AMPHIBIANS FROM LIBERIA AND THE GOLD COAST

by

H. W. PARKER
Department of Zoology, British Museum (Natural History)

Thanks to the courtesy of Drs. Boschma and Brongersma the author has been privileged to examine a large series of West African amphibians from the collections of the Royal Museum of Natural History in Leiden. Of the comparatively easily accessible parts of Africa, Liberia is probably the least known, in so far as its herpetological fauna is concerned, and consequently it is not surprising to find that the present material contains much of interest. The following notes concern some of the more obvious points which arise out of the material examined and do not purport to be in any way exhaustive. The author is indebted not only to the gentlemen already mentioned, but also to M. Angel and Mr. Loveridge who have most generously placed at his disposal material without which much of the work could never have been done.

The herpetological fauna of Liberia is essentially that of the western section of the "Rain Forest Province". In past times the fauna of the whole Rain Forest Province from Senegal to Uganda southwards to Angola was considered to be more or less uniform and the same species were frequently reported from diametrically opposite extremes of this area. Thus, for example, many "species" have been recorded from "West Africa and Angola" and, though there undoubtedly are many wide-ranging forms which may occur in these two widely-separated areas, it is becoming increasingly evident that the "West African" region, i.e., the forested zone from Senegal to Dahomey, is a very distinct faunal province which has very few species in common with Angola, and is even quite clearly marked off from the Cameroon-Gaboon area with which it is almost confluent.

The Liberian collections were made by the following collectors: — Büttikofer and Sala in 1880—1881; Büttikofer and Stämpfli in 1887; A. F. Demery in 1890 and Jackson Demery in 1897. The localities visited were

chiefly in the coastal zone and the place names used here are those of Büttikofer; all are to be found on the map he gives in the first volume of his "Reisebilder aus Liberia" (Leiden 1890). For convenience of reference, there being no gazetteer attached to the map, it may be pointed out tha

B a v i a is on the St. Paul's River 32 miles inland

B u l u m a is near Fisherman Lake

E d i n a is on the Hartford River

F i s h t o w n is near Marshall, at the mouth of the Farmington River

J u r i n g is on the Sulymah River

R o b e r t s p o r t is near Grand Cape Mount

S c h i f f e l i n s v i l l e is on the Junk River

S o f o r e h P l a c e is on the St. Paul's River, 50 miles inland.

The small collection from the Gold Coast was made by Schlüter in 1889, and no more precise localities are available.

AMPHIBIA SALIENTIA
RANIDAE

1. **Rana (Ptychadaena) oxyrhynchus** Smith

2 ♂♂, Liberia, leg. Jackson Demery, Mus. Leiden, reg. no. 6595.

2. **Rana (Ptychadaena) bibroni** Hallowell

2 ♂♂, 6 ♀♀, Grand Cape Mount, 23 and 25. VII. 1881, leg. Büttikofer and Sala, Mus. Leiden, reg. no. 6538.
5 ♂♂, 2 ♀♀, 1 Hgr., Grand Cape Mount, leg. A. F. Demery, Mus. Leiden, reg. 6604.
1 ♂, Farmington River, leg. Büttikofer and Stämpfli, Mus. Leiden, reg. no. 6535.
1 ♀, Juring, 29. III. 1890, leg. A. F. Demery, Mus. Leiden, reg. no. 6539.
2 ♂♂, 1 ♀, Soforeh Place, 3. VIII. 1880, leg. Büttikofer and Sala, Mus. Leiden., reg. no. 6545.
2 ♀♀, Buluma, 1 and 8. II. 1881, leg. Büttikofer and Sala, Mus. Leiden, reg. no. 6536.
1 ♀, Robertsport, 7. XI. 1881, leg. Büttikofer and Sala, Mus. Leiden, reg. no. 6541.
1 ♂, 1 juv., Edina, 5. IV. 1887, leg. Büttikofer and Stämpfli, Mus. Leiden, reg. no. 6542.
2 ♂♂, 1 Hgr., Schiffelinsville, II. 1887, leg. Büttikofer and Stämpfli, Mus. Leiden, reg. no. 6543.
1 juv. Fishtown, 1887, leg. Büttikofer and Stämpfli, Mus. Leiden, reg. no. 6544.
4 ♂♂, 1 ♀, Soforeh Place?, Mus. Leiden, reg. no. 6537 (taken from a bottle containing specimens labelled Soforeh).
3 ♂♂, 7 ♀♀, Liberia, Mus. Leiden, reg. no. 6540.
1 ♀, Loc.?, Mus. Leiden, reg. no. 6546.

3. **Rana (Ptychadaena) mascareniensis** Dum. & Bibr.

1 ♀, Robertsport, 30. XII. 1881, leg. Büttikofer and Sala, Mus. Leiden, reg. no. 6563.
3 ♀♀, 6 ♀♀, Grand Cape Mount, 12. V., 25. VII. and 30. XII. 1881, leg. Büttikofer and Sala, Mus. Leiden, reg. no. 6555.
1 juv., Fishtown, 1887, leg. Büttikofer and Stämpfli, Mus. Leiden, reg. no. 6560.

1 juv., Juring, 29. III. 1890, leg. A. F. Demery, Mus. Leiden, reg. no. 6561.
2 ♀♀, Soforeh Place, 2. VI. and 3. VIII. 1880, leg. Büttikofer and Sala, Mus. Leiden, reg. no. 6556.
5 ♂♂, 4 ♀♀, Soforeh Place?, Mus. Leiden, reg. no. 6557 (taken from same bottle as foregoing specimens).
1 ♀, 1 juv., leg. J. Demery, Mus. Leiden, reg. no. 6559.
1 ex., Gold Coast, purchased from W. Schlüter, Mus. Leiden, reg. no. 6562.
1 ♂, Loc.?, Mus. Leiden, reg. no. 6558.

