THE ZOOGEOGRAPHY AND SYSTEMATIC LIST OF AMPHIBIA IN THE KRUGER NATIONAL PARK

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The taxonomic revision of South African Amphibia by Poynton and the extensive nomenclatural changes proposed by him (personal communication) have necessitated the publication of a revised check-list of this faunal group in the Kruger National Park.

After a four-year period of collecting it is also now possible to provide, in condensed form, a series of distribution maps for endemic amphibian species. These maps are attached as an addendum at the end of this paper and provide a useful guide to the zoogeography of amphibian species in the Park.

From the work of Poynton emerged the interesting observation that amphibian distribution indicates a limitation in southern Africa of the Palaeotropical region (Ethiopian Subregion) to the lowlands of Mocambique and Northern Zululand. On the other hand a distinct temperate fauna is developed in the South-western Cape. The area between these tropical and temperate regions is a transition zone, carrying the opposing and overlapping subtraction margins of the tropical and temperate faunas, and also carrying four distinct local centres of endemism which this worker describes as the eastern and western tropical transitional zones and the eastern and western temperate transitional zones. It also appears that in the case of amphibians the limits of the main concentration of tropical forms, both western and southern, coincide rather remarkably with the 18°C mean July (midwinter) surface isotherm. This line is consequently taken to be the southern limit of the Palaeotropical region.

The area which constitutes the Kruger National Park lies almost entirely within the subtraction margin between the tropical region east of the Lebombo mountains and the eastern tropical transitional zone which includes the Pietersburg-plateau and the Drakensberg foothills as far east as the Pretorius-kop region and extends southwards through Swaziland to East London on the coast (Poynton 1960).

At several points, however, the eastern boundary of the Park is cut by the 18°C mean July surface isotherm, particularly in the region of the Olifants

Gorge, southwards to Nwanetzi and in the north between Pafuri and the southern limits of the Nwambia sandveld.

This delimitation explains to a large extent the zoogeography of amphibians in the Kruger Park and it is therefore not surprising that of the 31 valid species (there are approximately 120 valid forms in the whole of Southern Africa) recorded so far, 26 are tropical forms. Of the latter group quite a number are also found in the eastern tropical transitional zone and a few also in the western tropical transitional zone and the eastern temperate transitional zone. Significant, however, is the fact that a few tropical species which are confined to the Paleotropical region proper penetrate the Park from the east with the 18°C isotherm. The recorded localities for *Hylambates maculatus* Duméril, *Pyxicephalus ornatus ornatus* Peters, *Xenopus muelleri* Peters, *Afrixalus brachycnemis brachycnemis* Boulenger and *Leptopelis concolor* Ahl in the Park therefore not only represent the south-western limits of the range of distribution of these frogs, but in most instances are the only records of their presence within the borders of the Transvaal.

Tropical forms from the western tropical transitional zone have a representative in the Kruger Park in *Phrynobatrachus ukingensis mababiensis* Fitz-Simons.

Two species from the temperate zone i.e. *Cacosternum boettgeri* (Boulenger) and *Xenopus laevis laevis* (Daudin) find their way into the south-western part of the Park from the adjoining eastern temperate and eastern tropical transitional zones. *Pyxicephalus natalensis* (Smith) and *Rana fasciata fasciata* (Tschudi) are typical inhabitants of the eastern tropical transitional zone which have to date only been collected in the higher lying regions around Pretoriuskop.

TABLE 1

COMPOSITION OF THE TROPICAL, TRANSITIONAL AND TEMPERATE AMPHIBIAN FAUNAS IN THE KRUGER NATIONAL PARK

Family	*% Contribution of family to each faunal division*					
	Tropical		*Transitional*		*Temperate*	
	No. species	*%*	*No. species*	*%*	*No. species*	*%*
Pipidae	1	3.85	0	0	1	50.0
Leptodactylidae	0	0	0	0	0	0
Bufonidae	5	19.25	0	0	0	0
Michrohylidae	2	7.70	0	0	0	0
Phrynomeridae	1	3.85	0	0	0	0
Ranidae	10	38.50	3	100	1	50.0
Rhacophoridae	7	26.95	0	0	0	0
	26	100.10	3	100	2	100.0

It is abundantly clear from the table above that the older families *(Pipidae, Leptodactylidae* and *Microhylidae)* which contribute 52 per cent of the Cape amphibian fauna according to Poynton, are but poorly represented in the Kruger Park, and the most recent and dominant groups in the Palaeotropical region *(Bufonidae, Ranidae, Rhacophoridae)* make up the bulk of the local frog population.

The 31 species comprising the indigenous frog population of the Park represent 3 sub-orders of the Order Anura, 6 families and 15 genera.

ORDER — ANURA.

SUB-ORDER — OPISTHOCOELA.

FAMILY — PIPIDAE.

SUB-FAMILY — XENOPINAE.

1. *Xenopus muelleri* (Peters) — Yellow-bellied Platanna or Clawed Toad.
   Dactlyethra mülleri Peters, 1844.
   Commonly found in stagnant waters throughout the Park with the focal point of population density towards the north and east.
2. *Xenopus laevis laevis* (Daudin) — Common Platanna or Clawed Toad.
   Bufo laevis Daudin, 1803.
   A rare species in the Kruger National Park and so far recorded only from Shaben spring, near Pretoriuskop at an altitude of 2400 ft., where it is found in small numbers co-existant with *X. muelleri.*

SUB-ORDER — PROCOELA.

FAMILY — BUFONIDAE.

1. *Bufo poweri* Hewitt — Common Lowveld Toad.
   Bufo regularis poweri Hewitt, 1935.
   The common Lowveld toad found throughout the Kruger National Park in large numbers.
2. *Bufo carens* Smith — Red Toad.
   Bufo carens Smith, 1849.
   Found locally in large numbers but their distribution is less general than that of the preceding species.
3. *Bufo pusillus* Mertens — Mertens' Striped Toad.
   Bufo regularis pusillus Mertens, 1937.
   The type locality of this toad is Letaba camp, Groot Letaba river, but it has been recorded from a number of other localities in the Park.
4. *Bufo regularis* Reuss, 1831 — Marbled Toad.
   Bufo regularis gutteralis Power, 1927.
   Confined to the Pretoriuskop area and even there only found in small numbers.

5. *Bufo fenoulheti* Hewitt & Methuen — Transvaal Dwarf Toad.
   Bufo fenoulheti Hewitt & Methuen, 1913.
   Bufo fenoulheti obtusum Hewitt, 1925.
   A rupicolous species occasionally found in rocky surroundings in the area north of the Sabie River.

SUB-ORDER — DIPLASIOCOELA.

FAMILY — RANIDAE.

SUB-FAMILY — RANINAE.

