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The Scorpions of Natal and Zululand.

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INTRODUCTION.

THE last revision of the South African scorpions was made in 1918 by Dr. J. Hewitt in his comprehensive " Survey of the Scorpion Fauna of South Africa," 'Trans. Royal Soc. S. Africa,' vol. vi, Pt. 2, p. 89. In this monograph the South African fauna was treated from a systematic point of view, and since its publication comparatively few additions have had to be made to the faunal lists, these being for the most part varieties or subspecies of already known forms. Valuable information was also given on the distribution of scorpions in a later paper by the same author, " Facts and Theories on the Distribution of Scorpions in South Africa," *ibid.*, vol. xii, p. 249, 1925.

The present paper provides a list of the species of scorpions found in Natal and Zululand,[1] based mainly on the collections of the Natal Museum. A new subspecies is described and some generalizations on the fauna of the area as a whole are made. The keys used for distinguishing the species have been adapted from those given by Hewitt in his systematic monograph already referred to.

For the sake of brevity the main contributors to the collections contained in the Natal Museum are referred to by their initials in capital letters, thus :

[1] A few records from Swaziland have also been included in the systematic lists.

W.G.R. (Mr. W. G. Rump), F.T. (Mr. F. Toppin), W.E.J. (Mr. W. E. Jones), E.W. (Dr. Ernest Warren), H.W.B. (Mr. H. W. Bell-Marley), R.F.L. (Dr. R. F. Lawrence), R.E.S. (Mr. R. E. Symons), C.A. (Dr. C. Akerman). In other cases the names of the collectors are given in full.

SYSTEMATICS OF THE FAUNA.

Family BUTHIDÆ.

Only two of the six genera found in South Africa occur in the Natal Zululand region. These can be distinguished by means of the following key :

A single tooth on the lower margin of the immovable finger of the chelicera
Pseudolychas Kraepelin.

No teeth on the lower margin of the immovable finger of the chelicera . *Uroplectes* Peters.

Gen. *Pseudolychas* Kraepelin.

There are apparently only two species of this small scorpion in South Africa, *ochraceus* (Hirst) and *pegleri* (Purcell), the species *multicarinatus* described by Hewitt from Zululand being regarded here as a variety of *pegleri*.

The species *ochraceus* does not occur in the Natal-Zululand area, but the Museum has 6 specimens from Barberton in the Transvaal which include 2 male and 1 female adult forms. When compared with specimens of *pegleri* from Port St. Johns the species is easily distinguishable from it in having the second sternite of the female granular at the sides and along its posterior margin, while sternites III and IV are wholly granular ; in *pegleri* even sternite IV is for the most part smooth and polished. In *pegleri* the middle lateral keel of caudal segment III is weak or obsolete, in *ochraceus* clearly defined, at any rate in its posterior two-thirds. The keels of the tergites and tail are in general stronger in *ochraceus*, there being also vestiges of short keels near the posterior margin of the cephalothorax. The hands of *ochraceus* are covered with minute scattered granules, those of *pegleri* being smooth. In the female of *pegleri* there is along the outer side of the cutting edge of the movable finger an enlarged granule at the middle of the basal row of granules, in addition to the double granules at the base of the remaining six rows (see Lawrence, 'Ann. Transvaal Mus.,' vol. xix, p. 291, fig. 1*c*). This extra granule is absent in *ochraceus* and *multicarinatus*. In our specimens of *ochraceus* the tooth beneath the aculeus is practically non-existent, but clearly defined in *pegleri*. The tail of the male *ochraceus* is stouter and proportionately shorter than that of the female and the fingers of the hands have a very prominent lobe near their bases, these being completely absent from the fingers of the female, which are long and straight like those of most *Uroplectes* species.

This character and the greater width of the male hand as compared with that of the female is more accentuated in *ochraceus* than in *pegleri*.

The two forms of *Pseudolychas pegleri* which occur in our area can be separated by means of the following key :

Middle lateral keel of caudal segment III obsolete, or represented by an irregular row of granules. Aculeus with a weak tubercle below . . *pegleri*, typical form (Purcell).

Middle lateral keel of caudal segment III strong and well developed. Aculeus with a strong pointed tubercle below . . . . . *pegleri multicarinatus* (Hewitt).

Pseudolychas pegleri (Purcell).

Lychas pegleri Purcell, Ann. S.A. Mus., vol. xi, p. 173, 1901.

The Museum has the species from the following localities in Natal : 1 ♂. Margate (W.G.R.) ; 1 ♀, Edendale, Pietermaritzburg (W.G.R.) ; 1 ♀, Town Bush, Pietermaritzburg (W.G.R.) ; 2 ♀♀, 6 juv., Port Shepstone (R.F.L.) ; 1 ♀, Pietermaritzburg (R.F.L.) ; 1 ♂, Otto's Bluff, near Pietermaritzburg (R.F.L.).

Pseudolychas pegleri multicarinatus (Hewitt).

Pseudolychas multicarinatus Hewitt, Rec. Alb. Mus., vol. iii, Pt. IV, p. 290, 1925.

