Some new forms of Batrachians and Reptiles from South Africa.

By John Hewitt.

[With Plates XXVII—XXXVI.]

Family Bufonidae.

Bufo regularis Reuss.

In Mr. Boulenger's pioneer paper (P.Z.S. 1880, p. 560) the great variation exhibited by this African species was well emphasized. He gave in the main an impression of erratic behaviour, although suggesting the occurrence of several regional varieties. The Cape variety, now described as *pardalis* subsp. nov., was indicated as the biggest of all. On variation in size and shape of the parotoids, his comment was 'I am convinced that they do not afford any good specific characters, being subject to considerable variation.'

To-day, the recognition of distinct subspecies seems to offer a practical line of progress: although many still smaller units probably occur, those in the Cape Province seem well contained in two or three groups, and two such groups may be represented in the same district or even in the same pool. In his interesting book 'Veld and Vlei' p. 61-65, 1929, Mr. W. Rose has figured and discussed two forms, a larger one in the Cape Peninsula and a smaller one at Paarl; Mr. J. H. Power has reported two forms, also differing somewhat in size, from the same pools at Lobatsi, Linokana,* Kuruman, and Upington (Trans. Roy. Soc. S.A. XIV p. 416, 1927, and XX p. 46, 1931); more recently, Mr. G. A. Ranger has sent me a good series and his habitat notes on two forms found on the same farm Gleniffer, near Kei Road. These two Gleniffer forms are clearly closely allied, and their status as geographical subspecies may seem somewhat arbitrary. They

* Here it may be noted that *tuberculosus* Boc. (Journ. Sci. Math. Phys. Nat. Lisboa 2. IV. 1896) from Linokana cannot stand, the name being preoccupied (A. Risso, 1826). In Fr. Nieden's work, Das Tierreich, Anura 1. p. 100, 1923, it is listed under *granti* Blgr., a synonym of *gariepensis* Smith; this identification must certainly be excluded if the material actually came from Linokana. The only possibilities at Linokana are the forms referred to by Power as *regularis, gutturalis,* and *vertebralis albiventris* or hybrids thereof.

the intergular shield and on the relative lengths of abdominal and femoral shields (see Annals Natal Mus., vol. VI, p. 465).

Pelusios sinuatus Smith.

A small specimen measuring 205 x 154 x 85 from Letaba River, near Rubber Vale, E. Transvaal (Transvaal Museum coll.) agrees better with true *sinuatus* than with *zuluensis*: Smith's type was considerably bigger, the shell length being 14 inches 5 lines. Apparently, *sinuatus* is the form of the Limpopo system.

Pelusios rhodesianus Hwtt. (Records Albany Mus. III, p. 373, Pl. XXI, figs. 2 and 3 and Text-fig. 1a. and c.)

This species, described as a subspecies of *nigricans*, is evidently very distinct. The British Museum has a single large specimen from Entebbe, Victoria Nyanza (C. R. S. Pitman). This differs from the type in its larger size, carapace 241 x 157, a more elongate intergular shield, and the outer border of the pectoral is shorter than that of the humeral (40.5, 50).

Pseudomopus signatus Walb.

This species can be separated into at least two fairly well defined forms. The typical one has the posterolateral margins of the carapace distinctly serrate in both sexes, strongly so in the male. A second form now described as *Pseudomopus signatus peersi* subsp. nov. [Pl. XXXVI] is only feebly serrate in adults of either sex. In this respect, it approaches *P. boulengeri* Duerden. This feature and the colour are the only important distinguishing characters mentioned in Dr. Duerden's key to the species of Homopus: for neither the femoral tubercles nor the prefrontal scales afford a satisfactory means of separating *signatus* and *boulengeri*. Another important character, not emphasized in the description, is the form of the carapace: depressed in *signatus*, higher and more rounded in *boulengeri*. The breadth and height measurements of fairly typical adult females of *signatus* and *boulengeri* are respectively: 74.5—38 and 74.5—47.