1. *Rana angolensis Bocage,* 1866 — Common River Frog.
   A common species frequenting the banks of most perennial rivers in the Park.
2. *Rana fasciata fasciata* (Tshudi) — Long-toed Grass Frog.
   Strongylopus fasciata Tschudi, 1838.
   Only a single specimen of this typical inhabitant of the more temperate regions has been collected at Folly vlei near Pretoriuskop.

Subgenus — Ptychadena

3. *Rana oxyrhynchus* Smith, 1849 — Sharp-nosed Grass Frog.
   A tropical form which has, however, only been collected in the long grass-veld regions around Pretoriuskop.
4. *Rana abyssinica* Peters, 1881 — Long-legged Grass Frog.
   Rana oxyrhynchus FitzSimons, 1935 (non Smith).
   One of the two most common amphibian species in the Kruger Park and generally distributed throughout.
5. *Rana mossambica* Peters, 1854 — Single-striped Grass Frog.
   Rana vernayi FitzSimons, 1932.
   A species with morphological characteristics resembling *Rana grandisonae* Laurent. Fairly common north of the Sabie River.
6. *Pyxicephalus ornatus ornatus* Peters, 1878 — Ornate or Black-throated Pyxie.
   Rana ruddi Boulenger, 1907.
   A true tropical species which invades the Park from the east, north of the Sabie River.
7. *Pyxicephalus delalandii cryptotis* (Boulenger), 1907 — Striped Pyxie or Burrowing Frog.
   The tropical form of *P. delalandii* which is common in the Park and widely distributed throughout.
8. *Pyxicephalus natalensis* Smith, 1849 — Natal Pyxie or Burrowing Frog.
   An inhabitant of the eastern tropical transitional zone which has been collected on top of Numbi and Shaben hills in the Pretoriuskop area.

9. *Pyxicephalus marmoratus* Peters, 1854 — Blunt-nosed Pyxie or Burrowing Frog.
   Pyxicephalus obtusus FitzSimons, 1930.
   Less common than *P. delalandii cryptotis,* but often associated with it.
10. *Pyxicephalus adspersus* Tchudi, 1838 — Bull Frog.
    Fairly generally distributed throughout the Park, but do not appear to attain the large size locally of their counterparts in higher-lying regions. The call is also much more subdued and of a plaintive note.

SUB-FAMILY — CACOSTERNINAE.

1. *Cacosternum boettgeri* (Boulenger) — Dainty Frog.
   Arthroleptis boettgeri Boulenger, 1882.
   A temperate form which is rare in the Park and has been recorded from only a few isolated localities.

SUB-FAMILY — PHRYNOBATRACHINAE.

1. *Phrynobatrachus natalensis* (Smith) — Puddle Frog.
   Stenorhynchus natalensis Smith, 1849.
   Probably the most common and widely distributed of all the local amphibian species.
2. *Phrynobatrachus ukingensis mababiensis* FitzSimons, 1932 — Dwarf Puddle Frog.
   Phrynobatrachus mababiensis FitzSimons, 1932.
   Arthroleptis minutus Mertens, 1937. (non Boulenger).
   This tiny species is less common than *P. natalensis* but fairly generally distributed, particularly north of the Sabie River and along the western half of the Park.

SUB-FAMILY — HEMISINAE.

1. *Hemisus marmoratus* (Peters) — Shovel-nosed Burrowing Frog.
   Engystoma marmoratum Peters, 1854.
   Hemisus marmoratus Peters, 1882.
   A rare burrowing form which has not been recorded south of the Sabie River.

FAMILY — RHACOPHORIDAE.

1. *Afrixalus brachycnemis brachycnemis* (Boulenger) — Short-legged Spiny Reed Frog.
   Megalixalus brachycnemis Boulenger, 1896.
   A tropical form only recently discovered within the borders of the Transvaal and the locality records from the Kruger Park represent the most south-western limits of its range of distribution.
2. *Chiromantis xerampelina* Peters, 1855 — Grey Tree Frog.
   A common tree frog in the Lowveld, the characteristic foam nests of

which may be seen in great abundance after the first spring rains on branches of trees or twigs overhanging stagnant pools or temporary waterholes.

3. *Hylambates maculatus* Duméril, 1853 — Red-legged Pan Frog.
   A rare tropical form which inhabits a series of pans along the north-eastern boundary of the Park and has recently also been discovered at three points between the Olifants and Sabie Rivers. These are the first records of the presence of *Hylambates* within the borders of the Transvaal. (See Fig. (i)).
4. *Hyperolius marmoratus taeniatus* Peters — Striped Rush Frog.
   Hyperolius taeniatus Peters, 1882.
   Both the striped and brown phase of this rush frog may commonly be found in suitable habitats throughout the Park during the summer months.
5. *Hyperolius pusillus* (Cope) — Water-lily Frog.
   Crumenifera pusilla Cope, 1862.
   Less common than *H. marmoratus taeniatus* but often found associated with it in the same habitat.
6. *Kassina senegalensis* (Duméril & Bibron) — Senegal Kassina.
   Cystignathus senegalensis Duméril & Bibron, 1841.
   These strikingly-coloured frogs are common in the Park and their characteristic explosive calls form an integral part of the night symphony during the summer months.
7. *Leptopelis concolor* Ahl, 1929 — Brown-backed Tree Frog.
   A tropical form which is rare in the Transvaal and has until recently been erroneously identified as *L. johnstoni* (Boulenger). These frogs have been collected in fair numbers at a number of different localities throughout the Park.

FAMILY — MICROHYLIDAE.

SUB-FAMILY — BREVICIPITINAE.

1. *Breviceps adspersus adspersus* Peters, 1882 — Transvaal Blaasop or Rain Frog.
   A burrowing form whose incessant chirping call may be heard throughout the Park during and after rainy spells.
2. *Breviceps mossambicus* Peters, 1855 — Mocambique Blaasop or Rain Frog.
   Was collected by Lang at Punda Milia in 1932 but has not been rediscovered and the inclusion of this species in the check-list remains provisional.

FAMILY — PHRYNOMERIDAE.

1. *Phrynomerus bifasciatus bifasciatus* (Smith) — Red-banded Rubber Frog.
   Brachymerus bifasciatus Smith, 1849.
   Phrynomerus bifasciatus Noble, 1926.
   Not a common frog and one rarely seen, but generally distributed

throughout the Park, and the melodius trilling call can often be heard after rains on a quiet summer night.

SYNOPSIS

An amended check-list of amphibian species in the Kruger National Park and a series of distribution maps are provided. The zoogeographical significance of the local amphibian fauna is briefly discussed.

