

***Gerrhosaurus flavigularis flavigularis* Wiegmann**

Gerrhosaurus flavigularis Wiegmann, 1828, *Isis*, xxi, p. 379 (type loc.: "Africa merid. Krebs"). Werner, 1910, *Jena. Denkschr.* xvi, p. 341 (Kokong-Kang, Kalahari); 1915, in Michaelsen, *Land- u. Süßwasserfauna Deutsch.-S.W.-Afrikas*, Lief. 3, p. 347 (Okasise, South-West Africa).

Four specimens were collected as follows: V.L.K.E. No. 481 (March 1930), Gabani; No. 484 (March), Gaberones; Nos. 482 and 483 (March), Molepolole.

DISTRIBUTION. An eastern and southern form ranging over the whole of South Africa, with the exception of the south-western Cape Province, Little Namaqualand and the southern part of South-West Africa, and extending northwards as far as the Sudan.

REMARKS. The series comprises three semi-adult specimens (2 ♂♂ and 1 ♀) and one adult (female) in which the tail has been regenerated. Head small, length into head and body 5.2-5.8 times, width into length 1.35-1.44 times; frontonasal broader than long, not touching rostral; prefrontals narrowly separated in three specimens, in wide contact in one (No. 483). Dorsal scales distinctly striated, strongly keeled on middle of back, not or but feebly keeled laterally; in 24 longitudinal and 58 transverse rows. Six complete rows of scales between the two white streaks dorsally. Scales on soles of feet distinctly keeled. 20 scales under fourth toe. Femoral pores 12-14, partly covered by anterior row of plates. Tail from 2 to 2.3 times as long as head and body.

COLOUR. Argus to verona brown above and on sides, with two well-defined white to pale lemon coloured stripes (dark edged above) along back, arising on the hindmost supraocular and finishing over anterior part of tail; two interrupted series of black spots with whitish shaft-like centres down middle of back, present or absent; sides of head, neck and body in semi-adult specimens with vertical barring of whitish and dark brown or black. Below yellowish white.

DISCUSSION. A series of 77 specimens from South Africa were examined and the following prefrontal variations noted:

Prefrontals in fair contact in 28 specimens.

Prefrontals in narrow contact in 8 specimens.

Prefrontals narrowly separated in 19 specimens.

Prefrontals widely separated in 20 specimens.

Prefrontals separated by an extra shield in 2 specimens.

FIELD NOTES. Found only on the eastern edge of the Kalahari, on the rocky outcrops and koppies near Gaberones. No specimens were seen in the Kalahari sand veld, where they were replaced by *G. auritus*.

DIMENSIONS. A summary of the measurements is as follows:

	No. of specimens	Extremes	Average
Total length	3	232.0-274.0 mm.	259.0 mm.
Body	4	76.0-111.0 mm.	88.2 mm.
Tail	3	156.0-190.0 mm.	175.0 mm.
Head length	4	14.3- 19.0 mm.	16.3 mm.
Head width	4	10.0- 14.0 mm.	11.6 mm.
Arm	4	20.0- 27.0 mm.	22.4 mm.
Leg	4	37.3- 47.0 mm.	40.8 mm.
Foot	4	18.0- 23.5 mm.	20.4 mm.

***Gerrhosaurus flavigularis nigrolineatus* Hallowell**

Gerrhosaurus nigrolineatus Hallowell, 1857, *Proc. Acad. Nat. Sci. Philadelphia*, ix, p. 49 (type loc.: Gaboon, West Africa).

Two specimens were collected near the Chobe River, V.L.K.E. No. 485 at Kabulabula and No. 486 at Kasane, during July 1930.

DISTRIBUTION. A western form ranging from Gaboon, through the open country of the Lower Congo and Angola, to the northern parts of South-West Africa and Bechuanaland, and the north and eastern Transvaal.

REMARKS. Two semi-adult specimens (male and female). Head moderate, length into snout to vent 4.2-4.4 times, 1.52-1.58 times as long as broad; frontonasal much broader than long, not touching rostral; prefrontals in long contact. Scales strongly keeled dorsally, but feebly striated anteriorly; diagonally keeled and striated laterally; in 24 longitudinal and 55-56 transverse rows. Four complete rows of scales between the two pale dorso-lateral stripes. Scales on soles of feet almost tubercular. Sixteen scales under fourth toe. Femoral pores 16-18, largely exposed. Tail from 2.6 to 2.8 times length of head and body. Limbs generally longer and more slender than in *flavigularis*.

COLOUR. Above bright tawny brown, with two white black-edged streaks on back, from back of head and over anterior third of tail; an interrupted vertebral series of squarish dark spots with paler centres; limbs light brown, with pale rounded spots; short vertical whitish barring on sides of neck and body; numerous scales on flanks, scarlet tipped. Below pale yellowish.

DISCUSSION. The above-described specimens, together with a series of six specimens in the Transvaal Museum from the eastern Transvaal, definitely extend the range of this form much farther south than hitherto recorded. The eastern *G. f. flavigularis* and the western *G. f. nigrolineatus* are both found in the eastern Transvaal, and it would appear that in spite of this overlapping little or no fusion and intergradation of characters has taken place.

With a view to establishing a definite means of differentiating between the two forms, a series of 77 *G. f. flavigularis* from various South African localities were examined, together with eight *G. f. nigrolineatus* (six from the eastern Transvaal and two from the Chobe River). A careful comparison of characters was made and the results tabulated as follows:

<i>G. f. flavigularis</i>	<i>G. f. nigrolineatus</i>
Frontals as broad as long or subequal	Frontals always broader than long
Prefrontals in short contact in 36 cases, separated in 41 (by an extra scale in two specimens)	Prefrontals always in long contact
Dorsal scales moderately keeled and striated; in 22-24 longitudinal series (average 22.4) and 54-64 transverse series (average 58) (series of 32 adult specimens)	Dorsal scales strongly keeled, occasionally feebly striated anteriorly; in 20-24 longitudinal series (average 23) and 54-56 transverse series (average 55.4) (series of 8 specimens)
Lateral scales smooth or feebly striated in adults, usually moderately keeled and striated in young	Lateral scales definitely keeled in adults
Scales on sole of foot rounded and almost tubercular	Scales on sole of foot imbricate and keeled
Lamellae under fourth toe 17-21 (average 18.6) (series of 32 adult specimens)	Lamellae under fourth toe 15-17 (average 16) (series of 8 specimens)
Femoral pores 11-17 (average 13.5) (series of 32 adult specimens)	Femoral pores 16-19 (average 17.6) (series of 8 specimens)
Head length into length from snout to vent 5.4-8.4 times (average 6.2) (series of 32 adult specimens)	Head length into length from snout to vent 4.2-5.3 times (average 4.6) (series of 8 specimens)
Length head and body into tail 1.8-2.3 times (average 2.06) (series of 14 adult specimens)	Length head and body into tail 2.63-2.8 times (average 2.7) (series of 4 specimens)
Posterior edge of symphysial straight	Posterior edge of symphysial projecting in middle between adjacent chin-shields

Furthermore it would appear that *nigrolineatus* grows to a larger size than *flavicularis*, as three specimens of the former measure respectively 163, 163 and 180 mm. from snout to vent, whereas the largest specimen of the latter available only reaches 135 mm. In fully adult specimens of *G. f. nigrolineatus* the yellowish streaks down the back become very obscure and almost indiscernible.

FIELD NOTES. Found among stony outcrops, about a mile south of the Chobe River; very shy and elusive in habit.

DIMENSIONS. For comparison the measurements of a specimen from the eastern Transvaal are given in addition to those above:

	♂ (V.L.K.E. No. 485)	♀ (V.L.K.E. No. 486)	♂ (T.M. No. 837)
Total length	395.0 mm.	395.0 mm.	389.0 mm.
Body	84.0 mm.	80.0 mm.	112.0 mm.
Tail	221.0 mm.	225.0 mm.	277.0 mm.
Head length	19.2 mm.	19.0 mm.	23.4 mm.
Head width	12.5 mm.	12.0 mm.	14.0 mm.
Arm	24.0 mm.	23.7 mm.	28.0 mm.
Leg	49.0 mm.	45.0 mm.	53.0 mm.
Foot	25.0 mm.	24.0 mm.	26.0 mm.

Fam. SCINCIDAE

Mabuia quinquetaeniata margaritifer (Peters)

Euprepes margaritifer Peters, 1854, *Mon. Berl. Akad.* p. 618 (type loc.: Tette, East Africa), also 1882, *Reise n. Mossamb.* III, p. 64, pl. X, fig. 1.

Sixteen specimens were collected as follows: V.L.K.E. No. 776 (December 1929), Kalakamati; Nos. 700-709 (September 1930), Zimbabwe; Nos. 710-714 (September), Banderlikerop.

DISTRIBUTION. A southern subspecies, ranging from Tanganyika Territory in the north, through Southern Rhodesia and Portuguese East Africa, to Zululand, north and eastern Transvaal and the north-eastern edge of the Kalahari.

REMARKS. Eleven adult (5 ♂♂ and 6 ♀♀) and five immature (1 ♂ and 4 ♀♀) specimens. Prefrontals forming a median suture in thirteen specimens, meeting at a point with frontal and frontonasal in two and separated in one. Nostril pierced above and just behind suture of rostral and first labial. Anterior loreal in contact with first labial in seven specimens, separated in nine. Frontal in contact with first, second and third supraoculars. Five supraciliaries. Labials anterior to subocular 4-4 in eight specimens, 4-5 in six and 5-5 in two. Dorsal and lateral scales tricarinate; scales on nape quadri- or quinquecarinate. 42-44 scales round middle of body. Subdigital lamellae smooth, 20-22 under fourth toe. Scales on soles of feet rounded with dark brown horny surfaces. Tail 1.4 times length of head and body in females, 1.5-1.8 in males.

COLOUR. Adult male: Above buff to olive brown, each scale with a bluish white spot near posterior edge; faint traces of three pale longitudinal streaks over back in young adults, absent in old specimens. Below creamy white, with or without slight intrusions of greyish brown laterally. Tail a light yellowish brown. Adult female: Above dark brown to blackish, with three yellowish white longitudinal bands down back, the median (made up of two adjacent narrow stripes) commences on the snout, while dorso-lateral (made up of three to four adjacent stripes) arises just above the eye; scales on flanks with pale bluish white centres. Below whitish, with or without a slight

greyish infusion on chin and throat. Tail usually bright blue. In juveniles dorsal bands bluish white and well defined.

DISCUSSION. The above form is clearly referable to *Euprepes margaritifer* Peters, and not to typical *Mabuia quinquetaeniata* as described from the Sudan, from which it differs in the higher average number of scales round body, more elongate and narrowed snout, more elongate submental, larger average size and colour markings. In view of the above I am inclined to agree with Schmidt¹ in retaining the name *margaritifer* Peters for a southern subspecies of *quinquetaeniata*. The species may thus be divided up into three forms, viz.: the northern *M. quinquetaeniata quinquetaeniata* Licht., extending through West Africa, the Sudan, Abyssinia and up the Nile Valley to Lower Egypt; the eastern and southern *M. quinquetaeniata margaritifer* Peters, ranging from East Africa southwards to Zululand and Transvaal; and the western *M. quinquetaeniata binotata* Bocage, localised to the littoral and intermediate savannah zones of Angola.

FIELD NOTES. This skink is localised in the south to the granite formations of Southern Rhodesia, north and eastern Transvaal and along the eastern edge of the Kalahari. In its rupicolous habit it is similar to Peters, *margaritifer*, but contrasts with the northern form, which according to Schmidt² is terrestrial and arboreal. At Zimbabwe these lizards were found on the granite hills in association with *Gerrhosaurus validus*, *Agama kirkii* and *Platysaurus guttatus*. Many specimens were in process of casting their skins, pieces of which they often pulled off and swallowed. Stomach contents: (No. 701) nothing but cast skin; (No. 710) remains of grasshoppers and small flying insects of various kinds. A female (No. 701) contained six well-developed eggs, averaging 15 × 8 mm.

DIMENSIONS. A summary of the measurements of adult specimens is as follows:

	Sex	No. of specimens	Extremes	Average
Total length	♂	3	253·0–273·0 mm.	262·0 mm.
	♀	5	220·5–241·0 mm.	230·9 mm.
Snout to vent	♂	5	91·0–105·0 mm.	98·6 mm.
	♀	6	95·0–105·0 mm.	98·1 mm.
Tail	♂	3	155·0–170·0 mm.	162·3 mm.
	♀	5	123·0–138·0 mm.	132·2 mm.
Head length	♂	5	21·5–25·0 mm.	23·5 mm.
	♀	6	20·5–24·0 mm.	21·9 mm.
Head width	♂	5	15·5–18·2 mm.	16·9 mm.
	♀	6	15·1–16·0 mm.	15·6 mm.
Arm	♂	5	30·0–32·0 mm.	31·1 mm.
	♀	6	26·2–31·0 mm.	28·3 mm.
Leg	♂	5	43·0–50·0 mm.	46·2 mm.
	♀	6	41·5–47·0 mm.	43·2 mm.

