DR. KARL JORDAN'S EXPEDITION TO SOUTH-WEST AFRICA AND ANGOLA : HERPETOLOGICAL COLLECTIONS.

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(With two text-figures.)

NO large area of the African continent now remains completely unexplored, and in many regions the herpetological fauna is remarkably well known. But during recent years there has been a tendency towards an intensive study of some of the more easily accessible regions, so that the growth of our knowledge has not been uniform. For this reason alone the present collections would have been of considerable value, but they have an additional and greater value owing to the fact that the areas selected for field-work were chosen to include as many different types of terrain as possible ; full details of these localities, together with details of their topography, climate and flora, will be found in Dr. Jordan's introductory article. The author wishes to express his indebtedness to Dr. Jordan, not only for the privilege of studying the collections, but for much valuable assistance and information concerning habitats and habits ; acknowledgments are also due, and made with gratitude, to Mr. A. Loveridge for much enlightening correspondence and to M. Gaston de Witte, who very generously placed the magnificent collection of the Congo Museum at the author's disposal.

Dr. Jordan's collections contain over 700 specimens, representing 95 species and subspecies, of which six are believed to be new to science. Their study has resulted in the discovery of numerous points of systematic interest which are embodied in the following notes, but some matters of more general interest concerning distribution and zoogeography may conveniently be discussed first. The bulk of the collections were made in strongly contrasting regions. In Angola most of the material (40 species) was collected in the heavily forested areas about Congulu and Quirimbo, whereas in S.W. Africa, though not geographically far distant, most of the species were taken in dry regions of granite, gneiss and sand. But, in addition, collections were made in open forest country both in Angola and in Damaraland, as well as in dry granitic and sandy areas in Angola analogous with those in S.W. Africa. Analysis of the lists of species taken in these different climatic and vegetational zones emphasizes the enormous effect which these environmental factors play in determining the composition of the fauna, and the facts may be summarized for each zone as follows :

A. Forest and Swamp in Angola (Congulu and Quirimbo).

Of the 40 species collected in these localities only 4 were collected in the dry zone of Damaraland ; three of these are widespread, tolerant species : *Boaedon lineatus*, *Gerrhosaurus flavigularis* and *Bufo regularis*, and the fourth, *Agama planiceps* (q.v. infra), shows a distinct tendency towards subspecific differentiation under the different conditions. The facies of the remainder of the fauna is distinctly that of the equatorial Rain Forests, for 64 per cent. of the species are strictly confined to that area or to the outlying forest islands. Many of these forms are to be found widely distributed through the whole of this zone,

but a considerable proportion are essentially species of the Congo Basin and are not known to occur in the Cameroon-Gaboon area or the western forest province. The remaining species are either apparently indigenous in Angola (17 per cent.), widespread species such as *Causus rhombeatus*, which was not actually taken in Damaraland but undoubtedly occurs there, or species widely distributed in the Savannah countries bordering the Rain Forest and sometimes encroaching upon it (17 per cent.). Some of the indigenous species, such as *Rana albolabris acutirostris* and *Leptopelis jordani*, are obviously closely allied to, and are probably derived from, true Rain Forest species. It is thus apparent that, as might be expected, the forests of western Angola are essentially similar faunistically to the forests of the Congo basin, but that some slight degree of differentiation has taken place, giving rise to new, indigenous species ; and further, their position on the edge of the main forest-zone has exposed them to penetration by the more virile forms from the surrounding savannahs.

B. Open Forest in Angola (Mt. Moco to Catengue).

The collections made in the more open type of forest are, unfortunately, not sufficiently large to permit of any very extensive generalizations. But it seems probable that this vegetational zone has very little in common with the true Rain Forest. Of the 12 species collected, 55 per cent. are either widespread species (*Causus rhombeatus*, *Rana oxyrhynchus* and *Bufo regularis*) or are savannah species found in the countries bordering the forest. The only two which might be regarded as Rain Forest forms are *Chamaeleo dilepis* subsp. and *Ichnotropis bivittata* (?) (q.v.), and it may be significant that both of these differ from the normal. Their presence, however, does suggest that this open forest may be a derivative of the primeval Rain Forest, which has been subjected to penetration from the savannahs, and in which conditions have changed to such an extent that the components of its original fauna have either been exterminated or become modified to meet the changing environmental conditions.

C. Open Forest in Damaraland (Sissekab).

Only 9 species were collected in this zone, but these suffice to indicate that it has little in common with the Angolan forests. Two of the species occur also in the damp forests of Angola, but both are tolerant forms, *Bufo regularis* and *Gerrhosaurus flavigularis*, whilst the only one which also occurs in the open forests of Mt. Moco is probably racially distinct (*Chamaeleo dilepis*, q.v.). The remainder are either species indigenous in the Damaraland region, or forms which inhabit the zone bordering the equatorial rain forests on the south and east.

D. Dry, Granitic or Sandy Localities in Angola (Bocoio and Lobito) *or Limestone* (Morro de Pundo).

Three species only were collected, the cosmopolitan *Hemidactylus mabouia* and two species indigenous in the dry country of S.W. Africa and southern Angola, *Mabuia acutilabris* and *Rhoptropus boultoni*.

E. Dry Granite, Gneiss, Limestone or Sand in S.W. Africa (Lake Otjikoto, Waterberg Mts., Omongongua, Okahandja, Swakopmund, Windhoek, Hoffnung, Rehoboth, Naukluft Mts., Maltahöhe, Voigtsgrund and Satansplatz).

Of the 46 species collected in these localities, only 4 are found in the damp Angolan forests and these have been discussed above. The remainder consists of one or two tolerant species which range over almost the whole of the continent, irrespective of vegetational or climatic conditions, of a more numerous class of species which extend over a greater or less extent of the belt surrounding the Rain Forest and of species indigenous in the dry region from southern Angola to Little Namaqualand. These latter constitute the largest element of the fauna (46 per cent.), but it is quite impossible to distinguish clearly between them and those species which range across the southern border of the Rain Forest, and these, in turn, grade insensibly into others with a more extended range around the Rain Forest. Thus 21 species may be classed as strictly indigenous in the dry zone and are not known to extend eastwards beyond the Kalahari ; but another group of 6 species extends eastwards into the Transvaal and S. Rhodesia ; 7 others range still farther eastwards into Mozambique and Southern Tanganyika Territory ; 8 have a similar range, but extend northwards into the Kenya, Sudan or Somaliland areas ; and only one, *Kassina senegalensis*, ranges completely round the whole Rain Forest. This offers a decided contrast with the conditions obtaining in the Angolan forests, where, of the 7 invading species, 5 range completely round the forest belt and the other two have an extensive range on both the south and east of this area.

If, as seems probable, a process of desiccation is in progress in the south-west of Africa similar to that which is occurring in the north and north-east, the natural sequence of changes in the herpetological fauna consequent on the destruction of the primeval forest and its replacement by arid steppe and desert conditions may well be exemplified by the fauna of the different types of country considered above. First of all, with the approach of the dry zone to the original dense, wet, forest there is an infiltration of new species which are widely distributed round the margin of the dying forests (A). As the true Rain Forest is replaced by a more open type of savannah forest (B and C) the original species are, for the most part, exterminated and replaced by other species with a wide distribution in similar zones. As desiccation proceeds, greater and greater specialization becomes necessary to the fauna, and new forms make their appearance, which, since the area of maximum desiccation in the south-west is still relatively small, have a more and more restricted range. The intermediate stages of open forest have a fauna which, to judge from the present collections, is much more limited in the number of its component species. This may, of course, be a purely fictitious conclusion and be merely the expression of the length of time spent by the collector in each zone. But it may have a deeper significance, for Sanderson (1936, p. 178) has recently shown that, in the Cameroons, the artificial clearing of primeval forest produces a similar result, and that in the various intermediate stages before the land is allowed to revert to its natural, permanent, secondary condition, the number of species in the frog fauna is very much smaller than in either the original or final stages. A possible explanation of this phenomenon may lie in the fixity, or otherwise, of the different zones. Both the primeval forest and the final condition of steppe and desert after its desiccation may not be large and their actual sizes are changing ; but their conditions are relatively permanent and they have fixed geographical centres. The intermediate zones, on the other hand, may be large in extent, though strip-like, but they are fluctuating and have no permanent positions. Consequently species which can survive in them must not only be adapted to the physical and biological environment, but must be possessed of

the requisite mobility to maintain their positions in this shifting medium. Too great a dependence on external factors and too close a linkage with the environment must tend to render a species immobile, for it can only persist when its exact requirements are fulfilled; the more complex these are, the less is the probability of exactly the same conditions arising again within migrational range when the original combination is destroyed. But in areas of fixed position and with relatively permanent physical conditions, nicety of adjustment to the environment is no handicap.

The following lists, in which the species are grouped roughly according to their geographical distribution, shows also their distribution in the different climatic and vegetational zones, as determined by the present expedition. It shows the changes mentioned above and also emphasizes the great differences in the composition of the forest and desert faunae. In the former snakes abound, whilst geckos and lacertid lizards are almost non-existent, whereas, in the dry zones, the number of snakes is greatly reduced, and the dominant elements in the lacertilian fauna are geckos and lacertids, with, also, an increase in the number of skinks of the genus *Mabuya*. In the Somaliland Peninsula, another recently desiccated area (Parker, 1932), the fauna is essentially similar in its general composition, with numerous geckos (the genus *Hemidactylus* taking the place of the S.W. African *Pachydactylus*), lacertids and skinks.

I. WIDESPREAD SPECIES VERY TOLERANT OF DIFFERENT CLIMATIC AND VEGETATIONAL CONDITIONS.

	A.	B.	C.	D.	E.
Boaedon lineatus	+				+
Causus rhombeatus	+	+			
Hemidactylus mabouia				+	
Gerrhosaurus flavigularis	+		+		+
Chamaeleo dilepis[1]		+	+		+
Rana (Ptychadaena) oxyrhynchus	+	+			
Bufo regularis	+	+	+		+

[1] A species with many local races. As noted below, the form in zone B is very different from that in zones C and E.