The differences which Dr. Hewitt described between this and the typical form, though well marked, seem hardly sufficient to warrant specific recognition for it. In our Zululand specimens the middle lateral keels on caudal segment III are certainly strong and more clearly defined than in *pegleri*, but this character, as well as the tubercle below the aculeus, is rather variable in the typical form, and the Natal Museum has a number of specimens which might be regarded as connecting the two. Our specimens of *multicarinatus* from Zululand, as stated above, have only a double series of 6 flanking granules without the addition of a basal tooth along the external cutting edge of the movable finger, in this resembling *ochraceus* rather than the typical *pegleri*. The Museum has the species from the following localities in Zululand : 6 ♀♀, 1 ♂, Ingwavuma (R.F.L.) ; 8 ♀♀, 2 ♂♂, " Zululand " (F.T.) ; 2 ♀♀, 1 ♂, East Zululand (E.W.) ; 4 ♀♀, 3 ♂♂, Mfongosi (W.E.J.) ; 1 ♀, Melmoth (Miss Hickley) ; 1 ♀, Middeldrift, Tugela River (R.F.L.) ; 1 ♂, Tugela River (W.G.R.). The Albany Museum has 2 males from Ntambanana, Zululand.

Gen. *Uroplectes* Peters.

Three forms of this genus are found in the area under consideration ; they can be distinguished by means of the following key :

1. Caudal segments I–III with more or less distinct granular keels below. Colour of body uniform olive or blackish-green . . . . *triangulifer marshalli* Pocock.
   Caudal segments I–III quite smooth below. Colour of body yellow with black markings, or black with yellow markings . . . . . 2.
2. Terminal tooth of superior crests of caudal segments II and III greatly enlarged in the ♂. Last sternite almost wholly black . . . . . *formosus typicus* Pocock.
   Terminal tooth of superior crest of caudal segment III but not II greatly enlarged in the ♂. Last sternite almost wholly yellow . . . . *formosus maculipes* Hewitt.

Uroplectes triangulifer marshalli (Pocock).

Uroplectes marshalli Pocock, Ann. Mag. Nat. Hist. (6), vol. xvii, p. 392, 1896.

The Museum has a large number of specimens from Zululand and Natal which agree with Pocock's description as far as the colouring is concerned. These specimens, I think, cannot be well separated from *triangulifer*, as the vesicle in the male differs markedly from that of the female in being provided with a flattened sole. The colour pattern is however different from that of *triangulifer* and is constant throughout a large number of specimens, the trunk and tail being a uniform bronze or blackish-green. The appendages are variegated yellow and green, the segments of the legs being usually yellow with a broad green band in the middle; the fingers of the hands and the humerus at its apex are usually yellow, the rest of the pedipalp green. The markings of the appendages are somewhat variable. With the fairly large series of specimens before me I do not think the small differences between *marshalli* and *triangulifer* justify the retention of the former as a separate species. Our specimens differ from Pocock's description in having the basal pectinal tooth of the ♀ enlarged but not strongly so. In our Mfongosi specimens both the ♂ and the two ♀♀ have 22 pectinal teeth; the female is without a tubercle at the base of the immovable finger. This form seems to be a connecting link between *olivaceus* and *triangulifer*. It resembles the former in colouring and the absence of a tubercle at the base of the immovable finger in the female. It resembles *triangulifer* in the vesicle of the male, and Hewitt considers it to be identical with this form. It differs from *triangulifer tristis* Thorell in lacking a yellow median stripe on the trunk, although as noted by Hewitt there must be a close relationship between the two forms. This species seems to be the only form of *Uroplectes* found throughout the inland districts of Natal, where it replaces *U. formosus typicus* and is one of the commonest species of scorpion.

The Natal Museum has specimens from the following localities: 1 ♂, 2 ♀♀, Mfongosi, Zululand (W.E.J.); 2 ♀♀, East Zululand (E.W.); 2 ♂♂, Pongola, River, Zululand (H.W.B.); 1 ♂, Ingwavuma, Zululand (R.F.L.); 1 ♂ Melmoth, Zululand (W.G.R.); 1 ♂, 1 ♀, Nongoma, Zululand (E. S. Perks); 1 ♀, Ladysmith (Osborn); 1 ♀, Natal (A. E. Haviland); 1 ♂, 4 ♀♀, Krantzkop (W.G.R.); 2 ♀♀, Mpofana, near Greytown (R.F.L.); 2 ♀♀, van Reenen (W.G.R.); 2 ♂♂, 6 ♀♀, Junction of the Blaauwkrantz and Tugela Rivers (W.G.R. and R.F.L.); 4 ♂♂, 8 ♀♀, Weenen (W.G.R. and R.F.L.); 4 ♂♂, 22 ♀♀, Estcourt (W.G.R. and R.F.L.).

Uroplectes formosus typicus Pocock.

Uroplectes formosus Pocock, Proc. Zool. Soc., p. 134, 1890.

