

SPIDERS OF THE NAMIB DESERT

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(With 5 Text-figures and 1 Plate)

INTRODUCTION

THE material taken in the Namib desert by various members of the expedition reached a total of thirty-nine identifiable species of Arachnida and Myriopoda.

The division between the fauna of the sand-dunes and that found on the rocky flats behind or to the east of the dried up Kuiseb River is a very sharp and definite one. As can be seen from the list on page 198, all the species taken in the sand-dunes are different from those found on the flats, a region covered with boulders of decomposing granitic rock, the bed of the Kuiseb River forming a clear-cut boundary between them.

Only one species was not found either under stones on the flats or in the sand-dunes, this being the scorpion, *Uroplectes otjimbinguensis*, which was taken only in the river bed and appears to be associated with *Acacia* trees under whose bark it lives.

The dune fauna was conspicuously lacking in several large groups such as the Pseudoscorpions, Isopoda and Myriopoda, while only a single species of scorpion was represented, a form of the large *Opisthophthalmus*. At least ten species of spider are represented in it, though the real number is doubtless far greater, as compared with thirteen taken in the flats. Three species of Solifugae live in the dunes as compared with five on the flats, though the latter number is probably a very conservative estimate.

The region, called the rocky flats, to the east of the Kuiseb supports a fauna which, though interesting and containing many unknown species, is fairly closely related to that of the inland semi-desert or arid parts of South-West Africa. Almost all the genera at any rate are identical, but as the coast is approached the number of new species becomes progressively greater. The largely rupicolous Arachnid orders, such as Scorpions and Pseudoscorpions, are best represented here; of the last-named group seven species were taken, five of them new to science, while not a single specimen was collected in the dunes.

The sand-dune fauna is still further differentiated than that of the rocky flats and, apart from the absence of the previously mentioned groups and certain Acari such as *Caeculus*, which are not able to live in sand at all, most of the genera are completely different from those living close at hand on the plains across the Kuiseb River.

A good example of such differentiation is to be found among the Sparassid spiders of which four genera exist, these apparently being different from other Sparassine genera in South-West Africa and some of them much larger than any occurring in Southern Africa. It is to be

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expected that some of the faunal gaps of the sand-dunes will be filled in by more extensive exploration; there is a fair possibility for instance that some Isopoda and Mollusca will be found living at the base of the *Aristida* grass tussocks in the dunes.

An adaptation highly developed in the desert among spiders is the armament of numerous strong spines on the legs and pedipalps and a fringe of modified setae on the pedipalps. Scopulae and brushes of modified thickened hairs on the metatarsi and tarsi are also extremely common; all are found in the large Sparassid spiders of the dunes as well as in other families.

Stridulatory organs in different spider families living in arid or desert regions are well known. Hitherto in South-West Africa they have been observed in the Sicariidae (*Sicarius*), Selenopidae (*Selenops*), some of the larger Aviculariid spiders and in most scorpions and Solifuges, a characteristic faunal element of dry and hot regions. To these may now be added the Palpimanidae, a large representative of which, *Palpimanus stridulator*, with a well-developed stridulatory organ, lives in the sand-dunes at Sandwich Bay.

My sincere thanks are tendered to all those members of the expedition who collected Arachnida so assiduously and especially to Dr R. Paulian and Mr Dick Brown, whose tireless labours both by day and night have brought forth so many interesting and new types of sand-dune spiders.

The following list affords a comparison of the fauna of the two adjacent habitats:

	Sand-dunes	River-bed	Rocky flats	
Araneae	<i>Camillina corrugata</i> <i>Palpimanus stridulator</i> <i>Caesetius deserticola</i> <i>Latrodectus mactans</i> <i>Tetragnatha andonea</i> <i>Leucorchestris arenicola</i> <i>Carparachne alba</i> <i>Palystella browni</i> <i>Microrchestris melanogaster</i>	—	<i>Stegodyphus canus</i> <i>Loxosceles spinulosa</i> <i>Sicarius albospinosus</i> <i>Opopaea</i> sp. <i>Prodidomus</i> sp. <i>Asemesthes</i> sp. <i>Xerophaeus aridus</i> <i>Palpimanus namaquensis</i> <i>Iheringia biplagiata</i> <i>Smeringopus</i> sp. <i>Argyope nigrovittata</i> <i>Olios correvooni nigrifrons</i>	1 ♀, N 1 ♀, G 1 ♀, F 3 ♀♀, C 1 ♀, I 1 imm
Scorpions	<i>Opisthophthalmus</i> sp. near <i>wahlbergi</i> ?	<i>Uroplectes</i> <i>Otjimbinguensis</i>	<i>Parabuthus villosus</i> <i>Uroplectes planimanus</i> <i>Opisthophthalmus carinatus</i> <i>histrion</i>	1 ♀, S Kuisseb I collected 1 ♀, G 1 ♀, G
Solifuges	<i>Blossiola</i> <i>Eberlanzia flava</i> <i>Solpuga</i> sp.	—	<i>Hexisopus pusillus</i> <i>Biton striata</i> <i>Namibesia pallida</i> <i>Namibesia purpurea</i> <i>Solpugista</i> , near <i>ornithorhynchus</i>	2 ♀♀, Hohenh
Myriopoda	—	—	<i>Aspidopleres intercalatus</i> <i>Diphtherogaster flavus</i> <i>Scolopendra morsitans</i> <i>Cormocephalus anceps</i> <i>Trachycormocephalus occidentalis</i>	

HOLO
R. Paulian
May 195

ARANEAE

FAMILY ERESIDAE

Dresserus sp.

1 ♀, Natab, Kuiseb River, Namib, collected R. F. Lawrence, May 1959.