4. **Rana albolabris** Hallowell.

1 ♂, Grand Cape Mount, leg. A. F. Demery, Mus. Leiden, reg. no. 6552.
1 ♂, Farmington River, leg. Büttikofer and Stämpfli, Mus. Leiden, reg. no. 6551.
43 ex., Soforeh Place, 9, 23 and 24. VIII. 1880, leg. Büttikofer and Sala, Mus. Leiden, reg. no. 6547.
1 ♂, 3 ♀♀, Soforeh Place, 15 and 24 VIII. 1880, leg. Büttikofer and Sala, Mus. Leiden, reg. no. 6548.
3 ♂♂, Soforeh Place, 15. VIII. 1880, leg. Büttikofer and Sala, B. M., reg. no. 1935, 9.2.5—7.
1 juv., Edina, leg. Büttikofer and Stämpfli, Mus. Leiden, reg. no. 6550.
2 ♂♂, 2 ♀♀, 1 juv., 3 larvae, Schiffelinsville, 29. XII. 1886 and II. 1887, leg. Büttikofer and Stämpfli, Mus. Leiden, reg. no. 6549.
1 ♂, 1 ♀, Schiffelinsville, II. 1887, leg. Büttikofer and Stämpfli, B. M., reg. no. 1935. 9.2.3—4.
1 ♂, Liberia, Mus. Leiden, reg. no. 6554.
1 ♂, 1 ♀ Gold Coast, purchased from Schlüter, V. 1889. Mus. Leiden, reg. no. 6553.

Two males from Schiffelinsville exhibit considerably less webbing between the toes than is normally present. In this respect they resemble the male specimen from Eshobi to which reference has recently been made (Parker, 1936). But since another male from the same locality, captured at the same time, has the normal amount of webbing and is indistinguishable in any other respect, it must be concluded that there is a good deal of individual variation in this character.

5. **Rana subsigillata** A. Dum.

1 ♂, Hilltown, 13. III. 1887, leg. Büttikofer and Stämpfli, Mus. Leiden, reg. no. 6525.

A character of this species which appears to have escaped notice hitherto, is the presence of an oval, dermal, glandular aggregation on the lower surface of the thigh and a similar smaller one at the base of the upper arm on its ventral surface. The species has not previously been recorded from Liberia, but the British Museum has examples from the Gold Coast and Ashanti so that it may be presumed to have an almost continuous range across the whole Rain Forest area as far east as the Uele Region.

6. **Rana occipitalis** Gthr.

1 ♂, Bavia, II—III. 1880, leg. Büttikofer and Sala, Mus. Leiden, reg. no. 6526.
3 ♂♂, 1 ♀, Buluma, 26. II. 1881, leg. Büttikofer and Sala, Mus. Leiden, reg. no. 6599.

1 ♀, 2 juvs., Grand Cape Mount, 21. X. 1881, leg. Büttikofer and Sala, Mus. Leiden, reg. no. 6598.
1 ♂, 1 ♀, Robertsport (from a spring) 22—28. XI. 1881. leg. Büttikofer and Sala, Mus. Leiden, reg. no. 6597.
2 ♂♂, Robertsport, Cape Mount River, 24—28. XI. 1881, leg. Büttikofer and Sala, Mus. Leiden, reg. no. 6596.
1 ♂, 1 ♀, Robertsport, 22. XI. 1881, leg. Büttikofer and Sala, B. M., reg. no. 1935. 9.2.1—2.

7. **Phrynobatrachus brongersmai** nov. spec.

1 ♂, holotype, Grand Cape Mount, leg. A. F. Demery, Mus. Leiden, reg. no. 6591.
1 ♂, paratype, Grand Cape Mount, leg. A. F. Demery, B. M., reg. no. 1935. 9.2.20.
1 ♀, paratype, Soforeh Place, 9. VIII. 1880, leg. Büttikofer and Sala, Mus. Leiden, reg. no. 6592.
1 ♂, paratype, Liberia, leg. J. Demery, Mus. Leiden, reg. no. 6593.
1 ♀, paratype, Liberia, leg. J. Demery, B. M., reg. no. 1935. 9.2.21.

Head a little longer than broad. Snout rounded, not prominent, a little longer than the eye; nostrils nearer the tip of the snout than the eye; canthus rostralis very rounded; loreal region slightly oblique, not concave; interorbital space a little broader than the upper eyelid; tympanum indistinct, a little less than half the diameter of the eye. Tongue with a median papilla. Fingers very slightly dilated terminally; first shorter than the second, which is shorter than the fourth; third just as long as the snout. Toes with small, but distinct, discs, half webbed (exactly as in *ogoensis*, more than in *graueri* but less than in *acridoides*); third toe extending beyond the fifth; two metatarsal, and one tarsal, tubercles, the former two closer to one another than to the latter; tibio-tarsal articulation reaching the nostril; length of the tibia contained nearly twice in the distance from snout to vent.

Upper surfaces with smooth warts of which the four largest form a  shaped figure between the occiput and scapular region; smooth beneath.

