of moderate size, distally conspicuously produced, rather considerably longer than broad, with two setae at the outer margin, one seta rather near the base of the inner margin, and the distal setae somewhat removed from the end. The antero-lateral setae are not half as long as the processes; between these and the distal setae five or six short setae are inserted at the lateral margin. The third scutum
(fig. 4 a) with the processes slightly broader than long, less produced than those of the second scutum, but with the same number of setae; the distance between the processes almost twice as long as their length; the antero-lateral setae as on the preceding scutum, and only four setae between the antero-lateral and the distal ones.

Legs.—The last pair (fig. 4 b) nearly as in S. vulgaris in several respects. The tibia with two moderately short, dorsal protruding setae; the metatarsus with two dorsal protruding setae in the anterior row, the distal one much longer than the other, but yet considerably shorter than the depth of the joint. The tarsus three times longer than deep, with three protruding setae in the anterior dorsal row, all somewhat shorter than the depth of the joint. The claws moderately long, subequal in length, the anterior somewhat deeper than the slender posterior claw. (The first pair of legs, which in this group generally are difficult to observe, have not been searched for.)

Cerci (fig. 4 c).—A little shorter than the last pair of legs, not fully four times longer than deep. They are set with a moderate number of setae, which differ somewhat in length from each other, but none of them are more than half as long as the depth of the cerci; some of the setae are protruding, and the others depressed. The terminal area more than two thirds as long as the depth of the cerci and looks essentially downwards; the surface above it is rather long, with about eight conspicuous transverse lines; the apical seta nearly as long as the area.

Length.—The specimen, which is rather extended, measures 1.7 mm. in length.

Locality.—Austin, Texas (Prof. W. M. Wheeler).

Remarks.—This species is more closely allied to the European S. vulgaris than to any other form, but it is easily distinguished by the second scutum, the processes of which are larger and more produced, its setae, the antero-lateral pair included, being much longer. The number of antennal joints is unusually high, considerably higher than
observed in any other species of this group, with exception of S. antennata (see below).

11. Scolopendrella brevipes, n. sp. Pl. 7, figs. 5 a—5 e.

Material.—One specimen with the full number of legs, and another with ten pairs.

Head.—Rather elongate, about one third longer than broad. The central rod interrupted at the middle and without lateral branches, its anterior part slender, and the frontal branches thin.

Antennæ.—They contain in both specimens fourteen joints, but it must be supposed that a higher number will be found in other adult specimens. The setæ in the central whorls are naked, slender, and tapering from the base, moderately long on the proximal, and considerably shorter on the distal joints. The secondary whorl begins below outside the middle of the antennæ, but is not developed above even on the most distal joints; its setæ are considerably shorter than those in the central whorls, but comparatively thick at the base.

Scuta.—The second scutum (fig. 5 a) with the hind margin between the processes straight, without striped band; the processes are large, considerably longer than broad, distally much produced with the terminal part very narrow; they have one seta at the outer margin, two on the basal part of the inner margin, and the distal seta rather far from the apex. The distance between the processes one half shorter than their length. The antero-lateral setæ are between half as long and one third as long as the processes; between the antero-lateral and the distal setæ four rather short setæ are inserted along the lateral margin. The third scutum (fig. 5 a) with the processes considerably smaller than those on the second, about as long as broad, distally somewhat produced; the distance between the processes not fully twice as long as their length; the setæ nearly as on the second scutum.
Legs.—The last pair (fig. 5 b) are short and slender. The tibia and metatarsus each with one protruding seta, which is nearly longer than the depth of its joint. The tarsus scarcely three and a half times longer than deep, with only two protruding setae in the anterior dorsal row, and these setae are considerably longer than the depth of the joint. The anterior claw is moderately robust and considerably longer than the other, which is slender and strongly curved. The first pair are small knobs, scarcely longer than thick, with two moderately long setae (fig. 5 c).

