

SOLIFUGES, SCORPIONS AND CHILOPODA  
OF THE NAMIB DESERT

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(With 2 Text-figures)

## SOLIFUGAE

Family HEXISOPIDAE

Genus *Hexisopus* Karsch*Hexisopus pusillus* sp.nov.

(Figs. 1 a, b, 2 c)

TYPES. 1 ♂ holotype, 1 ♂ paratype, Berghof, Kuiseb River Valley, Namib, S.W. Africa, collected by R. F. Lawrence, May 1959.

COLOUR. Head-plate, mandibles and dorsal surface of appendages light violet, with some darker purplish markings; mandibles with two very ill-defined dorsal stripes, anterior margin of head-plate with purple markings as in Fig. 2c; anterior half of abdomen black, posterior half (last 6 or 7 tergites?) white but the posterior margins of these tergites with a narrow dark emargination and some long fine black setae; the two halves of the abdomen contrasting strongly in the living animal; head-plate and mandibles with a background coating of short black setae, some much longer blackish ones scattered among them; ventral surface of appendages light violet, the remaining parts yellow, malleoli white with a very fine blackish margination at the sides.

DENTITION. Both jaws long and slender as in *lanatus* but the ventral much longer than the dorsal one; dorsal jaw with 2 large distinct teeth (Fig. 1 a), the distal or uppermost much larger than the other (the opposite in *lanatus*); fangtip of dorsal jaw with a large inner tooth (Fig. 1 a), the granules at the base of the fang as in Fig. 1 b, seen from above. An inner series of 3-4, outer series of 7-8 cheek-teeth, the teeth of both series vestigial, minute and granuliform, those of the outer series far back and quite isolated, forming a regular row along the margin of the socket for the reception of the ventral jaw; 9-10 stridulatory ridges. Ventral jaw with one distinct tooth and some almost invisible black granules, a row of minute black granules in the middle of its outer surface.

FLAGELLUM as in Fig. 1 a, resembling that of *lanatus* and *infuscatus*, being intermediate to these in the degree of curvature of the shaft, differing from both in the far greater width of the shaft where it emerges from the cup-like capsule, the apex curved downwards in a fine point.

ABDOMEN piriform, much wider anteriorly than posteriorly, its anterior margin quite straight, the anterior part of the abdomen extending forwards over the head-plate and almost covering it; the black colour of the anterior half due to a thick covering of short fine jet-black hairs.

SPINATION. Tibia and metatarsus of pedipalp ventrally with numerous blackish cylinder bristles of varying length, cleft at their apices, some much shorter black hairs of uniform length dorsally. Legs spined much as in Purcell's description of *H. lanatus* (1899, p. 384).