This is the commonest species of *Uroplectes* and one of the commonest scorpions in Natal. It is, however, confined to the coastal strip of the province

and does not seem to appear at Ladysmith, Estcourt, Weenen and other inland localities. The Museum has it from the following localities : *Natal :* 10 ♀♀, 2 ♂♂, " Natal " (E.W.) ; 2 ♀♀, Park Rynie (W.G.R.) ; 2 ♀♀, Scottburgh (J. Smith) ; 1 ♀, Pietermaritzburg (Carnegie) ; 1 ♀, Pietermaritzburg (E. Barnes) ; 10 ♂♂ and ♀♀, Pietermaritzburg (W.G.R.) ; 1 ♂, Umgababa (W.G.R.) 1 ♂, 1 ♀, Mazongwaan Forest, Greytown (R.F.L.) ; 2 ♀♀, Margate (W.G.R.) ; 2 ♀♀, Middeldrift, Tugela River (R.F.L.) ; 1 ♀, Port Shepstone (R.F.L.) ; 4 ♀♀, near Bulwer (W.G.R.) ; 1 ♀, Port Edward (W.G.R.) ; 3 ♀♀, Pietermaritzburg (C.A.) ; 1 ♀, Pietermaritzburg (H. D. Stanton). *Zululand :* 1 ♀, Umkuzi River (H.W.B.) ; 1 ♂, 2 ♀♀, Gollel (R.F.L.) ; 1 ♀, Ingwavuma (R.F.L.) ; 1 ♀, Pongola River (H.W.B.). Dr. Hewitt records it from Marianhill, Natal, and Forbes Reef, Swaziland.

Uroplectes formosus maculipes Hewitt.

Uroplectes formosus maculipes Hewitt, Proc. R. Soc. S. Africa, vol. vi, Pt. 2, p. 121, 1918.

The Museum has this subspecies from the following localities : 3 ♀♀, Zululand (F.T.) ; 3 ♀♀, Kosi Bay (R.F.L.) ; 1 ♀, Otobotini, Zululand (R.F.L.) ; 1 ♀, Umkuzi River, Zululand (H.W.B.). There seem to be a number of intergrading colour forms connecting this subspecies with the typical *formosus*.

Uroplectes planimanus Karsch.

Mr. Pocock has recorded the species from Durban on the evidence of Mr. G. A. K. Marshall. I do not think there can be any doubt that the record is an incorrect one. Dr. Hewitt has also expressed this view in his monograph on the South African scorpions. In the large series of *Uroplectes* from Natal and Zululand in the collections of the Museum there is not a single specimen of *planimanus* or any species resembling it.

Fam. Scorpionidæ.

Four genera are found in the Natal-Zululand region, one of which, *Opisthophthalmus*, falls in the sub-family Scorpioninæ, the remaining three in the sub-family Ischnurinæ. These genera can be distinguished by means of the following key :

1. Tarsi of legs with a pair of rounded lateral lobes at their apices which overlap the bases of the claws and often extend as far as the superior lobe or beyond. Tail strong, the first four segments normally with 8 keels. Adults without a prominent lobe near the base of each finger of the hand . . . . . *Opisthophthalmus* C. L. Koch.

   Tarsi of legs without a pair of rounded lateral lobes at their apices but sharply truncated on each side, the superior lobe projecting far beyond the lateral extremities of the segment. Tail rather weak, the lateral surfaces without well developed keels. Adults usually with a prominent lobe near the base of each finger . . . . . 2.

2. Ventral surface of brachium with numerous trichobothria arranged in 1–3 rows near to the granular post-ventral border, and similarly also on the under surface of the hand near its posterior margin. Tail strongly compressed laterally, often greatly elongated in the male ; the two infero-median keels of each caudal segment, except the first, tend to merge into each other and cannot be sharply separated. Pectinal teeth usually numerous, 13–30 in the adult male . . . . *Hadogenes* Kraepelin.

Ventral surfaces of brachium and hand with only a few trichobothria near the posterior margins. Tail not so strongly compressed laterally, not modified in the adult male ; the two infero-median keels of each caudal segment are well separated except sometimes in segment V. Pectinal teeth not more than 10 . . . . . 3.

3. Cutting edge of fingers armed with 2 continuous parallel rows of granular teeth *Opisthacanthus* Peters.

Cutting edge of fingers armed with only a single row of granular teeth, adjacent to which inferiorly there is a series of about 5 or 6 widely separated teeth *Cheloctonus* Pocock.

Genus *Opisthophthalmus* C. L. Koch.

Two species of the genus occur in Natal and Zululand, which can be distinguished by means of the following key :

Colour yellow-brown, at least part of the upper surfaces of the hands smooth and shiny *O. glabrifrons* Peters.

Colour blackish-brown, entire surface of hands covered with low granules *O. latimanus natalensis* Hewitt.

Opisthophthalmus glabrifrons Peters.