Mabuia trivittata (G. L. Cuvier)

Scincus trivittatus G. L. Cuvier, 1829, *Regne Anim.* ed. 2, II, p. 62 (type loc.: "Midi de l'Afrique").

Mabuia trivittata Werner, 1910, *Jena. Denkschr.* xvi, p. 341, pl. VII, fig. 6 (Okahandja, South-West Africa; Mookane and Vleij Topan, Kalahari). Sternfeld, 1911, *Mittl. Zool. Mus. Berlin*, v, p. 406 (Windhuk and Luderitzbucht, South-West Africa). Methuen and Hewitt, 1914, *Ann. Trans. Mus.* IV, p. 141 (Kraikluft and Nakeis, South-West Africa).

¹ 1919, *Bull. Amer. Mus. Nat. Hist.* xxxix, p. 547.

² *Ibid.* p. 550.

Mabuia kalaharica Werner, 1910, *Jena. Denkschr.* xvi, p. 350, pl. VIII, fig. 11 (Lehututu-Kang, Kalahari).

Six specimens were collected as follows: V.L.K.E. Nos. 534-537 (March 1930), Kuke; Nos. 538 and 539 (April), Kaotwe.

DISTRIBUTION. Ranging throughout South Africa, south of the 22nd latitude.

REMARKS. Two adult, one half-grown and three juvenile specimens. Pre-frontals separated in three specimens; a pair of band-like nuchals meeting in middle line in five cases, broken up into small scales in one. Five labials anterior to subocular in one specimen. Anterior loreal reaches first labial in two cases. Dorsal scales tricarinate. 34-36 scales round middle of body. Subdigital lamellae sharply unicarinate in juveniles, bluntly keeled in adults. Tail $1\frac{1}{3}$ - $1\frac{1}{2}$ times head and body.

COLOUR. Above light brown to olive brown, with a series of short dark brown to blackish transverse markings or bands; three pale slate brown longitudinal bands from back of head to root of tail (median band almost twice as wide as dorso-laterals). Juveniles and half-grown specimens also with numerous pale rounded spots on back. Below a uniform greyish or yellowish white.

FIELD NOTES. In comparison with other skinks, this species is very sluggish in movement. They were usually found among the short dense bushes, growing round the edges of the pans, where they were seen abroad only during the late afternoon, being probably semi-nocturnal in habit. Stomach contents (No. 538): remains of beetles, mostly carabids and tenebrionids, which are usually fairly plentiful round the pans.

DIMENSIONS. The measurements of the two adult specimens are as follows:

	No. 536	No. 537
Total length	254.5 mm.	264.5 mm.
Snout to vent	111.0 mm.	106.5 mm.
Tail	143.5 mm.	158.0 mm.
Head length	21.2 mm.	21.0 mm.
Head width	17.5 mm.	17.8 mm.
Arm	28.5 mm.	26.5 mm.
Leg	34.5 mm.	34.0 mm.

Mabuia varia varia (Peters)

Euprepes varius Peters, 1867, *Mon. Berl. Akad.* p. 20 (type loc.: Tette, East Africa), and 1882, *Reise n. Mossamb.* III, p. 68.

Mabuia varia Werner, 1910, *Jena. Denkschr.* xvi, p. 343, pl. VIII, fig. 12 (Rooibank, South-West Africa; Severelela-Kooa, Mookane, Kanya and Vleij Topan, Kalahari). Sternfeld, 1911, *Mittl. Zool. Mus. Berlin*, v, p. 406 (Warmbad, South-West Africa). Methuen and Hewitt, 1914, *Ann. Trans. Mus.* IV, p. 141 (Kraikluft, Nakeis, Groendoorn, Narudas Sud and Luderitzbucht, South-West Africa). Werner, 1915, in Michaelson, *Land- u. Süßwasserfauna Deutsch-S.W.-Afrikas*, Lief. 3, p. 348 (Swakopmund, Karibib, Tsumeb and Okawango, South-West Africa).

Forty-three specimens were collected as follows: V.L.K.E. Nos. 785 and 786 (December 1929), Titumi; No. 540 (March 1930), Gaberones; Nos. 541-544 (March), Gabani; No. 515 (March), between Molepolole and Kuke; Nos. 502-504, 559, 563, 565 and 569 (March), Kuke; No. 505 (April), between Kuke and Gomodimo; Nos. 506-508 (April), Kaotwe; Nos. 509 and 510 (April), between Okwa River and Damara Pan; Nos. 511-513 (April),

Damara Pan; No. 514 (April), between Damara Pan and van Zyl's Cutting; Nos. 516-518 (May), Mabeleapudi; No. 519 (June), Shaleshonto; Nos. 520-527 (August), Figtree; No. 528 (August), between N'kate and Nata River; No. 533 (August), Matopos; Nos. 529-532 (September), Zimbabwe.

DISTRIBUTION. A tropical species ranging from Kenya and Tanganyika, throughout Southern Africa, with the exception of the south-western Cape Province.

REMARKS. Twenty-one adult and 22 immature specimens. Considerable variation is found in the head scaling of the above series. Anterior loreal in contact with first labial in 30 specimens, separated in 12. Frontal shorter, subequal to, or slightly longer than frontoparietals and interparietal together. Second supraciliary as long as, slightly shorter or longer than third, fourth and fifth combined. Upper labials anterior to subocular, 5-5 in 18 specimens, 4-5 in two and 4-4 in 22. Subocular only slightly narrowed in 22 specimens, narrowed by one-third in nine and by a half in 11. Hind limb reaches wrist in 26 specimens and elbow in 16. Dorsal scales tricarinate. 32-34 scales round middle of body. Tail about 1.4 times as long as head and body.

COLOUR. Above light brown to olive brown with or without small dark brown to blackish spots; a pale stripe on each side from supraciliaries to root of tail usually present in Kalahari specimens, often absent in others; a well-defined white, dark-edged, lateral streak from upper lip through ear to groin. Below whitish.

FIELD NOTES. The Kalahari specimens were invariably found living among the short stunted bushes and thorn trees round the pans, but unlike *M. striata* are not arboreal. Specimens from other localities were more or less confined to granite formations. Stomach contents (No. 559): remains of crickets, small grasshoppers and beetles.

DIMENSIONS. A summary of the measurements of adult specimens is as follows:

	No. of specimens	Extremes	Average
Total length	14	112.0-163.0 mm.	130.4 mm.
Snout to vent	21	46.0- 62.0 mm.	53.5 mm.
Tail	14	64.0-103.0 mm.	78.3 mm.
Head length	21	10.2- 13.0 mm.	11.7 mm.
Head width	21	7.0- 9.2 mm.	8.2 mm.
Arm	21	15.0- 19.0 mm.	16.8 mm.
Leg	21	19.3- 28.0 mm.	24.4 mm.

NOTE. A series of young specimens (Nos. 502-508 and 511) from the central Kalahari differ from the adult forms in the following: subocular narrowed ventrally to a third; dorsal scales quincercarinate; colour above pale brown, with small dark brown and whitish spots; three pale indistinct stripes on back (median wider than laterals); a white streak from upper labials to groin, distinct on neck, pale and ill-defined along sides of body.

***Mabuia striata* (Peters)**

Tropidolepisma striatum Peters, 1844, *Mon. Berl. Akad.* p. 36 (type loc.: Mozambique Island).

Mabuia striata Boettger, 1887, *Ber. Senck. Nat. Ges.* p. 150 (Aus-Angra Pequena, Aus and Aus-Keetmanshoop, South-West Africa); 1894, *Ber. Senck. Nat. Ges.* p. 90 (Rehoboth, South-West Africa). Werner, 1910,

Jena. Denkschr. xvi, p. 343, pl. VII, fig. 7 (Keetmanshoop and south Hereroland, South-West Africa; Lehututu and Vleij Topan, Kalahari). Sternfeld, 1911, *Mittl. Zool. Mus. Berlin*, v, p. 407 (Windhuk and Outjo, South-West Africa). Werner, 1915, in Michaelsen, *Land- u. Süßwasser-fauna Deutsch-S.W.-Afrikas*, Lief. 3, p. 350 (Okahandja, Neudamm, Asis, Auasbergen, Usakos and Okawango, South-West Africa).

One hundred and fifty-nine specimens were collected as follows: V.L.K.E. Nos. 777-783 (December 1929), Titumi; Nos. 546-550 (March 1930), Gaberones; No. 545 (March), Molepolole; No. 551 (March), between Molepolole and Kuke; Nos. 552-558, 560-562, 564, 566-568 and 570 (March), Kuke; No. 571 (April), Gomodimo; No. 572 (April), Chukudu; Nos. 573-579 (April), Kaotwe; Nos. 580-587 (April), between Kaotwe and Damara Pan; Nos. 588, 589 and 699 (April), Gemsbok; Nos. 590-596 (May), between Sunnyside and Machumi; Nos. 597-601 and 1318 (May), Mabeleapudi; Nos. 602-621 (May), Motihatlogo, on Lake Ngami; Nos. 622 and 623 (May), Toten; Nos. 624-636 (May), Maun; No. 637 (June), Shorobe; Nos. 638, 639 and 642 (June), Shaleshonto; Nos. 640-641 (June), Kwaai; Nos. 643-649 and 653-658 (July), Tsotsoroga; Nos. 650-652 (July), Kabulabula; Nos. 659-663 (July), Kasane; Nos. 664 and 665 (August), Figtree; Nos. 666-668 (August), N'kate; Nos. 669-696 (August), Makarikari; Nos. 697 and 698 (September), Fort Victoria.

DISTRIBUTION. Extending throughout Africa, south of the Equator, with the exception of the southern Cape Province.

REMARKS. The above series comprises 89 adult (47 ♂♂ and 42 ♀♀), 65 half-grown and five juvenile specimens. The following variations in the head scaling were noted: anterior loreal in contact with first labial in 135 specimens, separated in 19; supranasals in contact behind the rostral in 28 specimens, separated in 126; parietals separated by interparietal in 52 specimens, not separated in 102; subocular reaching to lip in 131 specimens, on one side only in five, and not reaching lip at all in 18; upper labials anterior to subocular, 4-5 in one specimen, 5-5 in 52, 5-6 in 29, 6-6 in 68, 6-7 in two and 7-7 in two. 34-40 scales round middle of body. Tail from 1.2 to 1.8 times length from snout to vent. Adult males may be distinguished from females by their generally larger head, longer limbs and presence of two to three enlarged yellowish white roughened scales on heel. Specimens from the eastern edge of the Kalahari and as far west as Kaotwe are on the average much smaller than those from the west and north, with length from snout to vent averaging 70 mm. as opposed to 77 mm.

COLOUR. A considerable degree of colour variation is found within the above series, and allowing for intergradation the three following distinct colour phases may be distinguished:

A. Above dark brown, uniform or each scale with a pale spot, so arranged as to form irregular longitudinal lines; a well-marked pale dorso-lateral band, from just above eye, fading out over lumbar region. Below dirty white, often more or less suffused with slaty brown. All those specimens from Gaberones as far west as Kaotwe, and a few young specimens from other localities, fall under this group.

B. Above olive brown, more or less intensely spotted with dark brown to blackish, these spots often aggregated on nape and anterior part of back into five longitudinal stripes; pale dorso-lateral band present, but ill defined, bounded below by a wide dark lateral band running from eye to just beyond shoulder. Below uniform greyish white. Odd specimens from various localities.

C. Above uniform pale brown to olive brown, with a wide well-marked black band running laterally from eye, over ear and shoulder and fading out on sides of body between fore and hind limbs; pale dorso-lateral band sometimes faintly discernible on nape; adult males usually bright orange red on snout and lips, which colour often extends posteriorly over flanks as an edging to the black lateral bands. Below greyish white to slate. Practically all the specimens from west and north of Kaotwe fall under this group.

FIELD NOTES. These skinks are largely arboreal, living in cracks and holes in old tree stumps, etc. In the Kalahari they were usually localised to the areas round the pans; while at Motlhatlogo, Tsotsoroga and Makarikari they were found in great profusion in the partly cleared forest near native villages and cattle posts. Stomach contents consisted of beetles of various kinds, grasshoppers, white ants, hemiptera and ascarid worms. Two females examined contained eight and ten well-developed eggs respectively. Five eggs, found under some dead wood at Titumi, averaged 18.5×9.2 mm.