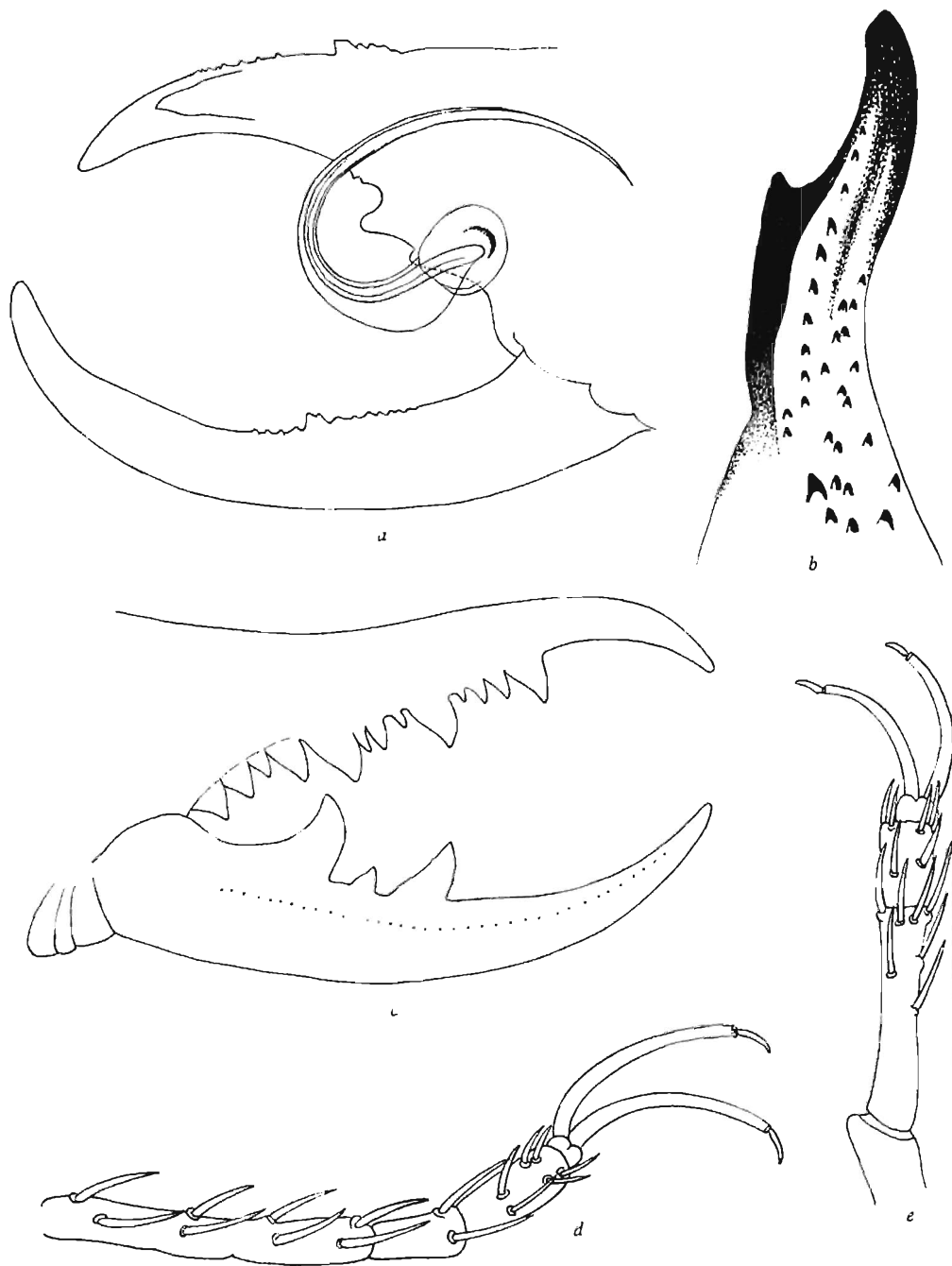


Fig. 1. *Hexisopus pusillus* sp.nov. ♂: a, chelicerae from inner side; b, apex of dorsal jaw from above. *Namibesia pallida* sp.nov. ♀: c, chelicerae from outer side; d and e, ventral view of tarsus IV and tarsus III respectively.

**DIMENSIONS.** Total length 7–8 mm.

This small solifuge was found running very actively between quartzite stones and gravel supporting small bushes and succulents on flat ground near Berghof. It differs from *H. lanatus* Purcell in colouring, dentition, size, and the shape of the flagellum (in its basal half), and in having the lower jaw distinctly longer than the upper; it does, however, in general resemble this species, especially in the long and slender mandibles. While differing from *infuscatus* (C. L. Koch) in the last respect, it resembles it in the dentition and shape of the inner tooth at the fang-tip of the dorsal jaw. In its colouring and unusually small size it differs from all other species of *Hexisopus*, the next smallest species of this genus being *H. reticulatus* Purcell (11.3 mm.), while *infuscatus* (C. L. Koch) is 12 mm., the much larger form *H. lanatus* Purcell 16–20 mm., the female of *H. crassus* Purcell 25 mm. in body length.

FAMILY DAESIIDAE

Genus *Blossiola* Roewer

*Blossiola* sp.

Two very small females from the sand-dunes at Gobabeb collected by D. Brown, and Farm Djab, Kuiseb River Valley, collected by R. F. Lawrence, May 1959.

Genus *Biton* Karsch

*Biton striata* Lawrence

1 ♀, Farm Djab, Kuiseb River Valley, Namib, collected by R. F. Lawrence, May 1959.

Genus *Eberlanzia* Roewer

*Eberlanzia flava* Roewer

The male only of this very distinct species was described by Roewer (1941, p. 138); the following is a description of the female which agrees in all important respects with that of the male.