Cerci (figs. 5 d and 5 e).—They are conspicuously longer than the last pair of legs, moderately large, scarcely four times longer than deep, and somewhat broader than deep. They are set with a considerable number of setae, of which about one third are rather long, often two thirds as long as the depth of the cerci, and protruding in all directions, while the others are much shorter and depressed. The terminal area looks outwards and is exceedingly oblique, so that it is apparently one half shorter when seen from the outer side (fig. 5 d) than its real length, which is seen from above (fig. 5 e); seen from the outer side it seems to be considerably shorter than half of the depth of the cerci. The surface opposite the area is rather short, and has six or seven lines with conspicuous spines; the apical seta is nearly as long as the area.

Length.—The adult specimen measures 1·6 mm.

Locality.—Island Koh Chang, Gulf of Siam, together with S. simplex (Dr. Th. Mortensen).

Remarks.—This species is distinguished by some excellent characters, the second scutum having the setae short and the processes large and strongly produced, the last pair of legs having very few protruding long dorsal setae, and the cerci different from those of almost all other species.
12. *Scolopendrella antennata*, n. sp. Pl. 7, figs. 6 a—6 i.

**Material.**—Eleven specimens from five localities, and several of them with the full number of legs.

**Head.**—Very moderately elongate, only rather little longer than broad. The central rod is not interrupted; its most anterior part and the frontal branches are thin; a strong median rod exists apparently between the posterior branches.

**Antennæ.**—In the adult specimens the number of joints varies from twenty-three to twenty-nine. The setæ in the central whorls, with exception of those on the inner side of the proximal joints, are very thick at the base, nearly obliquely conical, moderately short on the proximal and short on the distal joints, and all set with a number of fine hairs (fig. 6 a). On the inner side from the base to the fourth or to the eighth proximal joint the setæ of the central whorl are naked, very thin (fig. 6 b), and much longer than the thick pubescent setæ; on the following joints these thin and naked setæ become gradually much shorter and situated behind the central whorl (fig. 6 c), which on all sides contains only thick and pubescent setæ. The secondary whorl begins below about one short, thick, and pubescent seta; on the distal joints two or three such setæ are present below, but on the upper part of the joints the whorl is completely absent on all joints. The terminal joint with a number of very short, thick, and pubescent setæ.

**Scuta.**—The second scutum (fig. 6 d) without striped band on the hind margin. The processes are large, a little broader than long, distally somewhat produced, with the apex narrow; they have two setæ at each margin, and the distal seta is somewhat removed from the end. The distance between the processes about as long as their length. The antero-lateral setæ are slightly longer than the processes; two pairs of the lateral setæ are rather long, and the other marginal setæ of middle length. The third scutum (fig. 6 d)
with the processes considerably smaller than those on the second scutum, much broader than long, distally a little produced, and the distance between them nearly twice as long as their length; the setae less numerous, otherwise nearly as on the second scutum.

**Legs.**—The last pair are rather short (fig. 6 e). The tibia with one dorsal seta, which is a little shorter than the diameter of the joint; the metatarsus with two dorsal protruding setae in the anterior row about as long as the depth of the joint. The tarsus is not quite four times longer than deep, with three protruding setae in the anterior dorsal row, and the two distal ones of these are somewhat longer than the depth of the joint. The claws (fig. 6 f) are moderately short, the anterior one rather robust, a little longer and somewhat thicker than the other; the front seta is moderately short. The first pair (fig. 6 g) a little longer than thick, with a small terminal acute process and about three setae, one of which is long.

**Cerci** (figs. 6 h and 6 i).—Rather large, almost as long as the last pair of legs, four to four and a half times longer than deep, and especially in its proximal half considerably broader than deep. They are very densely clothed with setae, many of which protrude in all directions, and some of them about half as long as the depth of the cerci, while the others are much shorter and depressed. The terminal area looks outwards (fig. 6 h), is very oblique, and not half as long as the depth of the cerci; the surface on the opposite side rather short, with about six lines. The apical seta is very short, much shorter than the area.

**Length.**—The adult specimens measure from 2 to 2·6 mm.

**Locality.**—Southern Brazil: Bella Vista (Paraná), two specimens. Paraguay: Tacurú Pucú (Alto Paraná), July 6th, 1900, two specimens. Argentina (Misiones): Pampa Piray, July 21st, 1900, one specimen; S. Ana, July 27th, 1900, two specimens; Posadas, June, 1900, four specimens. (All specimens collected by Dr. F. Silvestri.)