DIMENSIONS. A summary of the measurements of adult specimens is as follows:

	Sex	No. of specimens	Extremes	Average
Total length	♂	32	156.0-236.0 mm.	198.0 mm.
	♀	22	160.0-234.0 mm.	190.8 mm.
Snout to vent	♂	47	68.5-91.0 mm.	77.7 mm.
	♀	42	67.5-92.0 mm.	78.6 mm.
Tail	♂	32	87.0-150.0 mm.	116.2 mm.
	♀	22	90.0-136.0 mm.	111.5 mm.
Head length	♂	47	16.0-20.3 mm.	17.8 mm.
	♀	42	15.0-19.7 mm.	16.4 mm.
Head width	♂	47	12.3-15.6 mm.	13.8 mm.
	♀	42	11.0-15.0 mm.	12.9 mm.
Arm	♂	47	21.3-27.5 mm.	24.2 mm.
	♀	42	20.0-27.0 mm.	23.5 mm.
Leg	♂	47	28.0-40.0 mm.	34.0 mm.
	♀	42	27.0-38.0 mm.	31.7 mm.

Lygosoma sundevallii sundevallii (A. Smith)

Eumeces (Riopa) sundevallii A. Smith, 1849, *Ill. Zool. S. Afr., Reptiles*, App. p. 11 (type loc.: country to the eastward of Cape Colony = Natal).

Lygosoma sundevallii Werner, 1910, *Jena. Denkschr.* xvi, p. 350 (Sekuaa-Khakhea, Kalahari). Sternfeld, 1911, *Mittl. Zool. Mus. Berlin*, v, p. 408 (Outjo and Gobabis, South-West Africa). Lampe, 1911, *Jahrb. nass. Ver. Nat.* LXIV, p. 175 (Rietmond, South-West Africa). Werner, 1915, in Michaelsen, *Land- u. Süßwasserfauna Deutsch-S.W.-Afrikas*, Lief. 3, p. 352 (Grootfontein, South-West Africa).

Thirty-eight specimens were collected as follows: V.L.K.E. Nos. 715 and 716 (April 1930), Kaotwe; No. 717 (April), between Okwa River and Damara Pan; No. 718 (April), van Zyl's Cutting; Nos. 719-722 (April-May), Gembok; Nos. 723-729 (May), Machumi Pan; No. 730 (May), between Mabeleapudi and Lake Ngami; Nos. 731-733 (May), Motlhatlogo, on Lake Ngami; Nos. 734-745 and 1383 (July), Kabulabula; No. 746 (August), Plumtree; Nos. 747, 748 and 787 (August), Kalakamati; Nos. 749 and 750 (August), World's View, Matoppos.

DISTRIBUTION. Ranging throughout Africa from south of the Sahara to Natal, Transvaal, Bechuanaland and South-West Africa.

REMARKS. The above series comprises 14 adult, 13 semi-adult and 11 juvenile specimens. About 30 per cent. bear regenerated tails, and in two cases tails are bifid. Head scaling normal and uniform with the following exception: prefrontals fused with frontonasal in two cases; supranasal continuous round nostril anteriorly, making contact with first labial in 19 specimens. Dorsal scales smooth. 24-26 scales round middle of body. 12-14 scales under fourth toe. Tail from three-quarters to just less than length of head and body.

COLOUR. Brownish above, each scale with a dark brown spot or short longitudinal streak, giving the appearance of longitudinal striping over body and sides. Below yellowish to creamy white, with or without scattered dark brownish dots along sides and under tail.

FIELD NOTES. Found usually under stones, dead logs and in the soft mould under small bushes and shrubs. On exposure they rapidly disappear underground with an energetic wriggling motion in which the limbs play little or no part. Very plentiful along the Chobe River, where the sand veld of the northern Kalahari meets the river forest. The stomach contents of two specimens (Nos. 722 and 745) examined consisted chiefly of small carabid and other ground beetles, together with a certain amount of sand.

DIMENSIONS. A summary of the measurements of adult specimens is as follows:

	No. of specimens	Extremes	Average
Total length	9	121.0-159.0 mm.	137.6 mm.
Body	14	66.5- 81.0 mm.	74.2 mm.
Tail	9	52.0- 78.0 mm.	65.0 mm.
Head length	14	10.0- 11.6 mm.	10.6 mm.
Head width	14	7.5- 8.7 mm.	8.1 mm.
Snout to arm	14	18.0- 21.0 mm.	19.3 mm.
Arm	14	8.6- 10.7 mm.	9.3 mm.
Leg	14	15.0- 16.6 mm.	15.8 mm.

***Ablepharus wahlbergii* (A. Smith)**

Cryptoblepharus wahlbergii A. Smith, 1849, *Ill. Zool. S. Afr., Reptiles*, App. p. 10 (type loc.: country to the eastward of Cape Colony = Natal).

Nine specimens were collected as follows: V.L.K.E. Nos. 751-757 (July 1930), Tsotsoroga; No. 758 (July), Kasane; No. 759 (August), Kalakamati.

DISTRIBUTION. A tropical species ranging from Kenya and the Congo, south to Natal, Transvaal, Southern Rhodesia and Angola, and extending also into the northern part of South-West Africa, Ngamiland and along the north-eastern border of the Kalahari.

REMARKS. Of the nine specimens collected four are semi-adult and five juvenile. Scales round body 24-26. Tail from $1\frac{1}{3}$ to $1\frac{2}{3}$ length of head and body.

COLOUR. Above olive brown, uniform or each scale with a blackish dot, forming interrupted dark longitudinal stripes on back; a well-defined dark streak running dorso-laterally from snout, through eye along body and tail; upper and lower labials spotted with blackish; sides of body greyish brown; scales on limbs with paler centres. Below pink to pinkish white.

FIELD NOTES. Found usually in well-shaded spots, such as under dead brushwood, or among the dry leaves, etc., under bushes and shrubs. Very quick of movement and detected often only by the rustle of their progress. The majority of the specimens obtained were found in open mopane forest, while that from Maun was taken in a deserted termite hill.

DIMENSIONS. A summary of the measurements of the four largest specimens is as follows:

	No. of specimens	Extremes	Average
Total length	3	71.0-79.0 mm.	75.6 mm.
Body	4	30.0-35.0 mm.	31.4 mm.
Tail	3	41.0-49.0 mm.	45.4 mm.
Head length	4	5.5- 8.0 mm.	6.4 mm.
Head width	4	3.7- 4.5 mm.	4.0 mm.
Arm	4	6.0- 7.2 mm.	6.6 mm.
Leg	4	8.1-11.0 mm.	9.4 mm.

Acontias meleagris (Linnaeus)

Anguis meleagris Linnaeus, 1766, *Syst. Nat.* ed. 12, 1, p. 390 (type loc.: South Africa).

Acontias meleagris Boettger, 1894, *Ber. Senck. Nat. Ges.* p. 90 (Great Namaqualand). Bocage, 1896, *Journ. Sc. Lisb.* (2), IV, p. 118 (Bechuanaland). Werner, 1910, *Jena. Denkschr.* XVI, p. 351 (Okahandja, South-West Africa; Pitsani, Kalahari). Sternfeld, 1911, *Mittl. Zool. Mus. Berlin*, V, p. 409 (Luderitzbucht and Warmbad, South-West Africa). Werner, 1915, in Michaelsen, *Land- u. Süßwasserfauna Deutsch-S.W.-Afrikas*, Lief. 3, p. 353 (Okasise and Neudamm, South-West Africa).

A single specimen (V.L.K.E. No. 765) was collected between Gomodimo and Kaotwe during April 1930.

DISTRIBUTION. A southern species ranging from Southern Rhodesia and Portuguese East Africa through Transvaal, Bechuanaland and South-West Africa to the Cape Province, where its range extends eastward as far as the Transkei. Not recorded from Natal and Zululand, where it is evidently replaced by *A. plumbeus*.

REMARKS. An adult male. Head conical, snout strongly projecting; anterior-most supraocular subequal to other two together; width of large preanal plate just exceeds distance between frontal and end of snout; distance between anterior corner of eye and end of snout equals length of rostral shield. Sixteen scales round middle of body. Ventral scales 167. Diameter of body 26 times into total length. Tail about one-sixth length of head and body.

COLOUR. Above uniform blackish. Below slightly paler, with a few scattered blotches of yellowish.

DISCUSSION. A very dark form of *A. meleagris*, resembling *A. plumbeus* in general appearance.

FIELD NOTES. Dug out of leaf mould under a thick patch of bush, growing on a low ridge in typical Kalahari sand veld.

DIMENSIONS.

Total length	...	...	...	196.5 mm.
Body	...	...	...	169.5 mm.
Tail	...	...	...	27.0 mm.
Diameter of body	...	...	...	7.6 mm.

Typhlacontias ngamiensis FitzSimons

(Figs. 17-19)

Typhlacontias ngamiensis FitzSimons, 1932, *Ann. Trans. Mus.* xv, p. 37 (type loc.: Motlhatlogo, Ngamiland).

TYPE. An adult specimen (V.L.K.E. No. 772 and T.M. 14461) collected at Motlhatlogo, on Lake Ngami, during May 1930. Also three paratypes (Nos. 771, 773 and 774).

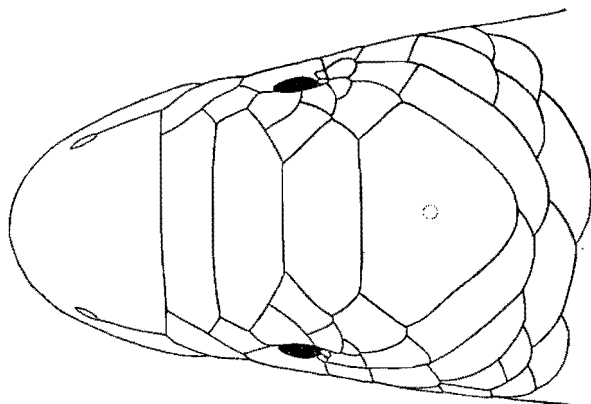


Fig. 17. *Typhlacontias ngamiensis* FitzSimons. Dorsal view of head.

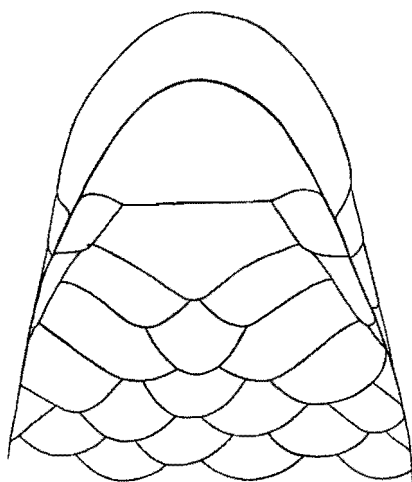


Fig. 18. *Typhlacontias ngamiensis* FitzSimons. Ventral view of head.

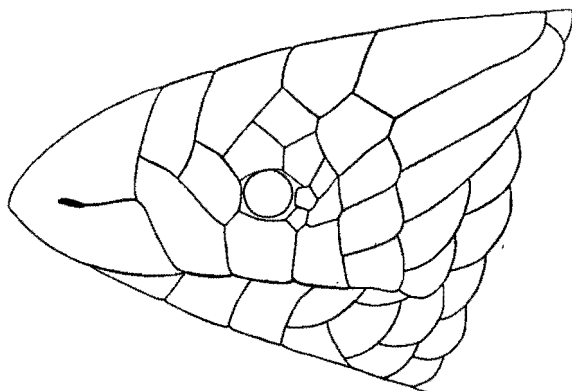


Fig. 19. *Typhlacontias ngamiensis* FitzSimons. Side view of head.

DESCRIPTION. Snout strongly projecting, with a sharp horizontal edge. Nostril pierced in a very large rostral, with the posterior border of which it is connected by an almost straight groove. A band-like supranasal and fronto-nasal, the latter distinctly longer, but slightly narrower than former. Frontal subhexagonal, bordered behind by two narrow band-like parietals which meet one another near the middle line. Length of rostral equal to frontal + fronto-nasal, subequal to interparietal, greater than supranasal + fronto-nasal. Two small widely separated prefrontals. Two supraoculars, a loreal and two small postoculars. No suboculars or preoculars. Four upper labials, first very large and vertically elongate, second entering eye. Pineal spot plainly visible in middle of interparietal. Three lower labials. Mental large, subtriangular. A single large submental shield, subpentagonal in shape. Three elongate chin-shields in contact with lower labials. Eighteen scales round middle of body. Preanal scales not or but feebly enlarged. Diameter of body into total length about 30 times. Tail just over half length of head and body.

COLOUR. Above light purplish to pearly grey, each scale with a small dark brownish dot; on two middorsal scale rows dots confluent, forming two longitudinal stripes, which fuse on head into a single median streak from parietals to middle of rostral; a dark dorso-lateral streak from loreal through eye over body and tail; below this line dots on scales large, well marked and more or less confluent, to form a wide dark lateral band. Below whitish, scales with darker centres. Tail creamy white below, isolated scales only, with dark centres.

DISCUSSION. The above new species from Lake Ngami adds yet another form to the large list of degenerate Lacertilia, in which Africa seems to have a distinct monopoly. Two other species of this genus are known, viz. *T. gracilis* Roux¹ from Zambesia, and *T. punctatissimus* Bocage² from Rio Coroca, Mossamedes, Angola. From these *T. ngamiensis* may be readily separated by means of the following key:

Key to all known species of *TYPHLACONTIAS*.