**COLOUR** entirely white to pale yellow except for the following parts which are very lightly infuscated pale violet; apex of femur of pedipalp on outer and upper surface, apex of femur III dorsally and laterally; whole of femur IV except at its base, whole of tibia IV (but very lightly in distal half).

**SPINATION.** Pedipalp incarsate, much shorter than body length, with strong and definite spination as follows: femur on inner side with 1, tibia on inner side 2 long setiform spines and some even longer setae; metatarsus on inner side with 3 strong short blunt spines on its distal half, the 2 distal ones paired with similar but slightly shorter spines on the opposite side of ventral surface; opposite the proximal inner spine a strong, long seta. Tarsus long, about one-third metatarsus, with 1 short blunt inner spine in distal half, no outer spine.

Metatarsus of leg III with a dorsal row of 3 spines, the two proximal ones in basal fourth short, the third (subapical) twice as long as these; posterior surface with a row of 3 long slender spines (as long as the subapical dorsal spine); leg II similar to III but only the basal spine of dorsal surface much shorter than the others; metatarsus IV with 2 long subapical spines on outer surface, an even longer one at apex of inner surface.

**DENTITION.** Dorsal jaw with the anterior of the two distal main teeth smaller than the posterior, 1 fairly large intermediate tooth, 3 or 4 outer and 3 inner cheek teeth; ventral jaw as in ♂, normal.

**HEAD-PLATE** with a few long scattered setae, those on the posterior margin of head-plate stronger and forming a distinct regular row, mandibles above with a few scattered setae, more numerous mesially, laterally and at the base of the fang.

Abdomen without ctenidia on the first stigma-bearing sternite.

**DIMENSIONS.** Total length 21 mm.; pedipalp 14.5 mm.

The material consists of 5 adult ♀♀ from Gobabeb, collected R. Paulian and D. Brown, a single ♀ from Rooibank, Namib desert, both taken in sand-dunes, May 1959.

The genus differs from *Biton* in the unusually large number of true spines on the pedipalp-metatarsus and tarsus as well as in the number of segments of tarsus IV and their spination formula. It resembles *Namibesia* in the number of tarsal segments for leg IV but differs completely in the spination formula of these segments; it further differs in the dentition and in being more thickset and strongly built, the pedipalp being much shorter instead of longer than the total length of body and with a true spine on the tarsus, this being absent in *Namibesia*.

*Eberlanzia* seems to be another specialized form with a restricted distribution and confined ecologically to a sand-dune habitat, whereas *Biton* and *Namibesia* are not.

#### *Namibesia* gen.nov.

(Figs. 1c-e, 2a, b)

Legs II and III with 2, IV with 3 segments, as in *Eberlanzia*; spination of tarsi of these legs as follows: II and III 1.2.2/2.2.2, the last pair of the first segment flanked laterally by an additional very strong pair of lateral spines (Fig. 1e), the last pair of the second segment more lateral than the other two pairs; there is also an indication of a weak division of the second segment so that the tarsal formula might then be expressed as 1.2.1(2)1/2/2.2, but it seems more probable that there are only two tarsal segments; tarsal formula of leg IV 2.2.2.2/2/2.2.2, the last pair of spines more laterally situated, all three pairs of this segment considerably smaller than the others (Fig. 1d).

Coxae I-III with thick bacillar spines (Fig. 2a), as in the Rhagodidae of North Africa, and on the same segments as in this family, being absent from coxa IV and coxa of pedipalp; coxae I-III with 2, 10, 10 spines respectively but probably a slightly larger number; the spines are easily distinguished from other similar 'cleft' setae in their neighbourhood; they are much thicker, increasing rather than decreasing in width distally, yellow-brown in colour, the apex blackish; apex with a simple indentation (Fig. 2b), not sharply 'cleft' or with radial grooves at the apex as in Roewer's figure of *Solpuga venator* (1934, 109c).

**DENTITION.** Mandibles elongate and slender (Fig. 1c), dorsal jaw with 3 large main teeth, 3 smaller intermediate teeth between first and second main tooth and between second and third, one of these intermediate teeth may be extremely small, granuliform or absent but usually 9 teeth in all; in addition 4 outer cheek teeth, 3 inner. Ventral jaw normal, with 1 small intermediate tooth, its outer surface with a fine keel-like row of minute granules extending from apex of jaw to behind the second tooth.