Stegodyphus canus Purcell

1 ♀, Gobabeb flats, Namib, collected O. Prozeski, May 1959.

FAMILY SICARIIDAE

Loxosceles spinulosa Purcell

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

Sicarius albospinosus Purcell

3 ♀♀, Gobabeb flats, Namib, collected R. F. Lawrence, May 1959.

Scytodes broomi Purcell

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

FAMILY OONOPIDAE

Opopaea sp.

1 immature, ♂, Gobabeb flats, Namib, collected R. F. Lawrence.

FAMILY PRODIDOMIDAE

Prodidomus sp.

1 ♀, Swartbankbergen, Namib, collected R. F. Lawrence. 1 ♂, Farm Djab, Kuiseb River Valley, collected R. F. Lawrence. 2 ♀♀, Good Hope Mine, Namib, collected R. F. Lawrence.

FAMILY DRASSIDAE

Camillina corrugata Purcell

1 ♀, Gobabeb sand-dunes, collected D. Brown, May 1959.

Asemesthes sp.

1 ♀, Gobabeb flats, Namib, collected R. F. Lawrence, May 1959.

Xerophaeus aridus Purcell

2 ♀♀, Gobabeb flats, Namib, collected R. F. Lawrence, May 1959. 2 ♀♀, Hohenheim, Kuiseb River Valley, collected R. F. Lawrence, May 1959.

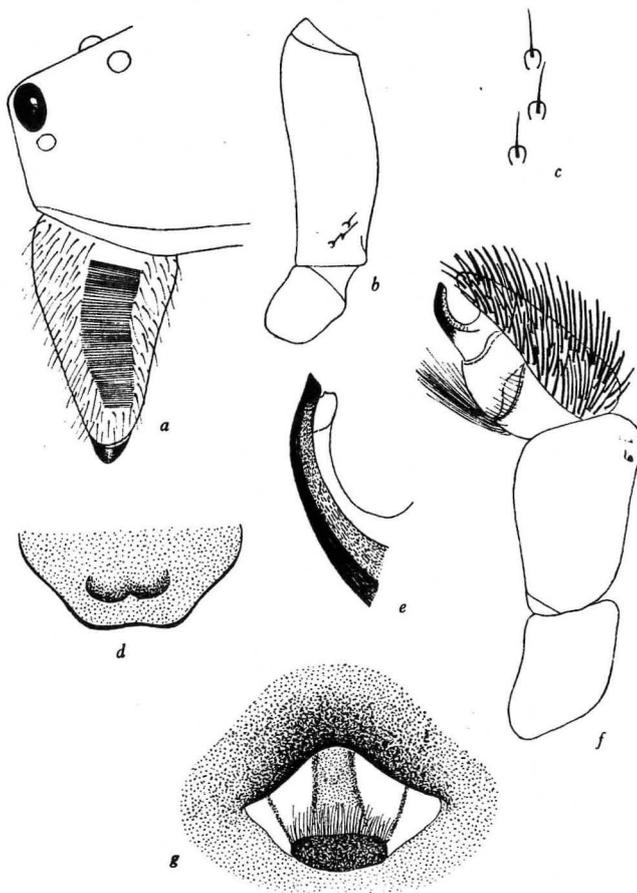
FAMILY PALPIMANIDAE

Palpimanus stridulator sp. nov.

(Text-fig. 1a-f)

HOLOTYPE. 1 ♂, Sandwich Bay near Walfish Bay, in sand-dunes, collected R. Paulian, May 1929; 1 allotype ♀, Gobabeb, in sand-dunes, collected D. Brown, May 1959.

COLOUR. Carapace dark red bordered narrowly with black, thickly covered with long white hairs, much less dense on ocular area and clypeus; chelicerae red with moderately dense white hairs in distal half; sternum and labium dark red bordered with black, maxillae orange; all coxae and trochanters of legs orange, remaining segments cream; abdomen fawn yellow, epigastric region with a large rounded dark red area on each side, a median quadrate area longer than wide much lighter red, bearing two dark red drop-shaped impressions in the middle near posterior margin.



Text-fig. 1. *Palpimanus stridulator* sp. nov. ♂: a, chelicera and anterior end of carapace from the side; b, trochanter and femur of pedipalp, inner side; c, stridulatory pegs of pedipalp enlarged; d, epigastric region of ♀; e, style of ♂ sex organ enlarged; f, ♂ pedipalp, outer side. *Caesetius deserticola* Simon. ♀: g, vulva.

CARAPACE closely covered with minute granules; fovea very deep, short, thoracic portion demarcated by a transverse procurved groove passing through the fovea.

EYES. Anterior row strongly procurved, medians large, about twice the diameter of laterals, their own radius apart and subcontiguous with the laterals; posterior row from above lightly recurved, subequal, medians $2\frac{1}{2}$ -3 times their diameter

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PEDIPALP papillae each the inner side of the inner side (see and certain) on the inner side and without

Text-fig. 1f LEGS AND except in leg dense or larger in base dense black denser than a very light ampulla, bec

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apart, a little less from the laterals; median quadrangle much wider in front than behind, wider in front than long; anterior medians about $1\frac{1}{2}$ times their diameter from the edge of the clypeus.

CHELICERAE. Superior margin with a regular straight row of strong sub-spiniform blunt-tipped setae; lateral surface with a stridulatory organ composed of an apparently smooth, hairless strip (Text-fig. 1a), but under higher magnification covered with extremely minute transverse striae.