I. Third labial below eye:

(a) Suborbital present; no preoculars.

T. punctatissimus.

(b) Suborbital absent; two preoculars.

T. gracilis.

II. Second labial below eye: no suborbital or preoculars.

T. ngamiensis.

FIELD NOTES. Found under stones lying on sandy ground in the thick bush, near edge of the lake depression.

DIMENSIONS:

	Type (No. 772)	Paratypes		
		(No. 771)	(No. 773)	(No. 774)
Total length	125.0 mm.	103.0 mm.	94.0 mm.	95.0 mm.
Snout to vent	80.0 mm.	66.0 mm.	60.0 mm.	70.0 mm.
Tail	45.0 mm.	37.0 mm.	34.0 mm.	25.0 mm.
Diameter of body	4.0 mm.	3.5 mm.	3.2 mm.	3.8 mm.
Head length	4.8 mm.	4.5 mm.	4.2 mm.	4.6 mm.
Head width	3.1 mm.	3.0 mm.	2.9 mm.	3.4 mm.

(Tail regenerated in No. 774.)

¹ 1907, *Rev. Suisse de Zool.* p. 83, text-figs.

² 1873, *Jorn. Sc. Lisb.* IV, p. 213.

Fam. **ANELYTROPIDAE****Typhlosaurus lineatus** Boulenger

Typhlosaurus lineatus Boulenger, 1887, *Cat. Liz. Brit. Mus.* III, p. 432, pl. XXXVIII, fig. 3 (type loc.: Cape of Good Hope). Boettger, 1887, p. 152 (Noi Xas, near Ghanzi, Kalahari), and 1894, p. 91 (Great Namaqualand).

Ten specimens were collected as follows: V.L.K.E. Nos. 760 and 761 (April 1930), between Kuke and Gomodimo; Nos. 762 and 763 (April), Gomodimo; No. 764 (April), Kaotwe; Nos. 766 and 767 (April), between Okwa River and Damara Pan; Nos. 768-770 (April), Gemsbok.

DISTRIBUTION. A western species ranging from the Kalahari through Great Namaqualand into Little Namaqualand.

REMARKS. Six adults and four juveniles. Snout strongly projecting, with a sharp horizontal edge. Rostral shorter than other head-shields together. Interparietal twice, or just over, length of frontal. Scales on body hexagonal, broader than long; two median dorsal series distinctly broader than remainder. Fourteen scales round middle of body. Diameter of body into total length about thirty times. Tail short, 6.5-8 times into head and body.

COLOUR. Above yellow, with four to eight longitudinal series of dark brown spots over body and tail; the four median dorsal series usually confluent into longitudinal stripes. Below yellowish white. One specimen (No. 760) is a dark vinaceous grey above, with no trace of dorsal striation, but scales, with slightly darkened centres. Below creamy pink.

FIELD NOTES. Found in the open sand veld, under logs, stones, dead leaves or roots of small shrubs. The majority of specimens were secured during or just after rain, when they came near the surface of the ground in search of their insect food. They are very active and disappear rapidly into the sand again after exposure. When captured by hand they wriggle strenuously, hooking their heads firmly round the fingers in their endeavours to extricate themselves, and this, coupled with the hard glass-smooth surface of their bodies, renders them extremely difficult to retain in one's grasp.

DIMENSIONS. A summary of the measurements of the adult specimens is as follows:

	No. of specimens	Extremes	Average
Total length	5	142.0-161.0 mm.	149.6 mm.
Body	6	123.0-141.0 mm.	130.4 mm.
Tail	5	17.0-21.0 mm.	19.1 mm.
Diameter of body	6	4.5-5.5 mm.	4.9 mm.

Suborder **RHIPTOGLOSSA**Fam. **CHAMAELEONTIDAE****Chamaeleon dilepis dilepis** Leach

Chamaeleo dilepis Leach, 1819, in Bowdich, *Miss. Ashantee*, App. No. 4, p. 493 (type loc.: Gaboon, West Africa). Werner, 1915, in Michaelsen, *Land- u. Süßwasserfauna Deutsch-S.W.-Afrikas*, Lief. 3, p. 354 (Okahandja, Windhuk, Usakos, Neudamm, Okasise and Okawango, South-West Africa).

Ten specimens were collected as follows: V.L.K.E. No. 803 (December 1929), between Plumtree and Tsessebe; No. 802 (December 1929), Sebena; Nos. 794-796 (May 1930), Maun; Nos. 797 and 798 (June), between Shale-

shonto and Kwaai; No. 799 (July), Kabulabula; No. 800 (August), Makarikari; No. 801 (August), Kumalo.

DISTRIBUTION. A tropical species extending south to Portuguese East Africa, Zululand, Southern Rhodesia, north and eastern Transvaal and the northern parts of Bechuanaland and South-West Africa.

REMARKS. Five adults (2 ♂♂ and 3 ♀♀) and five half-grown specimens. Distance between angle of mouth and extremity of casque equals length of mouth. Occipital lobes large, in contact or overlapping in middle line. Dorsal crest well defined and serrated anteriorly, disappearing over posterior half of body. Males with a tarsal process. Tail usually slightly longer than head and body.

COLOUR MARKINGS. Gular crest white; a pale whitish band on each side of body, from axilla but fading out before reaching groin; often a short white streak above shoulder and just behind lower edge of occipital lobe, followed by a second about one-third along back; sometimes in young specimens a white streak at angle of mouth.

FIELD NOTES. Found only in the open forest and bush country, along the northern, north-eastern and western edges of the Kalahari. Stomach contents (No. 797): remains of small beetles and flying insects, together with a large number of parasitic worms. A large female (No. 802) contained over 40 eggs, averaging 8 mm. in diameter.

DIMENSIONS. A summary of the measurements of adult specimens is as follows:

	Sex	No. of specimens	Extremes	Average
Total length	♂	1	230.0 mm.	230.00 mm.
	♀	3	203.0-270.0 mm.	226.60 mm.
Snout to vent	♂	2	110.0-114.0 mm.	112.00 mm.
	♀	3	100.0-135.0 mm.	113.00 mm.
Tail	♂	1	117.0 mm.	117.00 mm.
	♀	3	98.0-145.0 mm.	116.00 mm.
Head length	♂	2	38.0-38.7 mm.	38.35 mm.
	♀	3	32.0-41.5 mm.	35.60 mm.
Head width	♂	2	19.8-20.0 mm.	19.90 mm.
	♀	3	18.0-21.0 mm.	19.20 mm.
Mouth	♂	2	23.7-24.7 mm.	24.20 mm.
	♀	3	21.0-27.5 mm.	23.50 mm.
Angle of mouth to occiput	♂	2	23.6-24.0 mm.	23.80 mm.
	♀	3	21.0-27.0 mm.	23.60 mm.
Width of cranial crests	♂	2	14.4-15.7 mm.	15.00 mm.
	♀	3	13.0-15.0 mm.	14.00 mm.
Occipital lobe at base	♂	2	15.0-15.5 mm.	15.25 mm.
	♀	3	13.0-15.6 mm.	14.70 mm.
Arm	♂	2	47.3-50.2 mm.	48.70 mm.
	♀	3	44.0-58.0 mm.	49.30 mm.
Leg	♂	2	46.5-46.7 mm.	46.60 mm.
	♀	3	41.0-58.0 mm.	47.60 mm.

Chamaeleon dilepis quilensis Bocage

Chamaeleo dilepis var. *quilensis* Bocage, 1866, *Jorn. Sc. Lisb.* 1, p. 59 (type loc.: Rio Quillo, Angola). Werner, 1910, *Jena. Denkschr.* xvi, p. 352 (Lehututu-Kang, Ku-Gui-Di and Vleij Topan, Kalahari). Lampe, 1911, *Jahrb. nass. Ver. Nat.* LXIV, p. 179 (Rietmond and Karibib, South-West Africa).

Chamaeleon quilensis Sternfeld, 1911, *Mittl. Zool. Mus. Berlin*, v, p. 409 (Outjo, Windhuk-Okahandja and Walfisch Bay, South-West Africa).

Chamaeleon parvilobus Boettger, 1887, *Ber. Senck. Nat. Ges.* p. 152 (Ondonga, Ovamboland; Damaraland); 1894, p. 91 (Rehoboth, South-West Africa).

Six specimens were collected as follows: V.L.K.E. No. 782 (March 1930), Gaberones; Nos. 788-791 (March), Metsimaklaba; No. 793 (April), Okwa River.

DISTRIBUTION. Tropical Africa southwards to Natal, Transvaal, northern Cape Province, Bechuanaland and South-West Africa.

REMARKS. One adult (female), one half-grown and four juvenile specimens. Parietal crest distinct in adult, low and indistinct in juveniles. Lateral crests strong and well defined. Occipital lobes small, free and movable in adult, immovable in young. Distance between commissure of mouth and extremity of casque slightly less than length of mouth. Tail in female slightly less than length of head and body.

FIELD NOTES. Found in open bush country. Juveniles were captured at night by lamplight, in which they showed up a conspicuous pale greenish white against the dark green background.

DIMENSIONS. Measurements of adult female (No. 782):

Total length	...	...	...	...	233.0 mm.
Snout to vent	...	...	...	...	120.0 mm.
Tail	...	...	...	...	113.0 mm.
Head length	...	...	...	...	36.5 mm.
Head width	...	...	...	...	19.0 mm.
Mouth	...	...	...	...	26.0 mm.
Angle of mouth to occiput	...	...	...	...	22.0 mm.
Width of head between cranial crests	...	...	...	...	15.0 mm.
Occipital lobe at base	...	...	...	...	11.5 mm.
Arm	...	...	...	...	53.0 mm.
Leg	...	...	...	...	53.0 mm.

SYSTEMATIC LIST OF AMPHIBIA COLLECTED

Order SALIENTIA

Fam. PIPIDAE

Xenopus laevis laevis (Daudin)

Bufo laevis Daudin, 1803, *Hist. Nat. d. Rainettes*, p. 85, pl. XXX, fig. 1.

Xenopus laevis Boettger, 1894, *Ber. Senck. Nat. Ges.* p. 93 (Kuisib, Namis and Rehoboth, South-West Africa). Werner, 1910, *Jena. Denkschr.* xvi, p. 291 (Bethany, Bersheba and Okahandja, South-West Africa); 1915, in Michaelsen, *Land- u. Süßwasserfauna Deutsch-S.W.-Afrikas*, Lief. 3, p. 370 (Neudamm, Grootfontein, Windhuk, Usakos, Auasbergen and Bismarckbergen).

A single half-grown specimen (V.L.K.E. No. 1306) together with eight tadpoles (No. 989) at various stages of development were collected in small rain-filled vleis near the Metsimaklaba River, during March 1931.

DISTRIBUTION. Southern Africa including Angola, extending northwards in the east as far as Abyssinia.

REMARKS. Half-grown specimen, uniform greyish brown above, dirty white below. Tadpoles, greyish brown, paler below. Length of largest tadpole = 72 mm., tentacle = 19.3 mm.

Fam. BUFONIDAE

Bufo regularis regularis Reuss

Bufo regularis Reuss, 1834, *Mus. Senckb.* 1, p. 60 (type loc.: Egypt). Werner, 1910, *Jena. Denkschr.* xvi, p. 291 (Okahandja, South-West Africa, Mashoning and Ku-Giu-Di, Kalahari); 1915, in Michaelsen, *Land- u. Süßwasserfauna Deutsch-S.W.-Afrikas*, Lief. 3, p. 371 (Okahandja, Tsumeb and Windhuk).

Forty-five specimens were collected as follows: V.L.K.E. Nos. 1275 and 1276 (March), Gaborones; Nos. 1259-1274 (March), Metsimaklaba River; Nos. 1277-1281, 1284-1288 and 1290 (May), Lake Ngami; No. 1289 (May), Maun; No. 1291 (June), Shorobe; Nos. 1292-1304 (July), Kabulabula; No. 1305 (July), Victoria Falls.

DISTRIBUTION. Throughout tropical Africa, including Egypt and Southern Africa.

REMARKS. A fair range of variation is found in the above series, both in size and other characters. Tympanum slightly smaller than eye, usually vertically oblong, but sometimes almost circular, as found in some Chobe River specimens. Parotids well defined, with a strong outward curve posteriorly and from $2\frac{1}{2}$ to 3 times as long as broad, as in Metsimaklaba River specimens, almost straight and just over twice as long as broad in those from Lake Ngami and the Chobe River. Inner metatarsal tubercle usually with a well-defined digging edge, sometimes soft and rounded as in Lake Ngami specimens. Specimens from the Chobe River all bear horny spines on the warty tubercles over back and limbs. Tarso-metatarsal articulation of adpressed hind limb reaches just beyond shoulder, to tympanum or posterior edge of eye.