Pale brown above, the warts sometimes outlined with darker brown. Limbs cross-barred. Upper lip with alternately lighter and darker bars radiating from the eye, the dark ones continued on the lower lip. Lower surfaces white with a brown stippling on the gular and pectoral regions, this colour forming two distinct patches on the breast. Vent surrounded by a dark triangular marking.

Length from snout to vent 21 mm; hind limb 37 mm. There is no vocal sac.

The four paratypes, another male from the same locality as the type, a female from Soforeh Place, and a male and female from Liberia, without precise locality, agree in essentials with the type, but may have a fine white vertebral line. The larger female measures 27 mm from snout to vent.

This species is obviously allied to the *acridoides, graueri, ogoensis* group of species. It has less digital webbing than the first-named, more than the

second and in this and many other respects agrees closely with *ogoensis*. It differs from the latter, however, in its larger size, more distinct tympanum and the absence of a vocal sac in the male. *Phrynobatrachus elberti* (Ahl) is also closely allied, but is said to resemble *graueri* and to have an interorbital space about twice as wide as the upper eyelid.

8. **Phrynobatrachus alleni** nov. spec.

P. giorgii (non de Witte) Barbour and Loveridge, 1930, in Strong, African Rep. Liberia, II, p. 780 (part).

1 ♀, holotype, Firestone Plantation, Du River, Liberia, leg. Dr. G. Allen, B. M., reg. no. 1929. 6.1.12.

1 ♂, 1 ♀, paratypes, Gbanga, Liberia, leg. Dr. G. Allen, M.C.Z. Harvard, reg. no. 11946—7.

28 ♂♂ ♀♀, paratypes, Firestone Plantation, Du River, Liberia, leg. Dr. G. Allen, M.C.Z. Harvard, reg. no. 11951—60.

74 ♂♂ ♀♀, paratypes, Paiata, St. Paul's River, Liberia, leg. Dr. G. Allen, M.C.Z. Harvard, reg. no. 11961—70.

20 ♂♂ ♀♀, paratypes, Soforeh Place, Liberia, 30. VII and 5—9. VIII. 1880, leg. Büttikofer and Sala. Mus. Leiden, reg. no. 6594.

6 ♂♂ ♀♀, paratypes, Soforeh Place, Liberia, 30. VII. and 5—9. VIII. 1880, leg. Büttikofer and Sala, B.M., reg. no. 1935. 9.2.14—19.

5 ♀♀, 1 juv., paratypes, Odda, Koforidua, Ashanti, leg. Ingoldby, B.M., reg. no. 1927. 9.27.112—117.

Description of holotype: snout rounded, slightly prominent, a little longer than the eye, with rounded canthus rostralis and oblique, slightly concave, loreal region. Nostril nearer the tip of the snout than the eye; interorbital space slightly broader than the upper eyelid; tympanum rather indistinct, half the diameter of the eye. Fingers short, free, with small terminal discs, the first shorter than the second which is shorter than the fourth. Toes with distinct discs, larger than those of the fingers; fully webbed. An elongate, oval, inner metatarsal tubercle, and a small, rounded outer one; a tarsal tubercle, connected by a fold with the inner, and situated as far from the latter as is the outer. Tibio-tarsal articulation reaching the tip of the snout.

Skin finely shagreened above, and on the flanks; smooth beneath. A strong, curved, supratympanic fold and a pair of feeble dorso-lateral folds from the posterior corner of the upper eyelid convergent towards the scapular region, but only extending over the anterior half of the body.

Uniform brown above; flanks indistinctly white-stippled. Limbs faintly cross-barred; lower surfaces of metatarsus and foot darker brown; a triangular dark mark surrounding the vent. White beneath.

Length from snout to vent 30 mm.

Fore-limb	16 mm.
Hind-limb	52 mm.

The large series of specimens is remarkably constant in morphological characters. The only appreciable variations are in the degree of distinctness of the tympanum, the rugosity of the skin, which may be quite warty or quite smooth, the length of the leg, and the amount of digital webbing; the tibio-tarsal articulation reaches, as a rule, well beyond the tip of the snout, but the toes may not be quite so fully webbed as in the type, though the membrane always reaches nearly to the discs of all except the fourth. There is some variation in colour, though the majority resemble the type. Occasionally a broad dorsal area from the tip of the snout to the vent between the dorso-lateral folds is black, and the fore-arms and anterior aspects of the knees are the same colour; rarely the top of the head and anterior half of the back between the folds is light rufous, and in two examples (Soforeh Place), there is a light stripe on each side from the eye to the groin, such as occurs in *P. albomarginatus* de Witte, and sometimes in *P. versicolor* Ahl. A broad, light, dorsal stripe from snout to vent may be present. The male has a vocal sac opening by a short slit on each side of the tongue and manifest externally as plications on the sides of the gular region; in addition, the dorsal surfaces and edges of the lower jaw are beset with minute pustules.

In life, according to Büttikofer and Sala, the dorsal surfaces are olive, sometimes tinged with green and sometimes with brown, or bronzy; the lower surfaces are white or yellow with brown flecks on the edge of the lower jaw.

This species appears to be the western forest representative of *P. giorgii* de Witte from which it differs principally in its longer legs (in *giorgii* the tibio-tarsal articulation only reaches the nostril). It appears to be quite a common form and has probably been confused with *P. plicatus* from which it differs in its shorter, higher snout, more oblique lores, less marked dorso-lateral folds, more extensive digital webbing, slimmer habitus and colour.

9. **Arthroleptis poecilonotus** Ptrs.