PEDIPALP with a reciprocating organ of stridulation composed of 3 round papillae each bearing a black setiform spine (Text-figs. 1b, c), situated basally on the inner surface of the femur. The whole organ resembling that found in *Sicarius* (see Simon's figures 228 and 229, *Hist. Nat. des Araignees*, vol. 1, p. 269), and certainly of the same type; in *Sicarius*, however, there are 6 chitinous pegs on the inner surface of pedipalp femur, much larger than those of *Palpimanus* and without a setiform spine. Tarsal organ, seen from the outer side, as in Text-fig. 1f, e.

LEGS AND STERNUM. Sternum densely and regularly granular; all coxae smooth except in leg I which is entirely covered with small round red granules, not as dense or large as those of sternum, ventral surface of patella in distal half, of femur in basal third also with similar granules; tibia and metatarsus I with a dense black scopula along entire segment, that of metatarsus much thicker and denser than tibia, forming a dense black brush on inner ventral edge; tarsus with a very light scopula; the same segments in leg II with distinct but much weaker scopula, becoming progressively more so in III and IV.

DIMENSIONS. Carapace 4.8 mm., total length 12 mm.

♀. Colour as in ♂ except for the epigastric region (Text-fig. 1d), which is light red like the central portion of ♂ epigaster, bordered posteriorly by a sharply defined blackish red margin.

Pedipalp tarsus and tibia somewhat incrassate, its outer surface with a patch of thick blackish brown blunt setae. A stridulatory organ present on lateral surface of chelicerae and inner surface of pedipalp femur similar to that of the ♂.

Resembling the ♂ in all remaining characters, differing from it in only two respects: first, the shape and colour of the epigastric region (Text-fig. 1d), which in the male is not strongly indented in the middle; secondly, the complete absence of small red granules on the ventral surface of coxa, patella and femur of leg I.

DIMENSIONS. Length of carapace 4.5 mm., total length 10.1 mm.

This large species differs from all previously described forms in the granulation of the ventral surface of the basal segments of leg I of the ♂, and in the possession of a well-developed stridulatory organ.

Palpimanus namaquensis Simon

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

Iheringia biplagiata (Simon)

2 ♀♀, Farm Djab, Kuiseb River Valley. 3 ♀♀, Good Hope Mine, Namib.
2 ♀♀, Hohenheim, Kuiseb River Valley, collected R. F. Lawrence.

FAMILY ZODARIIDAE

Caesetius deserticola Simon

(Text-fig. 1g)

1 ♀, Rooibank, Walfish Bay, collected R. Paulian, May 1959. 4 ♀♀, Sandwich Bay, near Walfish Bay, collected R. Paulian, May 1959. 16 ♀♀, and young at

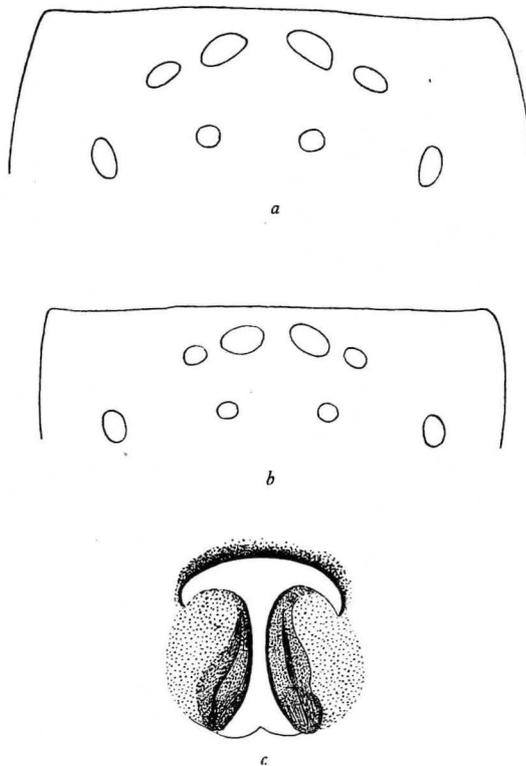
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various stages, Gobabeb, Namib, collected D. Brown and R. Paulian, May 1959.

All these specimens were taken in the sand-dunes. Spiders of all stages burrow head foremost with extreme rapidity into the sand, covering themselves completely in a few seconds. The material agrees well with Simon's description although the spines, especially of the posterior legs, are far too complex and numerous to be adequately dealt with in a written description. The large vulva is very distinctive (Text-fig. 1g). No males were taken although the species is one of the most common spiders of the dunes.



Text-fig. 2. *Leucorchestris arenicola* sp. nov. ♀: a, eyes from above. *Carparachne alba* sp. nov. ♀: b, eyes from above; c, vulva.

FAMILY PHOLCIDAE

Smeringopus sp.

3 ♀♀, Hohenheim, Kuiseb River Valley, collected R. F. Lawrence, May 1959.

FAMILY THERIDIIDAE

Latrodectus mactans Fabr.

2 ♀♀, Sandwich Bay, near Walfish Bay, collected R. Paulian, May 1959.

H. W. Levi of the Museum of Comparative Zoology at Harvard, U.S.A., has recently established the widespread South African species *L. indistinctus* or button-spider, as a synonym of the above.

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FAMILY ARGYOPIDAE

Argyope nigrovittata Blackwall

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

Tetragnatha andonea Lawrence

1 ♂, Sandwich Bay, near Walfish Bay, collected R. Paulian, May 1959.

FAMILY SPARASSIDAE

Leucorchestris gen.nov.

Resembling in general the North African genus *Cerbalus* of Simon, the anterior eyes more strongly recurved, the medians considerably larger than the laterals; posterior row fairly strongly recurved, the laterals much larger than the medians; median quadrangle a little longer than wide. Chelicerae with 3 triangular teeth on inferior margin, the apical largest. Pedipalp with 17-18 spines and an inner and outer brush of long modified setae on the ventral surface from femur to tarsus. Legs: tibiae and metatarsi with 2 inferior and 2 lateral pairs of spines on I-III, IV with 3 inferior, 3 lateral pairs; tarsi and metatarsi with a very thick scopula of short black hairs along their ventral surfaces. Legs II, III, IV, I. Size very large. The name of the genus (*λευκός* = white, *ὄρχηστρίς* = dancing girl)—is derived from the popular name given it by the observers who first saw it on the sand-dunes at night.