COLOUR. Above pale yellowish brown to dark olive brown, with large black-edged blotches of dark reddish brown over back; in very dark specimens blotches often barely discernible; adult males usually with bright reddish infusions on flanks and hinder side of thighs. Below dirty white to yellowish; in old males throat blackish.

DIMENSIONS. A summary of the measurements of five adult specimens from the three following localities, (1) Metsimaklaba River, (2) Lake Ngami, (3) Chobe River, is as follows:

(1) *Metsimaklaba River*

	Extremes	Average
Snout to vent	68.0-71.0 mm.	69.82 mm.
Head length	15.0-16.0 mm.	15.56 mm.
Head width	24.0-26.0 mm.	24.68 mm.
Tympanum	4.7- 5.4 mm.	5.08 mm.
Eye	7.3- 7.6 mm.	7.42 mm.
Tibia	27.0-27.8 mm.	27.26 mm.
Foot	37.2-38.5 mm.	37.78 mm.

(2) *Lake Ngami*

Snout to vent	88.0-97.0 mm.	92.20 mm.
Head length	19.6-22.2 mm.	20.90 mm.
Head width	30.5-34.3 mm.	31.92 mm.
Tympanum	7.4- 8.3 mm.	7.74 mm.
Eye	9.3-10.0 mm.	9.66 mm.
Tibia	31.5-34.6 mm.	32.94 mm.
Foot	44.5-47.2 mm.	45.94 mm.

(3) *Chobe River*

	Extremes	Average
Snout to vent	94.2-103.0 mm.	98.54 mm.
Head length	21.0- 24.5 mm.	22.44 mm.
Head width	33.3- 36.0 mm.	34.42 mm.
Tympanum	6.6- 8.7 mm.	7.64 mm.
Eye	8.7- 10.0 mm.	9.24 mm.
Tibia	33.6- 36.7 mm.	35.06 mm.
Foot	44.0- 50.0 mm.	47.60 mm.

FIELD NOTES. No specimens were found in the central Kalahari, into which they have evidently not yet penetrated. Specimens from the Metsimaklaba River were for the most part captured at night in the dry river bed. Those from Lake Ngami were taken from native wells along the edge of the lake depression. The Chobe River specimens were all captured during one evening, when they made a sudden appearance following a spell of unseasonably warm weather coupled with rain. From an examination of stomach contents their diet consists mainly of beetles and ants of various kinds.

***Bufo regularis ngamiensis* FitzSimons**

Bufo regularis ngamiensis FitzSimons, 1932, *Ann. Trans. Mus.* xvi, p. 40 (type loc.: Motlhatlogo, on Lake Ngami).

TYPE. An adult specimen (V.L.K.E. No. 1283 and T.M. 14828) collected on Lake Ngami, 12th May, 1930. A second specimen (No. 1282) was secured at the same time.

DESCRIPTION. Snout short, obtusely pointed. Head just over half as long as broad; width of head greater than length of tibia. Canthus rostralis well marked. Nostrils set very close together, distance between being slightly less than their distance from eye; nearer end of snout than eye. Interorbital space distinctly concave, as wide as or wider than upper eyelid. Orbits prominent. Tympanum distinct, vertically oval, largely exposed from above, major axis distinctly shorter than eye. Parotids distinct, from $2\frac{1}{2}$ to 3 times as long as broad, not in contact with eye or tympanum, with surface reticulated and not or but very slightly pitted. Fingers slender, first extending beyond second, subarticular tubercles simple, two well-defined tubercles on palm near wrist strongly convex. Toes moderate, about one-third webbed, subarticular tubercles small; inner metatarsal tubercle large and rounded, outer small and subconical. Tarso-metatarsal articulation of adpressed hind limb barely reaches shoulder. Tibia into length from snout to vent just less than three times, foot just over twice. Skin above roughened with rounded subconical warts, surface of forearms and thighs finely granular. Below densely granular throughout, granules slightly larger along sides.

COLOUR. Above uniform dark olive brown to blackish. Below dirty brownish white, chin and legs with slight blackish infusions.

DIMENSIONS.

	Type No. 1283	Paratype 1282
Snout to vent	76.0 mm.	72.0 mm.
Head length	16.6 mm.	17.0 mm.
Head width	29.0 mm.	27.0 mm.
Tibia	26.7 mm.	24.5 mm.
Foot	37.0 mm.	34.8 mm.

FIELD NOTES. Found among the undergrowth of an old reed-bed within the lake depression.

Bufo carens A. Smith

Bufo carens A. Smith, 1849, *Ill. Zool. S. Afr., Reptiles*, pl. LXVIII, fig. 1 (type loc.: interior of Southern Africa). Werner, 1910, *Jena. Denkschr.* xvi, p. 293 (Mashoning, Kalahari).

Nine specimens were collected as follows: V.L.K.E. Nos. 1250-1256 (March), Metsimaklaba River; Nos. 1257 and 1258 (March), Gaberones.

DISTRIBUTION. Natal, Transvaal, northern Cape Province and along the eastern edge of Bechuanaland; extending thence north and east through Southern Rhodesia and Portuguese East Africa to Kenya Colony.

REMARKS. Three young adult and six half-grown specimens. First finger extending as far as or slightly farther than second. Toes about half webbed; subarticular tubercles simple but distinct. Two metatarsal tubercles, inner only slightly larger than outer; a tarsal fold present. Tarso-metatarsal articulation of adpressed hind limb reaches eye in males and tympanum in females. Skin above with irregular, much depressed, but distinctly porous warts. Parotids depressed and indistinct. Below, wrinkled and finely granular on throat, chest and belly, coarsely granular round posterior margin of belly and under thighs.

COLOUR. Above light to dark pinkish brown, with a few scattered dark red spots or markings; two well-defined large blood-red spots, one on either side of vertebral line on lumbar region; glandular fold edged below with dark red; limbs barred with dark brownish. Below dirty to yellowish white, with or without an irregular speckling or spotting of dark brown on throat, chest and belly; in males throat more or less suffused with dark brown.

FIELD NOTES. Found at Gaberones under stones, and at Metsimaklaba in the river bed at night after rain. Stomach contents (No. 1254): remains of large "Stink Ants" (Poneridae) and beetles (Carabidae).

DIMENSIONS. A summary of the measurements of the three largest specimens is as follows:

	Extremes	Average
Snout to vent	61.0-65.0 mm.	62.66 mm.
Head width	20.0-21.5 mm.	20.83 mm.
Fore limb	36.0-37.5 mm.	36.60 mm.
Tibia	24.8-26.0 mm.	25.26 mm.
Foot	32.5-35.5 mm.	33.66 mm.
Hind limb	67.0-80.0 mm.	73.66 mm.

Bufo fenoulheti obtusum Hewitt

Bufo fenoulheti obtusum Hewitt, 1925, *Rec. Albany Mus.* III, p. 362 (type loc.: Bleskop, Rustenburg District).

Two adult males (V.L.K.E. Nos. 1318 and 1319) were collected at Titumi during December 1929.

DISTRIBUTION. From the western Transvaal northwards to the north-western Transvaal, and along the eastern edge of Bechuanaland.

REMARKS. Snout short and truncate; nostrils very much nearer end of snout than to eye; interorbital space slightly wider than upper eyelid; parotids somewhat depressed, but definable, wider anteriorly than posteriorly, greatest width about twice into length; tympanum almost circular, just over half length of eye. First finger not extending as far as second, subarticular tubercles mostly double. Toes feebly webbed, less than one-third; subarticular tubercles under third and fourth toes all double, while only those at bases of other toes are double; sole of foot with numerous small tubercles; metatarsal tubercles enlarged, inner slightly larger, harder and more rounded than inner.

No tarsal fold. Tarso-metatarsal articulation of adpressed hind limb reaches posterior border of eye. Skin above much roughened with warty tubercles, which bear finely granular asperities; loreal region and upper lip strongly granular. Below reticulated on chest and belly, finely granular on throat, coarsely granular under thighs.

COLOUR. Above greyish to olive brown, with more or less symmetrically arranged dark brown patches; a dark brown band between and behind eyes; a characteristic subquadrangular-shaped pale area on nape. Below uniform creamy white to yellowish.

DISCUSSION. The above specimens were compared with the types from Bleskop, Rustenburg District, from which they proved indistinguishable; they may be separated from Power's closely allied *B. vertebralis albiventris* from Lobatsi by the short truncate snout.

FIELD NOTES. Found under stones on a rocky outcrop in mopane forest near Titumi.

DIMENSIONS. Both specimens measure 27 mm. from snout to vent.

Fam. **RANIDAE**

Rana mascareniensis mascareniensis Duméril and Bibron

Rana mascareniensis Duméril and Bibron, 1841, *Erpet. Gen.* VIII, p. 350 (type loc.: Mascarene Island).

A single specimen (V.L.K.E. No. 1014) collected near Zimbabwe (September 1930).

DISTRIBUTION. From the Sahara in the west and Egypt in the east, southwards through tropical Africa to the northern part of South-West Africa, Southern Rhodesia, north and eastern Transvaal, reaching its most southerly limit in the eastern Cape Province near Kingwilliamstown.

REMARKS. Snout sharply pointed and projecting strongly. Interorbital space equal to width of upper eyelid. Tympanum about three-fifths width of eye. Tibio-tarsal articulation of adpressed hind limb reaches well beyond end of snout. Tibia just over two-thirds length from snout to vent. Six longitudinal glandular folds on back, outer most distinct. A well-marked fold from below eye to arm.

COLOUR. Above olive brown, with a series of very dark band-like markings on back; a pale vertebral streak; outer glandular fold picked out in whitish. Limbs banded with dark brown. Hinder side of thighs reddish brown, with whitish mottling. Below creamy white, with a few dark brown markings on chin.

DIMENSIONS.

Total length	...	...	33.6 mm.
Head width	...	...	11.2 mm.
Fore limb	...	...	18.5 mm.
Hind limb	...	...	65.0 mm.
Tibia	...	...	23.3 mm.
Foot	...	...	27.3 mm.

Rana vernayi FitzSimons

(Figs. 20 and 21)

Rana vernayi FitzSimons, 1932, *Ann. Trans. Mus.* xv, p. 39 (type loc.: Metsimaklaba River).

Fifteen specimens were collected as follows: V.L.K.E. Nos. 960-969, 971, 975, 978 and 1191 (March), Metsimaklaba River; No. 985 (June), Tsotsoroga Pan.

TYPE. A half-grown specimen (V.L.K.E. No. 975 and T.M. 14768) collected on the Metsimaklaba River, 11th March, 1930.

DESCRIPTION. Vomerine teeth in two short straight series in front of choanae, with outer edges in contact with inner front edges of latter. Snout sharply pointed, projecting, twice as long as eye. Interorbital space wide and flat, $1\frac{1}{2}$ times width of upper eyelid. Loreal region concave. Nostrils much nearer end of snout than to eye, and widely spaced. Tympanum moderate, about three-quarters diameter of eye. First finger extending as far or slightly farther than second. Toes moderate, about two-thirds webbed; subarticular tubercles distinct and prominent; an inner and outer metatarsal tubercle, former slightly elongate, latter much smaller and rounded. Tibio-tarsal

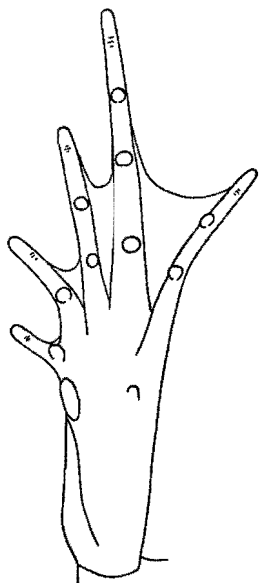


Fig. 20. *Rana vernayi* FitzSimons.
Ventral aspect of left foot.

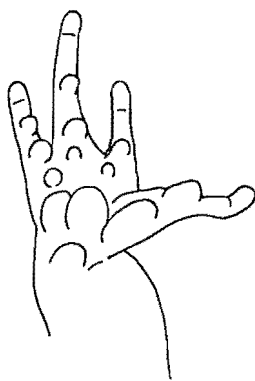


Fig. 21. *Rana vernayi* FitzSimons.
Ventral aspect of left hand.

articulation of adpressed hind limb reaches to between eye and nostril. Tibia into length from snout to vent just over $1\frac{1}{2}$ times. Foot into length from snout to vent just less than $1\frac{1}{2}$ times. Eight longitudinal glandular folds on back, depressed and usually broken up, except outer fold which is strongly glandular; a well-marked fold from eye to arm. Sides of body coarsely granular; infero-posterior surface of thighs finely granular.

COLOUR. Above greyish brown, with irregular markings of darker brown and a vertebral streak of reddish brown from tip of snout to vent; limbs banded with dark brown. Below creamy white, yellowish under thighs; a pale streak along upper lip from tip of snout to armpit; lower lip spotted with dark brown.