**PEDIPALP** long and slender, only a little shorter, or longer than body. Femur on inner side of ventral surface with a row of 6-7 very long, powerful setose spines, alternating with much shorter and more slender similar spines, the larger ones arising from large conical projections. Outer side an irregular row of much shorter blunt-tipped spines; tibia similar to femur, an outer row of 5 very long stout setose spines alternating with 5 much shorter similar spines, inner side with about 8 shorter blunt-tipped spines; metatarsus with an outer row of 8-9 setose spines, 3 of them very long and thick, inner side with 4 long alternating with 4 shorter spines, all of them shorter than the outer row; tarsus ventrally unspined but both dorsally and ventrally with apically cleft cylinder bristles, metatarsus and tibia dorsally with shorter cylinder bristles.

The genus is possibly allied to the female of Hewitt's *Daesiella* (1934, p. 406),

the female of which is unknown but it differs markedly from this genus in the dentition, number of tarsal segments and the far larger number of spines on the ventral surface of these segments when compared with the ♂ of *Daesiella*; it seems to differ from all known South African forms in the remarkably thick bacillar rods of the coxae, such large spines (or any other large spines) being completely absent in the case of *Eberlanzia* for instance. Similar spines, however, though not so strongly developed, are to be found in other genera such as *Ceroma*.

TYPE. *Namibesia pallida* sp.nov.

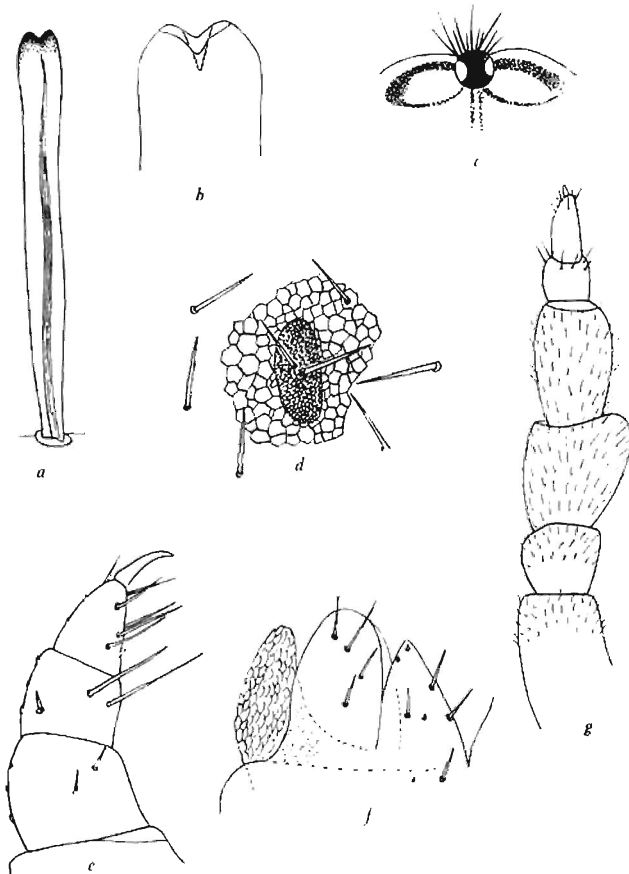


Fig. 2. *Namibesia purpurea* sp.nov. ♀: a, bacilliform seta of coxa II; b, apex of same, enlarged. *Hexisopus pusillus* sp.nov. ♂: c, ocular tubercle to show adjacent pattern of markings. *Eurytion aporopus* Attems ♀: d, clypeal area; e, telepodite of second maxilla, oral view; f, first maxilla, aboral view; g, last leg of ♂.

### *Namibesia pallida* sp.nov.

(Fig. 1c-e)

TYPE. 1 ♀, Gobabeb flats, east of the Kuiseb River, Namib, collected by R. F. Lawrence, May 1959

COLOUR almost entirely pale yellow, only leg IV with some infuscation consisting of a distinct violet stripe along the ventral surface of distal two-thirds of

femur and whole of tibia; femur and tibia of pedipalp also with a faint violet stripe on dorsal and ventral surfaces. Anterior margin of head-plate with a narrow purplish band, some ill-defined purple markings at the sides. Abdomen ash grey, without markings.