II. SPECIES CONFINED TO THE RAIN FOREST AND ITS OUTLIERS.

	A.	B.	C.	D.	E.
Typhlops punctatus intermedius	+				
Lycophidion ornatum sp. n.	+				
Oophilositum parkeri	+				
Hormonotus modestus	+				
Chlorophis heterodermus	+				
Boiga pulverulenta	+				
Boiga blandingi	+				
Thelotornis kirtlandii	+				
Naja goldii	+				
Naja melanoleuca	+				
Dendraspis jamesoni	+				
Bitis nasicornis	+				
Hemidactylus longicephalus	+				
Ichnotropis bivittata		+			
Mabuya maculilabris	+				
Lygosoma breviceps	+				
Lygosoma dewittei	+				
Ablepharus cabindae	+				
Feylinia currori	+				
Chamaeleo etiennei	+				
Arthroleptis parvulus	+				

III. SPECIES INDIGENOUS IN THE ANGOLAN FORESTED REGION.

	A.	B.	C.	D.	E.
Agama planiceps[1]	+			+	+
Eremias benguelensis		+			
Mabuya bocagii	+				
Rana albolabris acutirostris subsp. n.	+				
Rana (Ptychadaena) ansorgii	+	+			
Pyxicephalus tuberculosus	+	+			
Hyperolius bocagii	+				
Hyperolius cinnamomeoventris	+				
? *Hyperolius* sp.		+			
Leptopelis jordani sp. n.	+				

[1] Distribution uncertain ; Angolan specimens differ appreciably from those from Damaraland (see p. 132).

IV. SPECIES DISTRIBUTED ROUND THE PERIPHERY OF THE WHOLE RAIN FOREST, BUT ENCROACHING UPON IT.

	A.	B.	C.	D.	E.
Chlorophis irregularis	+	+			
Dasypeltis scaber	+				
Crotaphopeltis hotamboeia	+				
Mabuya raddoni	+				
Phrynobatrachus natalensis	+				
Kassina senegalensis					+

V. SPECIES BORDERING THE RAIN FOREST ON THE EAST AND SOUTH (FROM THE SUDAN-SOMALILAND-KENYA REGION SOUTHWARDS).

	A.	B.	C.	D.	E.
Typhlops schlegeli mucroso					+
Tarbophis semiannulatus					+
Dendraspis angusticeps			+		
Causus resimus	+				
Agama atricollis		+			
Mabuya striata					+
Mabuya varia		+			
Riopa sundevallii					+
Rana fuscigula angolensis	+	+			
Pyxicephalus delalandii					+
Pyxicephalus adspersus					+
Cacosternum boettgeri					+

VI. SPECIES BORDERING THE RAIN FOREST ON THE SOUTH, FROM TANGANYIKA TERRITORY OR MOZAMBIQUE WESTWARDS.

	A.	B.	C.	D.	E.
Leptotyphlops distanti					+
Aspidelaps scutatus					+
Pachydactylus bibroni turneri					+
Pachydactylus punctatus					+
Acontias meleagris					+
Amphisbaena quadrifrons					+
Xenopus laevis laevis					+

VII. SPECIES CONFINED TO COUNTRIES TO THE SOUTH OF THE FOREST, BUT NOT EXTENDING INTO TANGANYIKA TERRITORY OR MOZAMBIQUE.

	A.	B.	C.	D.	E.
Psammophis notostictus					+
Psammophis bocagei					+
Bitis caudalis			+		+
Ptenopus garrulus					+
Agama hispida aculeata					+
Eremias lineo-ocellata					+
Eremias lugubris					+
Rana fuscigula fuscigula					+

VIII. SPECIES CONFINED TO THE DRY AREAS IN ANGOLA, DAMARALAND, BECHUANALAND AND NAMAQUALAND.

	A.	B.	C.	D.	E.
Typhlops boylei					+
Rhoptropus barnardi			+		
Rhoptropus boultoni				+	
Pachydactylus bibroni pulitzerae				+	
Pachydactylus laevigatus					+
Pachydactylus weberi					+
Pachydactylus rugosus					+
Pachydactylus purcelli					+
Narudasia festiva					+
Chondrodactylus angulifer					+
Agama anchietae anchietae					+
Cordylosaurus trivittatus					+
Zonurus jordani sp. n.					+
Eremias namaquensis					+
Eremias undata					+
Scapteira reticulata					+
Nucras intertexta damarana subsp. n.			+		
Mabuya sulcata					+
Mabuya damarana					+
Mabuya acutilabris				+	+
Mabuya binotata			+		
Monopeltis capensis					+
Phrynomerus annectens				+	
Bufo jordani sp. n.					+

REPTILIA SERPENTES.

1. **Typhlops punctatus intermedius,** Jan. 1861.

3 Congulu April
1 Quirimbo May

These specimens are of the lineate form with the central zone of the belly immaculate ; the pigmentation does, however, invade the sides of the belly more than in normal *intermedius*, so that in this respect they approach typical *punctatus*.

2. **Typhlops schlegeli mucroso** (Peters, 1854).

1 Omongongua Jan.

Scales 34 ; ratio of diameter to length, 27.

3. **Typhlops boylei** Fitzsimons, 1932.

1 Hoffnung Dec.

This example differs from the original description of the species as follows : The rostral extends backwards to the level of the eyes, the nasal suture proceeds

from the first upper labial, instead of from the suture between the first and second, the portion of the rostral visible from below is once and a half, instead of " slightly," broader than long, and there are 28 instead of 26 mid-body scale-rows.

But in a series of 5 specimens from Ghanzi, near the type locality of *boylei*, there is some variation in all these characters. The rostral may not extend quite to the level of the eyes ; the length of the first upper labial is not absolutely constant, so that the nasal suture may or may not touch the labial suture, and there are from 26 to 28 scale-rows. The number of scale-rows and high diameter/length ratio suggest close affinity with *T. lalandii*, and it may be that some S.W. African records of this may be in reality based on *boylei* ; the two are readily distinguishable by the much more prominent snout and cutting rostral edge of the latter.

4. **Leptotyphlops distanti** (Boul., 1892).

Stenostoma scutifrons (*non* Peters, 1854) Peters, 1865, *Mon. Ak.*, Berlin, p. 261, fig. 5 ; *idem*, 1882, Reise Mossambique, iii, p. 104 (part) pl. xv, fig. 4.

Glauconia scutifrons Boulenger, 1890, *Ann. Mag. N.H.* (6), vi, p. 92 ; *idem*, 1893, *Cat. Snakes Brit. Mus.*, i, p. 68.

Glauconia boettgeri Werner, 1899, *Zool. Anz.*, xxii, 581, p. 116.

Glauconia latifrons Sternfeld, 1908, *Sitzber. Ver. Nat. Fr.*, Berlin, p. 94.

Glauconia okahandjana Ahl, 1924, *Archiv Naturg.*, xc, 4, 5, p. 247.

1	Hoffnung	Nov.
3	,,	Dec.
2	,,	Feb.
1	Windhoek	Jan.
2	?	
1	Okahandja	Dec.

Fitzsimons and Loveridge (Loveridge, 1933, p. 225) have given reasons for considering *distanti* Boulenger to be a synonym of *scutifrons* Peters. But in doing so they have not given any further consideration to the problem of whether *scutifrons* Peters 1854, is conspecific with the *scutifrons* of Peters 1865, and of Boulenger 1893 (p. 68). The specimen described and figured by Peters in 1865 was that recorded by Boulenger, but this point seems to have been missed by Sternfeld and Werner, who have both discussed the matter. Sternfeld (1908, p. 94) considered that the true *scutifrons* of Peters (1854) was distinct from the *scutifrons* of Boulenger (which is also the *scutifrons* of Peters, 1865 *nec* 1854), the former lacking the anterior upper labial ; he accordingly proposed a new name, *latifrons*, for the latter. Werner (1909, p. 210) is unconvinced that the two really are distinct, preferring to believe that a labial so small as that of *latifrons* might easily be lost (presumably as an individual anomaly), giving rise to the condition found in the type of *scutifrons*. Sternfeld (1910, p. 13) maintains his original views without further comments, and Werner (1910, p. 354), with more material before him, is still dubious, but speaks of a " *scutifrons* group " with 4 members, distinguished thus :

First Supralabial	*Supraoculars*	
Present	Present	*latifrons* Sternfeld.
Present	Absent	*boettgeri* Werner.
Absent	Present	*scutifrons* Peters.
Absent	Absent	*labialis* Sternfeld.

There can be little doubt that Loveridge and Fitzsimons are correct in considering *scutifrons, sensu* Peters 1865, and Boulenger 1893, i.e. *latifrons* Sternfeld, to be synonymous with *distanti* Boulenger. But the position of true *scutifrons* is by no means established, and it may, perhaps, be significant that all the examples of *scutifrons* and *labialis* which have been recorded are symmetrical ; if their labial condition was merely anomalous, some asymmetry might have been expected. Accordingly, until some proof is forthcoming that the absence of the anterior labial is an individual abnormality, *L. scutifrons* must be considered as a species distinct from *L. latifrons* ; the latter is conspecific with *distanti*, which is the older name and must be be used. *L. labialis* and *L. boettgeri*, both known from one or two specimens only, are probably based on individual aberrations of *scutifrons* and *distanti* respectively, whilst yet another name, *G. okahandjana* Ahl (1924), ought, probably, to be added to the synonymy of the latter. The topotype in the present collection agrees well with the original description except that the ratio of length to diameter is 69 instead of about 53 ; but Werner (1910, p. 354) records a variation in " *scutifrons* " of from 55 to 105.

5. **Boaedon lineatus** Dum. & Bibr., 1854.

♀	Okahandja	Dec.–Feb.
2 ♂♂, ♀, 2 juvs.	Congulu	April

6. **Lycophidion ornatum** sp. n.

Among the collections from Congulu are two specimens of a species of *Lycophidion* closely allied to *L. capense*. They differ constantly from a large series of the latter, including 5 others from Angola, in having a broad light band bordering the snout (as in *L. capense uzungwense*), in a frontal as broad as, or broader than long, and in having the posterior nasal separated from the first upper labial. Each one of these differences appears trivial in itself, but they are correlated, for exactly the same differences were found in four other examples from Uganda, and in 10 specimens from the Belgian Congo. This suggests that they represent a distinct species, almost intermediate between *L. capense* and *L. laterale*.