**Remarks.**—This species is easily separated from all other
forms of this group by the very thick plumose setae on the antennæ, which, besides, typically possess a higher number of joints than in any other species of the genus. In the setæ on the posterior legs it agrees essentially with S. vulgaris and allied forms, but it is widely separated from them by the shape and clothing of the cerci.

EXPLANATION OF PLATES 1—7,
Illustrating Mr. H. J. Hansen's paper on "The Genera and Species of the Order Symphyla."

PLATE I.

Fig. 1.—Scutigerella immaculata (Newp.), from Europe.


Fig. 1 a.—Appendages of the mouth, cleaned with caustic potash, from below. \( \times 61 \). The mandible on the right side of the figure omitted.

Fig. 1 b.—Distal joint of the right mandible, from above. \( \times 160 \).

Fig. 1 c.—A small part of the cutting edge of the same mandible with its "lacinia mobilis," \( \times 375 \).

Fig. 1 d.—Inner chitinous plates, \( p \), of the head, the hypopharynx, \( h \), and the maxillulae, \( m \), seen from above. \( \times 61 \).

Fig. 1 e.—The hypopharynx, \( h \), and the maxillulae, \( m \), from above. \( \times 190 \).

Fig. 1 f.—The process containing the calicle with the tactile hair, seen from the outer side. \( \times 200 \). t. Basal part of the tactile hair.

Fig. 1 g.—One of the setæ from the margin of the calicle shown in Fig. 1 f. \( \times 400 \).

Fig. 1 h.—The same calicle with the basal parts of the tactile setæ. \( \times 400 \).

Fig. 1 i.—The twenty-fifth joint of an antenna with fifty joints of a specimen from Rome, seen from the outer side. \( \times 90 \).

Fig. 1 j.—Second scutum of a large specimen from Rome. \( \times 36 \).
Fig. 1 f.—The two last scuta of the same specimen. X 36. c. The cavity on the last scutum.
Fig. 1 m.—Twelfth left leg of a large specimen from Denmark, seen from in front. X 57.
Fig. 1 u.—Claws of the twelfth right leg of the same animal, from behind. X 346.
Fig. 1 o.—First leg of the same Danish specimen. X 57.
Fig. 1 p.—Claws of the first right leg of the same animal, from behind. X 346.
Fig. 1 q.—Left cercus of the same Danish animal, from the outer side. X 57.
Fig. 1 r.—Twelfth left leg, not quite full-grown, of a specimen measuring 2·8 mm. in length from Marburg, from in front. X 89.
Fig. 1 s.—Claws of the twelfth right leg of the same specimen, from behind. X 383.
Fig. 1 t.—Eleventh left leg of the same specimen from Marburg, from in front. X 89.
Fig. 1 u.—Claws on the first leg of the same specimen. X 383.
Fig. 1 v.—Left cercus of the same small specimen from Marburg, from the outer side. X 89.

Fig. 2.—Scutigerella immaculata (Newp.), from Buenos Aires.
Fig. 2 a.—Claws of the twelfth right leg of a specimen 5·4 mm. in length, from behind. X 400.
Fig. 2 b.—Claws of the first right leg of the same large specimen, from behind. X 400.
Fig. 2 c.—Twelfth left leg of a specimen measuring 3·5 mm., from in front. X 83.
Fig. 2 d.—Claws of the twelfth right leg of the same smaller specimen, from behind. X 400.
Fig. 2 e.—Claws of the first right leg of the same smaller specimen, from behind. X 400.
Fig. 2 f.—Left cercus of the same smaller specimen, from the outer side. X 83. The apical seta has been broken off.

Fig. 3.—Scutigerella immaculata (Newp.), from Austin, Texas.
Fig. 3 a.—Claws of the twelfth right leg of a large specimen 5·7 mm. in length, from behind. X 405.
Fig. 3 b.—Claws of the first right leg of the same large specimen, from behind. X 405.
Fig. 3 c.—Left cercus of the same large specimen, from the outer side. X 75. The apical seta has been broken off.
Fig. 3 d.—Twelfth left leg of a smaller specimen, from in front. \( \times 91 \).
Fig. 3 e.—Claws of the twelfth right leg of the same smaller specimen, from behind. \( \times 405 \).
Fig. 3 f.—First leg of the same smaller specimen. \( \times 91 \).
Fig. 3 g.—Claws of the first right leg of the same smaller specimen, from behind. \( \times 405 \).
Fig. 3 h.—Left cercus of the same smaller specimen, from the outer side. \( \times 91 \).