The new subspecies occurs in the Klaver district, C.P., near Van Rhynsdorp, living high up on the mountain sides. The

depressed form, as in *signatus*, suggests a rupicolous habit. *P. signatus peersi* is distinct from *signatus* in colour characters: none of the shields of the carapace have a dark margin, the shields being salmon red in the male, and similar with faint yellow admixture in the female: in the male, this ground colour is broken by innumerable black spots not very definitely arranged: in the female, there are numerous incipient short thin black rays at the outer margins of the costal shields and the central portions of the carapace shields are minutely black spotted, more particularly so the costals. The plastron shields are more or less strongly dark-margined in the male, much less so in the female. A peculiar feature in both type specimens is the fact that the axillary and humeral shields are not actually in contact: this also is sometimes a feature of *boulengeri*: on the other hand it is not applicable to a third specimen of *peersi*. Vertebrals and costals all flattened, without raised centres and with only shallow grooves along the sutures. Two or three posterior marginals on each side, and the supracaudal, with upturned margins in the female: in the male, only the marginals show indication of being upturned. (The supracaudal apparently is never upturned in *boulengeri*.) Outline of posterior half of carapace somewhat angular, more especially so in the male: it is rather acute mesially behind and there is an obtuse angle in the region of marginals VIII and IX. Nuchal shield rather small: in *signatus* generally rather large, often broad and doubled: Adult male with plastron deeply excavated in the region of the abdominals and femorals. Femoral tubercles rather small. Forelimb armed in front with rather broad scales, none of which are acuminate: in *signatus* they are rather more elongate and acuminate or tapering. In males of approximately similar size the claws of the forelimb are shorter and stouter in *peersi* than in *signatus*. Measurements: length of carapace, M. 78, F. 91: breadth of carapace, M. 57, F. 68.5: height of carapace, M. 27.5, F. 38.5.

The typical *signatus* is apparently widespread in Namaqualand, C.P. Mr. Peers reports it to be fairly numerous amongst the granite koppies some sixteen miles from Bitterfontein.

H. boulengeri occurs in the districts of Willowmore, Beaufort West and Aberdeen: *peersi* is an intermediate form, geographically and structurally, in some characters a little nearer to *boulengeri* but now placed under the first described species because the occurrence of intermediates therewith is anticipated.

Dr. C. de Villiers has ten shells of *signatus*, all from the Steinkopf neighbourhood: three of these have supernumerary vertebrals (6– or 7), and one of the three has also supernumerary costals (5). In all except very young specimens, the carapace shields are raised near their margins and the shell is thus more or less pronouncedly sulcate, especially so along the line between vertebrals and costals. Such sulci are not found in the female of *peersi* and only very slightly in the male.

Hewitt, I think, rarely counted marginals; he concentrated on vertebrals & costals.

Mr. R. Luckhoff has found *boulengeri* at Miller Station, Klipplaats, and amongst red rocks at a locality between Willowmore and Aberdeen: the latter specimen of the same colour as the rocks, and quite unrecognisable except when moving. We also have it as a rarity from farm Hoek-onder-Berg about halfway between Montagu and Touws River: the local name is Donner-weer (L. Hoffman) as it makes its appearance after thunderstorms. Also, what appears to be this species has been reported to me as a rarity found amongst stones on the kopjes at Victoria West.

Kinixys spekii Gray.

Mr. Loveridge has lent to me a specimen from Simbo, Tabora district, T.T., which he thinks must be referable to typical *spekii*. It is adult male, measuring 133 (plastron length) x 100 x 55.5. Inguinal large, in good contact with marginal VI: nuchal unusually short and rather broad (6.5 x 4): plastron well excavate: vertebral I narrow (24.5), especially when compared with V which is very wide (52): vertebral IV is also narrow in relation to the length (L.W. 32 x 32): vertebral I without a distinct hump, the anterior half being sloped downwards but not abruptly so: marginal VII almost as big as VI: marginals I and II not well elongate in an antero-posterior direction, the greatest antero-posterior measurement of 11 being only 16.7. Enlarged

A half-grown specimen is marked very much like the Zomba adults: this measures plastron length 134, carapace width 92, vertebral IV behind 23.5, and the anals are fairly short. Lastly, a very small specimen with long anals has no trace of zonary ornamentation on the carapace; but, there are sharply defined thin yellow rays at the corners of the costals, and also of vertebrals and marginals but less noticeably so: it is abnormal in that the prefrontal is large and single, and the forelimbs have only 4 claws, the outermost being lacking in each case. Total length 66.5.

The British Museum has a specimen from Mt. Elgon, 9,000-10,000 ft. (C. R. S. Pitman), representing an unnamed form of *belliana,* apparently the opposite extreme of *zuluensis.* The carapace is moderately well raised, the individual costals and vertebrals however much flattened and all hinder marginals and supracaudal strongly upturned: pattern conspicuously radial.

Kinixys natalensis sp. nov. [Pl. XXXV, figs. 3 and 4.]

This is founded on a series of sixteen specimens from the Tugela River valley, presented to the Albany Museum by Mr. F. Bayer.

Types: an adult male from Jameson Drift, Tugela River, and an adult female from Dimane stream, near Jameson Drift.

Mr. Bayer reports the habitat as Euphorbia tirucalli country, on the rather bare and dry slopes of the south bank of the Tugela River. The elevation is about 1,000 feet.