The holotype is a female in the British Museum, from Congulu, Angola ; collected in April 1934 by Dr. Karl Jordan.

Diameter of the eye greater than its distance from the lip. Rostral more than twice as broad as deep ; internasals about as large as the nasals ; prefrontals longer than broad ; frontal little broader than long, a little shorter than its distance from the rostral, $\frac{3}{4}$ the length of the parietals ; loreal twice as long as deep ; one preocular, as large as the supraocular and making a broad suture with the frontal ; two postoculars, both in contact with the parietal ; temporals 1 + 2 ; eight upper labials, the first separated from the posterior nasal, and the third, fourth and fifth entering the eye. Two pairs of small chin-shields, the posterior the smaller ; five labials in contact with the anterior. Scales smooth, with single apical pits in 17–17–17 rows ; ventrals 199 ; anal entire ; subcaudals 42 + 1.

Grey-brown above, each scale faintly mottled with lighter ; a broad, light band round the snout, extending backwards on to the temple, where it becomes indistinct ; lower surfaces grey, the chin and the posterior edge of each scute lighter.

Length from snout to vent 299 mm. ; tail 45 mm.

The paratypes are :

B.M.
Congulu. ♀. Sc. 17–17–17. V. 199. C. 46 + 1.

Mus. Congo 5174
Nyonga, Katanga. ♂. Sc. 17–17–17. V. 196. C. 48 + 1.

Mus. Congo 4952
Nyonga, Katanga. juv. ♂. Sc. 17–17–17. V. 205. C. 43 + 1.

Mus. Congo 1925
Karemi, L. Tanganyika. ♀. Sc. 17–17–17. V. 194. C. 40 + 1.

Mus. Congo 4000
Usumbura, L. Tanganyika. ♀. Sc. 17–17–17. V. 200. C. 41 + 1.

Mus. Congo 3823
Kissenyi, Kivu. juv. ♂. Sc. 17–17–17. V. 187. C. 44 + 1.

Mus. Congo 3797
Lulenga, Kivu. juv. ♂. Sc. 17–17–17. V. 174. C. 46 + 1.

Mus. Congo 3793
Lulenga, Kivu. ♀. Sc. 17–17–17. V. 190. C. 39 + 1.

Mus. Congo 3781
Lulenga, Kivu. ♀. Sc. 17–17–17. V. 194. C. 39 + 1.

Mus. Congo 1144
Beni, Ituri. ♀. Sc. 17–17–17. V. 198. C. 41 + 1.

Mus. Congo 1688
Moera, Ituri. ♂. Sc. 17–17–17. V. 196. C. 53 + 1.

B.M. 1934.12.15.555–556
Muko, 7,000 ft., Kigezi, Uganda. ♀♀. Sc. 17–17–17. V. 202, 204. C. 38 + 1, 37 + 1.

B.M. 1934.12.15.557
Kayonsa Forest, 7,000 ft., Kigezi. ♀. Sc. 17–17–17. V. 200. C. 39 + 1.

B.M. 98.12.27.17
Mau Ravine, 7,500 ft., Uganda. ♂. Sc. 17–17–17. V. 198. C. 46 + 1.

Total variation in pholidosis : Sc. 17–17–17. V. ♂♂ 174–205. ♀♀ 190–204. C. ♂♂ 43–53 + 1. ♀♀ 37–42 + 1.

The series shows singularly little variation in colour or in the proportions of the head-shields. With respect to the latter and to the number of ventrals and subcaudals it is very similar to *L. laterale*, but may be at once distinguished by the single apical pits.

7. **Oophilositum parkeri** Angel, 1934.

2 ♂♂, 4 ♀♀ Congulu April

These six specimens are referred to this species with an element of doubt. The species was originally described as differing from *O. fasciatum* in having fewer teeth, longer parietals and only six upper labials, of which two entered the eye. Another difference was found in the size of the maxillary foramen, but this, quite correctly, was considered of doubtful importance. Examination of a much larger series of *O. fasciatum* than was available when the genus *Oophilositum* was described (Parker, 1933, p. 545) reveals that the maxillary foramen is of no importance whatever from a taxonomic standpoint, that the length of the

parietals of *O. fasciatum* varies sufficiently to include the condition of *O. parkeri* and that there is a greater variation in the number of teeth than was previously believed. The size of the maxillary foramen is, to some extent, correlated with age ; no very young specimens have been found in which it is not very large, but, on the other hand, it has been found to exist in specimens considerably larger than others which lack it. Possibly if large series from different localities were available its absence might prove to be an age character, but the age at which it closes varies in different areas. The number of posterior maxillary and mandibular teeth is extremely variable, and it is rather remarkable that the number in one jaw appears to be quite unrelated to that in the other. The only remaining characters whereby the species *parkeri* might be recognized are the lower number of upper labials and the fact that only two, instead of three, enter the eye. The present series is quite uniform in this respect and agrees with another example from the Ituri, which is in the same general area as the type locality of *parkeri*. If these really are conspecific the variation in the development of the maxillary foramen and the number of teeth is quite comparable to that found in *O. fasciatum*. The variation in these characters in the two species is :

A. *O. fasciatum*.

Locality.	Sex.	Length.	Post. Max. Teeth.	Post. Mand. Teeth.	Max. Foramen.
W. Africa (Type)	♀	198 mm.	7	11	Large
Ituri	♂	162 ,,	7	5	,,
Sierra Leone	♂	202 ,,	7	11	,,
Efulen, Cameroons	♂	260 ,,	7	5	,,
Musolo, Fernando P.	♀	288 ,,	5	4	Moderate
Oil River	♀	264 ,,	8	11	,,
,, ,,	♂	265 ,,	8	7	Small
,, ,,	♂	335 ,,	8	10	Large
Ja River, Cameroons	♂	325 ,,	7	5	,,
Gaboon	♂	360 ,,	5	7	,,
Bitye, Cameroons	♂	363 ,,	8	8	Absent
,, ,,	♀	370 ,,	12	10	V. Small
,, ,,	♀	380 ,,	9	12	Moderate
,, ,,	♀	390 ,,	11	12	Absent
			5–12	4–12	

B. *O. parkeri*.

Locality.	Sex.	Length.	Post. Max. Teeth.	Post. Mand. Teeth.	Max. Foramen.
Kabulire (Type)	?	?	3	4	Large
Ituri	♀	317 mm.	11	11	,,
Congulu	♂	270 ,,	6	5	Small
,,	♂	290 ,,	6	5	Absent
,,	♂	305 ,,	6	5	,,
,,	♂	320 ,,	6	7	,,
,,	♀	332 ,,	8	5	,,
,,	♀	352 ,,	6	7	,,
			3–11	4–11	

Scales about the body are 17–17–15 or 17–17–17 ; Ventrals ♀♀ 171, 172, 173, 174, ♂♂ 176, 180 ; Subcaudals ♀♀ 40, 36, 39 and 37 + 1, ♂♂ 43, 43 + 1.

8. **Hormonotus modestus** (Dum. & Bibr., 1854).

♀ Congulu April

This example appears to be the first recorded from Angola, but is quite typical of this widespread Rain Forest species.

9. **Chlorophis heterodermus** Hallowell, 1857.

2 ♀♀, 5 juvs. Congulu April

10. **Chlorophis irregularis** (Leach, 1819).

♀ Mt. Moco March
2 juvs. Congulu April

Schmidt (1923, p. 76) has already drawn attention to the fact that this species of the Savannahs does occasionally invade the forest area in the Cameroons and the Ituri district ; its occurrence in the forested Congulu area and on Mt. Moco indicates a similar encroachment in the south.

11. **Dasypeltis scaber** (Linn, 1758).

3 juvs. Congulu April

12. **Tarbophis semiannulatus** (Smith, 1849).

juv. Okahandja Feb.

13. **Boiga pulverulenta** (Fischer, 1856).

♂ Congulu April

14. **Boiga blandingi** (Hallowell, 1844).

♂, ♀ Quirimbo May

15. **Crotaphopeltis hotamboeia** (Laurenti, 1768).

♂, juv. Quirimbo May

16. **Thelotornis kirtlandii** (Hallowell, 1844).

2 ♀♀ Quirimbo May

Both examples lack the head-markings so frequently found in southern and eastern specimens and thus conform to the typical forest race.

17. **Psammophis notostictus** Peters, 1867.

♂ Maltahöhe Dec.
♀ Hoffnung Jan.

The male is aberrant in having 9 upper labials, of which the fourth, fifth and sixth enter the orbit.

18. **Psammophis bocagii** Boul., 1895.

♀ Otjosongombe Nov.

This appears to be the most southerly record for the species, which ranges into Angola and eastwards through Bechuanaland to S. Rhodesia.

19. **Naja goldii** Boul., 1895.

2 ♀♀ Quirimbo May

The discovery of this Rain Forest species in Angola extends its known range considerably ; it has not previously been recorded south of the lower Kasai River and Lower Congo. Both specimens are, however, quite typical with 15 scale-rows, 194–198 ventrals and 78–80 + 1 subcaudals ; the larger measures 1,770 mm.

20. **Naja melanoleuca** Hallowell, 1857.

♀	Quirimbo	May
juv.	Congulu	April

21. **Dendraspis angusticeps** (Smith, 1849).

Head Sissekab Nov.

22. **Dendraspis jamesoni** (Traill, 1843).

♀	Quirimbo	May
juv.	Congulu	April

23. **Aspidelaps scutatus** (Smith, 1849).

♀, juv.	Okahandja	Feb.
♀	Omongongua	Jan.

Fitzsimons (1935, p. 326) has drawn attention to the uniformly dark heads of western (Kalahari and S.W. Africa) examples of this species, as contrasted with the white-blotched heads of eastern specimens. The two adults in the present collection agree with this generalization, but the juvenile has white blotches disposed exactly as in a cotype from Natal.

24. **Bitis caudalis** (Smith, 1849).