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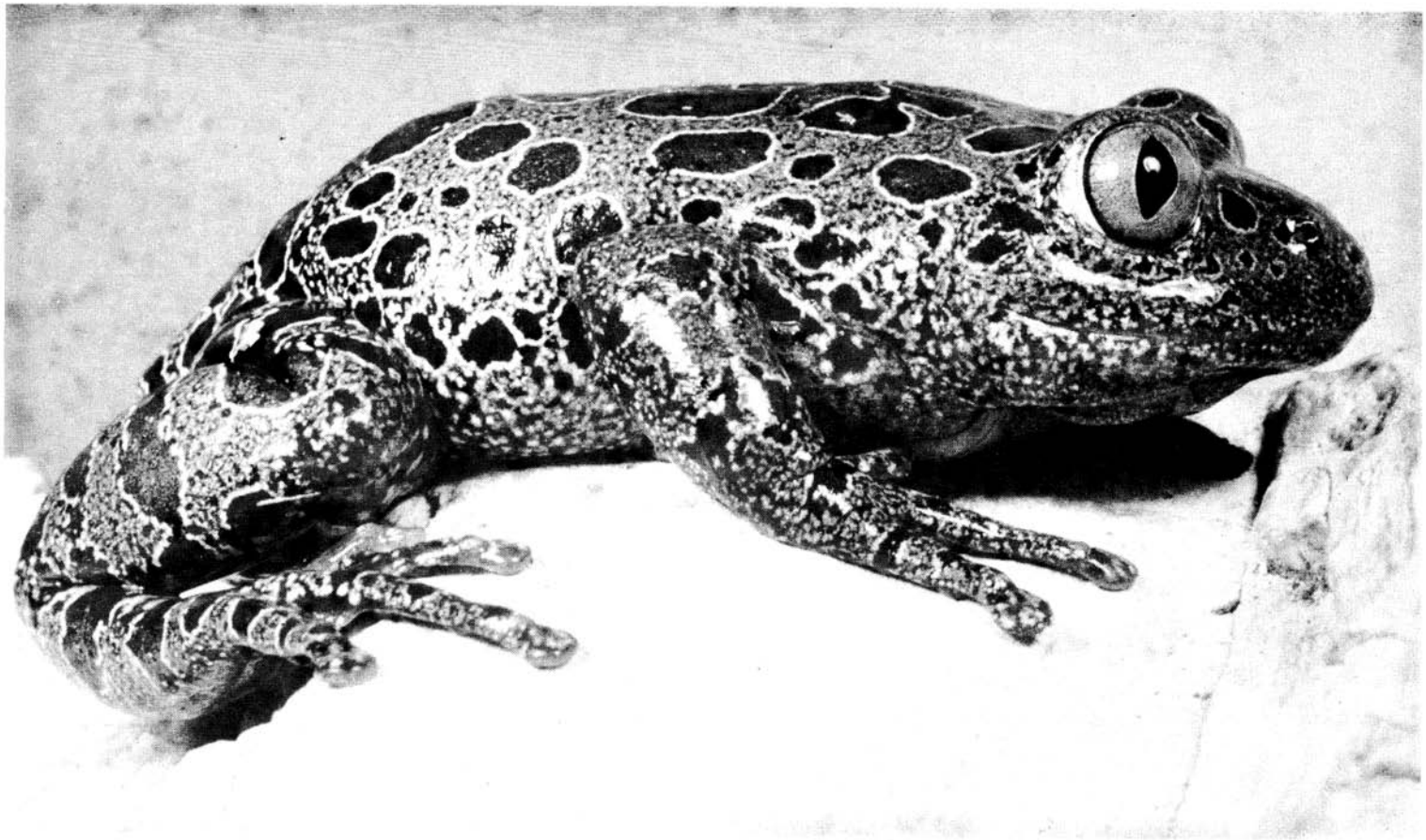

FIG. 1. *Hylambates maculatus,* Machai Pan, Nwambia sandveld, K.N.P.
Photograph by courtesy of Dr. C. K. Brain.

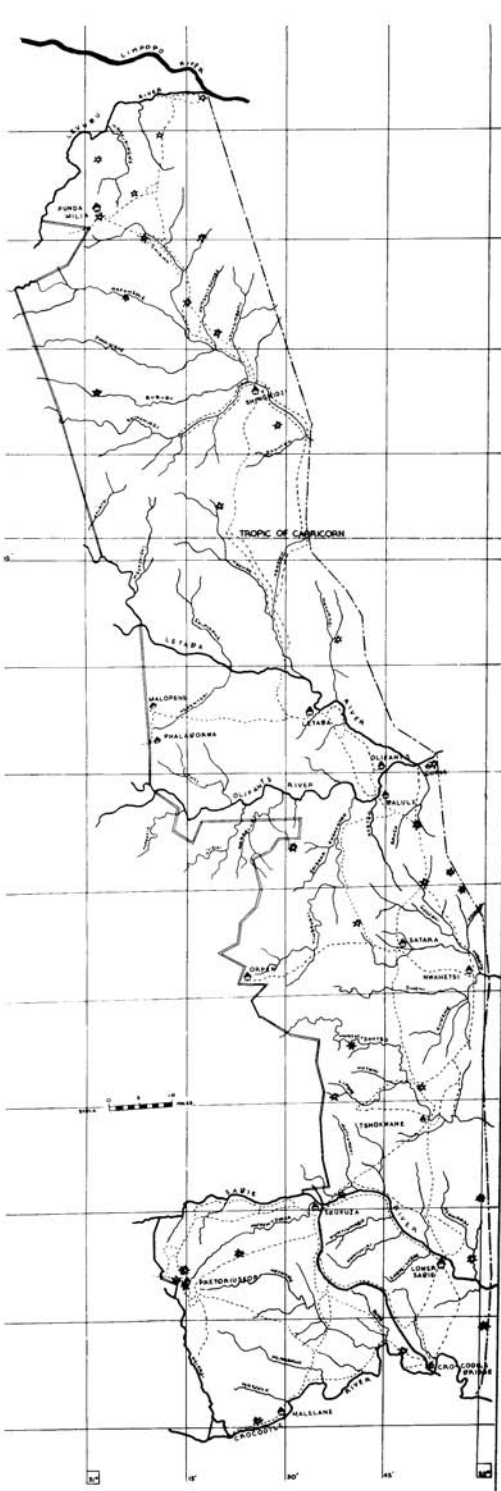

FIG. 2. *Xenopus muelleri* (Peters)