PLATE 2.

Fig. 1.—Scutigerella armata, n. sp
Fig. 1 a.—Twelfth left leg, from in front. \( \times 85 \).
Fig. 1 b.—Claws of the twelfth right leg, from behind. \( \times 340 \).
Fig. 1 c.—First leg of the same specimen. \( \times 85 \).
Fig. 1 d.—Femur of the leg shown in Fig. 1 c, from in front. \( \times 175 \).
Fig. 1 e.—Process of the femur of another specimen. \( \times 175 \).
Fig. 1 f.—Claws of the first right leg, from behind. \( \times 340 \).

Fig. 2.—Scutigerella unguiculata, n. sp
Fig. 2 a.—The middle (sixteenth) joint of an antenna, from the outer side. \( \times 180 \). a. Small striped sense-organ.
Fig. 2 b.—Terminal antennal joint, from the outer side. \( \times 187 \).
Fig. 2 c.—The striped sense-organ, sitting on its protuberance, of the same terminal joint. \( \times 320 \).
Fig. 2 d.—Second scutum. \( \times 52 \).
Fig. 2 e.—Twelfth and thirteenth scuta. \( \times 52 \).
Fig. 2 f.—Twelfth left leg, from in front. \( \times 68 \).
Fig. 2 g.—Claws of the twelfth right leg of the same animal, from behind. \( \times 336 \).
Fig. 2 h.—First leg of the same specimen. \( \times 68 \).
Fig. 2 i.—Claws of the first right leg, from behind. \( \times 336 \).
Fig. 2 k.—Left cercus of the same specimen, seen from the outer side. \( \times 68 \).

Fig. 3.—Scutigerella caldaris, n. sp
Fig. 3 a.—Thirteenth joint of an antenna with twenty-five joints, from the outer side. \( \times 131 \).
Fig. 3 b.—Second scutum. \( \times 58 \).
Fig. 3 c.—Twelfth left leg, from in front. \( \times 90 \).
Fig. 3 d.—Claws of the twelfth right leg of the same specimen, from behind. \( \times 415 \).
Fig. 3 e.—Claws of the first right leg of the same specimen, from behind. \( \times 415 \).

Fig. 3 f.—Left cercus of the same specimen, from the outer side. \( \times 90 \).

Fig. 3 g.—The process with the calicle containing the tactile seta, seen somewhat obliquely and from the outer side. \( \times 340 \).

Fig. 4.—Scutigerella orientalis, n. sp.

Fig. 4 a.—Twelfth left leg of a large specimen (5 mm. long) from Sumatra, from in front. \( \times 60 \).

Fig. 4 b.—Claws of the twelfth right leg of the same large specimen, from behind. \( \times 275 \).

Fig. 4 c.—First leg of the same large specimen. \( \times 60 \).

Fig. 4 d.—Claws of the first right leg of the same large specimen, from behind. \( \times 275 \).

Fig. 4 e.—Twelfth left leg of a smaller specimen from Koh Chang, from in front. \( \times 76 \).

Fig. 4 f.—Claws of the twelfth right leg of the last-named specimen, from behind. \( \times 344 \).

Fig. 4 g.—Claws of the first left leg of the last-named specimen, from in front. \( \times 344 \).

PLATE 3.

Fig. 1.—Scutigerella orientalis, n. sp. (continued).

Fig. 1 a.—Head of a specimen from Koh Chang, from above. \( \times 43 \).

Fig. 1 b.—Basal part of the left antenna of the same specimen, from above. \( \times 90 \).

Fig. 1 c.—The twenty-first joint of an antenna with forty joints of a large specimen from Sumatra, from the outer side. \( \times 140 \).

Fig. 1 d.—Second scutum of a specimen from Sumatra. \( \times 44 \).

Fig. 1 e.—Penultimate scutum of the last-named specimen. \( \times 44 \).