♂, ♀, juv.	Hoffnung	Jan.
♂	Büllsport	Dec.
juv.	Sissekab	Nov.

25. **Bitis nasicornis** (Shaw, 1802).

♂, 2 ♀♀ Quirimbo May

This constitutes yet another first Angolan record of a typical species of the Rain Forest. Previously it has not been reported south of the Lower Congo.

26. **Causus rhombeatus** (Licht., 1823).

2 ♀♀	Mt. Moco	March
juv.	Quirimbo	May

27. **Causus resimus** (Peters, 1862).

2 ♂♂, juv.	Quirimbo	May
juv.	Congulu	April

The distribution of this species is rather puzzling. It is certainly not a forest species, but is common in the eastern savannahs from the Anglo-Egyptian Sudan, Ethiopia and Somaliland southwards to Tanganyika Territory. But it does not appear to have been recorded between the latter and Angola. Boulenger's record of the species from Rhodesia (1907, p. 12), quoted by Pitman (1934, p. 300), is erroneous and based on examples of *C. defilippii*. In addition to this apparent discontinuity of range is the fact that in Angola the snake appears to be confined to the low-lying, swampy and forested littoral zone (Bocage, 1895, p. 146).

SAURIA.

28. **Rhoptropus barnardi** Hewitt, 1926.

♀	Sissekab	Nov.
3 ♂♂, 4 ♀♀	Lake Otjikoto	Nov.

This series agrees with other examples in the British Museum from the Messum River and from Mossamedes ; they have the acute snout so characteristic of *barnardi*, none have any transversely enlarged plates beneath the tail and the total number of lamellae beneath the fourth toe varies from 15 to 17.

29. ? **Rhoptropus boultoni** Schmidt, 1933.

♂	Bocoio, Benguela	March

This single specimen differs from the preceding series in having a broader, more rounded snout, a series of transverse plates beneath the tail on all except the first three segments, rather more subdigital lamellae (20) and smaller chin-shields. It agrees well with the description of *bradfieldi* Hewitt, except that the scales on the snout are faintly keeled in the canthal region, and in having the second pair of lower labials distinctly elongate. But, at the same time, it is obviously conspecific with 5 other specimens from Benguela, which are now in the British Museum, and these show more deviations from the description of *bradfieldi* in having chin-shields, 4 to 6 of the anterior caudal segments without transverse plates and fewer (17–20) lamellae beneath the fourth toe. If these northern specimens really are conspecific with *bradfieldi*, the species exhibits a range of variation which would include the described condition of *boultoni* Schmidt, and if these two are synonymous then the described species of the genus (excluding *bracconnieri* of uncertain status) may be distinguished thus :

I. Median gular scales larger than those on the belly ; anterior nasals separated by two or three granules ; digits very long and slender ; no preanal pores.
R. afer Peters.
(C and S. Damaraland.)

II. Median gulars much smaller than the ventral scales ; anterior nasals separated by a single scale ; digits shorter and stouter ; preanal pores usually present.

A. Tail without transversely enlarged plates below; snout pointed; subdigital lamellae beneath the fourth toe 14–17.
R. barnardi Hewitt.
(N. Damaraland to Mossamedes.)

B. Tail with transversely enlarged plates below, at least posteriorly; snout rounded; subdigital lamellae beneath the fourth toe 17–23.
R. boultoni Schmidt.
(N. Damaraland and Benguela.)

30. **Hemidactylus longicephalus** Bocage, 1873.

7 ♂♂, 9 ♀♀	Congulu	April
♂, 2 ♀♀	Quirimbo	May

31. **Hemidactylus mabouia** (Mor. de Jonnés, 1818).

♂	Lobito	April

Pachydactylus bibroni (Smith, 1849).

The various species and races forming the *bibroni* complex are at present very little understood. Boulenger (1910), in his survey of the South African forms, recognized two species, *bibroni* and *laevigatus*; *stellatus* Werner was not considered and Gray's *turneri* had long been considered a synonym of *bibroni*. Werner, in the same year, recognized *bibroni*, *laevigatus*, *stellatus* and *boulengeri* (of Tanganyika Territory) as distinct species. Hewitt considered both *laevigatus* and *stellatus* to be merely subspecies of *bibroni*, giving the ranges of the three respectively as S.W. Africa, Great Nama(qua)land and the Cape Province. But Schmidt (1933), finding *laevigatus* in the same localities as specimens of *bibroni*, confessed his inability to understand the distribution of the two, and of *stellatus*, on the hypothesis of their all being subspecies, and so accorded them all full specific rank, but described the Angolan *bibroni* as a new subspecies, *pulitzerae*.

It is evident, from a survey of the material in the British Museum, that one probable cause of confusion is misidentification owing to the fact that the degree of stellation of the dorsal tubercles, usually regarded as diagnostic of *stellatus*, is largely an age-character, and also occurs in typical *bibroni* and, to some extent, in *laevigatus*. A tentative arrangement, which seems to overcome the distributional difficulties, is to regard *stellatus* and *pulitzerae* as races of *bibroni*, and *laevigatus* as a distinct species. Unfortunately the name "*stellatus*" has to give way to the much older *turneri*, since the subspecies with the stellate tubercle is found to range from Damaraland to Mozambique. The various forms are not readily separable, but the following key may be of assistance :

I. Dorsal tubercles on the middle of the back smooth, or very obtusely keeled; stellate tubercles confined to the region behind the ear. Nostrils directed almost vertically upwards. Gular scales flat, half the size of the ventrals. Damaraland. *P. laevigatus* Fischer.

II. Dorsal tubercles always strongly keeled and trihedral. Nostrils lateral. Gular scales almost granular.

A. Stellate tubercles confined to the back of the head and flanks ; dorsal tubercles sometimes with additional radiating keels on their posterior facets. Distance from snout to anterior border of orbit no longer than the distance from the eye to the posterior border of the ear in the adult. Cape Province and Namaqualand.
P. bibroni bibroni (Smith).

B. Mid-dorsal zone with stellate tubercles, the radiating keels being present on the lateral as well as the posterior facets of many of them. Snout as in A.
Damaraland, Orange Free State, Transvaal, Rhodesia, Portuguese East Africa, Nyasaland and Tanganyika Territory.
P. bibroni turneri (Gray).

C. Tubercles as in A. Distance from the tip of the snout to the anterior border of the orbit much longer than the distance from eye to ear. Angola. *P. bibroni pulitzerae* Schmidt.

32. **Pachydactylus bibroni turneri** (Gray, 1864).

Homodactylus turneri Gray, 1864, *Proc. Zool. Soc. London*, p. 59, pl. ix, fig. 2.
Pachydactylus bibroni var. *stellatus* Werner, 1910, *Jena Denkschrift*, xvi, p. 309.

♀	Otjosongombe, 1,600 m.	Nov.
4 ♂♂, 2 ♀♀	Otavifontein	Nov.
2 juvs.	Lake Otjikoto	Nov.
6 ♂♂, 6 ♀♀, 4 juvs.	Maltahöhe, 1,460 m.	Dec.

This series has been compared with the cotypes of *turneri* and cannot be distinguished by any characters which might be of specific importance. Both have the stellate tubercles which characterize the rather ill-distinguished northern race of *P. bibroni*, but there is a considerable amount of individual variation in this respect. In juveniles the stellate tubercles are confined to the region behind the ear and the posterior part of the flanks, in which areas they are present in the typical form ; but with increasing age they are developed more and more over the middle of the back. Specimens have been examined from Tanganyika Territory, Nyasaland, Portuguese East Africa, Rhodesia (North and South) and the Transvaal. Other examples from the Orange Free State and Bechuanaland cannot be referred with confidence either to *turneri* or the typical form.

33. **Pachydactylus bibroni pulitzerae** Schmidt, 1933.

3 ♂♂, 1 ♀, 4 juvs.	Morro de Pundo, Angola	May

These 8 specimens, together with 4 others from the province of Benguela, resemble typical *bibroni* (cotypes examined) in the degree of development of their dorsal tubercles, but differ from that form and from *turneri* in a longer, more pointed snout, a somewhat narrower interorbital space and more pronounced frontal concavity. These differences seem to indicate the existence of a distinct Angolan race for which the name *pulitzerae* is available.

34. **Pachydactylus laevigatus** Fischer, 1888.

♂	Windhoek	Jan.
♂, 2 juvs.	Hoffnung, near Windhoek	Feb.
2 ♂♂, 2 ♀♀, 2 juvs.	,, ,,	Dec.
♂	,, ,,	Jan.
♂, ♀	Büllsport, Naukluft Mts., 1,450 m.	Dec.
2 juvs.	Rehoboth, 1,450 m.	Dec.
3 ♂♂, 2 juvs.	Satansplatz, 1,300 m.	Dec.

35. ? **Pachydactylus weberi** Roux, 1907.

♂	Windhoek	Jan.
♂	Hoffnung	Dec.

Recently Hewitt (1932, p. 124, and 1935, p. 315) has cast doubts on the validity of this species and on the accuracy of nearly all records of the species except the original one. He considers true *weberi* (from Klipfontein, Namaqualand) to be a subspecies of *P. capensis* ; specimens from Garies and nearby localities in the south of Little Namaqualand are referred to another subspecies, *P. capensis gariesensis*, whilst specimens from the Khan River, Karibib and Keetmanshoop (i.e. from Damaraland and Great Namaqualand) are determined as yet a third subspecies, *P. c. werneri*. The present specimens must almost certainly belong to the same race as those from Karibib and also those from Windhoek recorded as *weberi* by Sternfeld (1911, p. 387, and 1911a, p. 14), yet they do not agree in detail with the descriptions of any of the so-called races. This strongly suggests that some of the latter will prove to be untenable and geographical considerations suggest that *werneri* = *weberi* ; since proof of intergradation with *capensis* is still lacking, it is preferred to use the name specifically.

36. **Pachydactylus rugosus** Smith, 1849.

♂	Naukluft Mts., 1,300 m.	Dec.

This specimen has the colour pattern and mental shield ascribed to *P. rugosus frater* Hewitt. But none of the other characters used to define that race are at all apparent. The gular scales are conical and the ventrals pyramidal, as in the type.