There are in the Museum collections 7 ♀♀ and 2 ♂♂ from Mfongosi, Zululand (W. E. Jones), which have been described by Dr. Hewitt in the addendum of his monograph of the South African Scorpions (p. 183) as differing somewhat from the typical *latimanus natalensis*. I consider this form to be a variety of *glabrifrons*. In addition to the description given by Dr. Hewitt of these Zululand examples the following may also be noted :

The Zululand form is considerably larger, the hands and tail in particular being more robust than in *latimanus natalensis*. In the female the surface of the hand at its inner posterior angle is quite smooth and shiny, while in *natalensis* the entire surface bears distinct granules though these are admittedly low and smooth. In *natalensis* also the anterior portion of the carapace between the lateral eye groups bears distinct though minute granules ; these are quite absent in the Zululand form of *glabrifrons*. The colour of the Zululand form is noticeably less dark than that of *latimanus natalensis* ; the number of spines on tarsus IV is consistently 5 posterior and 1 anterior ; in *latimanus natalensis* the numbers are often 4 and 2, though specimens with 5 and 1 also occur.

Pectinal teeth in the ♀♀ 11–14, in the ♂♂ 14–16.

In view of the well-known variability of *glabrifrons* and its wide distribution,

I have hesitated to give a subspecific name to its Natal form. It has the characteristic reddish-brown to reddish-yellow colouring of *glabrifrons*, and in this character and its size, which is consistently larger than *latimanus natalensis*, it is almost intermediate between the latter and *glabrifrons*. In the granulation of the inferior surface of the first two caudal segments it is more like *latimanus natalensis* than *glabrifrons*, but this also seems a fairly variable character. In the spination of the posterior tarsi on the other hand it resembles *glabrifrons*.

The Museum has a ♂ and ♀ example from Mpofana near Greytown (R.F.L.); 1 ♀, Umsinga (C. Fuller); 1 ♀, Colenso (G. Wood); 1 ♂, 5 ♀♀, Weenen (R.F.L. and W.G.R.).

Opisthophthalmus latimanus natalensis Hewitt.

O. latimanus natalensis Hewitt, Ann. Natal Mus., vol. iii, Pt. 2, p. 325, 1915.

The Museum has this form from the following localities: 1 ♀, "Natal"; 9 ♀♀, Ladysmith, Natal (Osborn); 1 ♀, Mooi River, Natal. Dr. Hewitt records it from Weenen, Natal (J. Chadwick).

Genus *Opisthacanthus* Peters.

Five species or subspecies occur in the area under consideration. They can be distinguished by means of the following key:

1. Pectinal teeth 8–10 in the male (7 or more in the female). Fourth caudal segment with a distinct, usually toothed keel . . . . . 2.
   Pectinal teeth 5–7 (usually 6). Fourth caudal segment without a definite toothed keel dorsally . . . . . 3.
2. Supero-anterior crest of humerus not prominent, upper surfaces of palp with isolated rugosities or granules. Carapace rather coarsely granular throughout. A pair of bristles at the inferior distal angles of the fourth tarsi and in addition with 3·3 (occasionally 3·2 or 4·2) spines inferiorly. External surfaces of fourth femora granulated or punctate. . . . . *chrysopus* Peters.
   Supero-anterior crest of humerus prominent. Hand almost smooth above. Carapace not granulated on the anterior lobes. A pair of spines at the inferior distal angles of the fourth tarsi and in addition 3·2 spines inferiorly. External surface of fourth femora not granulated . . . . . *lævipes* Pocock.
3. Tarsus IV with a pair of long weak bristles at the distal angle inferiorly. Vesicle without granular rows inferiorly in the adult . . . . *O. validus typicus* Thorel. 1.
   Tarsus IV with a pair of spines at the distal angles inferiorly. Vesicle with at least one pair of strong granular rows in the adult . . . . . 4.
4. Upper surface of hand without a distinct keel forming its inner boundary *O. validus swazianus* Hewitt.
   Upper surface of hand with a very distinct keel forming its inner boundary *O. validus montanus* n. subsp.

Opisthacanthus chrysopus Peters.

Opisthacanthus chrysopus Peters, Monatsber. Ak. Berlin, p. 513, 1861.

The Museum has this species from the following localities in Zululand: 4 ♂♂, 12 ♀♀, 14 juv., Umseleni, East Zululand (F.T.); 3 ♀♀, Umkuzi River (H.W.B.); 1 ♂, Umfolosi River (B. Wood); 1 ♂, 1 ♀, 4 juv., Kosi Bay (R.F.L.). Hewitt records the species from Makowe, Zululand (Durban Museum). Total length of the largest ♀ from Umseleni, 92 mm.

Opisthacanthus lœvipes Pocock.

Opisthacanthus lœvipes Pocock, Ann. Mag. Nat. Hist. (6), vol. 12, p. 319, 1893.

The Museum has 6 ♀♀, 1 ♂, and 4 juv., from Ingwavuma, Zululand (R.F.L.). Total length of the largest ♀, 96 mm.

Opisthacanthus validus typicus Thorell.

Opisthacanthus validus Thorell, Act. Soc. Sci. Nat. ital., vol. xix, p. 244, 1877.