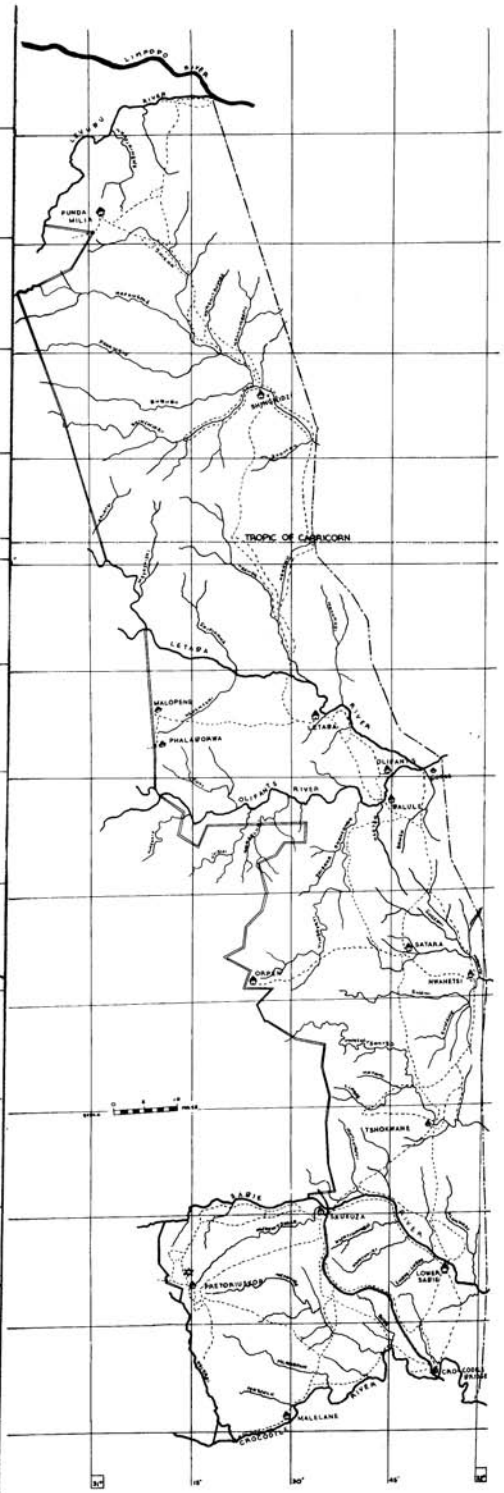

FIG. 3. *Xenopus laevis laevis* (Daudin)

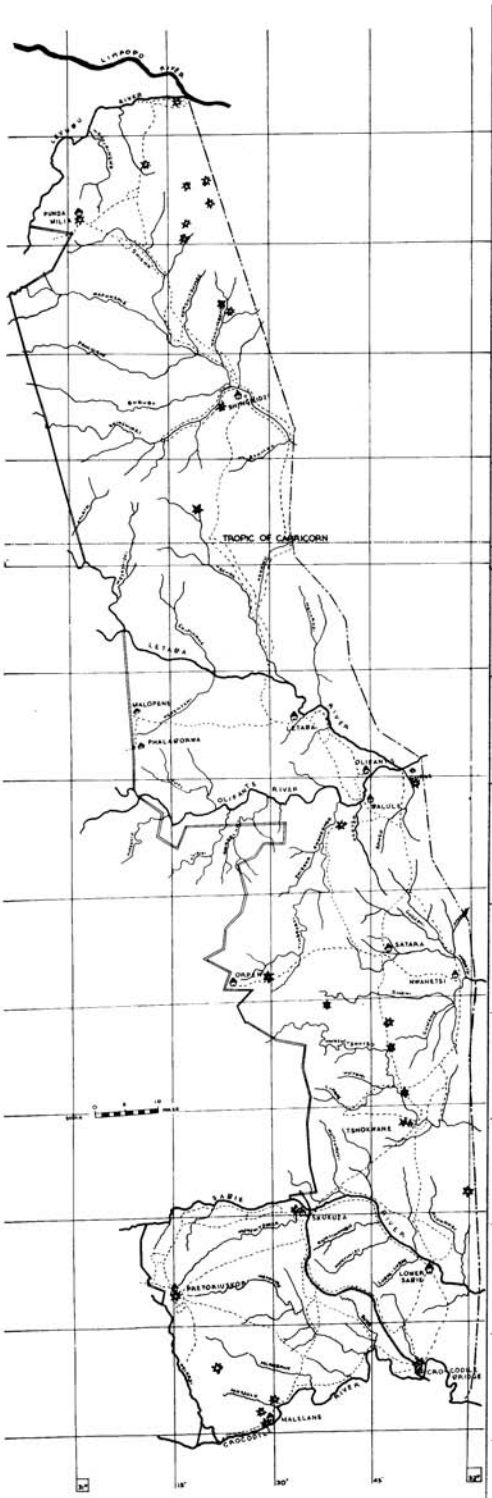

FIG. 4. *Bufo poweri* Hewitt

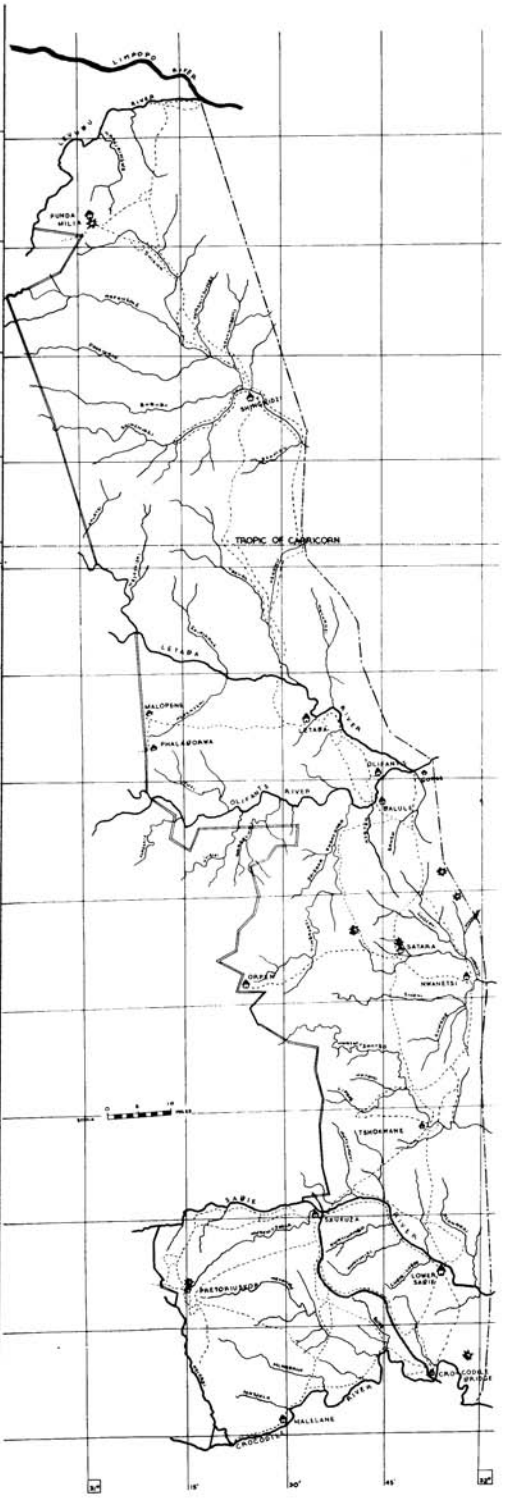

FIG. 5. *Bufo carens* (Smith)