1 juv., Edina, 1887, leg. Büttikofer and Stämpfli, Mus. Leiden, reg. no. 6570.
1 ♂, Juring, 29. III. 1890, leg. A. F. Demery, Mus. Leiden, reg. no. 6572.
1 juv., Schiffelinsville, II. 1887, leg. Büttikofer and Stämpfli, Mus. Leiden, reg. no. 6569.
1 ♀, Liberia, leg. J. Demery, Mus. Leiden, reg. no. 6571.
1 ♀, leg. J. Demery, B. M., reg. no. 1935. 9.2.22.

10. **Arthroleptis decorata** (Barb. & Lov.)

Cardioglossa decorata Barbour & Loveridge, 1927, Proc. New Eng. Zool. Club, X, p. 15; e i d e m, 1930, in Strong, Afr. Rep. Liberia, II, p. 781, Pl. 464, fig. 1.
1 ♀, Liberia, Mus. Leiden, reg. no. 6573.

This example has been compared with a male paratype of *Cardioglossa*

decorata and found to be conspecific. The generic status of the frog is not that accorded it by the original describers. Both specimens have maxillary teeth, a median lingual papilla and an outer metatarsal tubercle, the omosternum is only narrowly forked, the sternum has a bony style and the third finger of the male is not longer than that of the female. In all these characters it differs from true *Cardioglossa,* which Noble regards as a toothless derivative of the *Arthroleptis variabilis* stock (1922 p. 8 and 1924 p. 185), but resembles and cannot be generically differentiated from a quite different stock of the *A. cornutus — A. calcaratus* group. A further point in which it resembles this group of species (and their derived genera *Petropedetes* and *Phrynodon*) is to be found in the presence of a large, flat, oval gland on the hinder side of the thigh of the male (Parker, 1935).

11. **Arthroleptis werneri** Nieden

1 juv., Grand Cape Mount, leg. A. F. Demery, Mus. Leiden, reg. no. 6567.
1 ♀, Schiffelinsville, leg. Büttikofer and Stämpfli, Mus. Leiden, reg. no. 6568.
1 ♀, Liberia, leg. Jackson Demery, B.M., reg. no. 1935. 9.2.23.

This identification should only be accepted as provisional. Barbour and Loveridge, (1930, p. 780) have recorded a frog from Liberia under this name, but without a direct comparison with material from the Cameroons it is impossible to be certain that name is correctly applied; it is strange that, if the species actually occurs in both the Cameroons and Liberia, no examples have been recorded from the intervening countries.

12. **Astylosternus occidentalis** Parker

1 ♂, Farmington River, leg. Büttikofer and Stämpfli, Mus. Leiden, reg. no. 6600.
1 juv., Juring, leg. A. F. Demery, B.M., reg. no. 1935. 9.2.8.
11 ex. (developmental series), Liberia, leg. J. Demery, Mus. Leiden, reg. no. 6601.
5 larvae, Liberia, leg. J. Demery, B.M., reg. no. 1935. 9.2.9.—13.

The mature specimen has been compared with the holotype, from which it differs scarcely at all. In the original description of the secondary sex characters of the male, the gular skin beneath the vocal sacs was described as „plicate". This word is, however, scarcely adequate, for the skin is raised into a large number of irregularly shaped papillae, so closely crowded together that the interstices between them form irregular criss-cross lines. The skin of the corresponding region of *A. diadematus* is quite smooth.

The oldest examples of the larval series are metamorphosing and have the salient characters of the genus (Parker, 1936), claw-shaped phalanges on all the toes and a vertical pupil. Unfortunately the state of preservation is not sufficiently good to permit of an accurate description, but, so far as can be ascertained, the tadpole is almost identical in shape, proportions

and dentition with that of *A. diadematus* (Angel, 1930 as *Gampsosteonyx batesi*). The youngest specimen measures 36 mm and a full-grown example, with well-developed limbs, 88 mm, of which 61 belong to the tail; a juvenile, just through metamorphosis but with a vestige of the larval tail, measures 30 mm from snout to vent.

RHACOPHORIDAE

13. **Hyperolius fusciventris** Peters

Rappia fuscigula (non Bocage) Günther, 1868, Proc. Zool. Soc. London, p. 479; Boulenger, 1882, Cat. Batr. Sal. Brit. Mus., ed. 2, p. 124 (part).

?*Hyperolius oeseri* Ahl., 1931, Mitt. Zool. Mus. Berlin, XVII, p. 51; idem, 1931, Das Tierreich, Anura III, p. 313.

8 ♀♀, juvs., Buluma, 15 and 19. III. 1881, leg. Büttikofer and Sala, Mus. Leiden, reg. no. 6577.

7 ♀♀, juvs., Buluma, 19. III. 1881, leg. Büttikofer and Sala, B.M., reg. no. 1935 9.2.30—36.

2 ♀♀, Edina, 5. IV. 1887, leg. Büttikofer and Stämpfli, Mus. Leiden, reg. no. 6575.

5 ♀♀, Schiffelinsville, II. 1887, leg. Büttikofer and Stämpfli, Mus. Leiden, reg. no. 6576.

4 ♀♀, Schiffelinsville, II. 1887, leg. Büttikofer and Stämpfli, B.M., reg. no. 1935. 9.2.26—29.

3 ♀♀, Robertsport, 3. VII. 1881, leg. Büttikofer and Sala, Mus. Leiden, reg. no. 6578.

2 ♀♀, Robertsport, 3. VII. 1881, leg. Büttikofer and Sala, B.M., reg. no. 1935. 9.2.24—25.