37. **Pachydactylus purcelli** Boul., 1910.

2 ♂♂, 2 ♀♀	Maltahöhe, 1,460 m.	Dec.

38. **Pachydactylus punctatus** Peters.

♂, ♀	Hoffnung, near Windhoek, 1,850 m.	Feb.

It seems very probable that none of the so-called subspecies of *punctatus* are recognizable. Fitzsimons (1935, p. 339) has already expressed the opinion that *brunnthaleri* Werner, described from S. Rhodesia and also reported from Angola (Schmidt, 1933, p. 5), is untenable. The present two examples only differ from others from Rhodesia and Angola in having the first labial entering, or very narrowly separated from, the nostril, in which character they approach *langi* Fitzsimons and *amoenoides* Hewitt.

Although the two were collected on the same farm they are very different in colour, suggesting that colour differences, such as are said to characterize *langi* and *bicolor* Hewitt, are of little consequence.

39. **Narudasia festiva** Meth. & Hewitt, 1913.

♀ Satansplatz, 1,300 m. Dec.

This example has been compared with a paratype of the species and found to agree well. The status of the genus, however, is open to question. The original describers compared it with *Homonota* and *Stenodactylus*, but in reality it appears to be almost indistinguishable from *Gymnodactylus*. It differs from the majority of the species of that genus in the absence of chin-shields, but that is by no means a constant character and is insufficient to warrant the retention of a separate genus. But *Gymnodactylus* is a cumbersome, and possibly not a monophyletic, assemblage which may ultimately be broken up ; any revision of the genus should certainly consider the status of *Narudasia*.

40. **Ptenopus garrulus** (Smith, 1849).

♂ Mariental to Rehoboth Dec.

41. **Chondrodactylus angulifer** Peters, 1870.

♂ Büllsport, Naukluft Mts., 1,450 m. Dec.

42. **Agama anchietae anchietae** Bocage, 1896.

♂	Voigtsgrund	Dec.
2 ♂♂, ♀	Satansplatz	Dec.
2 ♂♂, 2 ♀♀	Maltahöhe	Dec.
3 ♂♂, 6 ♀♀	Windhoek	Jan.
2 ♀♀	Hoffnung, near Windhoek	Dec.

In this series, especially amongst those collected at Windhoek, there is every gradation between examples with a distinct dorsal crest and specimens without a trace of it ; at the same time the number of enlarged scales on the dorsum varies enormously, and in a few instances they are almost completely absent. Leg-length also varies and there is thus every stage of intergradation between *A. anchietae anchietae*, typically found in Angola, and *A. anchietae methueni* of Namaqualand ; Boulenger and Power (1921, p. 269) record the typical form from Maltahöhe (misspelt " Matahöle ").

43. **Agama hispida aculeata** Merrem, 1820.

♀	Omongongua	Nov.
2 ♂♂, 5 ♀♀	Windhoek, 1,650 m.	Jan.
2 ♀♀, 1 juv.	Hoffnung, Windhoek, 1,850 m.	Oct.
♀	,, ,, 1,850 m.	Jan.
♂, ♀	,, ,, 1,850 m.	Dec.
♀	W. of Mariental	Dec.

44. **Agama planiceps** Peters, 1862.

7 ♂♂, 6 ♀♀	Windhoek	Jan.
4 juvs.	Morro de Pundo	May
8 ♂♂, 5 ♀♀, 13 juvs.	Congulu	April
♂, 5 ♀♀	Quirimbo	April

Comparison of the Windhoek series with those from Angola shows that the former has, on the average, larger scales. This is most noticeable on the upper arm and femur, but is most easily described in terms of the number round the body. The Damaraland specimens available to the author (15) have a minimum mid-body count of 63 and a maximum of 74, the average being 69·5. The types, from Neu Barmen, in Damaraland, had from 73 to 76. But in Angola the number is much higher. In 55 specimens collected between 13° S. and 8° 30′ S., the minima and maxima respectively are 71 and 99, with an average of 87·5. There is thus an overlap, and tabulation of the figures suggests that further material from southern Angola and northern Damaraland will show a continuous gradation, rendering it impossible to recognize any clearly defined races. The following localities are arranged in order from south to north.

Locality.	Specs.	Min.	Max.	Average.
Windhoek	13	63	74	69
"Damaraland"	2	68	72	70
Neu Barmen (Types)	?	73	76	74·5
Caconda	4	76	90	81·5
Bihé	1	82	82	82
Morro de Pundo	4	76	83	79
Congulu	26	71	94	87
Quirimbo	6	85	99	89·6
Pungo Andongo	11	79	94	88
Ambaca	2	93	96	94·5
Duque de Braganza	1	89	89	89

45. **Agama atricollis** Smith, 1849.

♀ Mt. Moco, 15–1,900 m. March

Schmidt (1919, p. 477) has pointed out how this species, which is essentially a lizard of the savannahs of East and South Africa, enters the Rain Forest in the eastern Belgian Congo. Consequently its occurrence in the forest islands of Angola is to be expected. It should be pointed out that Schmidt's scale counts (loc. cit.) have been accidentally diminished by a hundred. In the present example the scales from chin to anus number 157.

46. **Cordylosaurus trivittatus** (Peters, 1862).

5 ♂♂, 4 ♀♀, 3 juvs.	Hoffnung	Dec.–Feb.
2 ♀♀	Voigtsgrund, 1,300 m.	Dec.

Dr. Jordan reports that this lizard runs with lateral undulations, recalling a slow-worm or a snake, and emphasizes the very fragile nature of the tail.

The series makes it very doubtful whether the subspecies *australis* Hewitt, from Namaqualand, can be maintained. This race was based on two examples only, with but a single other example for comparison, a series which was quite inadequate for the purpose. The present longer series, from the area in which the species was originally discovered, are obviously all conspecific, but show

variations which cover almost every feature said to distinguish *australis* and the other examples mentioned by Hewitt (1932, p. 115) which he considered might be specifically distinct. Thus, the light dorso-lateral lines never occupy more than two scale-rows on the body, though the light colour usually extends on to the posterior upper temporal. The parieto-occipital shield is completely undivided in 4 adults, has more or less distinct traces of incomplete sutures in 7 and is completely divided into parietals, interparietal and frontoparietals in the 3 juveniles. Femoral pores vary from 7 to 9, of which the proximal 3–5 are well developed and the distals rudimentary in females, but all, except sometimes the end pore, are well developed in males. The tympanic shield is always broader than the posterior upper temporal. The only difference which is not covered by the present series is the keeling of the scales ; in the lumbar region the median keel is always the most prominent. The largest example, a female, measures only 143 mm. from snout to vent.

47. **Gerrhosaurus flavigularis nigrolineatus** Hollowell, 1857.

juv.	Windhoek	Jan.
2 ads.	Sissekab	Nov.
5 juvs.	Congulu	April
6 ads.	Quirimbo	May

The three examples from the dry country of Damaraland approach the typical form of East Africa in several respects, notably in their longer, narrower frontals. Those from the forested parts of Angola appear to be typical of the West African subspecies.

48. **Zonurus jordani** sp. n.

Z. polyzonus (*non* Smith) Boettger, 1894, *Ber. Senck. Natf. Ges.*, p. 89 ; Werner, 1910, *Jena Denkschrift*, xvi, p. 325.

Holotype a ♀ from Hoffnung, near Windhoek, collected by Dr. K. Jordan in December 1933.[1]

Boettger, in recording a *Zonurus* from Rehoboth, under the name *polyzonus*, notes that it has only 7 femoral pores, and Werner records two others from Hereroland with pores varying from 5 to 7. The latter author calls particular attention to the fact that this low number is unusual, and that specimens of *polyzonus* from Namaqualand have from 12 to 17. Power, too, must have been suspicious of these records with a low number of pores, for in his revision of the genus (1930) he neglects them completely. The single specimen collected by the present expedition apparently belongs to the same form, for it " keys " into *polyzonus*, but has the lower number of femoral pores, and certain other differences, which seem to indicate that it is specifically distinct. The species does not appear to have received a name, and the type may be described thus :

Fronto-nasal separated from the rostral by the supra-nasals which form a long suture ; lower eyelid with a transparent disc composed of two much-enlarged scales ; head scales rugose and disposed as in *polyzonus*, but the scales of the temporal region distinctly larger. Dorsal scales feebly keeled ; laterals similar in size but strongly keeled and mucronate ; 36 transverse rows of scales between occiput and base of tail, a single row at the middle of the body containing 34. Ventrals smooth, in 22 longitudinal series, separated from the dorsals by 1 to 2 rows of granules lying in a distinct fold. Gular scales flat. Caudal scales very

[1] Paratypes a ♀ and a juv. from Otjosongombe, Feb. 1936 (W. Hoesch) ; pholidosis and counts as in holotype.

large and spinose, a single transverse series in each whorl. Scales on the limbs above strongly keeled and mucronate.

Pale brown above, with small, obscure, darker spots. Lower surfaces uniform, pale, straw-colour.

Length from snout to vent 111 mm. ; tail incomplete ; fore-limb 42 mm. ; hind-limb 56 mm.

The species is closely allied to *polyzonus*, with a large series of which (including the types) it has been compared, but also has some features in common with *cordylus*. From the latter it is readily distinguished by the presence of a supranasal and by its smaller scales, and from *polyzonus* as follows :

jordani	*polyzonus*
(1) Femoral pores 5–7.	(1) Femoral pores 12–17.
(2) Temporals larger.	(2) Temporals smaller.
(3) Caudal whorls composed of a single row of scales.	(3) Caudal whorls at the middle of the tail composed of 2 rows of scales.
(4) Posterior upper femoral scales much enlarged and strongly spinose.	(4) Posterior upper femorals scarcely larger or more spinose than the anterior.
(5) Transverse dorsal scales in 32–37 series.	(5) Transverse dorsal scales in 38–46 series.

49. **Eremias namaquensis** Dum. & Bibr., 1839.

♂, 5 ♀♀	Hoffnung, 1,850 m.	Nov.–Feb.
2 ♂♂, ♀	Rehoboth, 1,450 m.	Dec.