A constant character of the females is the great breadth of the gular region: in males it is also broad, but the disproportion of length to breadth is less marked. The anal character is much more variable: in the two males the anals are long, much longer than the interfemoral suture: in females the anal suture may be much longer than the femoral, or may be much shorter. Pectoral suture always very much shorter than the humeral, often less than half its length. A peculiar character is the frequent division of the supracaudal: in 13 large or medium-sized specimens the supracaudal is double, completely or partially so: such is also the case in two very young specimens: but three good-sized

specimens, including the type male, show no signs of duplication. This peculiarity is the more remarkable inasmuch as the carapace otherwise is almost devoid of scute abnormalities: out of 18 specimens only two present supernumerary shields, 6 vertebrals in each case: there are no plastron abnormalities except that one specimen, a small male, has no inguinal shield. Nuchal always long and very narrow or moderately narrow: in newly hatched young it is short. The inguinal is generally large: but it varies much in form, the anterior extension being more or less rounded, or somewhat acute, but never very sharply acute: the hinge normally lies between marginals VII and VIII, and the inguinal either does not reach VI, or is only just in contact therewith (three specimens), or in broad contact therewith (three specimens). In one case the hinge lies between marginals VI and VII. Hinge in adults moderately developed, and marginal VIII is normally much smaller than IX, and a little smaller than VII. Lateral margins well keeled, but the keels may be worn in large specimens. Hinder marginals more or less upturned, sometimes strongly so, sometimes only slightly so at the margins. Some of the carapace shields tend to be well raised centrally, especially the hinder vertebrals and costals. Vertebral II generally equal in width to costal II, sometimes broader, sometimes a trifle narrower. Vertebral IV tends to be rather narrower than III, which is less raised. Sulcations between the shields are frequent, especially in the posterior half, but they may also occur anteriorly: on the other hand sulcations as such may be almost absent. Anteriorly there is no hump on the carapace. Anterior lobe of plastron bent upwards more or less strongly in gular region. The top of the carapace along the mesial line is approximately level over the extent of vertebrals II and III: the highest point may be on either of these shields. Enlarged antebrachials elongate and more or less pointed.

The colouration is rather sombre, and the pattern not strongly contrasting: on both carapace and plastron it is of essentially concentric type, but on the vertebrals and costals of older specimens the dark rings are ill defined and tend to break up into short irregularly disposed rays: on the abdominals there

are generally large complete blackish rings, and all the plastron shields are extensively pigmented: no well defined dark rays on the plastron.

The outline of the carapace varies considerably in respect to the breadth: two adult females measure respectively as follows:—plastron length 136.5, 128.5: greatest breadth carapace 115, 121. Measurements of the types are as follows:—Plastron length, M. 112, F. 127: greatest breadth carapace, M. 94, F. 111.5: height of carapace, M. 51.5, F. 70: breadth of vertebrals II, III, and IV, M. 32, 32.5, 27.5; F. 42, 43, 39.5: breadth of costal II, M. 32.5, F. 40.5: breadth of gular region, M. 22.3, F. 26: length of gulars, M. 12, F. 10: length of pectoral suture, M. 11.5, F. 10.5: length of humeral, M. 24, F. 28.

This species seems distinctive enough in the tendency to elevation of the carapace shields, and in the prevalence of paired supracaudals. It is the same as that from Greytown and Impanza which I have previously described and figured as the young of *zuluensis* (Annals Natal Museum VI, p. 475, text fig. 1b, Pl. XXXVIII, 18-20). It extends well into Zululand (Ntambanana), also Manaba, N. Zululand (Transvaal Museum), and may perhaps occur in the same localities with *zuluensis*. But on the whole, *zuluensis* seems to belong to the low country of palms, swamps and sand dunes, and *natalensis* to the higher country of Natal and Zululand. The latter is related to *australis* of the Barberton district, but the carapace is not so depressed as in that species. It appears to be the most southern member of its genus, and might therefore be expected to show some structural approximation to its possible ally Homopus, a peculiar S. African genus: but no marked connection is traceable, unless the tendency to narrowing of the vertebral scutes has such significance. Actually, it is well separated from all the peculiar South African genera in the nostril character (see Annals Natal Museum VII, p. 259), in the very fine mesial groove on the snout, and in the presence of a small inferior temporal scale. Kinixys characters include: nostrils wide apart: a pair of prefrontals and a fairly large frontal with no trace of median suture anteriorly: a very large supratemporal scale and a small inferior temporal extending

therefrom to the beak margin: a row of small chin-shields: scales on palms fairly small and worn by use.