Fig. 1 f.—Left cercus of a specimen from Koh Chang, from the outer side. \( \times 76 \).

Fig. 2.—Scutigerella plebeia, n. sp.

Fig. 2 a.—Tenth left leg, from in front. \( \times 86 \).

Fig. 2 b.—Claws of the last-named leg, from in front. \( \times 290 \).

Fig. 2 c.—Claws of one of the first legs. \( \times 290 \).

Fig. 2 d.—Right cercus, seen from the outer side. \( \times 86 \). The apical seta has been broken off.
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Fig. 3.—Scutigerella nivea (Scop.).

Fig. 3 a.—Second scutum. × 88.
Fig. 3 b.—Thirteenth scutum. × 88.
Fig. 3 c.—Twelfth left leg of a rather small specimen, from in front. × 165.
Fig. 3 d.—Claws of the twelfth right leg of the last-named specimen, from behind. × 480.
Fig. 3 e.—Claws of the twelfth left leg of another specimen, from in front.
Fig. 3 f.—Claws of the first right leg, from behind. × 480.
Fig. 3 g.—Claws of the first right leg of another specimen, from behind.
Fig. 3 h.—Left cercus of the first-named specimen, from the outer side. × 165.

Fig. 4.—Scutigerella chilensis, n. sp.

Fig. 4 a.—Second scutum. × 44.
Fig. 4 b.—Thirteenth scutum of the same specimen. × 44.
Fig. 4 c.—Twelfth left leg, from in front. × 82.
Fig. 4 d.—Distal part of the tarsus with the claws of the twelfth right leg of the same specimen, from behind. × 340. In the interior of the tarsus the claws to be used after the next moult are to be seen.
Fig. 4 e.—First leg of the same specimen. × 82.
Fig. 4 f.—Claws of the first right leg of the same specimen, from behind. × 340.
Fig. 4 g.—Left cercus of the same specimen, seen from the outer side. × 82. The apical seta has been broken off.

Fig. 5.—Scutigerella capensis, n. sp.

Fig. 5 a.—Twelfth left leg of the largest specimen, from in front. × 42.
Fig. 5 b.—Claws of the last-named leg, from in front. × 224.
Fig. 5 c.—Tenth left leg of the same specimen, from in front. × 42.
Fig. 5 d.—Claws of the last-named tenth leg, from in front. × 224.
Fig. 5 e.—First left leg of the same specimen, from in front. × 42.
Fig. 5 f.—Claws of the last-named first leg, from in front. × 224.

PLATE 4.

Fig. 1.—Scutigerella capensis, n. sp. (continued).

Fig. 1 a.—The twenty-sixth joint of the antenna of the largest specimen, seen from the outer side. × 123.
Fig. 1 b.—Second scutum of the largest specimen. × 32.
Fig. 1 c.—Thirteenth scutum of the same specimen. × 32.
Fig. 1 d.—Left cercus of the largest specimen, from the outer side. $\times 42$.
The apical seta broken off.

Fig. 1 e.—Left cercus of the small specimen with the full number of legs, from the outer side. $\times 92$.

**Fig. 2.—Scutigerella angulosa, n. sp.**

Fig. 2 a.—Proximal part of the left antenna, from above. $\times 85$.

Fig. 2 b.—Terminal part of the last joint of the left antenna, seen from the outer side. $\times 330$. a. Large striped sense-organ. b. Small sense-organ with the stripes rudimentary. c. Sensory rods.

Fig. 2 c.—Second scutum. $\times 50$.

Fig. 2 d.—Thirteenth scutum of the same animal. $\times 50$.

Fig. 2 e.—Twelfth left leg of a very large specimen, from in front. $\times 86$.

Fig. 2 f.—Claws of the leg shown in Fig. 2 e, from in front. $\times 350$.

Fig. 2 g.—Twelfth left leg of a moderately large specimen, from in front. $\times 86$.

Fig. 2 h.—Claws from one of the first legs of a large specimen. $\times 350$.

Fig. 2 i.—Left cercus of the moderately large specimen (comp. Fig. 2 g), seen from the outer side. $\times 86$.