The females collected at Hoffnung in November, December and January are pregnant, but the single specimen taken in February has the oviducts still enlarged but empty, and the gonad itself is shrunken.

50. **Eremias undata** (Smith, 1838).

♂	Lake Guinas	Nov.
♂, ♀	Sissekab	Nov.
3 ♂♂, 3 ♀♀	Otjosongombe	Nov.
3 ♂♂	Hoffnung	Dec.
2 ♂♂, ♀	Rehoboth	Dec.
♂, ♀	Kobui, S. of Rehoboth	Dec.
♂	Büllsport, Naukluft Mts.	Dec.
♀	Voigtsgrund	Dec.
♂	Satansplatz	Dec.

51. **Eremias benguelensis** Bocage, 1867.

juv.	Catengue, Angola	March

52. **Eremias lineo-ocellata** Dum. & Bibr., 1839.

♂	Hoffnung	Jan.
4 ♂♂, 4 ♀♀	Maltahöhe	Dec.
♀	Satansplatz	Dec.
♂	Voigtsgrund	Dec.

53. **Eremias lugubris** (Smith, 1838).

3 ♂♂, ♀ Hoffnung Jan.

54. **Scapteira reticulata** Bocage, 1867.

2 ♂♂, 2 juvs. Swakopmund (Sea Shore) Feb.

55. **Nucras intertexta damarana** subsp. n.

3 ♂♂, 5 ♀♀ Sissekab Nov.

There is still a great deal of confusion regarding the species and subspecies of *N. intertexta* and *N. tessellata*, but the above specimens appear to differ constantly from any of the races previously described, in their smaller size, the reduction of the occipital scale and the shortening of the interparietal, so that the parietals always form a suture behind it. In 35 out of 37 specimens of *intertexta* subspp. the interparietal separates the parietals completely and is truncate behind, where it forms a suture with the occipital or its rudiments. The Sissekab specimens probably represent a race with a very limited distribution, for Sissekab is one of the few localities in S.W. Africa where open forest country persists. This race may be described as follows, the description being drawn up from the 8 cotypes.

Head small, broader than deep (1·1–1·3), once and a half to once and two-thirds as long as broad ; its length contained 4 to 4·9 times in the length from snout to vent. Limbs moderate, the hind-limb reaching the wrist or the elbow ; foot as long as the head. Tail once and a half to twice as long as the head and body.

Head-shields as in *N. intertexta* except that the frontal may be slightly shorter than its distance from the tip of the snout ; the parietals are only once and a half (vice $1\frac{2}{3}$) as long as broad ; the occipital is rudimentary or, usually, quite absent ; the interparietal is shorter, forming an acute angle posteriorly (instead of being truncate) and the parietals form a suture behind the interparietal. A parietal foramen and pterygoid teeth are present ; 25 to 31 gular scales in a median series between chin-shields and collar ; latter composed of 8 or 9 scales of which the median is usually much the largest. Dorsal scales smooth, in 35 to 41 rows at the middle of the body ; ventrals in 8 longitudinal and 28–34 transverse series. Femoral pores 10–13. Subdigital lamellae beneath the fourth toe 20–24.

Dark brown above, with three narrow white stripes ; flanks with two narrow white lines of which the upper, commencing at the middle of the ear, is complete. Limbs with circular white spots above ; a white line along the back of the thighs and the inner borders of the tibiae. Uniform pinkish white beneath.

The largest specimens, two females, measure 54 mm. from snout to vent ; another female of 52 mm. is gravid. The largest male is 52 mm. from snout to vent.

56. **Ichnotropis bivittata** Bocage, 1866.

1 juv. Mt. Moco, Angola, 1,500–1,900 m. March

This identification is questionable. The specimen has smaller scales than normal (45–56 at mid-body), but is too young to afford any reliable evidence as to whether racial differentiation has taken place outside the true Rain Forest.

7. **Mabuya bocagii** Boul., 1887.

4 Congulu April

In all these four examples the scales about the body number 40 instead of 36–38 and the dorsals are, for the most part, feebly tricarinate. Five keels do appear, however, in some places, and in other characters there is nothing whereby they may be distinguished from typical *bocagii*, so that the differences must be regarded as within the range of variation of the species.

58. **Mabuya striata** (Peters, 1844).

2	Otjosongombe	Nov.
2	Windhoek	Jan.
1	Hoffnung	Jan.
1	Voigtsgrund	Dec.
1	Mariental to Rehoboth	Dec.
2	Büllsport	Dec.

Fitzsimons (1935, p. 371) has recently drawn attention to the high proportion of specimens of this lizard which, in Bechuanaland, have the subocular reaching the edge of the lip. The same condition occurs in 20 out of the 21 specimens from Angola and Damaraland which have been examined. In the Transvaal and Rhodesia the proportion falls, somewhat, to 77 per cent. (49 examined), and in Mozambique and Natal there is a sharp decline to 6 per cent. (17 examined). To the north, however, the decline is less rapid, specimens from Nyasaland, Tanganyika Territory and southern Kenya Colony showing about equal numbers of those with the subocular reaching and cut off from the lip. In Uganda, Ethiopia, Somaliland and the Sudan, however, the proportions are similar to those in Mozambique and Natal, only 7 per cent. (32 examined) having the subocular bordering the mouth.

59. **Mabuya sulcata** (Peters, 1867).

M. sulcata var. *sexstriata* Werner, 1910, *Jena Denkschrift*, xvi, p. 345, pl. viii, fig. 10.

3 ♂♂, 2 ♀♀	Windhoek	Jan.
4 ♂♂, 4 ♀♀	Hoffnung	Dec.
1 juv.	,,	Feb.
♂	Rehoboth	Dec.
2 ♂♂, ♀	Maltahöhe	Dec.
♂, ♀	Voigtsgrund	Dec.
4 ♂♂, 2 ♀♀	Satansplatz	Dec.

The scale-rows in this series vary from 36 to 42. The majority have 38, but one male from Rehoboth has 40 and a female from Windhoek 42. This extends the range of variation to a sufficient extent to include *Mabuya ansorgii* Boul. of Benguela ; but it is possible that the latter may be a tenable subspecies, for adults retain the six-lined colour pattern, which is the juvenile livery in Damaraland. Werner (1910), in discussing a series from Damaraland, refers to a var. *sexstriata* which he ascribes to Bocage. The latter author described the coloration of the six-lined variety, but applied no varietal name ; consequently, the name *sexstriata* must date from Werner 1910, but it does not appear to be a valid subspecies and must be placed in the synonomy. In the same paper the author mentions another

example which he says is " really *octstriata* " ; the word is placed in inverted commas and is obviously being used descriptively and not nomenclatorially.

60 ? **Mabuya damarana** (Peters, 1869) (text-fig. 43).

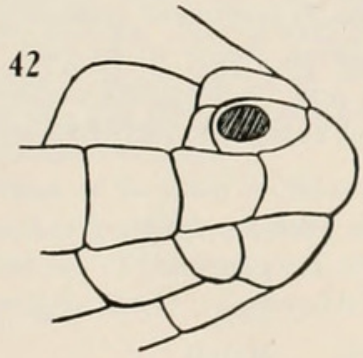
Euprepes damaranus Peters, 1869, *Oefvers. Vet.-Ak. Förhandl.*, p. 660.

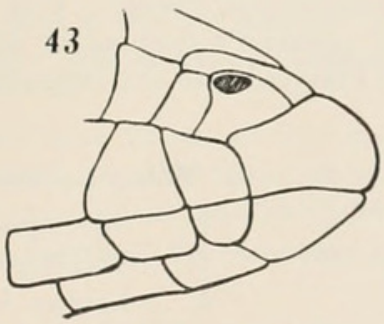
Mabuia hildebrandti (*non* Peters) Werner, 1910, *Jena Denk.*, xvi, p. 347 ; Boulenger, 1910, *Ann. S. Afr. Mus.*, v, p. 485 ; Sternfeld, 1911, *Mitt. Zool. Mus. Berlin*, v, 3, p. 408 ; *idem*, 1911, *Fauna Deutsch. Kolon.*, iv, 2, p. 40.

Mabuia varia var. longiloba, Methuen and Hewitt, 1914, *Ann. Transvaal Mus.*, iv, p. 142.

4	Hoffnung	Dec.–Jan.
3	Windhoek	Jan.
2	Maltahöhe	Dec.
2	Voigtsgrund	Dec.

Werner, in first recording the north-east African *M. hildebrandti* from Damaraland and S. Africa (1910, p. 347), suggested that his specimens might not be correctly identified, but might represent a distinct species. Methuen and Hewitt realized that specimens from this region, which were probably identical with the so-called *hildebrandti* of Werner, Boulenger and Sternfeld, were more closely allied to *varia* and proposed a new subspecific name for them. The material in the present collection confirms the opinion that this S.W. African skink is not related to *hildebrandti*, from which it may be distinguished by the





smaller scales on the soles of the feet and much shorter digits and claws. It certainly seems closely akin to *varia*, but, in addition to the length of the ear-lobules, which was the only constant character discovered by Methuen and Hewitt to distinguish the two, there is also a constant difference in the position of the nostril which, in all the material examined, affords a clear-cut differentiation between the two, without any sign of intergradation. Consequently it is proposed to accord full specific status to the south-western form, for which, on geographical grounds, the name *damarana* appears to be available in preference to the much later *longiloba* of Methuen and Hewitt.

M. varia and *M. damarana* may be distinguished thus :

A. Nostril lateral, separated from the first upper labial by a distance much less than its own diameter (text-fig. 42), its centre behind the rostro-labial suture. Subocular not, as a rule, very much narrowed inferiorly, its labial margin half, or more than half, the length of its upper border ; ear lobules short and broad.— *M. varia*.