Type: *Leucorchestris arenicola* sp.nov.

Leucorchestris arenicola sp.nov.

(Text-figs. 2a, 3a, d, g; and Pl. XLII)

TYPE. One not fully mature ♀, Gobabeb sand-dunes, Kuiseb River Valley, collected at night by D. Brown, May 1959.

COLOUR in general white to cream, under surface of metatarsi and tarsi, especially the apices of the latter, black, apex of pedipalp tarsus blackish brown; carapace more or less covered with cream-coloured hairs becoming longer and thicker anteriorly, especially on ocular area and clypeus; basal two-thirds of chelicerae with cream-coloured hairs, apical third yellow-brown, shiny, naked except for scattered brown and reddish setae. Abdomen above thickly covered with white to cream hairs, a broad ventral band dark smoky brown, becoming progressively darker posteriorly, the spinners and area surrounding them covered with jet-black hairs.

EYES as in Text-fig. 2a, seen from above. Anterior row distinctly recurved, a little more so than posterior row, the medians large, $1\frac{1}{3}$ the diameter of the laterals, about two-thirds their own diameter apart, less than a radius from the laterals, more than their own diameter from edge of the clypeus. Posterior row only $1\frac{1}{3}$ as wide as anterior row, laterals almost twice as large as the medians which are 3 times or a little more their own diameter apart, a little farther from the laterals; laterals on each side a very little farther from each other than a posterior from an anterior median; median quadrangle a little longer than its posterior width, slightly narrower in front than behind.

CHELICERAE. Inferior margin with 3 large, triangular-pointed teeth, the apical distinctly larger than the two others which are equal and closely contiguous. Superior margin with 2 teeth, the basal small.

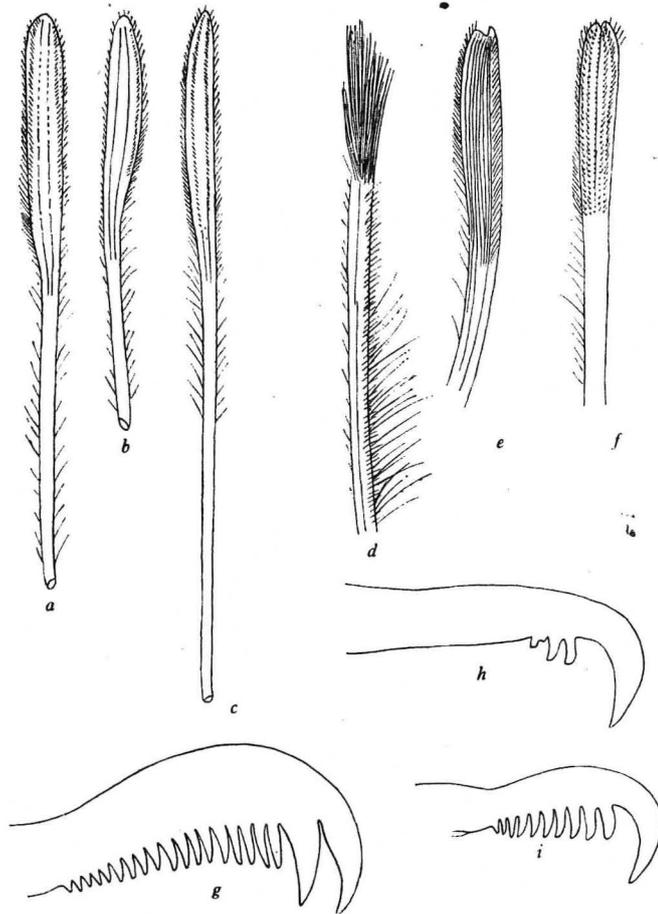
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LABIUM very wide and short, reaching to about a fourth the length of the maxillae.

Pedipalp. Femur apically with 2 dorsal, 1 outer, 1 inner spine, a fifth behind the two dorsal ones; patella dorsally with 1 inner, 1 outer spine, tibia similarly with 3 inner, 3 outer spines in basal half, tarsus with 2 outer, 3 inner spines, all these long and strong; small apical claw of tarsus with 7-8 comb-teeth. Ventral



Text-fig. 3. *Leucorchestris arenicola* sp.nov. ♀: a, scopula hair of metatarsus I; d, hair from fascicle of claws IV; g, superior claw, tarsus IV. *Carparachne alba* sp.nov. ♀: b, scopula hair, metatarsus I; e, hair from fascicle of claw IV; h, superior claw, tarsus IV. *Palystella browni* sp.nov. ♀: c, scopula hair of metatarsus I; f, hair from fascicle of claw IV; i, superior claw of tarsus IV.

surface with a continuous row of modified setae along the outer edge from femur to tarsus, those of the tibia most strongly developed, femur with a duplicated row of about 20, tibia with a brush (about 3 setae wide) occupying the whole length of segment, the modified setae very long, curved or sigmoid.