The Museum has the species from the following localities: 18 ♀♀, 7 ♂♂, 27 juv., Mfongosi, Zululand (W.E.J.); 1 ♂, 4 ♀♀, 4 juv., Krantzkop, near Greytown (W.G.R.); 2 ♂♂, 6 ♀♀, Mazongwaan Forest, near Greytown (R.F.L.); 1 ♀, Umzinto, South Coast, Natal (W.G.R.); 1 ♀, Amanzimtoti (McGladdery); 1 ♀, Drummond, Natal (W.G.R.); 3 ♀♀, Table Mt., Natal (W.G.R.); 1 ♂, 1 ♀, Eshowe, Zululand (R. Barclay). Dr. Hewitt records it from the following localities: Krantzkloof (P. Boneberg); Beaumont (A. Hediger); Amatikulu; Dumisa (F. Suter). The Durban Museum has it from the Bluff, Durban; Mount Moreland; and Tugela (Zululand).

The largest ♀ from Mfongosi measures 76 mm., the largest ♀ from Kranzkop, 81 mm.

Opisthacanthus validus swazianus Hewitt.

Opisthacanthus validus swazianus Hewitt, Trans. R. Soc. S. Africa, vol. vi, Pt. 2, p. 172, 1918.

The ♂ and ♀ types came from Forbes Reef, Swaziland. The Natal Museum has a female specimen from Mbabane, Swaziland (R.F.L.).

Opisthacanthus validus montanus n. subsp.

A series of 2 ♂♂, 7 ♀♀ and 7 juv. from van Reenen, Drakensberg Range, collected by Mr. W. G. Rump differs from the typical form of *validus* and its varieties. The main features of this form are as follows:

The whole animal is blackish-green except the vesicle, which is dark orange or reddish-brown.

Carapace smooth or with only the finest dust-like granulation scattered throughout its area. All tergites smooth and without granules.

Tail.—Inferior surfaces of the caudal segments differing from the typical *validus* in being more strongly granular (the inferior keels of segment III distinctly granular while those of *typicus* consist of smooth ridges). The two inferior keels of segment V are distinct and separate, while in *typicus* they are more or less fused. Sides of segment V entirely without granules in the ♀ except for a few dust-like particles near the positions of the dorsal keels, a few scattered granules in the ♂. Vesicle with a paired median row of strongly developed teeth below, the lateral row obsolete but visible.

Pedipalp.—Hands flattened above and coarsely sculptured with strong, smooth anastomosing ridges, these much stronger along the inner half of the upper surfaces, the outer half being fairly smooth, though the ridges are still apparent ; a strong well-marked keel continuing from the base of the immovable finger to form the inner boundary of the hand, usually reaching to the base of the hand and almost always three-fourths of the distance, being broken up into granules in the basal fourth. Upper and outer surfaces of the hand sharply opposed and forming a well-defined right angle, the well-defined keel formed by their junction very strong, straight, and sharp. Outer surface of hand studded with numerous small sharp granules, contrasting strongly with the smooth ridges of the upper surface. Brachium and humerus smooth, humerus with a strong sharp supero-anterior crest, the upper and anterior surfaces of the segment meeting at an acute angle. Tarsus IV with a pair of strong spines at its inferior distal angle, the segment thus with 4 posterior and 3 anterior spines along its inferior surface.

Pectinal teeth 5–6.

Dimensions.—Total length of largest ♀ 77 mm., largest ♂ 68 mm.

The subspecies differs from all the forms of *validus* in one or more of the characters detailed above. It perhaps resembles *fulvipes* and *swazianus* more closely than the other forms but differs from the former in colour and the sculpture of the hands, from the latter in possessing a very distinct keel along the inner boundary of the hand. From the typical form of *validus* it differs in the upper and outer sides of the hand meeting at right angles, in the strong granulation of the vesicle, in having a pair of spines at the distal apex of the fourth tarsus, and in the presence of a boundary keel along the inner margin of the hand.

Genus *Cheloctonus* Pocock.

The following is a key to the species of this genus found in the area under consideration :

1. Humerus without a supero-anterior crest. Upper surface of hand smooth and rounded *jonesi* Pocock.

   Humerus with a distinct supero-anterior crest . . . . . 2.

2. Upper surface of hand and brachium closely and finely punctured, the general surface almost smooth. Sides of fifth caudal segment without granules
crassimanus depressus Hewitt.

Upper surface of hand coarsely sculptured with thick smooth ridges. Sides of fifth caudal segment with comparatively coarse granules . . . . . 3.

3. Movable finger with a single row of granular teeth. Keel at the base of immovable finger continuous . . . . . *anthracinus* Pocock.

Movable finger with two rows of granular teeth along the cutting edge. Keel at the base of immovable finger of hand absent or broken up into granules
anthracinus warreni Hewitt.

Cheloctonus crassimanus depressus Hewitt.

Cheloctonus crassimanus depressus Hewitt, Trans. R. Soc. S. Africa, vol. vi, p. 153, 1919.

The three types were described from Weenen, Natal. According to Dr. Hewitt the subspecies is a little larger than the typical *crassimanus*. The upper surface of the hand is a trifle flatter and the hand is not quite so strongly lobed on the inner side at its base. The sides of the fifth caudal segment are quite free of granules, though in which sex the author does not state.