DENTITION as in generic description (Fig. 1c) seen from outer side; 7 stridulatory ridges; inner surface of dorsal jaw with a row of 7 enlarged smooth spines above the inferior margin; 4 enlarged smooth spines on outer surface of ventral jaw below and behind the second main tooth.

SPINATION. Metatarsus II with 1.1.2 spines on postero-inferior surface, 4 dorsal spines, metatarsus III similar but with 6 dorsal spines, IV similar but without dorsal spines; tarsi spined inferiorly as in generic description, the spines very large and regular; pedipalp spined as in generic description; mandibles fairly uniformly but not thickly covered with long slender brown setae; head-plate with far fewer and weaker setae, golden-brown in colour.

DIMENSIONS. Total length 25, length of palpi 22 mm.

### *Namibesia purpurea* sp.nov.

(Fig. 2a, b)

TYPE. 1 ♀, Farm Djab, Kuiseb River Valley, Namib, collected by R. Paulian, May 1959.

COLOUR. Whole of dorsal surface in general pale violet, metatarsus, tibia and femur (except at its base) of pedipalp darker violet, the ventral spines of femur with their bases encircled by a dark ring; mandibles with 2 dorsal, 1 lateral very ill-defined darker stripes; head-plate darker at the sides, abdomen damaged, but with a broad median violet marking. Distal half of metatarsus and whole of tarsus yellow in legs III and IV, femur and tibia with lateral violet stripes in II, metatarsus (except at base) and tarsus yellow, I with faint infuscation, metatarsus and tarsus yellow. Ventral surface of coxae and abdomen pale yellow.

Coxae I-III with thickened bacillar spines as in Fig. 2a, 2. 10. 10, or more on the last two segments, coxa of leg IV and pedipalp without (see generic description); these rods much thicker, relatively shorter and more conspicuously coloured than in the case of *N. pallida*.

DENTITION. The jaws long and slender, differing from the preceding species in having only 2 intermediate teeth between first and second main tooth, 1 between second and third main tooth, thus 6 teeth in the anterior single series, 4 outer cheek teeth and only 2 widely separated inner ones; inner surface of mandible with a row of 5 long smooth enlarged spines above the inferior margin of dorsal jaw, 7-8 stridulatory ridges. Lower jaw normal, 1 intermediate tooth, a row of a few well-separated minute granules, not forming a keel, on the outer surface.

SPINATION. Legs spined as in generic description. Pedipalps spined as in generic description, those on the outer side of ventral surface much shorter and blunt-tipped, the spines of the tibia the longest of all those on the appendage; tibia and metatarsus dorsally in the middle each with a pair of very long, fine, thread-like setae (trichobothria?),  $1\frac{1}{2}$  times as long as their respective segments. Metatarsus of pedipalp almost twice as wide in basal as in apical half seen from the side. Mandibles and head-plate with a few scattered fine setae, those of the head-plate weaker.

DIMENSIONS. Length of body 17 mm., of pedipalp 18 mm.

This species is smaller and more slender than *pallida*, with relatively longer pedipalps. In colouring and dentition it is also different.

## FAMILY SOLPUGIDAE

Genus *Solpuga**Solpuga* sp.

1 immature ♀, Gobabeb sand-dunes, Kuiseb River, Namib, collected by R. F. Lawrence. Two other very young females of this genus on the flats east of Gobabeb, collected by R. Paulian and R. F. Lawrence.

Genus *Solpugista* Rower

1 ♀, Swartbergen, near Walfish Bay, collected by C. Koch, May 1959.

This peculiar form differs from all others of the genus in its colouring; when the male is discovered it will doubtless prove to be a new species nearest to *Solpugista ornithorhyncha* (Hewitt).

COLOUR. Mandibles with 3 dorsal stripes, the middle twice as wide as the lateral ones; head-plate with 4 wide, irregularly defined longitudinal stripes, the two median ones longer than the laterals. Opisthosoma dorsally with three very clearly defined longitudinal stripes, composed of a series of a black dot to each tergite, those forming the lateral stripes more or less quadrate, much longer than wide, but at least twice as wide as those of the median stripe which consist of a narrow black line on each tergite but disappearing on the last 3 or 4 altogether. Ventral surface pale, without markings, malleoli yellow.