LEGS. Whole undersurface of metatarsi and tarsi with a sharply demarcated black scopula of modified hairs (Text-fig. 3a) much shorter and thicker than in

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Cebrennus (powelli) where there is a fairly thick scopula-like covering on the dorsal as well as on the ventral surfaces of these segments. Femora I-III dorsally with 3 anterior, 2 dorsal, 3 posterior spines, IV with 2.2.2(1) spines; patellae with an anterior and posterior lateral spine; and tibiae dorsally with 2 anterior, 3 dorsal and 2 posterior spines, and 3 pairs of inferior spines; all metatarsi with 2 pairs of long spines on basal half of inferior surface (IV with 3 pairs and median spine between the apical pair) and 3 pairs of lateral spines. Claws of leg IV as in Text-fig. 3g. Hairs of fascicle of metatarsus IV as in Text-fig. 3d enlarged.

DIMENSIONS. Carapace 12, total length 27 mm.; transverse measurement from tarsus to tarsus, 105 mm. ($4\frac{1}{4}$ inches).

FURTHER MATERIAL. 1 immature ♀ from Rooibank, Walfish Bay, collected R. Paulian, May 1959, which may perhaps be another species of this genus.

Carparachne gen.nov.

Related to *Leucorchestris* which it resembles in general appearance, differing from it as follows: anterior median eyes much larger than the laterals, posterior row more weakly recurved (Text-fig. 2b); posterior row almost twice as wide as anterior row, laterals on each side $1\frac{3}{4}$ as far from each other as is a posterior from an anterior median; median quadrangle much wider behind than long. Inferior margin of chelicerae with only two pointed triangular teeth. Pedipalp with spination and modified setae differing only in detail from *Leucorchestris* (Text-fig. 4d) Legs II, III, IV, I. Size much smaller.

TYPE. *Carparachne alba* sp.nov.

The genus is named in honour of Mr Bernard Carp of Cape Town, the well-known patron of scientific exploration, who sponsored and partly financed the expedition to the Namib desert of May 1959, where these sand-dwelling forms were collected.

Carparachne alba sp.nov.

(Text-figs. 2b, c; 3b, e, h; 4d; and Pl. XLII)

HOLOTYPE. 1 ♀, Gobabeb sand-dunes, Kuiseb River, captured at night by Dick Brown, May 1959.

COLOUR as in *Leucorchestris* with respect to the legs but the white hairs of the carapace much less dense, though fairly thick on the ocular area and clypeus; chelicerae entirely yellow, not darkened towards their apices, the white hairs very sparse on their anterior surfaces, only present on the basal two-fifths; ventral surface of abdomen without a darker median band, area surrounding spinners not black, only the spinners themselves blackish brown.

EYES as in Text-fig. 2b, seen from above. Both rows distinctly recurved, medians of anterior row large, almost twice the laterals, a little less than their diameter apart and a little nearer to the laterals; posterior row less recurved than anterior row but almost twice as wide; posterior medians about two-thirds the diameter of laterals, 4 times their own diameter apart, $1\frac{1}{3}$ times as far from the laterals as from each other; laterals on each side $1\frac{1}{2}$ - $1\frac{3}{4}$ as far apart as is a posterior from an anterior median; median quadrangle considerably wider behind than in front, much wider behind than long (by more than the diameter of a posterior median); anterior medians $1\frac{1}{2}$ diameters from edge of the clypeus.

CHELICERAE. Inferior margin with 2 large sharply triangular teeth, the apical distinctly larger; superior margin with 2 similar teeth, the basal much smaller.

PEDIPALP spined as in *Leucorchestris* except that the tibia has a row of 4 not 3 spines on inner side; femur with 5, patella 2, tibia 7, tarsus with 5 spines; modified setae of appendage as in Text-fig. 4d seen from below, femur on inner ventral edge with 4-10, outer edge with a rather irregular row of 15, continued on

the patella with 3-4, tibia with 18 and tarsus with 17-20 setae; tibia and tarsus with much less developed rather irregular inner rows of setae, the inner row of femur and outer row of tibia the longest and strongest of all these setae, which are usually sigmoid or curved.

LEGS. Femora I and II with 3 anterior, 2 dorsal, 3 posterior spines, III and IV with 3.2.2, or 3.2.1, remaining segments spined as in *Leucorchestris*; modified hairs of scopula of metatarsus I and fascicle of tarsus IV as in Text-fig. 3*b* and *e* respectively. Claw of tarsus IV as in Text-fig. 3*h*.

VULVA as in Text-fig. 2*c*, large, strongly chitinized and somewhat unsymmetrical.

DIMENSIONS. Carapace 11, total length 24 mm.; transverse measurement (tarsus to tarsus) 70 mm.

ADDITIONAL MATERIAL (paratypes). 1 adult ♀, 1 immature ♂, 10 smaller immature specimens of varying size, collected at night in sand-dunes at Gobabeb by R. Paulian and Dick Brown, May 1959.

Genus *Palystella* Lawrence

Palystella browni sp.nov. (Text-fig. 3*c, f, i*)

TYPE. 1 immature ♀, Gobabeb sand-dunes, Kuiseb River, Namib, collected at night by D. Brown, May 1959.

COLOUR. Carapace yellow, a little darker on the ocular area, thickly covered with long white hairs as in *Leucorchestris*, especially long on clypeus; chelicerae dark brown, with white hairs and setae in proximal half, black ones in distal half; legs uniform yellow, apices of tarsi black. Abdomen with very contrasting distinguishing coloration, anterior half of dorsum jet black, posterior half white except for a transverse black band at posterior apex encircling and including the spinners; this dark portion continued on to the ventral surface as a broad median black band becoming progressively lighter anteriorly, the epigastric region and sides of abdomen yellow.

CARAPACE. Cephalic portion elevated, its profile lightly arched but more or less level, thoracic portion sloping gently backwards, very short relatively to cephalic part, the fovea deep, situated far back near posterior margin of carapace.

CHELICERAE with 3 strong triangular teeth on inferior margin, the basal smallest, the apical largest; superior margin with a small basal, large apical tooth.