DIMENSIONS.

			Type No. 975
Snout to vent	...	...	36.3 mm.
Head width	...	...	13.4 mm.
Fore limb	...	...	19.3 mm.
Hind limb	...	...	58.0 mm.
Tibia	...	...	19.6 mm.
Foot	...	...	25.0 mm.

REMARKS. Colour above variable from a pale greyish to olive brown. Vertebral streak absent in four specimens. No. 985 from Tsotsoroga Pan differs slightly from the above description in a slightly shorter and more obtusely pointed snout.

DISCUSSION. Allied to *R. mascareniensis* but separable therefrom by the following: vomerine teeth in straight series; wide interorbital space; outer metatarsal tubercle present; subarticular tubercles distinct and prominent; shorter foot.

Rana oxyrhynchus A. Smith

Rana oxyrhynchus A. Smith, 1849, *Ill. Zool. S. Afr., Reptiles*, pl. LXXVII, figs. 2 and 2a-c (type loc.: Kaffirland and country towards Port Natal).

Twelve specimens were collected as follows: V.L.K.E. Nos. 954-959, 970, 974, 976, 977 and 979 (March), Metsimaklaba River; No. 1009 (July), Chobe River at Kasane.

DISTRIBUTION. From Portuguese Guinea in the west and Eritrea in the east, southwards through tropical Africa to the western Transvaal and south-eastern corner of Bechuanaland, north and eastern Transvaal, Natal and Pondoland.

REMARKS. Three adult (females), four half-grown (3 ♂♂ and 1 ♀) and five juvenile specimens. Toes almost entirely webbed (to terminal joint of first, second and third toes, to second joint of fourth and to tip of fifth). Inner metatarsal tubercle small and slightly elongate. Tibio-tarsal articulation of adpressed hind limb reaches beyond tip of snout. At least eight glandular folds along back, usually irregular and broken up. A well-marked fold from eye to arm. Tibia just less than two-thirds length from snout to vent. Foot equals length from vent to anterior edge of tympanum. Males with two external vocal vesicles (showing up blackish through the skin) opening by two slits below lower jaw.

COLOUR. Above grey, greyish brown to brown, with irregular spotting of dark brown, often aggregated along dorsal folds; limbs banded (often indistinctly) with dark brown, hinder side of thighs with dark brown and creamy white reticulations. Below creamy white on throat and chest, pale lemon yellow on belly and thighs; lips usually spotted with brownish.

FIELD NOTES. Very active and elusive. Captured at night, after rain, in the dry river bed and during the day in the long grass near the river banks.

DIMENSIONS. A summary of the measurements of three adults is as follows:

	Extremes	Average
Total length	42.0-47.0 mm.	43.60 mm.
Head width	15.0-16.5 mm.	15.50 mm.
Fore limb	25.0-27.0 mm.	26.00 mm.
Hind limb	78.0-86.0 mm.	81.30 mm.
Tibia	27.0-30.5 mm.	28.16 mm.
Foot	32.2-35.8 mm.	33.46 mm.

Rana chobiensis FitzSimons

(Fig. 22)

Rana chobiensis FitzSimons, 1932, *Ann. Trans. Mus.* xv, p. 39 (type loc.: Chobe River at Kasane).

Nineteen specimens were collected as follows: V.L.K.E. Nos. 990-997 (July), Kabulabula; Nos. 998-1008 (July), Kasane (both places on the Chobe River).

TYPE. An adult specimen (V.L.K.E. No. 998 and T.M. 14757) collected at Kasane, on the Chobe River, 26th July, 1930.

DESCRIPTION. Vomerine teeth in two widely separated, small, slightly oblique oval groups, with their outer edges in contact with inner front edge of choanae. Head slightly longer than broad; snout long, pointed and projecting, about one and a half times length of eye. Canthus rostralis rounded, loreal region slightly concave; nostril nearer tip of snout than to eye. Interorbital space narrow, about two-thirds width of upper eyelid, and less than distance between nostrils. Tympanum distinct, almost as large as eye, and about two and a half times its distance from same. Fingers elongate, webbed at base; first finger not extending beyond second. Toes long and slender, almost entirely webbed; subarticular tubercles small and indistinct; a small, distinct, slightly elongate inner metatarsal tubercle, whose length goes five times into length of inner toe; foot equals distance from nostril to vent; tibia about one and a half times into snout to vent. Tibio-tarsal articulation of adpressed hind limb reaches beyond tip of snout. Six longitudinal glandular folds on back; a well-marked fold also present from just below eye to forearm; infero-posterior surface of thighs densely granular.

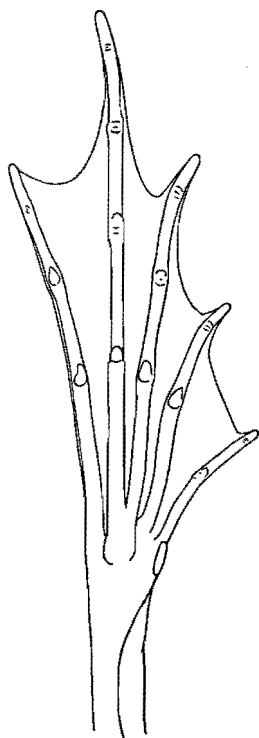


Fig. 22. *Rana chobiensis* FitzSimons.
Right hind foot.

COLOUR. Above a rich chocolate brown, with scattered spots and markings of darker; a bright pea to olive green vertebral stripe from tip of snout to vent; outer glandular fold and that from eye to forearm greenish yellow posteriorly. Below creamy white to bright yellow, spotted with brown, more intensely on chin and throat. Under side thighs bright yellow, with two to three irregular longitudinal dark brown streaks.

DIMENSIONS.

	Type No. 998	Paratypes		
		No. 1001	No. 1007	No. 1008
Snout to vent	48.5 mm.	50.0 mm.	52.0 mm.	54.0 mm.
Head width	17.3 mm.	18.0 mm.	18.0 mm.	18.5 mm.
Fore limb	29.3 mm.	29.5 mm.	28.5 mm.	29.0 mm.
Hind limb	94.0 mm.	95.0 mm.	94.0 mm.	102.0 mm.
Tibia	30.5 mm.	32.0 mm.	31.5 mm.	34.0 mm.
Foot	41.5 mm.	44.1 mm.	44.7 mm.	44.2 mm.

REMARKS. Vertebral streak absent in eight specimens. Spotting below sometimes very sparse or absent on thighs.

DISCUSSION. Allied to *R. oxyrhynchus* but readily separated therefrom by the spotted underparts, together with such characters as the vomerine teeth in oblique series, narrower interorbital space and more elongate and slender fingers and toes.

FIELD NOTES. Captured along the banks of the Chobe River; very active and elusive.

***Pyxicephalus delalandii* Duméril and Bibron**

(Figs. 23-25)

Pyxicephalus delalandii Duméril and Bibron, 1841, *Erpet. Gen.* VIII, p. 445, pl. 87, figs. 1, 1a-b (type loc.: South Africa). Werner, 1910, *Jena. Denkschr.* XVI, p. 298, fig. 5 (Quaiputz and Namib, South-West Africa; Mashoning and Lehututu, Kalahari). Nieden, 1913, *S.B. Ges. Nat. Fr. Berlin*, p. 451 (Rehoboth and Kuisib, South-West Africa). Werner, 1915, in Michaelsen, *Land- u. Süßwasserfauna Deutsch-S.W.-Afrikas*, III, p. 373 (Grootfontein, Okahandja, Omaruru, Teufelsbach and Neudamm, South-West Africa).

Rana delalandii Boettger, 1887, *Ber. Senck. Nat. Ges.* p. 170 (Ondonga, Ovamboland), and 1894, p. 93 (Rehoboth, Namis and Kuisib, South-West Africa).

One hundred and thirty-eight specimens were collected as follows: V.L.K.E. Nos. 1188-1190 (December 1929), Titumi; Nos. 1185-1187 (December 1929), between Lobatsi and Mafeking; Nos. 1136-1146 (March 1930), Gaberones; Nos. 1015-1054 (March), Metsimaklaba River; Nos. 1055-1084 (March), Kuke Pan; Nos. 1085-1103 (April), Gomodimo Pan; No. 1104 (April), between Gomodimo and Kaotwe Pans; Nos. 1105-1126 (April), Kaotwe Pan; Nos. 1127-1133 (April), Gembok Pan; No. 1134 (May), Mabeleapudi; No. 1135 (August), Makarikari.

DISTRIBUTION. South and South-West Africa, extending northwards through Southern Rhodesia and Portuguese East Africa to Eritrea and the Sudan.

REMARKS. Of the above series only ten may be considered adult, the remainder being either half-grown or juvenile. They may be divided roughly into two groups (*a*) the longer-limbed typical form and (*b*) the shorter-limbed Kalahari form. Group (*a*), comprising specimens from Lobatsi-Mafeking, Gaberones and a few from the Metsimaklaba area, has tarso-metatarsal articulation of hind limb reaching almost to tip of snout; tibia into length from snout to vent averaging 2.28 times and foot 1.64 times. Group (*b*), comprising a number of specimens from the Metsimaklaba River, together with all those from the central Kalahari, Gembok Pan, Mabeleapudi, Makarikari and Titumi, has tarso-metatarsal articulation reaching to tympanum or at most as far as eye; tibia into length from snout to vent averaging 2.6 times and foot 1.9; habit short and squat, sole of foot soft and fleshy, and inner metatarsal tubercle well developed and set at right angles to sole of foot. All the above characters are correlated to more or less degree with a like condition in *Pyxicephalus adspersus* and *Breviceps mossambicus*, and appear to be a direct adaptation to life in the dry sandy environment of the Kalahari. There is still, however, a certain degree of plasticity evident. Overlapping of the two forms was found along the Metsimaklaba River, where no doubt interbreeding is taking place as evidenced by the finding of intermediate specimens. As we progressed westwards, however, into the Kalahari proper, we found such consistent conformity to type as almost warrants subspecific separation. Figures from No. 1104.

COLOUR. Considerable variation in colour is evident within the series. Ground colour above grey, olive or brown, with pale-edged blotches and mottlings of olive green or dark brown; usually also with curved or U-shaped vermiculations of dark brown to blackish over back; a pale vertebral streak

present in 24 specimens, absent in the remainder; a large pale roughly hexagonal patch sometimes present on nape; limbs irregularly barred, except for a conspicuously wide band about middle of tibia and thigh. Below creamy

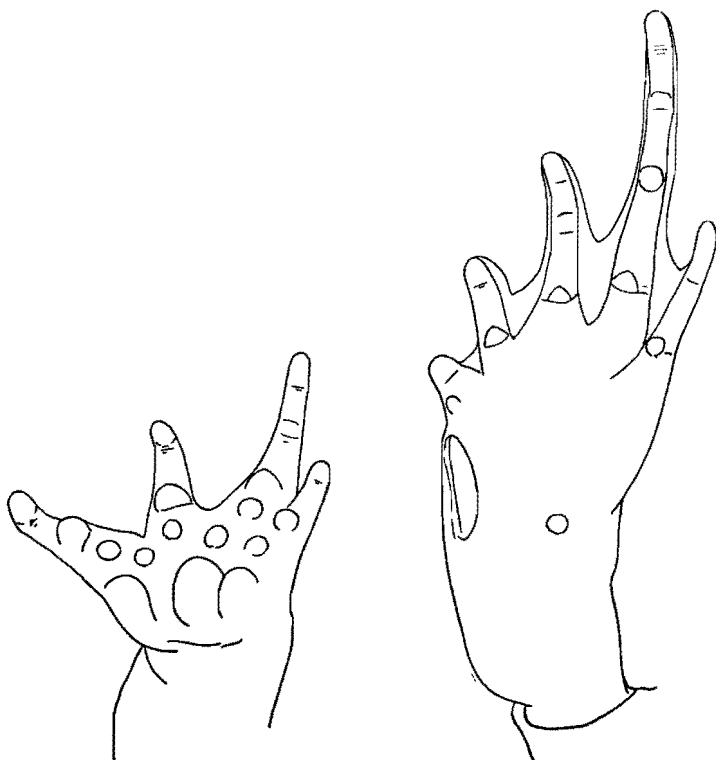


Fig. 23.

Fig. 24.

Fig. 23. *Pyxicephalus delalandii* Duméril and Bibron. Under side of left hand.
 Fig. 24. *Pyxicephalus delalandii* Duméril and Bibron. Under side of left foot.