B. Nostril directed vertically upwards, separated from the first upper labial

by a distance about as great as its own diameter (text-fig. 43), its centre vertically above the rostro-labial suture. Subocular usually more narrowed inferiorly, its labial margin not half the length of its upper border ; ear lobules long and lanceolate.—*M. damarana.*

The character of the subocular is by no means definitive and the position of the centre of the nostril relative to the rostro-labial suture also shows some variation. *M. varia* has been examined from the Cape Province, Transvaal, Natal, Angola, N. Bechuanaland, S. Rhodesia, N. Rhodesia, Nyasaland, Mozambique, Tanganyika Territory, Kenya Colony, Uganda and Somaliland. *M. damarana* appears to be confined to the south-western districts, material having been seen from Damaraland, Namaqualand (Narudas Süd) and the Cape Province (Deelfontein and Port Elizabeth) ; Methuen and Hewitt record it from Great Namaqualand and various localities in the Karoo (Steytherville, Victoria West, Middleburg, Klerksdale, Cradock and Steinkop). To prevent future confusion it must be pointed out that Fitzsimon's (1935, p. 369) inclusion of Methuen and Hewitt's Great Namaqualand records under *M. varia varia* is erroneous ; these examples were the cotypes of *longiloba.*

61. **Mabuya varia** (Peters, 1867) (text-fig. 42).

1	Mt. Moco	March

In specimens of this species from Angola and the Lower Congo, the supranasals tend to be separated. In 9 out of the 10 specimens examined the frontonasal just touches the rostral. This condition seems to be rare, though not unknown, in specimens from other areas, and its frequent occurrence in this western area may indicate the beginnings of subspecific differentiation.

62. **Mabuya acutilabris** (Peters, 1862).

1	Swakopmund	Feb.
1	Voigtsgrund	Dec.
4	Lobito, Angola	March

The example from Voigtsgrund has 34 scale-rows at the middle of the body and exhibits an anomalous fusion of the praefrontals and frontonasal.

63. **Mabuya binotata** (Bocage, 1867).

2	near Sissekab	Nov.

This appears to be the first record of this Angolan species from Damaraland, but as has already been pointed out (*Nucras intertexta damarana*, q.v.), Sissekab, with open forest country, is very different from most of the rest of Damaraland.

64. **Mabuya raddoni** (Gray, 1845).

11	Congulu	April

65. **Mabuya maculilabris** (Gray, 1845).

6	Congulu	April
2	Quirimbo	May

66. **Lygosoma dewittei** (Loveridge, 1934).

1 ad. Congulu April

This single specimen appears to agree with the species described by de Witte and subsequently renamed by Loveridge. One of the characteristic features which was believed to distinguish the species was a laterally compressed tail with a series of transversely enlarged subcaudals ; unfortunately the tail of the Congulu specimen is incomplete, but compressed tails have been noted in many other skinks and enlarged subcaudals appear frequently on regenerated tails. The species was originally referred to *Siaphos*, but this is now included by Smith (1935, p. 279) in *Lygosoma*.

67. **Ablepharus cabindae** Bocage, 1866.

4 Congulu April

Smith (1935, p. 309) has recently drawn attention to the fact that the genus *Ablepharus* is not a natural one, but a polyphyletic assemblage, and has also pointed out that the lower eyelid is not always fused to the upper completely. The present species illustrates both of these facts. The lower eyelid is not fused with the upper except at the corners. In this character, in the presence of supranasals, and the occasional presence of four supraoculars, it differs from all the other African species grouped with it, and there seems to be every probability that it is closely allied to the West African species grouped under *Riopa* (i.e. *breviceps*, *togoense*, *kitsoni* and *dahomeyense*). These species have probably nothing whatever to do with true *Riopa* and, if they be grouped with *cabindae*, as seems logical, the name *Panaspis* Cope (Type species *P. aeneus* = *cabindae*) becomes available for them.

The species is variable in other characters. Thus, of four specimens here recorded, one has four supraoculars, whereas in the other three the first and second are fused, and one of the latter has the frontoparietals and interparietal fused to form a single large shield ; scales about the middle of the body vary from 24 to 26.

68. **Lygosoma (Panaspis) breviceps** (Peters, 1873).

5 Congulu April

The discovery of this skink in Angola is a considerable extension of its known range. The specimens do not appear to differ from those found in the Cameroon-Gaboon area, though the number of scales about the body may be somewhat lower. They vary from 30 to 34, the known range of *breviceps* (including *batesi* Boul.) is from 32 to 38 (Müller, 1910, p. 588).

69. **Riopa sundevallii** (Smith, 1849).

2 Okahandja Dec.

70. **Acontias meleagris** (Linn., 1758).

5 Okahandja Dec.–Feb.

71. **Feylinia currori** Gray, 1845.

1 juv. Congulu April

72. **Amphisbaena quadrifrons** Peters, 1862.

6	Hoffnung	Dec.–Feb.
1	Okahandja	Feb.

Cott (1933, p. 160) records 7 examples of this species from Mozambique, and at the same time points out that they differ from typical examples from Damaraland in having fewer segments in an annulus, fewer annuli on the body, 6 instead of 4 preanal segments and certain differences in the head-shields. The comparative material available at that time was very small, but with the new material in the present collection, the records of Fitzsimons (1935, p. 353) and the material in the Congo Museum recorded by de Witte (1933, p. 72) it becomes apparent that the variation is continuous across the continent. The number of preanal segments and the variation in the head-shields appear to have no significance, and the numerical variations may be tabulated thus :

Locality.	Specs. Examined.	Segments in an Annulus.	Annuli on Body.
Damaraland	8	$\frac{18–22}{16–22}$	221–238
Kalahari (Fitzsimons)	15	$\frac{18}{16}$ (Av.)	231 (Av.)
Lower Congo	1	$\frac{18}{15}$	198
Katanga	15	$\frac{14–16}{13–15}$	200–216
Rhodesia (Fitzsimons)	8	$\frac{16}{14}$ (Av.)	217·6 (Av.)
Mozambique (Cott)	7	$\frac{15–18}{14–16}$	211–221

73. **Monopeltis capensis** Smith, 1849.

1	Rehoboth	Dec.
2	?	

These three specimens show some variation beyond that previously recorded for the species. There are constantly only two maxillary teeth ; the number of segments in an annulus is variable, even in closely adjacent annuli, but the limits appear to be between 51 and 56. The annuli on the body are 203, 209 and 211, and the caudals constantly 11 ; preanal pores are only feebly indicated. Without a larger series for purposes of comparison the significance of the smaller segments and reduced number of maxillary teeth cannot be ascertained.

74. **Chamaeleo etiennei** Schmidt, 1919.

5 ♀♀, 1 juv.	Congulu	April

Schmidt (1919, p. 574) drew attention to the fact that the so-called *Ch. gracilis* of the Lower Congo had a differently shaped casque from typical W. African examples, and that, in addition, the male lacked a tarsal spur ; he further suggested that the Angolan specimens generally referred to *gracilis* would prove to belong to the Lower Congo form, and this suggestion is well founded. But the material examined shows that this species has an even wider range, as may be seen from the following lists :

C. etiennei. 94 specimens examined from Angola (Congulu, Pungo Andongo, Duque de Bragança, Condo, Canhoca, Marimba) and the southern half of the

Belgian Congo (Lower Congo, Banana, Zambi, Leopoldville, Vista, Congo da Lemba, Moanda, Boma, Kisontu, Kwango, Luabo, Mwanza Kulu and Albertville) from the coast to Lake Tanganyika.

C. gracilis. 84 specimens examined from Gambia, Liberia, Sierra Leone, Gold Coast, Ashanti, Nigeria, Northern Belgian Congo (Uele, Ituri and Lake Albert areas), Anglo-Egyptian Sudan, Ethiopia, Uganda, Kenya and Italian Somaliland.

75. **Chamaeleo dilepis** Leach, 1819.

♂	Hoffnung	Feb.
♂	Windhoek	Jan.
juv.	Sissekab	Nov.
2 ♂♂, 5 ♀♀, 3 juvs.	Mt. Moco	March

This series contains representatives of two distinct forms of this very variable species. Those from the forested Mt. Moco are very much smaller (♂♂ 84–102, ♀♀ 94–104 mm. from snout to vent) with a flatter head, less concave interorbit, less marked parietal crest and slightly larger occipital lobes. But until a survey of all the local races can be undertaken the use of trinomials seems inadvisable.

AMPHIBIA SALIENTIA.

76. **Rana albolabris acutirostris** subsp. n.

♀	Congulu	Holotype.
4 ♂♂, ♀	Quirimbo	Paratypes.

These, the most southerly recorded examples of *Rana albolabris*, differ from a large series ranging from Liberia eastwards to Uganda and south to the mouth of the River Congo, in their much more acutely pointed and prominent snouts. This probably indicates the existence of a southern race, rather than a distinct species, but this is so clearly marked as to justify the use of a trinomial. A detailed description is not necessary, for in almost all respects, except the shape of the snout, these 6 specimens agree with typical *albolabris*. The snout is, however, acutely pointed and very strongly prominent, with a more obtuse canthus rostralis and more oblique loreal region. The distance between the nostril and the tip of the snout is contained not more than once and a quarter in the internarial distance, whereas in the typical form the same ratio is 1·5 to 1·7. The holotype, a mature female, measures 82 mm. from snout to vent, and has greatly distended ovaries and enlarged oviducts ; it was captured in April. Another female caught in May is in the same condition, and males caught in the same months have nuptial pads. The largest of the latter sex measures 74 mm. from snout to vent.

77. **Rana fuscigula angolensis** Bocage, 1866.

6 ♂♂, 5 ♀♀, 1 juv.	Quirimbo	May
5 ♂♂, 5 ♀♀, 2 juvs.	Congulu	April
12 ♂♂, 3 ♀♀, 13 juvs.	Mt. Moco	March

78. **Rana fuscigula fuscigula** Dum. and Bibr., 1841.

6 ♂♂, 5 ♀♀	Büllsport, Naukluft Mts.	Dec.

79. **Rana (Ptychadaena) ansorgii** Boulenger, 1905.

2 ♂♂, ♀	Mt. Moco	March
♂	Congulu	April

It will probably be found that all records of "*ansorgii*" from Tanganyika Territory, Portuguese East Africa, Nyasaland, Rhodesia and Zululand really refer to a distinct species, which is similar in its digital webbing, but has a broader head and less prominent snout, characters in which it resembles *R. mascareniensis*. The name available for this eastern form appears to be *mossambica* Peters, 1854.