Fig. 2 k.—Eleventh left leg of a specimen with eleven pairs from Posadas, seen from in front. $\times 89$.

**Fig. 3.—Scutigerella angulosa, var. brevicornis, n. var.**

Fig. 3 a.—The eighth joint of an antenna with fifteen joints, seen from the outer side. $\times 164$.

Fig. 3 b.—Distal part of the terminal joint of an antenna, with various organs, from the outer side. $\times 330$.

Fig. 3 c.—Second scutum. $\times 59$.

Fig. 3 d.—Thirteenth scutum. $\times 59$.

Fig. 3 e.—Twelfth left leg, from in front. $\times 120$.

Fig. 3 f.—Claws of the twelfth left leg of the same specimen, from behind. $\times 450$.

Fig. 3 g.—Claws of the first right leg of the same specimen, from behind. $\times 480$.

Fig. 3 h.—Left cercus of the same specimen, seen from the outer side. $\times 120$.

**Fig. 4.—Scutigerella erascicornis, n. sp.**

Fig. 4 a.—Proximal part of the left antenna of a large specimen, seen from the outer side. $\times 40$.

Fig. 4 b.—The eight proximal joints of the left antenna of a large specimen, from above. $\times 80$.

Fig. 4 c.—Left cercus, from the outer side. $\times 88$. 
PLATE 5.

Fig. 1.—Scutigerella crassicornis, n. sp. (continued).

Fig. 1 a.—Head, from above. \( \times 52 \).
Fig. 1 b.—The sixteenth joint of a left antenna with thirty-one joints, seen from the outer side. \( \times 131 \). t. Sensory rod.
Fig. 1 c.—Second scutum. \( \times 55 \).
Fig. 1 d.—Twelfth left leg, from in front. \( \times 88 \).
Fig. 1 e.—Claws of the twelfth right leg, from behind. \( \times 330 \).
Fig. 1 f.—First leg. \( \times 88 \).
Fig. 1 g.—Claws of the first right leg, from behind. \( \times 330 \).

Fig. 2.—Scutigerella pauperata, n. sp.

Fig. 2 a.—The thirteenth joint of an antenna with twenty-seven joints, seen from the outer side. \( \times 200 \).
Fig. 2 b.—Terminal joint of an antenna, seen from the outer side. \( \times 200 \).
Fig. 2 c.—Distal sense-organs on the joint shown in Fig. 2 b, strongly magnified.
Fig. 2 d.—Second scutum. \( \times 80 \).
Fig. 2 e.—Twelfth left leg of a well-developed specimen, from in front. \( \times 130 \).
Fig. 2 f.—Claws of the twelfth right leg of the same specimen, from behind. \( \times 400 \).
Fig. 2 g.—Leg of the first pair of the last-named specimen. \( \times 130 \).
Fig. 2 h.—Claws of the first right leg of the same specimen, from behind. \( \times 400 \).
Fig. 2 i.—Left cercus of the same specimen, seen from the outer side. \( \times 130 \).

Fig. 3.—Scolopendrella notacantha, Gervais.

Fig. 3 a.—Head, from above. \( \times 56 \).
Fig. 3 b.—Twelfth joint of an antenna, seen from the outer side. \( \times 200 \).
Fig. 3 c.—Second scutum. \( \times 84 \).
Fig. 3 d.—Posterior part of the twelfth scutum. \( \times 84 \).
Fig. 3 e.—Eleventh left leg, from in front. \( \times 165 \).
Fig. 3 f.—Claws of the eleventh right leg of the same specimen, from behind. \( \times 450 \).
Fig. 3 g.—First leg of the same specimen, from behind. \( \times 165 \).
Fig. 3 h.—Claws of the first right leg of the same specimen, from behind. \( \times 450 \).
Fig. 3 i.—Left cercus of the specimen mentioned, seen from the outer side. \( \times 165 \).
Fig. 3 k.—The terminal area of the cercus, seen obliquely from the outer
side and from above. × 370. Only the basal part of the apical seta has been drawn.

**Fig. 4.**—Scolopendrella microcolpa, Muhr.

Fig. 4 a.—Head, from above. × 80.

Fig. 4 b.—The sixth joint of an antenna, seen from the outer side. × 185.

s. One of its plumose setae more strongly magnified.