The Museum has a series of 8 ♂♂, 5 ♀♀ and 11 juveniles from Weenen, and 1 ♂, 4 ♀♀ from Estcourt (R.F.L. and G.W.R.). The sides of caudal segment V are without granules in both sexes. There is a short keel at the base of the immovable finger along the inner boundary of the hand ; in some cases it is longer than in others, but is then broken up into granules. The lobes at the bases of the fingers of the hand in the males are much less conspicuous than is usually the case in *Cheloctonus*, there being little difference between the sexes in this respect. Largest ♂ from Weenen 63 mm., largest ♀ 66·5 mm.

Cheloctonus anthracinus Pocock.

Cheloctonus anthracinus Pocock, Ann. Mag. Nat. Hist. (7), vol. 3, p. 413, 1899.

The Museum has specimens from the following localities in Natal : 1 ♀, Swartkops, near Pietermaritzburg (R.F.L.) ; 5 ♀♀, Umgeni Poort, Nottingham 4 ♀♀, Bushman's Peak, Drakensberg Mts. (R.E.S.) ; 6 juv., Giant's Castle Rd. (R.F.L.). ; 1 ♀, Cathkin Peak (R.F.L.) ; 1 ♀, York, New Hanover (W.G.R.); (R.E.S.). The Durban Museum has specimens from " Natal " and the British Museum examples from Greytown and Estcourt.

Total length of largest ♀ from Umgeni Poort, 58 mm.

Cheloctonus anthracinus warreni Hewitt.

Cheloctonus anthracinus warreni Hewitt, Ann. Natal Mus., vol. vi, Pt. 3, p. 459, 1931.

The two types were described from Bulwer (collected by Mr. W. G. Rump). The Museum has specimens from the following localities in Natal : 1 ♂,

10 ♀♀, near Bulwer (W.G.R. and R.F.L.); 34 ♀♀, Rosetta (W.G.R.); 2 ♂♂, 1 ♀, Karkloof (R.F.L.); 2 ♀♀, van Reenen (W.G.R.). Dr. Hewitt records it from Dargle; Karkloof (H.W.B.); Impolweni (W.G.R.); and Cedara, all localities in Natal.

Total length of the largest ♀ from Karkloof, 60 mm.

Cheloctonus jonesi Pocock.

Cheloctonus jonesi Pocock, Ann. Mag. Nat. Hist. (6), vol. 9, p. 44, 1892.

The Natal Museum has this species from the following localities, all in Zululand except the Kranztkop and Hlatikulu records: 5 ♂♂, 14 ♀♀, 14 juv., Hluhluwe Game Reserve (W.G.R. and R.F.L.); 1 ♂, 1 ♀, Ingwavuma (R.F.L.); 1 ♂, 1 ♀, Hlatikulu, Swaziland (R.F.L.); 1 ♀, Krantzkop, Natal (W.G.R.); 1 ♂, 4 ♀♀, Entendweni (F.T.); 1 ♂, East Zululand (E.W.); 1 ♀, Kosi Bay (R.F.L.); 1 ♀, Empangeni (W.G.R.); 1 ♀, Umkuzi River (H.W.B.); 1 ♀, Pongola River (H.W.B.). The Durban Museum has it from Ngxwala Hill, Zululand.

Total length of largest ♀ from Hluhluwe Game Reserve, 74 mm.; of largest ♀ from Entendweni, also 74 mm.

The ♀ from Kosi Bay differs rather from the typical *jonesi* in having rougher hands with small sharp granules intermixed with some smooth ridges. It seems to be a transitional form between *jonesi typicus* and *jonesi sculpturatus* Hewitt. Unfortunately the specimen is not full-grown.

Genus *Hadogenes* Kraepelin.

The genus is represented in the Natal-Zululand area by two forms, both subspecies of *Hadogenes trichiurus* Gervais. The males can be distinguished by means of the following key:

Caudal segment IV with an enlarged tooth at its distal superior apex. Total length about 157 mm. . . . . *H. trichiurus zuluanus* Lawrence.

Caudal segment IV without an enlarged tooth at its distal superior apex. Total length about 128 mm. . . . . *H. trichiurus pallidus* (Pocock).

Hadogenes trichiurus zuluanus Lawrence.

Hadogenus trichiurus zuluanus Lawrence, Ann. Natal Mus., vol. viii, Pt. 2, p. 259, 1937.

The types, 3 ♂♂ and 5 adult ♀♀, were described from the Hluhluwe Game Reserve, Zululand. In the description of the types the female was erroneously stated to have only caudal segment II provided with an enlarged dorsal tooth at its apex. Actually a similar tooth is present on caudal segment III, both being much smaller than those of the male. The Natal Museum has the

form from the following localities in Zululand : 2 ♀♀, East Zululand (E.W.) ; 9 juv., Umfolosi River (F.T.) ; 1 juv. ♂, Pongola River, near Magut (H.W.B.).