EYES. Posterior row much wider than anterior row which is lightly recurved; anterior laterals very large (the largest of the eyes) but not much larger than the medians which are three-quarters or four-fifths their diameter; medians their own radius apart and almost touching the laterals. Posterior row slightly recurved, the laterals about 3 times the diameter of the medians and subequal to the anterior laterals; medians twice their own diameter apart and $1\frac{1}{2}$ times as far from the laterals as from each other; a posterior median much farther from an anterior median than a posterior from an anterior lateral on each side; median quadrangle as wide behind as in front, much longer than wide; anterior lateral eye its own diameter from the edge of clypeus.

PEDIPALP with 17 spines, femur 5, patella 0, tibia 3-4 inner, 3 outer, tarsus 3 inner, 2 outer. Ventral surface with a row of modified setae in a series as in the two previous genera; outer row consisting of 15 (femur), 2 (patella), 10 (tibia) and 8 (tarsus).

LEGS. Femora I-III with 3 anterior, 2 dorsal, 3 posterior spines, IV similarly with 3.2.1 spines. Tibiae and metatarsi spined as in *Carparachne*. Claw of tarsus IV as in Text-fig. 3*i*; metatarsi and tarsi with a short blackish brown scopula not as thick as in *Carparachne*, the modified hairs of metatarsus I as in Text-fig. 3*c*, the fascicular hairs of tarsus IV as in Text-fig. 3*f*.

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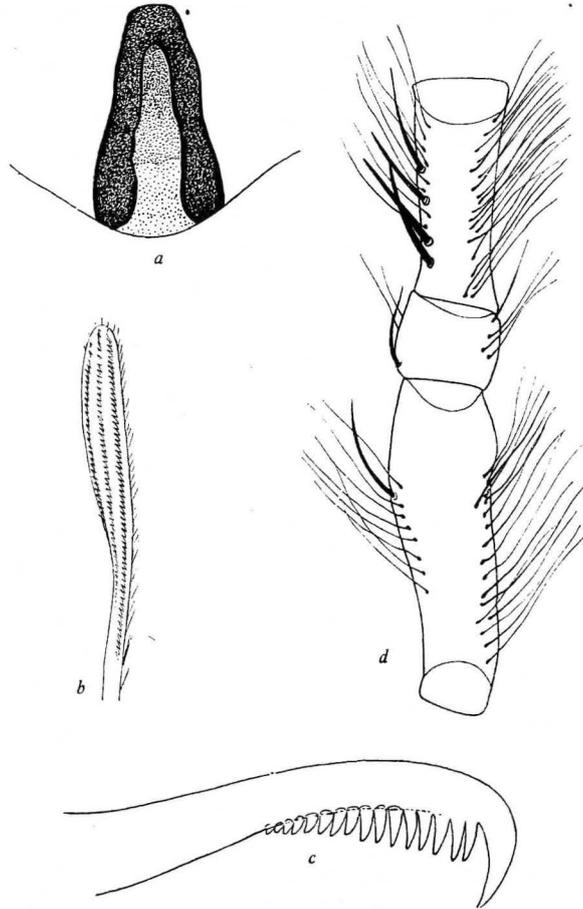
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DIMENSIONS. Carapace 8.5 mm.; total length 14.5 mm.

The species is named in honour of Mr Dick Brown of the Union Entomological Department, who captured a large number of the sand-dune inhabiting spiders collected during the Namib desert expedition. Though based on an immature ♀ it cannot be confused with any other species on account of the very distinctive bicoloured pattern of the abdomen and (except for the posterior



Text-fig. 4. *Microrchestris melanogaster* sp. nov. ♀: a, vulva; b, scopula hair of metatarsus I; c, superior claw, tarsus IV. *Carparachne alba* sp. nov. ♀: d, femur-tibia of pedipalp from below.

medians) the very large eyes and their specific disposition. It may later require to be accommodated in a separate genus related to *Palystella* Lawrence and *Arandisa* Lawrence; it differs from *Palystella* in having the scopula of leg IV sparse, the posterior median eyes much smaller than the laterals, the anterior surface of chelicerae flattened, not swollen and rounded.

Olios correvoni nigrifrons Lawrence

1 ♀, Gobabeb flats, Kuiseb River, collected R. F. Lawrence, May 1959.

Microrchestris gen.nov.

Both rows of eyes recurved, anterior row large, subequal, close together; posterior laterals subequal to eyes of anterior row, much larger than posterior medians; laterals nearer to each other on each side than is a posterior median to an anterior median; median quadrangle as long as wide. Chelicerae with 2 small teeth on inferior margin. Pedipalp ventrally with rows of modified setae as in *Leucorchestris* and *Carparachne*; scopula of anterior tarsi and metatarsi very weak, in posterior legs absent. Tibiae and metatarsi with long lateral and inferior spines, as in *Leucorchestris* and *Carparachne*. Size small.

Microrchestris melanogaster sp.nov.

(Text-fig. 4a-c)

HOLOTYPE. 1 ♀, allotype 1 subadult ♂, Sandwich Bay, near Walfish Bay, collected R. Paulian, May 1959.

COLOUR. Entire carapace, chelicerae, sternum, appendages, white to cream, only apices of tarsi black; entire abdomen above and below sooty blackish-brown. The eyes surrounded by black pigment.

EYES. Both rows seen from above well recurved, the posterior row a little more and not much wider than anterior row (about $1\frac{1}{2}$ times). Anterior eyes large, subequal, medians about a radius apart, subcontiguous with the laterals; posterior laterals much larger than medians, at least twice their diameter, medians as far from the laterals as from each other or a little nearer the laterals; laterals the largest of the eyes, a little larger than the anterior laterals, situated partly on a low tubercle; median quadrangle as long as posteriorly wide; anterior laterals a little nearer to posterior laterals than a posterior median is to an anterior median. Anterior medians their own diameter from the edge of the clypeus.