1 ♀, Grand Cape Mount, 2. VII. 1881, leg. Büttikofer and Sala, Mus. Leiden, reg. no. 6579.

1 ♀, Soforeh, Place, 9. VIII. 1880, leg. Büttikofer and Sala, Mus. Leiden, reg. no. 6547.

11 ♀♀, Juring, 29. III. 1890, leg. A. F. Demery, Mus. Leiden, reg. no. 6581.

5 ♀♀, Liberia, leg. J. Demery, Mus. Leiden, reg. no. 6580.

1 ♀, 18 larvae, Liberia, Mus. Leiden, reg. no. 6583.

Bocage, many years ago (1895, p. 170) pointed out that the specimens referred by Boulenger (and Günther) to his Angolan *fuscigula* were probably incorrectly identified. Specimens c—e of Boulenger's Catalogue have already been referred to *H. picturatus,* and specimens a and b, from "West Africa", prove to be examples of *H. fusciventris.* Ahl's *H. oeseri,* described from the type locality of *fusciventris* (Liberia), agrees admirably with the latter in its very characteristic colouring and the apparent differences in the webbing of the fingers and toes may well be due to preservation or to different descriptive standards.

The present series shows some variation, especially in the intensity of the ventral colour. The dark pigment is often reduced in amount mesially, in extreme examples persisting only towards the edges as a dark line.

The most extraordinary feature of the series is, however, that all the specimens are females, as also are all the other specimens in the British

Museum. No other *Hyperolius* of the present collections could well be the male of the species and it seems possible that the male is still unknown. To judge from the large series obtained, the species must be quite common and the failure to obtain more than the one sex suggests that, as in *H. argus* (Cott, 1932, p. 477), the female has a preference for a more exposed habitat than the male.

The relationships of *H. burtoni* (Boul.) seem to lie with this species and it may ultimately prove to be merely an eastern race in which the ventral pigment is not reduced uniformly as in Liberian examples, but irregularly so as to leave a few scattered blotches.

14. **Hyperolius ocellatus** Gthr.

33 ♂♂ ♀♀, Liberia, Mus. Leiden, reg. no. 6582.
12 ♂♂ ♀♀, Liberia, B.M., reg. no. 1935. 9.2.37—48.

Hyperolius spp.

At least 4 other apparent species of this perplexing genus are represented by short series in the collections; but their indifferent preservation renders it undesirable to attempt their precise identification.

15. **Megalixalus fulvovittatus** (Cope)

1 ♀, Juring, 29. III. 1890, leg. A. F. Demery, B.M., reg. no. 1935. 9.2.54.
1 juv, Robertsport, 15. VIII, 1881, leg. Büttikofer and Sala, Mus. Leiden, reg. no. 6602.

16. **Leptopelis viridis** (Gthr.)

1 ♂, Juring, 29. III. 1890, leg. A. F. Demery, Mus. Leiden, reg. no. 6564.
1 ♂, Farmington River, leg. Büttikofer and Stämpfli, Mus. Leiden, reg. no. 6565.
1 ♀, Schiffelinsville, leg. Büttikofer and Stämpfli, Mus. Leiden, reg. no. 6566.
1 ♀, Schiffelinsville, leg. Büttikofer and Stämpfli, B.M., reg. no. 1935. 9.2.55.

The frogs of the "*Leptopelis bocagei*" group are at present in rather a state of confusion, but for an appreciation of the condition a brief summary of the "species" involved and the various changes which have been advocated is necessary.

1864. *Leptopelis bocagei* (Gthr.) described from Angola
1868. *L. viridis* (Gthr.) described from "West Africa"
1893. *L. angolensis* (Bocage) decribed from Angola
1893. *L. cynnamomeus* (Bocage) described from Angola and Portuguese Guinea
1895. *Leptopelis marginatus* (Bocage) described from Angola
1904. *L. bocagii* var. *leucopunctata* (Beth. Ferreira) described from Angola, and said to link *bocagei* with *viridis*

1906. *L. hyloides* (Boul.) described from Portuguese Guinea
1924. *L. nanus* Ahl, described from Dahomey
1929. *L. togoensis* Ahl, described from Dahomey
1930. *Hylambates brevipalmatus* Ahl, described from Tanganyika Territory.

Although *bocagii* was originally described from Angola, it was not long before it was also recorded from West Africa (Boulenger, 1882, p. 133) and since that time two or more species have been recognised in that region under various names. The most important attempt to clarify the situation was Boulenger's revision of the genus in 1906 in which *viridis, angolensis* and *cynnamomeus* are reduced to the synonymy of *bocagei*, but *marginatus* is recognised as probably distinct. As a result only three forms are recognised, *bocagei* with a distribution from Portuguese Guinea to Abyssinia and Angola, *hyloides* confined to Portuguese Guinea and *marginatus* confined to Angola. Since that time the range of *bocagei* in the east of the continent has been shown to be continuous from Abyssinia to Rhodesia but some complications have been added. Noble (1924, p. 234) accepts Boulenger's dispositions and also suggests that *L. anchietae* ought to be reduced to the synonymy of *bocagei*. But it seems very probable that his material of *„anchietae"*, which led him to this conclusion, is incorrectly identified. Typical *anchietae* from Angola has no trace of digital discs, no webbing between the toes and has a very characteristic colour pattern (cf. Bocage, 1895, Pl. XIX fig. 4). Noble described his Congo specimens as having digital discs and a ∩-shaped marking on the back; the latter is typical of the eastern specimens of *bocagei* but is not found in typical *anchietae*. Loveridge (1929, p. 121) agrees with Noble that the Belgian Congo *"anchietae"* are not distinct from *bocagei* but has doubts as to whether these specimens really are referable to Bocage's species; he also refers *nanus* to the synonymy of *bocagei* and includes an East African record of *viridis* (Angel 1925).