Hadogenes trichiurus pallidus (Pocock).

Hadogenes pallidus Pocock, Ann. Mag. Nat. Hist. (7), vol. 11, p. 198, 1898.

I have no doubt that, as suggested by Dr. Hewitt, this Natal species should be more rightly regarded as a form of *trichiurus*. It is closely related to *H. trichiurus zuluanus* Lawrence from Zululand, but is smaller, more slender, and with less robust hands. Other features which serve to distinguish the two forms (males) are as follows :

An enlarged tooth at the superior distal end of caudal segment IV is absent in *pallidus*, but quite conspicuous in *zuluanus*. The hand in *pallidus* is considerably narrower and proportionately longer than in *zuluanus*, the length of handback being about twice the greatest width of the hand, in *zuluanus* only a little more than 1½ times as long. The hand is roughly parallel-sided, the inner boundary being less strongly curved than in *zuluanus*. The vesicle is not so strongly flattened from side to side as that of *zuluanus*, the actual width being less than in that form, in spite of its considerably smaller size.

The Museum has 1 ♂, and 13 ♀♀ and juveniles from the type locality, the junction of the Blaaukrantz and Tugela Rivers, near Weenen. An immature specimen of approximately the same total length as Pocock's type agrees fairly well with the proportions given by Pocock in his description, though not in all details.

The following is a description of an adult ♂ and ♀ from the type locality.

♂. Tail a little more than 6 times carapace. Carapace as long as caudal segment I plus ⅛ of caudal segment II, shorter than movable finger, and about as long as handback. Greatest width of hand half length of movable finger, a little more than half handback. Caudal segments II and III with a strong enlarged recurved tooth at their superior distal apices, IV without such an enlarged tooth although the superior crests bear a row of strong pointed teeth. Vesicle considerably wider than caudal segment V (in *zuluanus* these segments are equal in width).

Colovr.—Legs, vesicle and hands pale yellow, remainder of body brown with an olive tinge.

Pectinal teeth 17–18. Total length 133 mm.

♀. Tail a little more than 3½ times carapace. Carapace equal in length to caudal segments I plus II, and to caudal segment III plus a little more than half IV. Carapace a little longer than movable finger, a little longer than handback ; width of hand about ⅔ length of handback. Caudal segments II and III with a small but definitely enlarged terminal tooth at their dorsal apices. Superior crests of caudal segment V denticulated.

Colour as in ♂. Pectinal teeth 16–16. Total length 107 mm.

In other respects this subspecies resembles *H. trichiurus zuluanus*.

Dimensions of an adult ♂ and ♀ from Estcourt. Width of hand: ♂ 8·5, ♀ 9·5; handback, ♂ 13, ♀ 12·3; movable finger, ♂ 13·8, ♀ 14; carapace, ♂ 13·2, ♀ 13·9; caudal segment I, ♂ 11·7, ♀ 6; II, ♂ 15·5, ♀ 7·7; III, ♂ 17, ♀ 9; IV, ♂ 18·8, ♀ 9·9; V, ♂ 17·3, ♀ 10·8.

The largest ♂ of our series measures 138 mm., the average length of 7 full-grown specimens being 128 (*zuluanus* 157). The largest ♀ of our series is 112 mm., the average length of 11 full-grown specimens being 103 (*zuluanus* 127). The pectinal teeth in the males of these specimens vary from 17–20, those of the females from 14–17.

The Museum has the form from the following localities in Natal: 5 ♂♂, 8 ♀♀, 7 juv., Estcourt (R.F.L. and W.G.R.); 1 ♂, 13 ♀♀ and juveniles, junction of Blaauwkrantz and Tugela Rivers (R.F.L. and W.G.R.); 10 ♀♀, Weenen (R.F.L. and W.G.R.); 1 ♂, Bergville (H. R. Blacker); 1 ♂, Pepworth (Miss V. Harries); 1 ♂, 1 ♀, Elandslaagte (L. H. Grey).

GENERAL CONSIDERATIONS ON THE FAUNA OF THE REGION.

Of the eleven genera of scorpions which occur in South Africa, six are found in the area under consideration, *Buthus*, *Parabuthus*, *Lychas*, *Karasbergia* and *Pandinus* being absent from the Natal-Zululand region. *Parabuthus*, a genus very common in the western half of Southern Africa, is the most notable absentee from the Natal-Zululand fauna, and the Buthidæ as a family are poorly represented by only two out of the six South African genera.

The second family of scorpions occurring in South Africa, the Scorpionidæ, is, on the other hand, well represented in our region, but chiefly by members of the subfamily Ischnurinæ. The dominant genus appears to be the Ischnurine *Opisthacanthus* with five species or subspecies, of which *O. validus typicus* appears to be the most widespread; it is also the commonest of the Natal-Zululand Scorpionids in point of actual numbers. The subfamily Scorpioninæ, which is well represented in the remaining parts of South Africa by numerous species of *Opisthophthalmus*, an exclusively South African genus, is practically absent from the Natal-Zululand area, where only two forms, *O. glabrifrons* and *O. latimanus natalensis*, occur in limited numbers and only in certain areas of the more northern districts.