Pedipalps with indistinct blackish infuscation, especially above, tarsus and base of metatarsus darkest; legs not infuscated except IV which has the femur light violet, tibia quite black, metatarsus black in basal half, yellow in distal half (the last two segments with a mane of long yellow hairs), tarsal segments with some ill-defined infuscation above, strongest in the apical segment; the black portions of leg IV contrasting strongly with the remainder.

DIMENSIONS. Total length 29 mm., pedipalp 22 mm.

The following species have been received from other localities in South-West Africa:

*Biton ovambicus* (Lawrence)

1 ♀, Kaoko Otavi, collected by F. Gaerdes, Sept. 1959.

*Blossiola falcifera* Kraep

1 ♂, Windhoek, collected by D. Brown, May 1959. The specimen agrees with typical *falcifera* except that the apex is certainly not strongly hooked but lightly curved to a fine point.

*Solpuga venator* Pocock

1 ♂, 2 ♀♀, Aus, South-West Africa (Transvaal Museum), collected by Erni.

*Solpuga monteiroi* Pocock

1 ♂, 1 ♀, Okahandja, South-West Africa, collected by F. Gaerdes, Sept. 1959.

*Solpugassa kochi* Lawrence

2 ♂♂, the Kunene River, collected by F. Gaerdes, Sept. 1959.

These forms are more or less intermediate to *S. kochi* Lawrence (1959, p. 380) and *S. kaokoensis* Lawrence. They agree with *kaokoensis* in the greater length of the flagellum and its hooked apex; with *kochi* in the curvature of the shaft viewed from above and in having a small black tooth at the base of the second main

tooth of ventral jaw. *S. kaokoensis* seems to be a variable species and if, as I suspect, a number of intermediate forms connect it to *kochi* it may later be found necessary to combine the two species.

## SCORPIONES

### BUTHIDAE

#### **Parabuthus villosus** Pocock

1 ♂, 1 ♀, Gobabeb, plains east of Kuiseb River, Namib, collected by R. Paulian and R. F. Lawrence; 1 juv., Farm Djab, Kuiseb River Valley, collected by R. F. Lawrence, May 1959.

#### **Uroplectes planimanus** (Karsch)

1 ♂, Hohenheim, Kuiseb River Valley, Namib, collected by R. F. Lawrence, May 1959.

#### **Uroplectes otjimbinguensis** (Karsch)

3 ♀♀, 2 ♂♂, 15 young, under *Acacia* logs in dry river bed, Gobabeb, collected by R. F. Lawrence, May 1959.

This rare species was not found either in the sand-dunes or on the rocky plateaux east of the Kuiseb river but only along the banks of the river itself. It seems to be an arboricole species, not a sand-living or rupicolous one.

#### **Uroplectes carinatus mediostriatus** Kraepelin

1 ♀, Huab Mts., 40 miles east of Swakopmund, collected by D. Brown, May 1959.

### FAMILY SCORPIONIDAE

#### **Opisthophthalmus carinatus histrio** Thorell

2 ♀♀, 1 ♂, 2 immature from Hohenheim, Kuiseb River Valley and Gobabeb, Namib, collected by O. Prozesky and R. F. Lawrence, May 1959.

This is probably the commonest species of *Opisthophthalmus* in the central parts of South-West Africa.

#### **Opisthophthalmus** sp.

The right pedipalp of an adult ♀ and 2 very immature specimens were taken on the sand-dunes at Gobabeb but the material is quite insufficient to diagnose the species, which may very probably be unknown to science. In the straight claws of the juveniles and in their general colouring they seem to resemble *O. adustus longiceps* Lawrence and *O. wahlbergi nigrovesicalis* Purcell.

The following species from South-West Africa have recently been collected:

#### **Buthus aeratus** Lawrence

Many females and immature specimens, Kunene River between the Ruakana and Epupa Falls, collected F. Gaerdes, Sept. 1959; 1 juv. from Kaoko Otavi by the same collector.

#### **Parabuthus granulatus** (H. & E.)

1 juv., Okahandja, collected by F. Gaerdes, Sept. 1959.

#### **Parabuthus brevimanus** Thorell

1 ♀, Kunene River, collected by F. Gaerdes, Sept. 1959.



**Parabuthus schlechteri** Purcell

1 ♀, Bethanie, collected by F. Gaerdes, Sept. 1959.