The peculiar South African genera seem to be more closely interrelated than is any one of them with Kinixys and their structural peculiarities are not to be interpreted in terms of arrested development, a phenomenon often found in the peculiar South African genera of Anura according to Prof. C. de Villiers.

EXPLANATION OF PLATES XXVII–XXXVI

Pl. XXVII. Fig. 1. *Lophosaura ventralis*, male from Grahamstown. × 1⅔.

Fig. 2. *Lophosaura ventralis occidentalis*, male from Pt. Nolloth. × 1⅓.

Fig. 3. *Lophosaura ventralis occidentalis*. Type female. × 1⅓.

Pl. XXVIII. Fig. 1. *Lophosaura caffer*, from Port St. Johns, dorsal view of head. × 2.

Fig. 2 & 5. *L. caffer* subsp. ? from Ngqeleni. × 2½ and 1⅚.

Fig. 3. *Lophosaura melanocephala kentanica*, from Kentani, dorsal view of head. × 2½.

Fig. 4. *L. caffer*, from Port St. Johns, young male. × 1⅓.

Fig. 6. *L. caffer*, from Port St. Johns, adult male. × 1.1.

Pl. XXIX. Fig. 1. *Oedura halli*, from Telle Junction. × ¾.

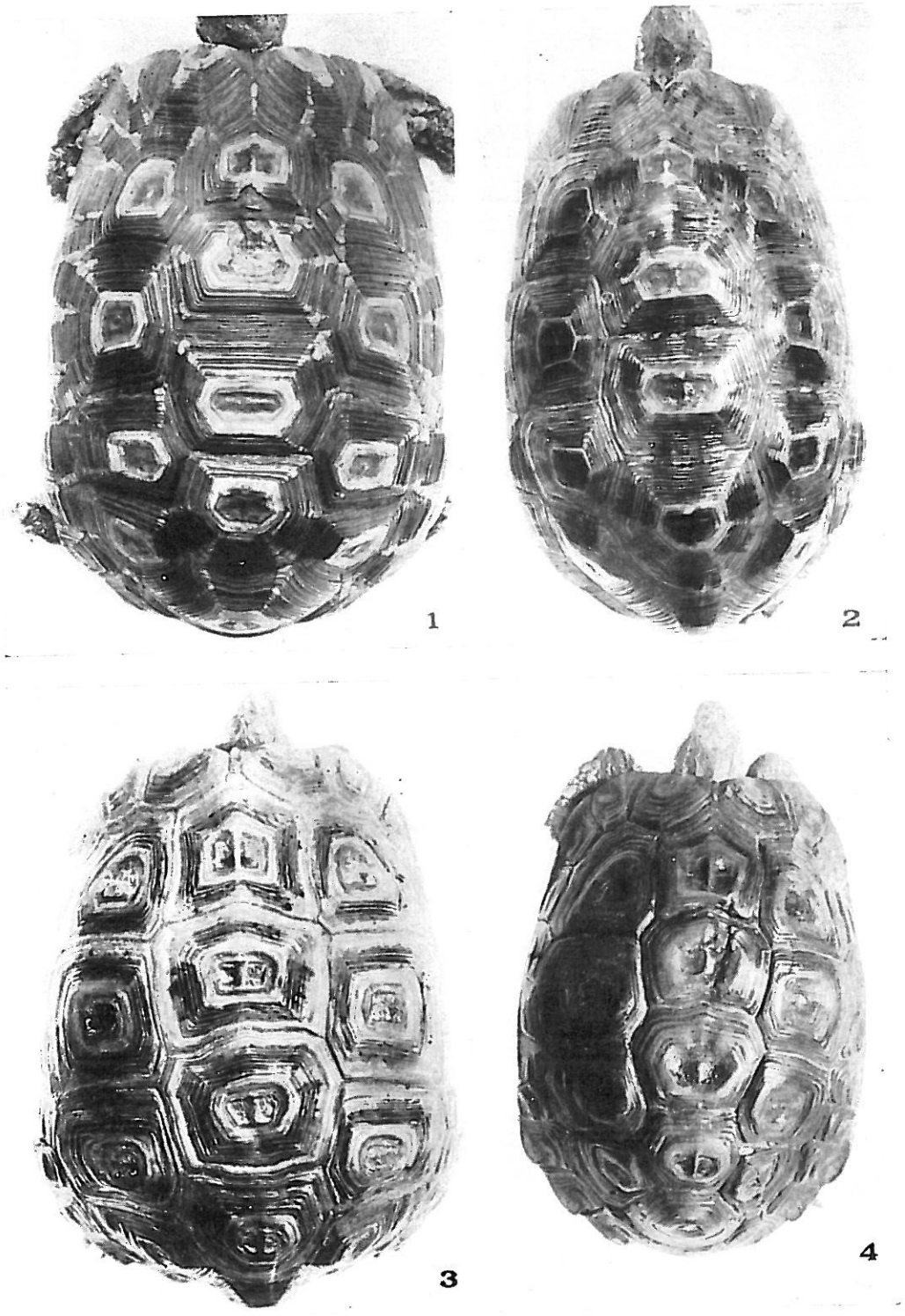
Fig. 2. *Oedura halli*, with reproduced tail. × ¾.