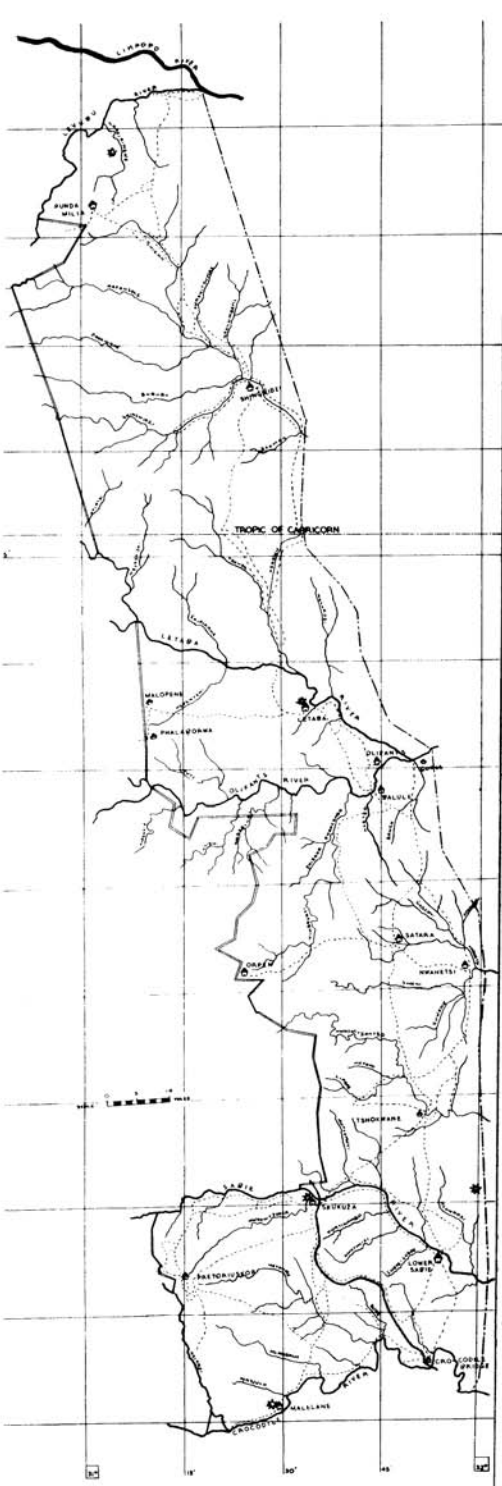

FIG. 6. *Bufo pusillus* Mertens

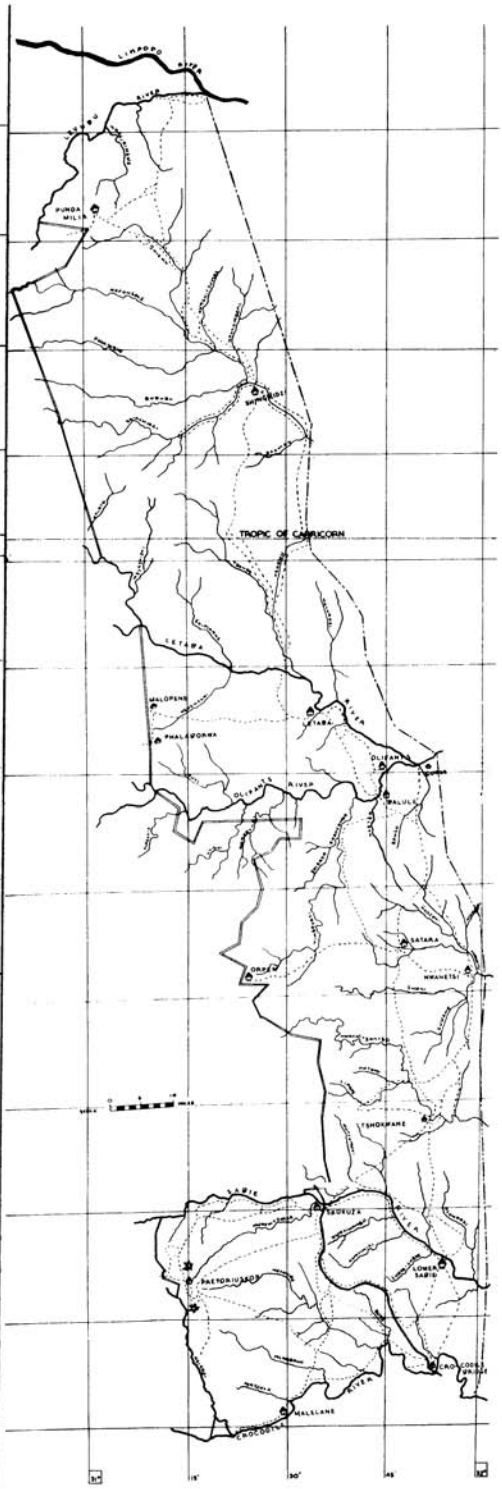

FIG. 7. *Bufo regularis* Reuss

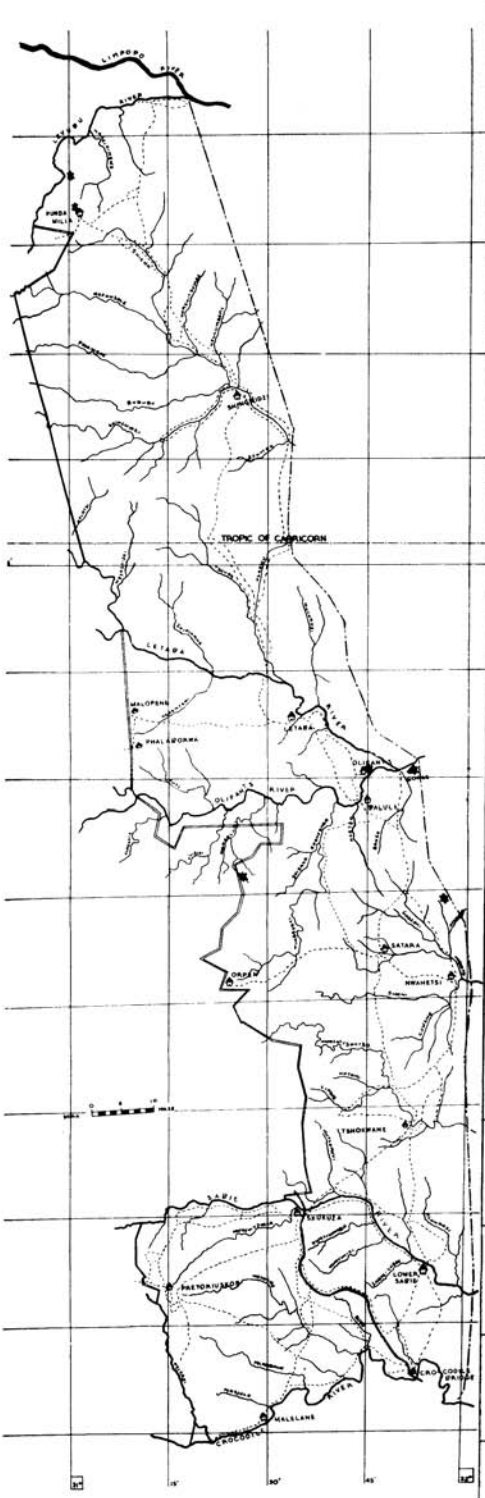

FIG. 8. *Bufo fenoulheti* Hewitt & Methuen

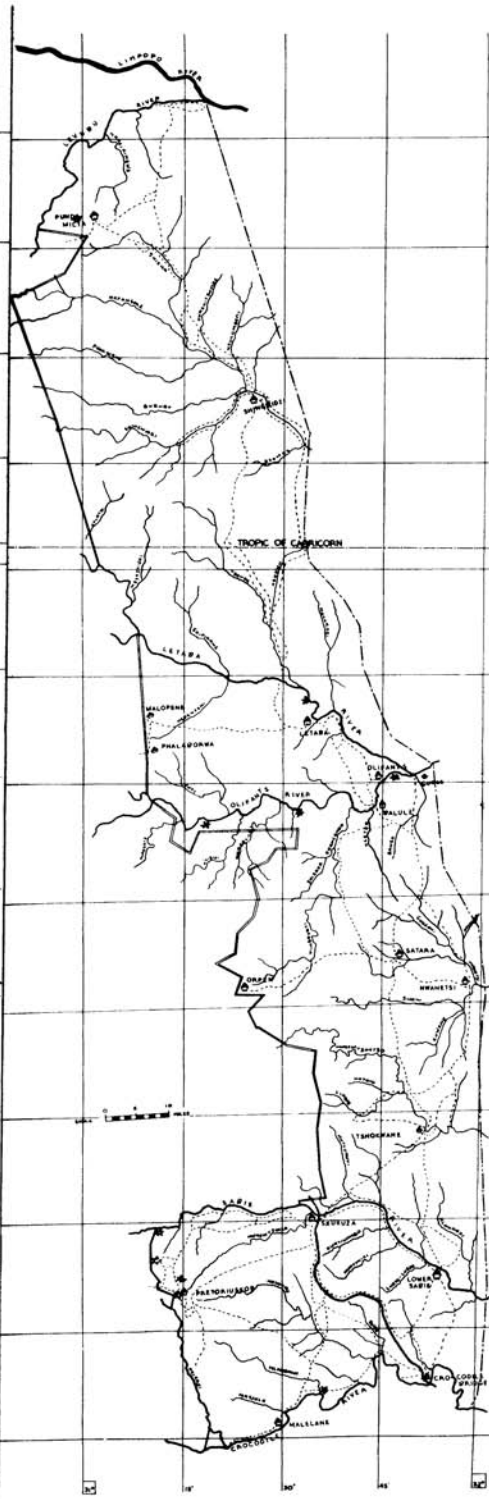

FIG. 9. *Rana angolensis* Bocage

FIG. 10. *Rana fasciata fasciata* (Tschudi)