Ahl (1929 and 1931) neglects the findings of Boulenger, Noble and Loveridge, recognising every species that had previously been described and adding yet another , *L. togoensis*. Finally, Loveridge (1933, p. 393) agrees with Boulenger's dispositions, but by a slip includes *anchietae* among the names which Boulenger had synonymised. This error led him to describe a greater amount of variation for *bocagei* than has actually been shown to occur, and to include among its synonyms both *brevipalmatus* Ahl and *marginatus* Bocage.

This very wide concept of *bocagei* as a species with a circum-Rain Forest distribution is not confirmed by the material in the British Museum. In the first place, as mentioned above, *anchietae* appears to be a distinct Angolan

and Katangan (de Witte, 1934, p. 185) species characterised by the complete absence of digital discs and webbing, by its smaller metatarsal tubercles and its colour pattern; possibly *marginatus* is a synonym. The remaining specimens are subdivisible into two groups confined to two dfferent geographical regions. First there is a large species, reaching a length of at least 69 mm with a characteristic colour pattern consisting of a dark interorbital bar and a large ∩- or ∧-shaped blotch on the back; this latter blotch may be fenestrated by light areas, but its outline, at least, is usually preserved. This form ranges southwards from Abyssinia through Kenya Colony, the eastern Belgian Congo and Tanganyika Territory to Nyasaland, the Katanga District, N. Rhodesia and Angola. The name which should be applied to it is undoubtedly *bocagei* and synonyms are *angolensis, cynnamomeus* and *leucopunctata*; Angolan and East African records of *viridis* appear to refer to this form.

In West Africa, from Portuguese Guinea to Nigeria is a closely allied, but much smaller form. Young specimens are scarcely to be distinguished from those of the preceding species, but the adult usually has perceptible digital discs, a longer outer toe and different colour pattern which consists of a triangular interorbital spot confluent with a much broken-up dorsal marking; the largest example examined in a series of 33 specimens is only 49 mm from snout to vent. Although Bocage, Boulenger and others have recognised two species in W. Africa, distinguished by the size of the discs, there appears to be, in reality, only one; the discs seem very variable, being, as a rule, proportionately larger in young specimens. The name to be applied is *L. viridis* (Günther) and synonyms are *hyloides, nanus* and *togoensis*; in addition all records of *bocagii* and *cynnamomeus* from the West African region appear to refer to this species.

BUFONIDAE

17. **Bufo camerunensis camerunensis** Parker

1 ♀, Soforeh Place, 3. X. 1880, leg. Büttikofer and Sala, Mus. Leiden, reg. no. 6532.
1 ♀, Gold Coast, purchased, from Schlüter, V. 1889, Mus. Leiden, reg. no. 6533.
1 ♀, Loc.? Mus. Leiden, reg. no. 6534.

The author has recently (1936) called attention to the confusion which has resulted in this well-known species lacking a name. Hitherto it has not been recorded further west than Ashanti.

18. **Bufo regularis** Reuss

2 ♂♂ 2 ♀♀, Cape Mount, 4. V., 6. VII., 23 and 25. VII. 1881, leg. Büttikofer and Sala, Mus. Leiden, reg. no. 6613.

2 ♂♂, 2 ♀♀, Cape Mount, 4. V. 1881, leg. Büttikofer and Sala, B.M., reg. no. 1935. 9.2.56—59.
3 juvs., Cape Mount, leg. A. F. Demery, Mus. Leiden, reg. no. 6609.
2 ♂♂, 1 ♀, Farmington River, leg. Büttikofer and Stämpfli, Mus. Leiden, reg. no. 6529.
5 ♀♀, Soforeh Place, 14. IV., 26. V., 27. VII. and 21. IX. 1880, leg. Büttikofer and Sala, Mus. Leiden, reg. no. 6610.
2 ♂♂, Soforeh Place, 18 and 22. VII. 1880, leg. Büttikofer and Sala, B.M., reg. no. 1935. 9.2.60—61.
2 ♀♀, Soforeh Place?, B.M., reg. no. 1935. 9.2.62—63.
2 ♂♂ 2 ♀♀, Soforeh Place?, Mus. Leiden, reg. no. 6614.
1 ♀, Robertsport, 9. X. 1881, leg. Büttikofer and Sala, Mus. Leiden, reg. no. 6612.
2 juvs., Juring, 29. III. 1890, leg. A. F. Demery, Mus. Leiden, reg. no. 6606.
1 ♂, 1 ♀, Buluma, Dec. 1880 and 3. II. 1881, leg. Büttikofer and Sala, Mus. Leiden, reg. no. 6605.
1 juv., Fishtown, 1887, leg. Büttikofer and Stämpfli, Mus. Leiden, reg. no. 6608.
2 ♀♀, Schiffelinsville, leg. Büttikofer and Stämpfli, Mus., Leiden, reg. no. 6530.
2 ex., Loc.?, Mus. Leiden, reg. no. 6611.
2 ♀♀, 2 juvs., Liberia, Mus. Leiden, reg. no. 6615.
1 juv., Liberia, leg. J. Demery, Mus. Leiden, reg. no. 6607.