Taking into consideration the particularly rich fauna of the South African subcontinent, the scorpions are poorly represented in Natal and Zululand, both as regards the number of individuals and variety of form. Two of the most characteristic South African genera, *Opisthophthalmus* and *Parabuthus*, which have also developed the largest number of species, and are found in most parts of Southern Africa, are either entirely absent or represented by one or two forms.

The poverty of the Natal-Zululand fauna may perhaps be ascribed to the

topographical conditions prevailing in the area, with its sandy rolling hills covered with grass and scrub, and the comparative absence of large outcrops of rock and weathered boulders found in other parts of the Union. At higher altitudes on the slopes of the Drakensberg the dense patches of indigenous forest do not provide a favourable environment for such a characteristically xerophilous group as the scorpions. In the thornveld of the northern districts, which provides conditions approaching more closely those found in the Karroo and the Eastern Cape Province, the exclusively rupicolous genus *Opisthophthalmus* makes a fugitive appearance.

Some of the Ischnurine genera such as *Opisthacanthus* and *Cheloctonus* have been partly able to adapt themselves to a forest existence, and can be found under bark and decaying logs as well as under stones. *Pseudolychas* seems to be, in Natal and Zululand at any rate, a non-rupicolous form living only in leaf mould or among the *debris* of the indigenous forest floor. It is, so far as I am able to judge, the only scorpion in Natal and Zululand which is definitely not rupicolous in habit.

The faunas of Zululand and Natal again show some marked differences from each other ; that of the low-lying parts of Zululand is characterized by almost exclusively tropical forms related to those of Portuguese East Africa and the lower parts of the Eastern Transvaal, while Natal and the more mountainous parts of Zululand show the influence of the temperate fauna of the Cape Province. Such species as *Opisthacanthus lœvipes*, *O. chrysopus* and *Cheloctonus jonesi* are exclusively Zululand forms and do not enter Natal proper. It should be noted, however, that in the Buthidæ this distinction is less marked, species such as *Uroplectes formosus* and *U. triangulifer marshalli* being distributed fairly evenly over both Natal and Zululand.

An interesting difference between the scorpions of Zululand and Natal is to be seen in the body-size of members of the family Scorpionidæ. The larger and more robust species of each genus are found in Zululand, *Opisthacanthus chrysopus* and *O. lœvipes* for example being distinctly larger than the largest specimens of the prevailing *Opisthacanthus* species in Natal, *O. validus typicus*. The Zululand species of *Cheloctonus*, *C. jonesi*, is also larger than the species and subspecies of *Cheloctonus* found in Natal ; even the species of *Opisthophthalmus* occurring in Zululand and Natal is distinctly larger than that found in Natal only, while the Zululand variety of *Hadogenes trichiurus* is larger and has more robust hands than the form found on the lower slopes of the Drakensberg, *H. trichiurus pallidus*.

A marked feature of the Natal-Zululand scorpion fauna when regarded as a whole is the almost entire absence of the larger bodied forms, such as *Opisthophthalmus* and *Parabuthus*, though the single species of the large *Hadogenes* constitutes an exception. All the Buthidæ (*Pseudolychas* and *Uroplectes*) and most of the Scorpionidæ (*Cheloctonus* and *Opisthacanthus*) are among the smallest of the South African fauna in body-size.

The Natal Zululand scorpion fauna thus reveals features which, though mainly negative ones, separate it fairly sharply from the remainder of the South African region. These can be briefly stated as follows :

1. The comparative poverty of the fauna when compared with other South African regions.

2. The absence of certain genera widespread in other parts of South Africa, *e. g. Opisthophthalmus* and *Parabuthus*.

3. The dominance of Ischnurine genera among the Scorpionidæ.

4. The emphasis on small body-size in the Natal Zululand scorpions as a whole.

APPENDIX.

The following species of scorpions from regions outside the boundaries of Natal and Zululand are present in the collections of the Natal Museum :

Parabuthus triradulatus Hewitt . .	Zimbabwe, S. Rhodesia.
,, flavidus Pocock . .	,, ,,
Pseudolychas pegleri (Purcell) . .	Port St. Johns.
,, *ochraceus* (Hirst) . .	Barberton, E. Transvaal.
Uroplectes formosus Pocock . .	Port St. Johns ; Kei Bridge, Transkei.
,, *triangulifer tristis* Thorell .	Barberton, E. Transvaal.
Opisthophthalmus latimus pugnax Thorell	Herschel ; Pietersburg, Transvaal.
,, *carinatus* Peters .	Wankie, S. Rhodesia.
Opisthacanthus validus albanicus Hewitt	Port St. Johns, Grahamstown.
,, *capensis* Thorell . .	Knysna ; Grahamstown.
,, *validus fulvipes* Pocock	Herschel.
,, *lævipes* Pocock . .	Nelspruit and Barberton, E. Transvaal.
Cheloctonus crassimanus Pocock .	Port St. Johns ; Kei Bridge, Transkei.