**Parabuthus villosus** Pocock

2 ♂♂ from Bethanie, collected by F. Gaerdes, Sept. 1959; 1 ♀, Aus (Transvaal Museum), collected by Erni.

**Uroplectes carinatus mediotriatus** Kraep.

1 ♂, Kaoko Otavi, 2 juv., Okahandja, collected by F. Gaerdes, Sept. 1959.

**Opisthophthalmus gigas** Purcell

1 ♂, Aus (Transvaal Museum), collected by Erni.

**Hadogenes tityrus** Simon

1 immature ♀, Aus (Transvaal Museum), collected by Erni.

**Opisthophthalmus carinatus histrio** Thorell

1 ♀, Bethanie district, collected by F. Gaerdes, Sept. 1959.

**CHILOPODA****GEOPHILOMORPHA****Aspidopleres intercalatus** Porat

2 ♀♀, near Good Hope Mine, east of Kuiseb River, Namib, both with 101 legs, collected by L. Vari; 1 ♂, ♀, Farm Djab, Kuiseb River Valley with 87 and 97 pairs of legs, collected by R. F. Lawrence, May 1959.

The species has also been collected by Mr F. Gaerdes at Ondongua, Ovambo-land (♀, 105 legs), and Okahandja (♂, 95 legs).

**Diphtherogaster flavus** Attems

♂ and ♀, Farm Djab, Kuiseb River Valley, with 111 and 137 pairs of legs, collected by R. F. Lawrence, May 1959.

These two large monotypic species of Geophilomorpha seem fairly common in South-West Africa and often occur in the same localities. They can be easily recognized on external characters alone, even by the non-specialist, and to the distinguishing characters given by Attems (1928, 1929) I add others in the following columns.

*A. intercalatus* Porat

4 separate groups of pores on sternites  
Genital (last) legs with 7 segments  
Colour in general dull pale yellow, each segment with a pair of fine black longitudinal lines, giving a general impression of a narrow black stripe down the middle of dorsum  
Two rows of paratergites  
Tergites rather roughened with creases and depressions, no paired sulci in the middle  
Sternites with a median sulcus (at least in posterior segments)  
Leg number: ♂ 87-95; ♀ 93-105

*D. flavus* Attems

Pores of sternites in a closed quadrangle  
Genital legs with 6 segments  
General colour bright orange yellow, no blackish markings of any kind  
No paratergites  
Tergites very smooth and shiny with a pair of very deep, distinct median sulci  
Sternites without sulci  
♂ 111-115; ♀ 127-138

**Eurytion aporopus** Attems(Fig. 2*d-g*)

**E. aporopus** Attems, 1922 (*Beitr. Kennt. Land-Süßwasser Fauna S.W. Afrika*, p. 99, fig. 1).

This species does not seem to have been recorded again since Attems first described it in 1922. Three specimens from the suburbs of Windhoek (under stones) differ from the description of the type only in having the clypeal area distinctly oval, longer than wide (Fig. 2*d*), and not circular as stated by Attems; in addition to the 6 spines near the clypeal area there are 6-7 others (more laterally to these) on each side, thus 18-19 in all.

Maxillae with the first pair spined as in Fig. 2*f*, aboral view, oral surface entirely without spines, the reverse being the case in the telepodite of second maxillae in which most of the spines are on the oral surface (Fig. 2*e*), there being only 2 small spines on the aboral surface, these confined to the basal segment.

Last leg of ♂ as in Fig. 2*g*; all specimens with 59 pairs of legs. *Material*: 1 ♂, 2 ♀♀ from Kleinwindhoek, collected by R. F. Lawrence, May 1959.

In spite of the small difference in the clypeal area there is little doubt that these specimens should be referred to Attems' species; in all other respects they agree well with his description.

## SCOLOPENDROMORPHA

**Scolopendra morsitans** Linn.

1 specimen Gobabeb flats, east of the Kuiseb River, collected by R. F. Lawrence, May 1959.

**Cormocephalus anceps** *anceps*

1 specimen, Farm Djab, Kuiseb River Valley, collected by R. F. Lawrence, May 1959.

**Trachycormocephalus occidentalis**

2 specimens, Farm Djab, Kuiseb River Valley, collected by R. F. Lawrence, May 1959.

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