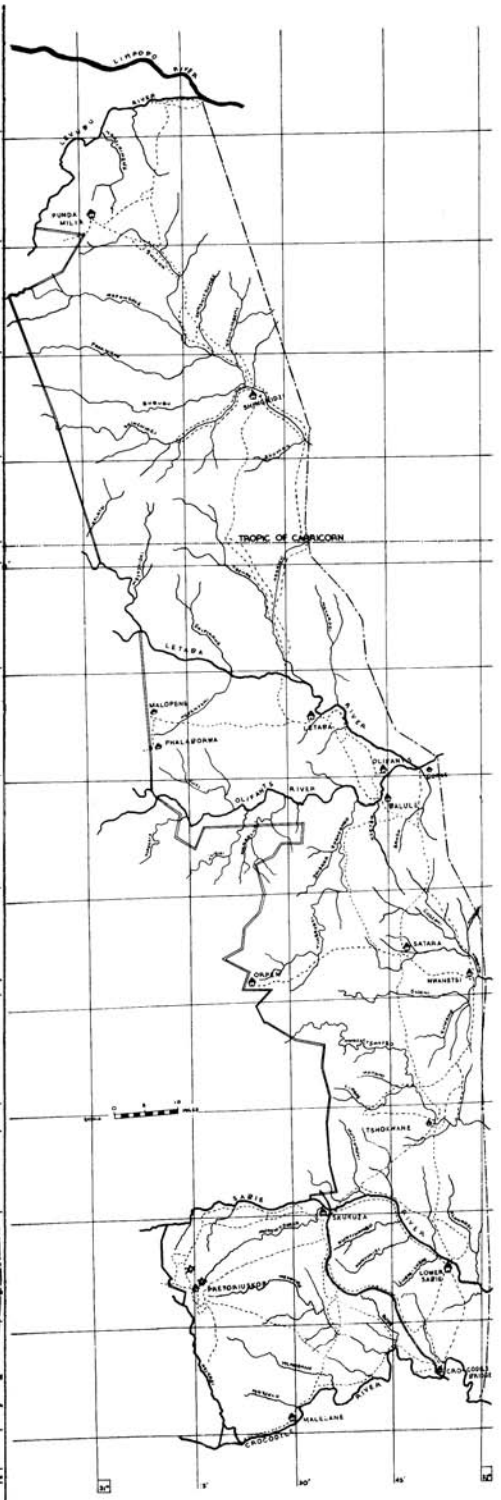

FIG. 11. *Rana oxyrhynchus* Smith

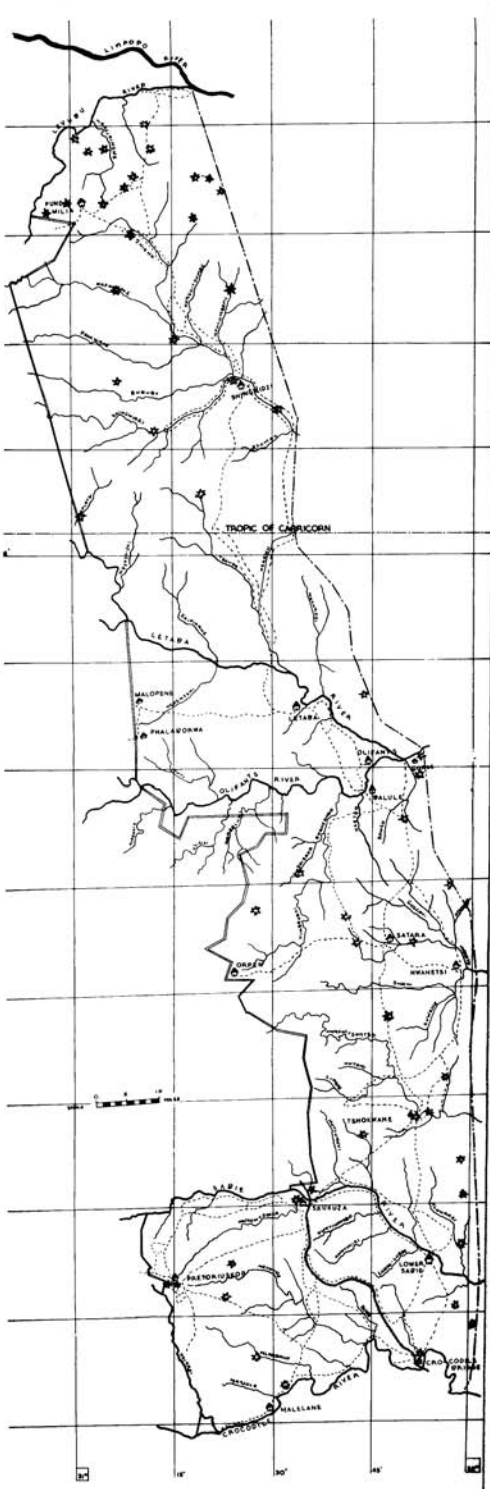

FIG. 12. *Rana abyssinica* Peters

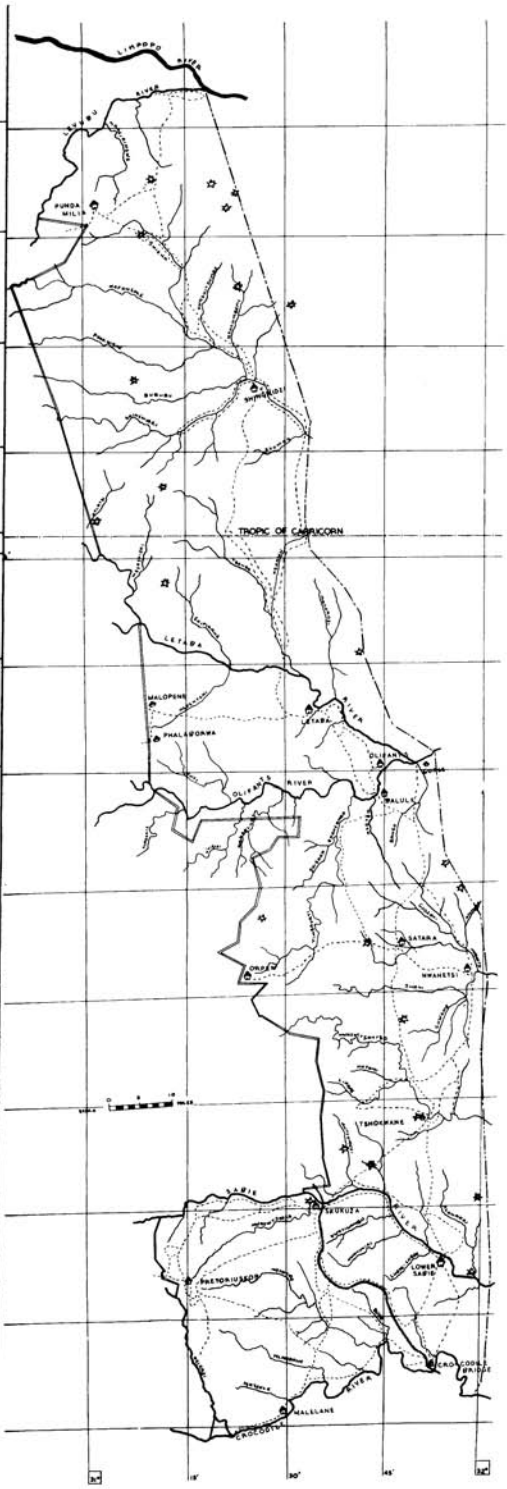