Fig. 4 c.—Antepenultimate joint of the same antenna, seen from the outer side, and drawn with the same degree of enlargement as Fig. 4 b.

Fig. 4 d.—Twelfth left leg, from in front. × 134.

Fig. 4 e.—Claws of the twelfth right leg of the same specimen, from behind. × 430.

Fig. 4 f.—First leg of the same specimen. × 134.

Fig. 4 g.—Claws of the first left leg of the specimens mentioned, from behind. × 430.

Fig. 4 h.—Process containing the left calicle with the base of the tactile hair. × 368.

**PLATE 6.**

**Fig. 1.**—Scolopendrella microcolpa, Muhr (continued).

Fig. 1 a.—Second and third scuta. × 95.

Fig. 1 b.—Left cercus, from the outer side. × 134.

**Fig. 2.**—Scolopendrella subnuda, n. sp.

Fig. 2 a.—Twelfth joint of an antenna with twenty joints, seen from the outer side. × 350.

Fig. 2 b.—Second and third scuta. × 148.

Fig. 2 c.—Twelfth left leg, from in front. × 250.

Fig. 2 d.—Claws of the leg shown in Fig. 2 c, from in front. × 500.

Fig. 2 e.—First leg of the same specimen. × 250.

Fig. 2 f.—Claws of the leg shown in the preceding figure. × 500.

Fig. 2 g.—Left cercus of the same specimen, seen from the outer side. × 250.

**Fig. 3.**—Scolopendrella Silvestrii, n. sp.

Fig. 3 a.—Sixth joint of an antenna, seen from the outer side. × 250.

Fig. 3 b.—The second scutum and the processes of the first scutum. × 170.

Fig. 3 c.—Eleventh left leg, from in front. × 200.

Fig. 3 d.—Claws of the leg shown in Fig. 3 c, from in front. × 460.

Fig. 3 e.—First leg of the same specimen. × 200.
Fig. 3.f.—Tarsus with one claw—the other hidden behind—of one of the first pair of legs. × 460.

Fig. 3 g.—Left cercus of the same specimen, seen from the outer side. × 200.

Fig. 4.—Scolopendrella Isabella, Grassi.

Fig. 4 a.—The ninth antennal joint, seen from the outer side. × 190.

Fig. 4 b.—Second and third scuta. × 77.

Fig. 4 c.—Twelfth left leg, from in front. × 127.

Fig. 4 d.—Claws of the twelfth right leg of the same specimen, from behind. × 430.

Fig. 4 e.—Left leg of the first pair, from the outer side. × 430.

Fig. 4 f.—Left cercus of the same animal, seen from the outer side. × 127.

Fig. 4 g.—Distal part of the same cercus, seen from the outer side, and showing the prominent dorsal and lateral lines. × 500.

Fig. 4 h.—Distal part of a cercus seen from below, showing the stripes on the terminal area and the base of the lateral lines. × 500.

Fig. 5.—Scolopendrella texana, n. sp.

Fig. 5 a.—The thirteenth joint of an antenna with nineteen joints, seen from the outer side. × 122.

Fig. 5 b.—Second scutum. × 85.

Fig. 5 c.—Twelfth left leg, from in front. × 122.

Fig. 5 d.—Claws of the twelfth right leg of the same animal, from behind. × 416.

Fig. 5 e.—Left cercus, seen from the outer side. × 122. The apical seta has been broken off.

Fig. 6.—Scolopendrella vulgaris, n. sp.

Fig. 6 a.—Twelfth left leg, from in front. × 165.

Fig. 6 b.—Claws of the twelfth right leg of the same specimen, from behind. × 430.

Fig. 6 c.—Left leg of first pair, from the outer side. × 430.

Fig. 6 d.—Left cercus, from the outer side. × 165.

PLATE 7.

Fig. 1.—Scolopendrella vulgaris, n. sp. (continued).

Fig. 1 a.—Second and third scutum. × 90.
Fig. 2.—Scolopendrella neotropica, n. sp.

Fig. 2a.—Seventh joint of the left antenna, seen from the outer side. × 170.

Fig. 2b.—Second and third scuta. × 80.