Fig. 3. *Pachydactylus capensis werneri*. Type from Khan River, S.W.A. × 1.3.

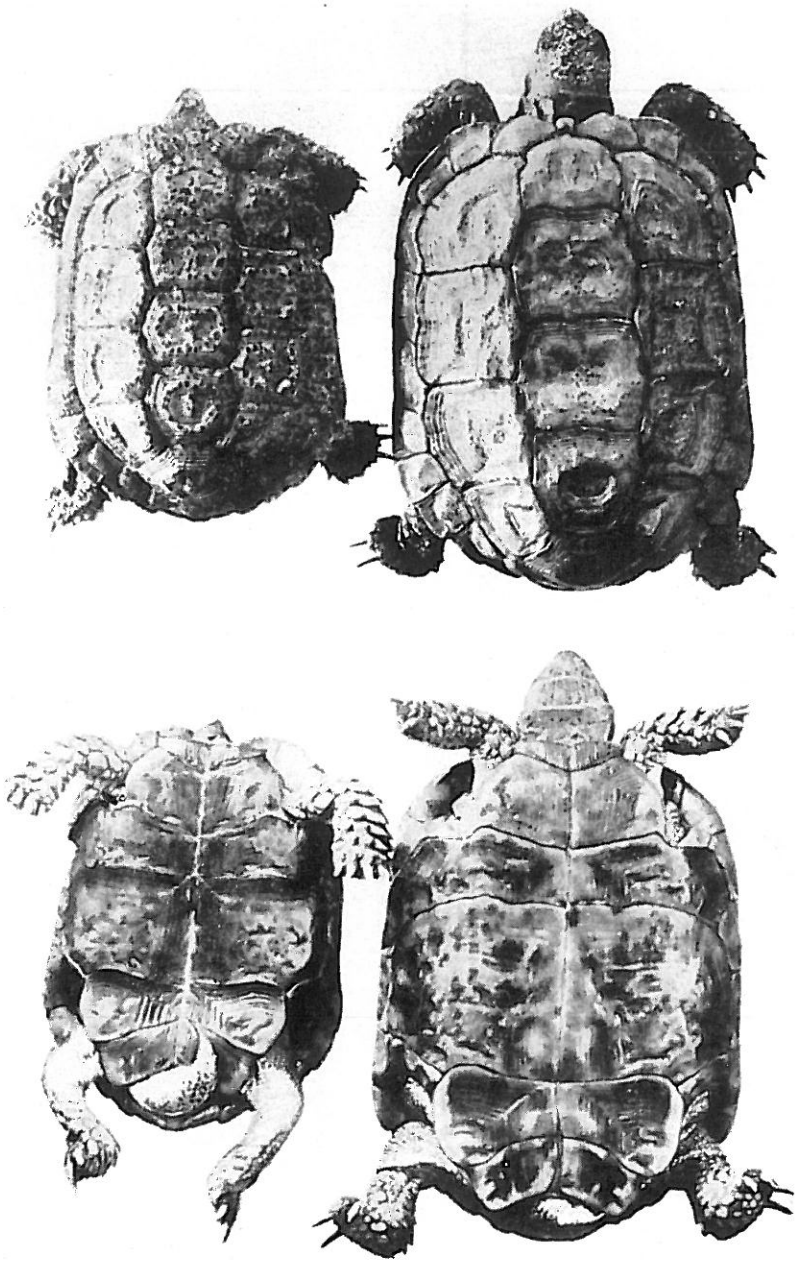
Fig. 4. *Phyllodactylus porphyreus namaquensis*. Type from Bitterfontein. × 1.1.

Fig. 5. *Pachydactylus rugosus frater*, female from Onscep. × .9.

Pl. XXX. Fig. 1 & 2. *Pelomedusa galeata subrufa*, male from New Year's River, Grahamstown. × ⅜.



Kinixys belliana zuluensis: 1. Female from Manaba. 2. From Umfolosi.
Kinixys natalensis: 3. Female. 4. Male.



Pseudomopus signatus peersi, subsp. nov.