FIG. 13. *Rana mossambica* Peters

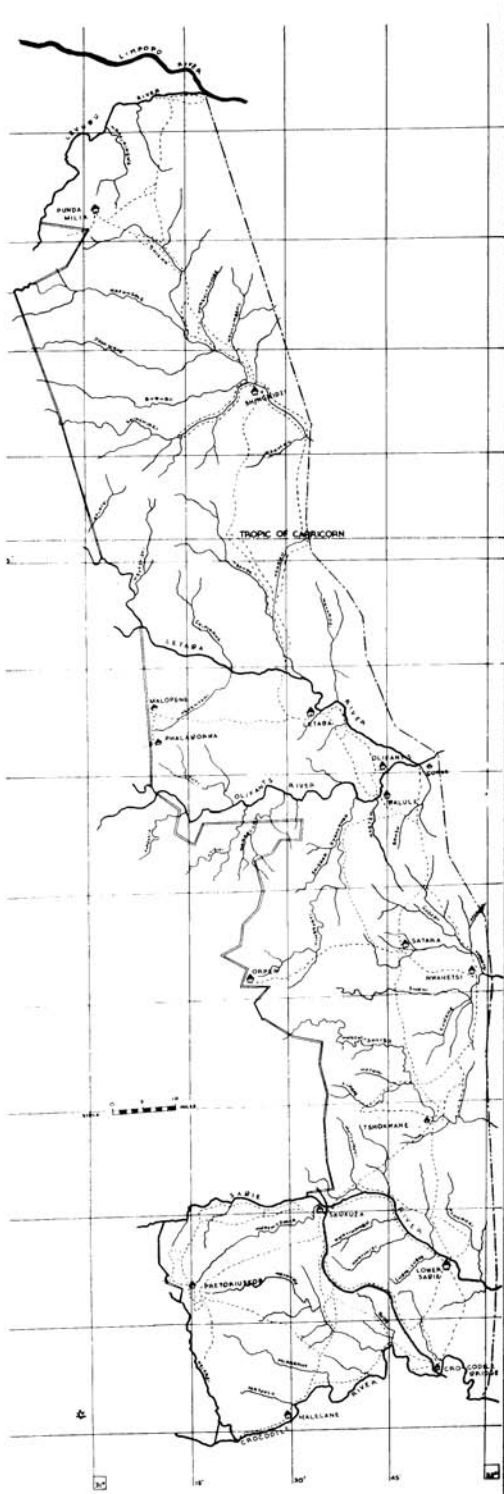

FIG. 14. *Rana porosissima* Steindachner

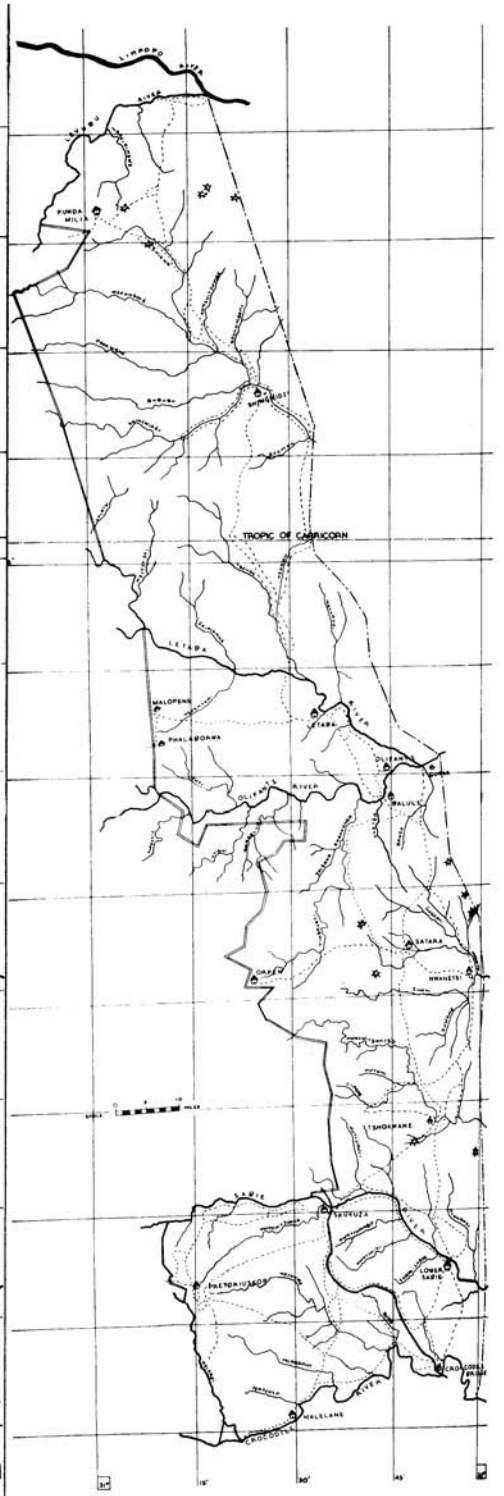

FIG. 15. *Pyxicephalus ornatus ornatus* (Peters)