80. **Rana (Ptychadaena) oxyrhynchus** Smith, 1849.

♀, juv.	Congulu	April
1 juv.	Mt. Moco	March

81. **Pyxicephalus tuberculosus** (Boul., 1882).

13 ♂♂	Mt. Moco	March
♂	Quirimbo	May

82. **Pyxicephalus delalandii** Dum. and Bibr., 1841.

♀	Windhoek	Jan.
8 ♂♂, 12 ♀♀	Farm Hoffnung, near Windhoek	Oct.–Jan.
2 juvs.	Omongongua	Jan.
2 juvs.	Okahandja	Feb.
19 ♂♂, 2 ♀♀	Maltahöhe	Dec.

This species was found breeding in December and January. Dr. Jordan reports that the voice of the males is loud but melodious, sounding at a distance like "lutter, lutter, lutter——" (the u sound being long); it is accordingly known locally as the "Lutheran."

83. **Pyxicephalus adspersus** Tschudi, 1840.

1 juv.	Omongongua	January

84. **Phrynobatrachus natalensis** (Smith, 1849).

7 ♂♂, 7 ♀♀	Congulu	April

85. **Arthroleptis parvulus** Boul., 1905.

34 ♂♂, 4 ♀♀	Calaongo, below Congulu	April

This series shows two features which have not previously been recorded for the species. First of all, males have a large, flat, oval gland on the hinder side of the thighs as in *A. cornutus*, and *A. ogoensis* (Parker, 1935, p. 403). Hitherto *parvulus* has not been suspected of relationship with these species, but has been grouped with *A. dispar* and *A. feae* (Noble, 1924, p. 201); examination of the latter two species shows that these femoral glands are present in the males of *dispar*, but not, apparently, of *feae*.

Secondly there appears to be a considerable amount of variation in the degree of webbing of the toes. The majority of individuals have the toes about a quarter webbed, as in the cotypes, but two others in the present collection, and two

others in the British Museum from Mossamedes, have them nearly half webbed, as in *ogoensis* ; they differ from this species, however, in their much smaller digital discs. It seems very improbable that these four specimens represent a distinct species, for they differ in no other characters and even in more normal specimens there is no absolute constancy in the webbing. The resemblance of this species to *dispar* is very marked, but the latter has larger digital discs as in *ogoensis* ; nevertheless it seems very probable that the two may have been confused and that the Angolan records of " *dispar* " (Peters, 1888, p. 618) really refer to *parvulus*.

86. **Cacosternum boettgeri** (Boul., 1882).

14 ♂♂	Hoffnung, near Windhoek	Dec.
♂	,, ,, ,,	Feb.
6 ♂♂	Maltahöhe	Dec.
♂	Voigtsgrund	Dec.

This species was breeding at Hoffnung in December ; the voice of the male resembles castanets.

87. **Phrynomerus annectens** (Werner, 1910).

Phrynomantis nasutus Methuen and Hewitt, 1914, *Ann. Transvaal Mus.*, iv, p. 122, pl. xiv, fig. 2.
Hoplophryne marmorata Ahl, 1934, *Zool. Anz.*, cvii, p. 334, fig. 1.

2 juvs.	Morro de Pundo	May

These two specimens both have a somewhat longer leg than has been described previously, and as all the previous records appear to have been from S. Africa and the Cape Province, this might suggest the existence of a distinct northern race in which the tarso-metatarsal articulation nearly reaches the eye (instead of the shoulder). But the difference is sexual, for out of a series of 8 specimens from Benguela the 4 males have the tarso-metatarsal articulation reaching the posterior corner of the eye, whilst in the four females it only reaches the axilla or shoulder.

88. **Kassina senegalensis** (Dum. & Bibr., 1841).

Kassina deserticola Ahl, 1930, *Zool. Anz.*, lxxxviii, p. 280 ; *idem*, 1931, *Das Tierreich, Anura*, iii, p. 449.

3 ♂♂	Hoffnung	Dec.
3 ♂♂	,,	Jan.

This series, which is almost topotypical of *K. deserticola*, shows a considerable variation in the degree of folding and wartiness of the anterior part of the belly ; other specimens in the British Museum from other localities also show considerable variation, and since this is the principal feature said to distinguish *deserticola* from *senegalensis* it seems very doubtful whether the former can be retained, even subspecifically.

The species was breeding in December. Males do not call from the water, but from beneath stones or herbage not far from it. The call is a short guttural " ou-i " (not unlike the sound of vomiting) and is not given continuously, but at long and irregular intervals. Power has described the mating call as resembling the withdrawal of a cork from a bottle or the bursting of a large bubble (1925).

89. **Hyperolius bocagei** Steindachner, 1869.

♂, ♀	Congulu	April

90. **Hyperolius cinnamomeoventris** Bocage, 1866.

1 ♀, 1 juv. Congulu April

These two specimens agree well in morphological characters with representative specimens of the species. In the female, however, the characteristic black lateral markings are only very faintly indicated, whilst in the juvenile they are completely absent.

91. **Hyperolius** sp.

♀ Mt. Moco March

This single specimen belongs to a very short-webbed, uniformly-coloured species which may well be undescribed.

92. **Leptopelis jordani** sp. n.

Holotype a female from Congulu, 700–800 m. ; collected in April 1934 by Dr. Karl Jordan.

Vomerine teeth in two groups between the choanae. Head broad, very much broader than long, with a blunt snout once and a quarter as long as the eye ; canthus rostralis obtusely angular, strongly curved ; loreal region oblique, very slightly concave. Tympanum distinct, slightly more than half the diameter of the eye and separated from the latter by a distance greater than half its own diameter. Digits with well-developed discs and strong subarticular tubercles. Fingers with a rudiment of web ; first shorter than the second, which is shorter than the fourth. Toes not quite half webbed. A very large compressed, inner metatarsal tubercle as long as its distance from the disc of the inner toe. Limbs short, the tibio-tarsal articulation reaching the shoulder and the metatarsal shovel the anterior corner of the eye ; tibia not three times as long as wide, its length equal to the maximum width of the head and contained 2·5 times in the length from snout to vent. Skin smooth above ; a few granules below the ear. Lower surfaces, including the thighs, strongly granular.

Purplish brown above ; a black line from the tip of the snout, through the nostril and eye, along the upper margin of the tympanum to the flanks. An obscure, dark, interorbital triangle connected by its apex to a dark chevron on the middle of the back ; posterior part of the back dark-stippled. A series of white streaks forms lines along the outer edge of the forearm, the outer edges of the tarsus and metatarsus and above the vent. Lower surfaces yellowish white, a few spots of this colour invading the flanks. Chin faintly brown-mottled.

Length from snout to vent 62 mm. ; width of head 24 mm. ; hind-limb 85 mm.

This species is undoubtedly the representative in the Congulu Forest-zone of the widespread *L. aubryi* of the Rain Forest proper. It differs from the latter in its shorter leg, broader head, larger size and the greater distance intervening between tympanum and eye. In a series of 27 examples of *L. aubryi* from French Guinea to the Ituri and south to Gaboon the tibio-tarsal articulation always reaches the eye and the metatarsal tubercle past the tip of the snout ; the tibial length is always appreciably greater than the width of the head and contained only 2–2·25 times in the length from snout to vent ; the greatest length is 54 mm. and the distance between eye and tympanum less than half the diameter of the latter, though subject to some variation.

93. **Bufo jordani** sp. n.

Holotype a ♂, from Satansplatz, *circa* 1,300 m. ; collected Dec. 1934 by Dr. Karl Jordan.

Crown without bony ridges ; snout bluntly rounded, once and a quarter as long as the eye ; canthus rostralis rounded but distinct ; loreal region nearly vertical ; tympanum and eustachian tubes absent ; interorbital space flat and broader than the upper eyelid. Fingers short, the first shorter than the second, which is shorter than the fourth ; third finger, measured along its mesial side, as long as the snout ; two large, flat, metacarpal tubercles. Toes nearly one-third webbed, with double subarticular tubercles ; sole with conical tubercles ; two metatarsal tubercles ; no tarsal fold ; tarso-metatarsal articulation reaching the eye and the length of the tibia contained 2·8 times in the length from snout to vent.

Paratoid glands absent. Dorsal surfaces closely beset with small conical warts each of which is tipped with a minute, blunt spine (♂). Lower surfaces wrinkled, but not granular.

Uniform purplish brown above ; immaculate white beneath.

Length from snout to vent 28 mm.

Nuptial asperities are developed on the inner two fingers ; vocal sacs absent.

This species is allied to *B. anotis* Boulenger and *B. katanganus* Loveridge, both of which it resembles in its reduced auditory apparatus ; it is distinguished from both by the absence of paratoid glands and by its ungranulated lower surfaces. These species, and also *B. taitanus* Peters, *B. rosii* Hewitt, *B. lönnbergi* Andersson, *B. mocquardi* Angel, *B. preussi* Matschie, *B. surdus* Boul., *B. fissipes* Boul., *B. variegatus* (Günther) and *B. ockendeni* Boul., have the tympanum not merely hidden but absent ; there is no *cavum typani*, *annulus tympanicus*, *columella auris* or Eustachian tubes as in the many genera previously recorded by the author (1934, p. 4). The same condition probably obtains in *B. micranotis* Loveridge, *B. ushoranus* Loveridge and *B. osgoodi* Loveridge.

94. **Bufo regularis** Reuss, 1834.

11 ♂♂, 2 ♀♀	Otjosongombe	Nov.
juv.	Sissekab	„
3 ♂♂, 6 juvs.	Cuito, Mt. Moco	March
♀	Congulu	April

95. **Xenopus laevis laevis** (Daud., 1803).

12 ♂♂, ♀♀	Otjosongombe	Nov.
2 ♀♀ and late larva	Hoffnung	28–31 Dec.
♀	Okahandja	Oct.
11 larvae and recently metamorphosed exs.	Voigtsgrund	14 Dec.

Most of these specimens are quite typical, with immaculate lower surfaces, though generally small. The single female from Okahandja, however, is very much larger (92 mm.), but has the mottled abdomen more commonly found in the Angolan *petersi* (Parker, 1936).

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