Fig. 2c.—Twelfth left leg, from in front. × 133.

Fig. 2d.—Claws of the twelfth right leg of the same specimen, from behind. × 425.

Fig. 2e.—Claws of the second right leg of the same specimen, from behind. × 425.

Fig. 2f.—Left first leg, from the outer side. × 425.

Fig. 2g.—Left cercus of the specimen mentioned, from the outer side. × 133.

Fig. 3.—Scolopendrella simplex, n. sp.

Fig. 3a.—Second and third scuta. × 120.

Fig. 3b.—Twelfth left leg, from in front. × 152.

Fig. 3c.—Claws of the twelfth right leg of the same specimen, from behind. × 460.

Fig. 3d.—Left first leg, from the outer side. × 460.

Fig. 3e.—Left cercus of the specimen mentioned, from the outer side. × 152.

Fig. 4.—Scolopendrella pusilla, n. sp.

Fig. 4a.—Second and third scuta. × 131.

Fig. 4b.—Twelfth left leg, from in front. × 212.

Fig. 4c.—Left cercus of the same specimen, from the outer side. × 212.

Fig. 5.—Scolopendrella brevipes, n. sp.

Fig. 5a.—Second and third scuta. × 153.

Fig. 5b.—Twelfth left leg, from in front. × 200.

Fig. 5c.—First left leg, from the outer side. × 200.

Fig. 5d.—Left cercus of the same specimen, seen from the outer side. × 200.

Fig. 5e.—The same cercus, from above. × 200.

Fig. 6.—Scolopendrella antennata, n. sp.

Fig. 6a.—Eighth antennal joint, seen from the outer side. × 210. a.

One of the plumose setæ strongly magnified. The specimen is from St. Ann.

Fig. 6b.—Fourth antennal joint of another specimen, from above. × 210.
Fig. 6 c.—Twelfth antennal joint of the last-named specimen (from Bella Vista), from above. × 210.

Fig. 6 d.—Second and third scuta of a specimen from Tacurú Pucú. × 120.

Fig. 6 e.—Twelfth left leg of a specimen from St. Ana, from in front. × 146.

Fig. 6 f.—Claws of the twelfth right leg of the last-named specimen, from behind. × 440.

Fig. 6 g.—First left leg of the last-named specimen, seen from the outer side. × 440.

Fig. 6 h.—Left cercus of the last-named specimen from St. Ana, seen from the outer side. × 146.

Fig. 6 i.—The same cercus, from above. × 146.

Postscript.—In the autumn of 1902 Dr. F. Silvestri told me in a letter that he had worked out a new treatment of the Italian species of the Symphyla and Pauropoda; it had been accepted in Berlese's work 'Acari, Myriopoda et Scorpiones hoc. in Italia rep.', and he believed that Prof. Berlese was about to distribute the part in question to the subscribers. When in the second week of December I looked over the proofs of my paper I asked for the part mentioned in the 'Great Royal Library' in Copenhagen, which has purchased Berlese's work, but the library had not yet received that new part. Therefore I do not know whether it really had been published when I looked over the proofs, and I could not compare my species from Italy with those described by Dr. Silvestri.
Scutigerella immaculata (Newp.)
(1. From Europe. 2. From Buenos Ayres. 3. From Texas)
1. Scutigerella armata, n.sp.
2. S. unguiculata, n.sp.
3. S. caldaria, n.sp.
4. S. orientallis, n.sp.
1. Scutigerella orientalis, n.sp. 2. S. plebeia, n.sp. 3. S. nivea (seep.)
4. S. chilensis, n.sp. 5. S. capensis, n.sp.
1. Scutigerella capensis, n.sp.
2. S. angulosa, n.sp.
3. S. angulosa, var. brevicornis n.var.
4. S. crassicornis, n.sp.
1. Scutigerella crassicornis, n.sp. 2. S. pauperata, n.sp. 3. Scolopendrella notacantha, conv.
4. S. microcolpa, Muhr.
1. Scolopendrella vulgaris, n.sp. 2. S. neotropica, n.sp. 3. S. simplex, n.sp. 4. S. pusilla, n.sp.
5. S. brevipes, n.sp. 6. S. antennata, n.sp.