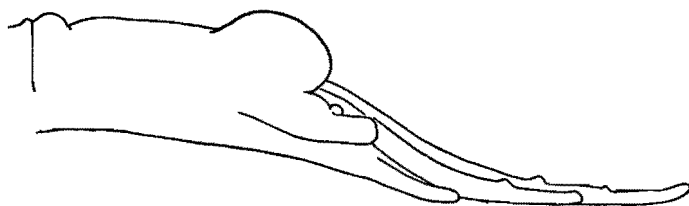


Fig. 25. *Pyxicephalus delalandii* Duméril and Bibron. Side view of left foot, showing inner metatarsal tubercle.

white, chin and throat in adult males dark brown to blackish. Specimens from Titumi almost uniform pale brownish above, with blotches only just discernible as indefinite darker suffusions.

DIMENSIONS. A summary of the measurements of ten adult specimens is as follows:

	Extremes	Average
Snout to vent	43-48.7 mm.	45.9 mm.
Tibia	17-19.0 mm.	17.8 mm.
Foot	22-25.0 mm.	23.9 mm.

FIELD NOTES. These frogs were only found at night after rain. In the Kalahari they were aggregated in and about the pans, no specimens being found any great distance therefrom. Stomach contents (No. 1106): remains of nocturnal termites and ants, together with small crustaceans from the pan in which the frog was found.

***Pyxicephalus adspersus* Duméril and Bibron**

Pyxicephalus adspersus Duméril and Bibron, 1841, *Erpet. Gen.* VIII, p. 444 (type loc.: South Africa). Werner, 1910, *Jena. Denkschr.* XVI, p. 298, fig. 6 (Vleij Topan and Leclake Pan, Kalahari).

Rana adpersa Boettger, 1887, *Ber. Senck. Nat. Ges.* p. 170 (Ondonga, Ovamboland).

Thirty-four specimens were collected as follows: V.L.K.E. No. 1160 (March), Metsimaklaba River; Nos. 1147-1159 (March), Kuke; No. 1179 (April), van Zyl's Cutting; Nos. 1161-1163 (April), Gemsbok Pan; Nos. 1164-1176 (May), Mabeleapudi; Nos. 1177-1178 (May), Maun; No. 1180 (August), Makarikari.

DISTRIBUTION. From the Sudan in the north, southwards through Central and East Africa, to the eastern Cape Province, and westward across Southern Rhodesia, Transvaal, Orange Free State, northern Cape Province and Bechuanaland into the northern part of South-West Africa, and Angola.

REMARKS. One adult, one half-grown and 32 juveniles. In addition to the above, a skull measuring 80 mm. across was found near Damara Pan. Vertical diameter of tympanum slightly less than length of eye. First finger extending as far as the second. Toes from one-third to half webbed. Foot much widened and fleshy; inner metatarsal tubercle as long as second toe. Subarticular tubercles indistinct. Tarso-metatarsal articulation of adpressed hind limb reaches tympanum. Longitudinal glandular folds often broken up in adults, continuous in young. In the specimen from the Makarikari region, skin on back with warty excrescences and longitudinal folds feebly developed. Tibia into total length 2.5-2.7 times. Foot into total length 2-2.3 times. On the average specimens from the central Kalahari have leg and foot slightly shorter than the typical form.

COLOUR. Adult: Above uniform dark olive green. Below dirty yellow in the middle, yellowish green on sides. Throat with slight infusions of brown. Half-grown: Above pale green, with large blotches of dark olive, and a dirty white vertebral streak. Sides bright yellowish green. Below uniform yellowish. Limbs with indistinct dark bands. Juvenile: Above olive brown, with a bronzy sheen; indistinct darker blotches over back; bright yellow-green vertebral streak from snout to anus, and sometimes a shorter dorso-lateral band from hind edge of eye to midway between fore and hind limbs. Below creamy white, with or without large irregular spots or blotches of dark brown on chin and throat. Limbs banded more or less with very dark brown.

DIMENSIONS.

	No. 1179
Snout to vent	183 mm.
Tibia	68 mm.
Foot (heel to tip of fourth toe) ...	81 mm.

FIELD NOTES. Young specimens were fairly numerous in and about pans at Kuke, Gemsbok and Mabeleapudi, where they were found in association with *P. delalandii*. An adult specimen secured at Kuke was stolen and devoured by some wandering Bushmen, who regard the flesh of these frogs as a great delicacy.

***Phrynobatrachus natalensis* (A. Smith)**

Stenorhynchus natalensis A. Smith, 1849, *Ill. Zool. S. Afr.*, *Reptiles*, App. p. 24 (type loc.: Port Natal).

Nine specimens were collected as follows: V.L.K.E. Nos. 972, 973, 980-984, 1321 and 1322 (March), Metsimaklaba River.

DISTRIBUTION. Tropical Africa excluding the Rain Forest, extending south to the eastern Cape Province, Orange Free State, Transvaal and along the eastern edges of the Kalahari.

REMARKS. Five semi-adult and four juvenile specimens. Toes between a half and two-thirds webbed. Tarso-metatarsal articulation of adpressed hind limb reaches end of snout or just beyond. Tympanum usually somewhat indistinct. Tibia goes about twice into length from snout to vent, foot $1\frac{1}{2}$ times. Skin above with irregular flattened warts.

COLOUR. Above greyish, olive or olive brown, with indistinct mottlings of darker; sometimes (two specimens) a pale greenish vertebral streak from tip of snout to vent. Limbs barred with darker. Below creamy white, females with a few scattered spots on chin, males more or less densely speckled with dark brown on chin and throat.

FIELD NOTES. Specimens from Metsimaklaba were captured at night after rain, in the dry river bed.

***Phrynobatrachus mababiensis* FitzSimons**

(Fig. 26)

Phrynobatrachus mababiensis FitzSimons, 1932, *Ann. Trans. Mus.* xv, p. 40 (type loc.: Tsotsoroga Pan, Mababe Flats).

A series of forty juvenile specimens were collected at Tsotsoroga Pan during the period 17th to 27th June, 1931.

TYPE. A juvenile male specimen (V.L.K.E. No. 986 and T.M. 14838) from Tsotsoroga Pan, on northern edge of the Mababe Flats, 17th June, 1931.

DESCRIPTION. Tongue with a small free conical papilla in the middle, and deeply notched behind. Habit medium. Head moderate, slightly longer than broad. Snout obtusely pointed, distinctly longer than eye; nostrils widely spaced and directed outwards. Interorbital space wide, much wider than upper eyelid, subequal to distance from eye to nostril. Tympanum hidden. First finger distinctly shorter than second. Toe less than one-third webbed, with traces of lateral fringing to near tips. Subarticular tubercles distinct. An inner and outer metatarsal tubercle present, both small; a third tubercle on inner side of tarsus, slightly nearer distal end of latter. Tarso-metatarsal articulation of adpressed hind limb reaches just beyond tip of snout. Skin above with irregular flattened warts. An external subgular vocal pouch.

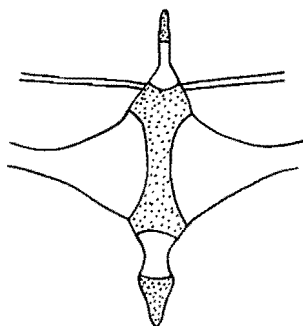


Fig. 26. *Phrynobatrachus mababiensis* FitzSimons. Pectoral apparatus.

COLOUR. Dark olive brown above; limbs cross-barred. Whitish below, throat blackish.

DIMENSIONS.

Type No. 986

Snout to vent ... 15.5 mm.

REMARKS. Colour varies from pale olive grey to dark olive brown, with or without darker marblings. Throat in females finely speckled with brownish.

DISCUSSION. The above specimens though very immature appear to represent a distinct species separable from *P. natalensis* by the following: snout more obtuse; the more widely spaced and outwardly directed nostrils; tongue more deeply notched; the shorter first finger and reduced webbing of toes.

FIELD NOTES. Found in considerable numbers in the shallows round the edges of Tsotsoroga Pan. In spite of diligent searching no adults were found.

***Phrynobatrachus maculatus* FitzSimons**

(Fig. 27)

Phrynobatrachus maculatus FitzSimons, 1932, *Ann. Trans. Mus.* xv, p. 40 (type loc.: Rain Forest, Victoria Falls).

TYPE. A young adult specimen (V.L.K.E. No. 1012 and T.M. 14830) collected in the Rain Forest, Victoria Falls, 31st July, 1930. In addition there are four juvenile specimens, Nos. 1010, 1182 and 1183 (July), Kasane, and No. 1013 (August), Nata River at Makarikari, which I think may be assigned to this species.

DESCRIPTION. Tongue with a free conical papilla in the middle. Body comparatively slender. Head moderate, slightly broader than long. Snout short and obtusely rounded, longer than eye. Canthus rostralis rounded. Nostrils much nearer tip of snout than to eye; widely spaced, distance between equal to or slightly greater than their distance from eye. Interorbital space subequal to width of upper eyelid. Tympanum indistinct, about two-thirds diameter of eye. First finger not extending as far as second. Toes about two-thirds webbed; subarticular tubercles distinct. Two metatarsal tubercles, inner elongate and prominent, outer small and rounded; a small tarsal tubercle on inner edge of tarsus, about one-third down from distal end. Tarso-metatarsal articulation of adpressed hind limb extends far beyond tip of snout, the tibio-tarsal joint to between eye and end of snout. Tibia into length from snout to vent $1\frac{3}{4}$ times; foot into length from snout to vent $1\frac{1}{4}$ times. Skin above much roughened with irregular flattened warty tubercles, more intense along sides, over posterior part of back and on tibia; below smooth, sparsely granular along infero-posterior surface of thighs.

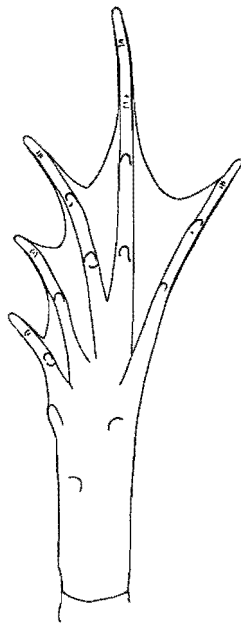


Fig. 27. *Phrynobatrachus maculatus* FitzSimons. Ventral aspect of left foot.

COLOUR. Above olive brown, with mottlings of darker on back and sides; a dark cross-bar between eyes and an irregular X-shaped marking between shoulders; limbs cross-barred; thighs with irregular marblings posteriorly. Below dirty white, with fairly large brown spots scattered over chest, belly and under side of limbs; throat suffused with paler brown; large brown spots on lips.

DIMENSIONS.

Type No. 1012

Snout to vent	...	25.8 mm.
Tibia	...	14.6 mm.
Foot	...	20.5 mm.

DISCUSSION. Allied to *P. ranoides* Boulenger but separable by the longer, less obtuse snout, shorter first finger and colour markings.

REMARKS. The ventral spotting not so apparent in the juvenile specimens and in some cases absent over the belly and thighs. Two of the latter from the Chobe River at Kasane have a wide reddish brown vertebral band over back from snout to vent.

***Chiromantis xerampelina* Peters**

Chiromantis xerampelina Peters, 1854, *Ber. K. Preuss. Ak. Wiss. Berlin*, p. 627 (type loc.: Mozambique).

A single adult specimen (V.L.K.E. No. 1181) collected at Tsotsoroga, June 1930.

DISTRIBUTION. From Ngamiland, along the north and eastern edges of Bechuanaland, through the Transvaal to Zululand, and extending thence northwards through Southern Rhodesia and Portuguese East Africa to Kenya.

REMARKS. Outer fingers from a third to half webbed. Tibio-tarsal articulation of adpressed hind limb reaches anterior edge of tympanum. Skin smooth above, with a few scattered tubercles; below granular, coarsely on belly, finely on thighs.

COLOUR. Above ash grey, with irregular markings of greyish brown to blackish. Below greyish white, throat slightly infuscated with brownish.

FIELD NOTES. During the rainy season December 1930 many egg masses of this frog were found near Titumi and Tsessebe. In all cases they were found over water, attached to overhanging branches, tree trunks, bushes, stones, etc., from which the developing tadpoles could find direct access to the water. It was remarkable with what rapidity these frogs worked, the nests complete with eggs often appearing overnight round temporary rain-filled pools. When newly made the nest is a pure white frothy mass, which turns yellow and hardens on the outside after exposure for a day or so. Number of eggs laid varies from 150 to 200. Newly laid eggs as found are unpigmented, with yolk-sac about 1.5 mm. in diameter.

DIMENSIONS.

No. 1181

Snout to vent	...	67.0 mm.
Tibia	...	31.7 mm.
Foot	...	39.0 mm.

***Kassina senegalensis senegalensis* (Duméril and Bibron)**

Cystignathus senegalensis Duméril and Bibron, 1841, *Erpet. Gen.* VIII, p. 418 (type loc.: Galam, Senegal).

Twenty-four juvenile and half-grown specimens were collected as follows: V.L.K.E. No. 1216 (December 1929), Bosoli; Nos. 1193-1210 and 1212

(March 1930), Metsimaklaba River; No. 1211 (March), Gaberones; Nos. 1213-1215 (May), Mabeleapudi. In addition to the above a series of 25 tadpoles (No. 998) were also collected near the Metsimaklaba River during March 1930.