CHELICERAE. Inferior margin with 2 small subequal teeth not touching each other; superior margin with 2 moderate teeth, the apical (largest of the 4 teeth) much larger than the basal.

VULVA as in Text-fig. 4a.

PEDIPALP. Femur with 5 apical spines dorsally, patella with 1 weak spine on each side; tibia with a row of 4 very long tapering setiform spines on inner side, 1 dorsal and 2 outer spines; tarsus with 2 lateral spines on each side. Femur with a very regular, equally spaced row of 6 long setae on the distal two-thirds of outer surface, inner surface without a row; tibia with outer inferior row of 10 setae, tarsus with a regular outer row of 8-9.

LEGS. Femora I-III with 3 anterior, 2 dorsal, 3 posterior spines, IV similarly with 2.2.1; patellae I-IV with a lateral spine on each side; metatarsi and tarsi spined as in *Leucorchestris* and *Carparachne*, the spines of anterior metatarsi very long, but the scopula on these segments very weak, hardly visible. Superior claw of tarsus IV as in Text-fig. 4c, hairs of the fascicle of the claw as in *Carparachne*, cf. Text-fig. 3e; modified hairs of scopula of metatarsus I as in Text-fig. 4b.

DIMENSIONS. Length of carapace 4.4, abdomen (detached) 5.6 mm.

Through the kindness of Professor Max Vachon, Director of the Zoological Laboratory, National Museum of Natural History, Paris, I have been enabled to examine two Moroccan species of *Cebrennus*, *C. powelli* Fage and *C. cultrifer* Fage, for purposes of comparison with the Namib Sparassinae.

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The three new South African genera described above are evidently related to E. Simon's North African *Cebrennus* and *Cerbalus* with which they form a group characterized by having both rows of eyes recurved, the anterior medians being larger than the anterior laterals. They differ from these genera, apart from their predominantly white colour and, except in the case of *Microrchestris*, their far greater size, in the much larger number of spines on the pedipalp and the well-developed brush-like rows of modified setae on its inferior surface, the shorter and far denser hairs of the tarsal and metatarsal scopulae, dentition of the chelicerae and the details of the eye arrangement. In colouring they perhaps resemble *Cerbalus* (which I have not seen) more than *Cebrennus*. The five genera can be separated by means of the following key:

1. Pedipalp with 17-19 stout spines; ventral surface from femur to tarsus with a serial row of long modified setae; colour in general white but spinners black. 2
- Pedipalp usually with 5 spines (2 femoral, 2 tibial, 1 tarsal); ventral surface without a row of long modified setae; colour fawn to reddish yellow, abdomen dorsally sometimes with small darker spots (*Cebrennus*). 4
2. Inferior margin of chelicerae with 3 pointed teeth; tibia of pedipalp with an inner row of 4 spines; median quadrangle longer than wide; size 27 mm. 3
Leucorchestris gen.nov.
- Inferior margin of chelicerae with 2 pointed teeth; tibia of pedipalp with an inner row of 3 spines; median quadrangle as long as wide or wider than long; size 10-19 mm. 3
3. Scopula of anterior legs very strong; lateral eyes on each side much further from each other than a posterior from an anterior median eye; anterior median eyes much larger than laterals; size 19 mm. 3
Carparachne gen.nov.
- Scopula of anterior legs very weak; laterals on each side nearer to each other than is a posterior to an anterior median eye; anterior median eyes a little smaller than laterals; size 10 mm. 3
Microrchestris gen.nov.
4. Inferior margin of chelicerae with 3 teeth, the two distal ones geminate; posterior row of eyes strongly recurved and subequal. 3
Cebrennus Simon
- Inferior margin of chelicerae with 3 separate pointed teeth, the middle largest; posterior row of eyes weakly recurved, the laterals larger than the medians. 3
Cerbalus Simon

A NOTE ON THE DUNE-LIVING SPARASSIDAE OF THE NAMIB DESERT

One of the discoveries of the Bernard Carp-Transvaal Museum Expedition to the Namib in May 1959 has been the number of large Sparassidae, belonging to the Sparassinae of Simon, living in the sand-dunes. The find is in the first place due to Dr C. Koch of the Transvaal Museum who had seen one of these spiders on a previous visit when collecting Tenebrionid beetles in the dunes at night and described it to colleagues as a 'very large, white, dancing spider'. Had the observer not been a naturalist of such unimpeachable standing a description of this nature might have passed for another traveller's tale; in actual fact every word of this description has been fully corroborated by subsequent observations of various members of the expedition to the Namib and by the specimens captured in May 1959. From Dr Koch's account the present writer thought that the dune spider would prove to be a member of the four-lunged Aviculariidae, the family of large hairy spiders (*Bobiaanspinnekoppe*) which in the genera *Ceratogyrus* and *Harpactira* embody the largest spiders of Southern Africa and which are well known in South-West Africa.

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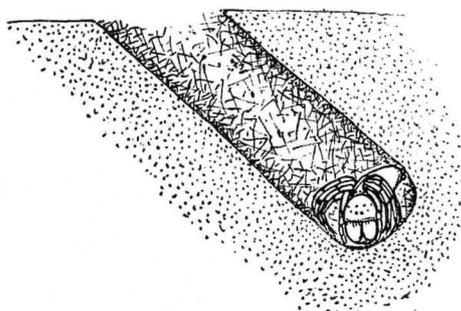
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At least one of these dune spiders, represented up to the present by four genera and four or five species, is comparable in size with the largest Aviculariid spiders. The type of the largest, *Leucorchestris arenicola*, is not a fully mature female, since there is no trace of a sexual orifice or epigyne, but even so, it is an inch in body length with a transverse leg span of more than 4 inches; this is unusually large for a two-lunged spider, even of the family Sparassidae which certainly has some large tropical representatives. There is thus no other species of Sparassid in Southern Africa as large as *Leucorchestris*, of which even larger forms may exist since it is known from only a single immature individual.