PIPIDAE

19. **Xenopus tropicalis** (Gray)

5 ex., Liberia, Mus. Leiden, reg. no. 6603.
3 ex., Liberia, B.M., reg. no. 1935. 9.2.64—66.

AMPHIBIA APODA

Geotrypetes Peters

In a previous publication (1927) the author has shown that *Uraeotyphlus seraphini* (Dum.) and *Geotrypetes petersi* Boul. are not only congeneric but conspecific, and, at that time, it seemed probable that there was but a single species of *Geotrypetes* in West Africa. The additional material which has since become available tends to show, however, that there may be at least 3 forms, though the three names at present available are all applicable to one form only. Tabulation of the number of primary and secondary folds in a geographical arrangement gives the following results:

A. In the Cameroon-Gaboon region primary folds vary from 86—98 and secondaries from 33—44. The 28 specimens examined include both males and females and were collected in the following localities: Lagos (1 specimen, type of *Geotrypetes petersi* Boul.); "W. Africa" (1 specimen, type of *Uraeotyphlus africanus* Boul.); Mamfe Division, Cameroons (17 specimens); Bitye, Cameroons, (7 specimens); Gaboon (2 specimens, one a cotype of *Coecilia seraphini* Dum.).

B. In the French Guinea-Gold Coast region, the primaries are slightly higher, 93—102 and the secondaries markedly higher, 49—60. Specimens examined: French Guinea (3 specs.) Sandaru, Sierra Leone, (1 spec.); Liberia (8 specs.); Tekyeman, Gold Coast (1 spec.); Obuasi, Kumasi and Bawhu, Ashanti (6 specs.).

C. In French Guinea, living side by side (speaking geographically; of their ecology nothing is known) with the preceding, are examples which have the same high number of primary folds, but an even lower number of secondaries than in the Cameroon-Gaboon region. Four specimens from Labé and Beyla have 99—105 primaries but only 28—33 secondaries.

It is scarcely conceivable that this apparent occurrence of two distinct forms in French Guinea is a fictitious result produced by chance. If it is to be assumed that B and C above are all the same species, and that the discontinuity of 16 in the secondary count is due to chance, then it must also be assumed that, though the total range of variation of the species as shown by 28 specimens from the French Guinea-Gold Coast region is 12 in the primary and 32 in the secondary count, chance has also so decreed it that an even larger series from the Calabar-Gaboon area, whilst showing the same variation in the primaries (12), only shows a third of the secondary variation.

It seems much more probable that A, B and C (above) are 3 different forms in which the primaries and secondaries vary by about the same number, the western (C) and the eastern (A) not being easily distinguished. A and B occupy neighbouring ranges and it seems probable that they will be found to intergrade in Dahomey. But B and C occur together and no intergradation is apparent,. The taxonomic relationships of these three are not obvious, but until further information is forthcoming it seems reasonable to regard A and B as subspecies with C a distinct species; A must obviously be known as *Geotrypetes seraphini seraphini* Dum. and the other two require new names.

Geotrypetes seraphini occidentalis nov. subspec.

The western subspecies of *seraphini* may be known by the above name; its characteristics and distribution have already been discussed as "B" above and the following specimens are the co-types [1]).

1) Two additional Liberian examples (Robertsport, leg. Demery, Mus. Leiden, reg. no. 6531) have been examined, but their preservation is not such as to make them suitable for inclusion as cotypes.

Sex	Locality	Museum	Primary Folds	Secondary Folds
♀	Beyla, French Guinea	Mus. Paris 20. 188	93	50
♂	" " "	Mus. Paris 20. 189.	91	51
♂	" " "		95	49
♀	Sandaru, E. Sierra Leone	B. M. 1930. 11.19.50	95	52
♀	Grand Cape Mt., Liberia	B. M. 1935. 9.2.67	94	50
♀	" " " "	Mus. Leiden no. 6527	94	53
♂	Liberia	" " no. 6528	94	54
♀	"	" "	94	54
♂	"	" "	93	54
♂	"	B. M. 1935. 9.2.68	95	51(?)
juv.	Tekyeman, Gold Coast	B. M. 1934. 6.6.8.	101	51
♀	Kumasi, Ashanti	B. M 1907. 10.25.10	103	60
♀	Obuasi, Ashanti	B. M.	99	54
♂ imm.	" "	1917. 4.13.33—35	97	50
			101	54
♀	Bawhu, Ashanti	B. M.	100	53
♂		1927. 9. 27. 164—165	100	53

The largest female measures 350 mm.

Geotrypetes angeli nov. spec.

The third from (C) discussed above, has the high primary count of *G. seraphini occidentalis* but the secondary count is even lower than in *G. seraphini seraphini.* It is also apparently smaller, but in other characters is similar to *G. seraphini.* The holotype is a female, number 1909.2.23.10 in the British Museum, from Labé, French Guinea, collected by Dr. E. Gendre.

Snout rounded, prominent, a little longer than the interocular distance; nostrils close to the tip of the snout; tentacular opening close to the labial border, slightly behind the vertical of the nostril. Primary folds 105, the last 27 uniting dorsally; secondary folds 33, the last 7 complete dorsally and ventrally. Uniform dark brown above and lighter beneath. Length 224 mm; greatest diameter 8 mm.

This specimen contained 8 mature embryos, 4 in each oviduct. They were lying stiffly extended, without any trace of foetal coiling, and each measures about 38.5 m. There is no trace of any aquatic modification such as gills or compressed tail, but the dentition is of the same peculiar type as has already been described for the young of *Geotrypetes seraphini* (Parker, 1936), though the teeth appear to be smooth on their distal edge; this apparent absence of cusps may, however, be due to their being incompletely developed.