DISTRIBUTION. An open country form, ranging over practically the whole of Africa, south of the Sahara, with the exception of the Kalahari, southern part of South-West Africa and the western Cape Province.

REMARKS. Inner metatarsal tubercle oval and distinct, outer very small and rounded. Tarso-metatarsal articulation of adpressed hind limb reaches almost to eye. Largest specimen (No. 1216) 27.7 mm. from snout to vent. The series of tadpoles comprise specimens in all stages of development from the first appearance of the limbs to the perfectly formed individual frog. The dimensions of the largest tadpole are as follows: total length 77 mm., body 22 mm., tail 55 mm., hind limb 18 mm.

COLOUR. Above light greyish olive, with longitudinal series of elongate dark olive brown spots, which are often confluent, forming three stripes over back; limbs with dark brown bars. Below yellowish white to greyish, males with dark infusion on throat. Tadpoles olive above and whitish below. Caudal crests transparent or marbled with dark brown. As development proceeds the individual becomes darker above, and assumes the characteristic markings of the adult some time before the tail is finally absorbed.

FIELD NOTES. Specimens from Metsimaklaba were captured at night in the dry river bed, along with *Phrynomerus bifasciatus* and *Hemisus marmoratum marmoratum*. No. 1216 from Bosoli was found in a hole about 9 inches deep, with opening under the lee of a small bush. Tadpoles were found in small rain-filled pans near the Metsimaklaba River.

***Cacosternum boettgeri* (Boulenger)**

(Fig. 28)

Arthroleptis boettgeri Boulenger, 1882, *Cat. Batr. Sal. Brit. Mus.* p. 118, pl. XI, fig. 6 (type loc.: Kaffraria).

Twelve specimens (V.L.K.E. Nos. 987 and 1372-1382) were collected in the Metsimaklaba River, during March 1930.

DISTRIBUTION. South Africa (excluding Little Namaqualand and the Kalahari) and South-West Africa, extending northwards into Southern Rhodesia.

REMARKS. One adult, five half-grown and six juveniles. Head somewhat flattened; snout obtuse. Third finger from one and a half times to twice the length of second. Tibio-tarsal articulation of adpressed hind limb reaches the shoulder. Toes webbed at base.

COLOUR. Above bright olive green, with large elongate dark brown spots, usually arranged in two dorso-lateral rows, and a reddish brown vertebral streak (absent in two juvenile specimens); small whitish ocelli sometimes present over rump; a black streak usually runs from nostril to eye. Below yellowish to

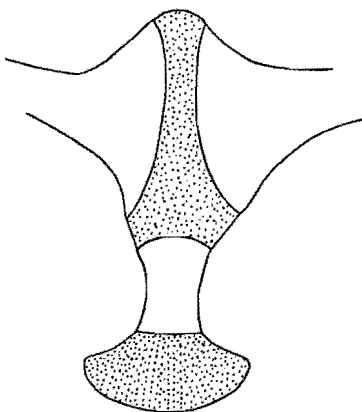


Fig. 28. *Cacosternum boettgeri* (Boul.).
Shoulder girdle of No. 987.

greenish white, with a few scattered dark brown spots on belly (absent in two cases); under surface of legs finely speckled with brown.

FIELD NOTES. Captured in the dry bed of the Metsimaklaba River, at night after rain.

DIMENSIONS. The largest specimen (No. 987) measures 21 mm. from snout to vent.

Hemisus marmoratum marmoratum (Peters)

Engystoma marmoratum Peters, 1854, *Ber. K. Preuss. Ak. Wiss. Berlin*, p. 628, and 1855, *Arch. Naturg.* pt. 1, p. 58 (type loc.: Cabaceira, Portuguese East Africa).

Eight specimens were collected as follows: V.L.K.E. Nos. 1232 and 1233 (December 1929), near Bushman Mine; Nos. 1226-1231 (March 1930), Metsimaklaba River.

DISTRIBUTION. Tropical Africa, from Gambia in the west to Egypt in the east, and ranging thence southwards to Portuguese East Africa, northern Transvaal, and along the eastern edge of Bechuanaland, reaching its southernmost limit on the Metsimaklaba River.

REMARKS. Five adult (1 ♂ and 4 ♀♀), two half-grown and one juvenile specimen. Snout acutely pointed and projecting. Three prominences on front edge of lower jaw, middle one indistinct and sometimes absent. Tarsometatarsal articulation of adpressed hind limb reaches eye. Subarticular tubercles more or less distinct. Inner metatarsal tubercle well developed, shovel-like, set almost at right angles to sole of foot, longer than fifth toe but shorter than third. Toes webbed at base. Skin smooth, with a distinct fold right round head just behind eye; a fold also present across chest. No. 1232 (male) with glandular surfaces on wrist and inner fingers.

COLOUR. Above greyish (Metsimaklaba) to reddish brown (Bushman Mine), with marbling of dark brown, forming an irregular network. Sides usually spotted with yellowish. Below: female, uniform creamy white; male, dirty white with minute speckling of dark brown, intense on sides of belly and hinder side of thighs, absent across chest fold (Metsimaklaba), throat a deep reddish brown (Bushman Mine).

FIELD NOTES. A pair (Nos. 1232 and 1233) were taken together under a rotting log, lying in damp mud on the edge of a rain-filled pan, in mopane forest near Bushman Mine. The female (No. 1233) was found nestling in a small cavity, alongside a recently deposited egg-mass, while the male was a short distance away. The respective dimensions of these two sexually mature specimens are as follows:

	♀ (No. 1233)	♂ (No. 1232)
Snout to vent	35.5 mm.	32.0 mm.
Fore limb	14.5 mm.	13.5 mm.
Hind limb	40.3 mm.	36.0 mm.
Tibia	13.0 mm.	12.7 mm.
Foot	19.5 mm.	17.0 mm.
Tibia into length from snout to vent	2.73	2.52

The egg-mass, containing about 200 eggs, is more or less beehive shaped and measures roughly 25 mm. in diameter by 17 mm. in height. The eggs, which vary from 2 to 2.5 mm. in diameter, are each enclosed in a transparent albuminous envelope about 2.5 mm. thick. Metsimaklaba specimens were secured in the dry river bed at night just after heavy rains. They were found moving about sluggishly over the sand looking for food, which consists for the most part of nocturnal termites.

Fam. **BREVICIPITIDAE****Breviceps mossambicus** Peters

(Figs. 29 and 30)

Breviceps mossambicus Peters, 1854, *Ber. K. Preuss. Ak. Wiss. Berlin*, p. 628, and 1855, *Arch. f. Naturg.* p. 58 (type loc.: Mozambique Island and Sena).*Breviceps verrucosus* Werner, 1910, *Jena. Denkschr.* xvi, p. 295 (Bersheba, South-West Africa).*Breviceps mossambicus* Werner, 1915, in Michaelsen, *Land- u. Süßwasserfauna Deutsch-S.W.-Afrikas*, Lief. 3, p. 372 (Grootfontein, Okasise and Okahandja).

Sixteen specimens were collected as follows: V.L.K.E. No. 1234 (March), Metsimaklaba River; Nos. 1235-1237 (April), Gomodimo; Nos. 1238-1249 (April), Kaotwe.

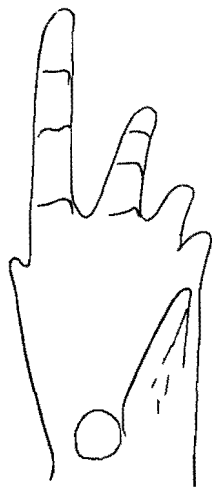


Fig. 29. *Breviceps mossambicus*.
Right foot of No. 1245.

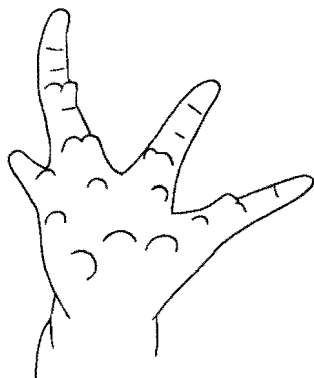


Fig. 30. *Breviceps mossambicus*.
Right hand of No. 1245.

DISTRIBUTION. South Africa (excluding Little Namaqualand), extending northwards into Angola, Northern Rhodesia and Tanganyika Territory.

REMARKS. Snout fairly prominent, averaging five times into length from tip of snout to vent. Eye small, eye cleft averages eight times into length from snout to vent. Fingers and toes thick-set; fourth finger about one-third or less than length of second, which is shorter than first. A large semidivided wedge-shaped tubercle at base of fingers 1-3; a few rounded tubercles scattered over palms. Indistinct subarticular tubercles along inner sides of toes 3 and 4. Soles of feet smooth. Inner metatarsal tubercle large, as long as third finger, with a blunt digging edge, set at right angles to sole of foot; base at an angle of 30-35 degrees to axis of fourth toe. Outer metatarsal tubercle fairly large, rounded and soft, close to but distinct from base of inner metatarsal tubercle. Skin above porous throughout, sometimes entirely or only partially covered with soft blister-like tubercles; sides slightly granular. Below smooth.

COLOUR. Above reddish brown, with a pair of large irregular yellowish white spots between the shoulders, two larger indistinct elongate spots on middle of back and a series of three to four smaller spots along the sides; these spots often fuse to form large irregularly shaped blotches. A narrow vertebral streak, and a transverse band between eyes usually present. Below pale yellowish, with a series of small irregular brownish spots or vermiculations on either side submentally, extending backwards over chest; a wide dark band extends backwards and downwards from infero-posterior corner of eye to arm.

DISCUSSION. The above specimens differ from typical *mossambicus* in the following characters: foot not so fleshy; subarticular tubercles small and indistinct; digits shorter, more flattened, with a distinct lateral fringe; inner metatarsal tubercle set at a more acute angle to axis of fourth toe. The above characters are evidently an adaptation to facilitate movement in the sandy environment of the Kalahari and are similar to the condition found in *Pyxicephalus delalandii*.

FIELD NOTES. The major portion of the above series was collected at night, just after rain. They were found crawling about laboriously over the sand in search of food, which (from stomach contents of No. 1246) consists mainly of nocturnal termites and other small ants. Two specimens from Kaotwe were found (*a*) in a newly raised termite heap and (*b*) in the loose damp sand of a recently pushed-up mole-hill. When placed on loose sand they burrowed down below the surface very rapidly, disappearing backwards by shovelling away the sand with their hind limbs.

DIMENSIONS. A summary of the measurements of the three largest specimens is as follows:

	Extremes	Average
Snout to vent	33.0 mm.	33.00 mm.
Eye	3.7-3.8 mm.	3.75 mm.
Snout	6.0-6.4 mm.	6.20 mm.
Length of foot	16.0 mm.	16.00 mm.

***Phrynomerus bifasciatus* (A. Smith)**

Brachymerus bifasciatus A. Smith, 1847, *Ill. Zool. S. Afr., Reptiles*, pl. LXIII (type loc.: country to the east and north-east of Cape Colony).

Nine specimens were collected as follows: V.L.K.E. Nos. 1223 and 1224 (December 1929), Titumi; No. 1225 (December 1929), Molepolole; Nos. 1217-1222 (March 1930), Metsimaklaba River.

DISTRIBUTION. Natal, Transvaal, northern Cape Province and along eastern edge of Bechuanaland; extending thence northwards to Angola in the west and Kenya Colony in the east.

REMARKS. Three adults (2 ♂♂ and 1 ♀) and six juveniles. Subarticular tubercles on feet somewhat indistinct. Inner metatarsal tubercle small and soft. Tip of fourth toe of adpressed hind limb just reaches the eye. Skin above smooth; a short fold from eye to shoulder; below smooth, or granular on throat (males).

COLOUR. Above dark brown to blackish, with a continuous or interrupted band of orange red (adults) to rose colour (juveniles) along each side, from nostril, over upper eyelid to groin; a large subtriangular to heart-shaped spot of the same colour in the coccygeal region, more or less conforming to the glandular area; limbs barred or spotted with reddish. Below light brown, spotted with whitish, especially round sides of belly; males with throat uniform dark brown to blackish.

FIELD NOTES. All the above specimens were captured on the surface of the ground, just after rain had fallen. Those from Metsimaklaba were found at night crawling or walking laboriously about the dry river bed. A pair from Titumi were captured during a rain storm, just as they were emerging from a hole in the ground, from which they were closely followed by a *Boodon lineatus*, which no doubt was responsible for their hasty exit.

DIMENSIONS. The measurements of the three adult specimens are as follows:

	♀ (No. 1223)	♂ (No. 1224)	♂ (No. 1225)
Snout to vent	47·4 mm.	47·6 mm.	47·6 mm.
Tibia	14·2 mm.	14·1 mm.	14·4 mm.
Foot	21·0 mm.	21·0 mm.	20·6 mm.