Text-fig. 5. The tube-like retreat built by *Carparachne alba*, from a sketch made at Gobabeb.

It would seem strange that such a large carnivorous arthropod should inhabit the ecological niche represented by a sand-dune habitat, where, as is well known, the basic food materials are small fragments of plant substances broken up and desiccated before being distributed by wind. Neither of the two most abundant insect groups, the Lepismatids and Tenebrionids, appear to provide a suitable diet, the former on account of their small size and secluded habits, the latter because of their extremely hard body coverings. It is more likely that the robust dune Sparassidae, like the large desert carnivora, require a prey more of their own order of body size with which they would sate themselves and avoid the necessity of having to feed again for some days or perhaps a week. They are evidently nocturnal in habit and indirect evidence pointed to the web-footed gecko, *Palmatogecko rangei*, also a nocturnal reptile, as their natural prey. It was observed that when the tracks of both gecko and spider met upon a dune there were signs of a disturbance and then only the tracks of the spider leading away from the scene; the lizard is soft-bodied, rather fragile and apparently without any means of defence, while the spider is quite strong enough to be able to overpower it. In Natal another large Sparassid spider, *Palystes natalius*, though somewhat smaller than *Leucorchestris*, often feeds upon the common wall gecko, *Lygodactylus capensis*, as was observed in 1923 by Warren (*Ann. Natal Mus.* 5 (1), 96). Weak and defenceless lizards such as geckos form very suitable prey for the larger spiders; other free-living hunting members of such families as the Lycosidae, Pisauridae and Aviculariidae have long been known to overcome and feed upon small vertebrates of various classes.

At least two of the dune-living genera of the Namib are closely related to two other desert Sparassinae from the northern extremity of Africa. Eugene Simon's two genera *Cebrennus* and *Cerbalus* have been found in the Canary Islands, the northern sea-board of Africa from Morocco to Egypt, Abyssinia and Syria; together with *Leucorchestris* and *Carparachne* they constitute a natural group but

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all the species of *Cebrennus* and *Cerbialus* which I have been able to study are much smaller and do not appear to possess the very light coloration of the Namib forms, which also differ in various structural details from their North African relatives.

The nocturnal arenicolous spiders, of which the Sparassidae appear to be the dominant family in the Namib, are characterized by large, well-developed eyes; in all of the three different forms found there the pedipalps have many more and stronger spines than is usual in this family. Another structure which is common to them all is a sweep or brush on the underside of the pedipalps composed of a row of long but strong setae which are unlike any of the other hairs or setae of the appendage; this is no doubt a modification for sweeping or moving sand when preparing the tunnels in which they live; it is brought to a higher point of development in other spiders which live in arid regions, such as the family Palpimanidae, where it forms a very thick stiff brush on the edge of the distal segments of the enlarged first leg, to a lesser extent on the posterior ones. A parallel modification can perhaps be seen in some Tenebrionid beetles such as the Opatrine *Gonopus conpachysoma* Koch from Little Namaqualand, although here the fringe of hairs is most abundant on the fourth leg (*Ann. Transv. Mus.* 21, 232, fig. 2).

In three of the four Namib Sparassine genera the scopula on the ventral surface of the tarsi and metatarsi is unusually thick and well developed; it doubtless plays a part in facilitating rapid movement over loose or shifting sand.

Both *Carparachne* and *Leucorchestris* were observed to make a shelter in the sand below surface level, that of *Leucorchestris* however being ill-defined and the structure rather rudimentary. *Carparachne* however makes a tube-like retreat, fairly short and wide, directed downwards at an angle of about 45° to the horizontal (Text-fig. 5); it is not known how the spider commences the tunnel as it was made during the night, but a rough irregular pattern of fine threads is laid on the inner walls, cementing the sand grains together and preventing the sand from pouring into the tube. From the opening above a certain amount of sand falls down the tube from time to time; this is pushed up the slope to the mouth of the tube by the spider's chelicerae which together form a vertical face, and by the palpi pressed against their sides, in the manner of a bulldozer. Most of the time the spider remains quiescent at the bottom of the tube with the appendages contracted and folded round the body. It is not certain if a sheet of silk is spun to cover the opening as in other spiders which construct a simple tube without a hinged trap-door, such as the four-lunged *Harpactira*.

The dune spiders in the open are very active and unusually aggressive. The impression of dancing may easily have been given by the aggressive or menacing attitudes of the spider, which, when threatened, raises itself very high above the ground, standing on the tips of the tarsi with the first pair of legs well extended and raised (Pl. XLII). The larger spider, *Leucorchestris*, appeared to be less aggressive than the smaller *Carparachne*, but this may have been due to injuries which had not been detected or the effects of a longer period of captivity.

In general the rather startling impression made on the writer by these spiders was their prevailing aggressiveness; while most spiders are in general on the defensive, and, when touched or otherwise stimulated, take to flight, these were always on the offensive and prepared to be aggressive at the slightest provocation.

It is perhaps permissible to suppose that large spiders such as these, living in surroundings where suitable animal food is by no means abundant, must often be extremely hungry; the loss of any opportunity for securing prey would be a disaster of greater magnitude in their case and qualities such as aggressiveness, vigilance and rapid reaction to any form of extraneous movement would be assets in the competition for survival.

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