The paratypes are 3 specimens in the Paris Museum, from Beyla, French Guinea, which have been examined through the courtesy of M. Angel, in whose honour the species is named. They agree with the type except that the

colour is blue-gray above and beneath, with the body-folds picked out in white. Their counts are as follows: —

Mus. Paris 20.190	♀	Primaries	100	Secondaries	28
	♀	„	100	„	28
	♀	„	99	„	32

The largest measures 234 mm; maximum diameter 8 mm.

LITERATURE

Ahl, E., 1924. Neue Reptilien und Batrachier aus dem Zoologischen Museum. Arch. Naturg., Abt. A, 90. Jahrg., Heft 5, pp. 246—254.

——, 1929. Zur Kenntnis der afrikanischen Baumfrosch-Gattung Leptopelis. Sitzber. Ges. natf. Fr. Berlin, pp. 185—222.

——, 1930. Zwei neue Baumfrösche der Familie Polypedatidae. Zool. Anz., vol. 87, pp. 228—230.

——, 1931. Anura III, in: Das Tierreich, pt. 55, XVI + 475 pp., 320 figs.

Angel, F., 1925. Reptiles et Batraciens, in: Voy. Alluaud et Jeannel Afr. Or. (1911—1912), pp. 1—61, 3 pls.

——, 1930. Sur les Têtards d'un Batracien anoure d'Afrique de la famille des Ranidés (groupe des Astylosternidés). Bull. Soc. Zool. France, vol. 55, pp. 219—222, 3 textfigs.

Barbour, T., and A. Loveridge, 1930. Reptiles and Amphibians from Liberia, in: Strong, The African Republic of Liberia and the Belgian Congo, vol. 2 pp. 769—786, textfigs., pls. Contr. Dep. Trop. Med. & Inst. Trop. Biol. Med. Cambridge Mass. no. 5.

Bocage, J. V. Barboza du, 1893. Diagnoses de quelques nouvelles espèces de Reptiles et Batraciens d'Angola. J. Sci. Lisb., ser. 2, vol. 3, pp. 115—121.

——, 1895. Herpétologie d'Angola et du Congo. Lisbon, XX + 203 pp., 29 pls.

Boulenger, G. A., 1882. Catalogue of the Batrachia Salientia s. Ecaudata in the Collection of the British Museum, 2nd ed. London, XVI + 503 pp., 29 pls., textfigs.

——, 1906. Report on the Batrachians collected by the late L. Fea in West Africa. Ann. Mus. Civ. Stor. Nat. Genova, ser. 3, vol. 2 (vol. 42), pp. 157—172, 2 pls.

Cott, H. B., 1932. The Zoological Society's Expedition to the Zambesi 1927: No. 4. On the Ecology of Tree-frogs in the lower Zambesi Valley, with special reference to Predatory habits considered in relation to the theory of warning colours and mimicry. Proc. Zool. Soc. Lond., pp. 471—539, 2 pls., 7 textfigs.

Ferreira, Bethencourt, 1904. Reptis e Amphibios de Angola da região ao Norte do Quanza (Collecção Newton — 1903). J. Sci. Lisb., ser. 2 vol. 7, pp. 111—117.

Günther, A., 1864. Descriptions of new species of Batrachians from West Africa. Proc. Zool. Soc. Lond., pp. 479—482, pl. 33.

——, 1868. First account of species of Tailless Batrachians added to the Collection of the British Museum. Proc. Zool. Soc. Lond., pp. 478—490, pls. 37—40.

Loveridge, A., 1929. East African Reptiles and Amphibians in the United States National Museum. Bull. U. S. Nat. Mus., no. 151, 135 pp., 1 pl.

——, 1933. Report on the scientific results of an expedition to the southwestern Highlands of Tanganyaka Territory. VII. Herpetology. Bull. Mus. Comp. Zoöl. Harv. Coll., vol. 74, pp. 197—416, 3 pls.

Noble, G. K., 1922. The Phylogeny of the Salientia. I. The Osteology and the Thigh Musculature; Their Bearing on Classification and Phylogeny. Bull. Am. Mus. Nat. Hist., vol. 46, pp. 1—87, pls. 1—23.

——, 1924. Contributions to the Herpetology of the Belgian Congo based on the Collection of the American Museum Congo Expedition 1909—1915. Part III. Amphibia. With abstracts from the Field Notes of Herbert Lang and James P. Chapin. Bull. Am. Mus. Nat. Hist., vol. 49, pp. 147—347, 8 textfigs., pls. 23—42.

Parker, H. W., 1927. The Caecilian genera Uraeotyphlus and Geotrypetes. Ann. Mag. Nat. Hist., ser. 9, vol. 20, pp. 478—480, 6 textfigs.

——, 1935. A new Genus of Frogs from the Cameroons. Ann. Mag. Nat. Hist., ser. 10, vol. 16, pp. 401—404.

——, 1936. The Amphibians of the Mamfe Division Cameroons. I Zoogeography and Systematics. Proc. Zool. Soc. Lond., pp. 135—163, pl. 1, textfigs. 1—8.

Witte, G. F. de, 1934. Batraciens récoltés au Congo Belge par le Dr. H. Schouteden et par M. G. F. de Witte. Ann. Mus. Congo Belge, C. Zool,, ser. 1, vol. 3, pt. 4, pp. 153—188, pls. V—XI.