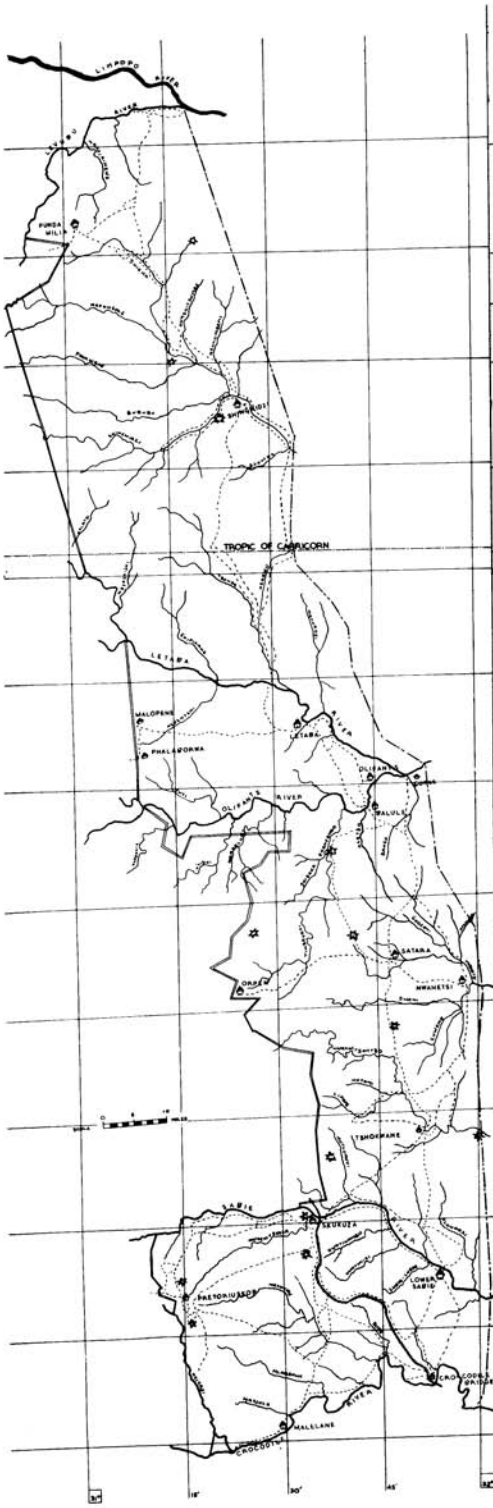

FIG. 16. *Pyxicephalus delalandii cryptotis* (Boulenger)

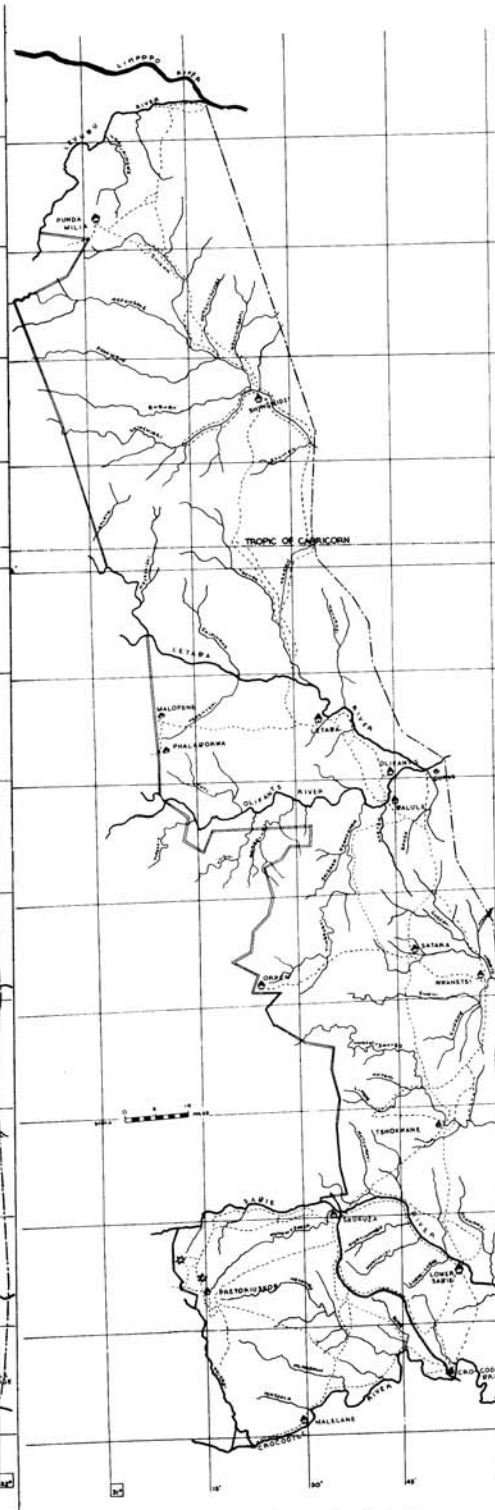

FIG. 17. *Pyxicephalus natalensis* Smith

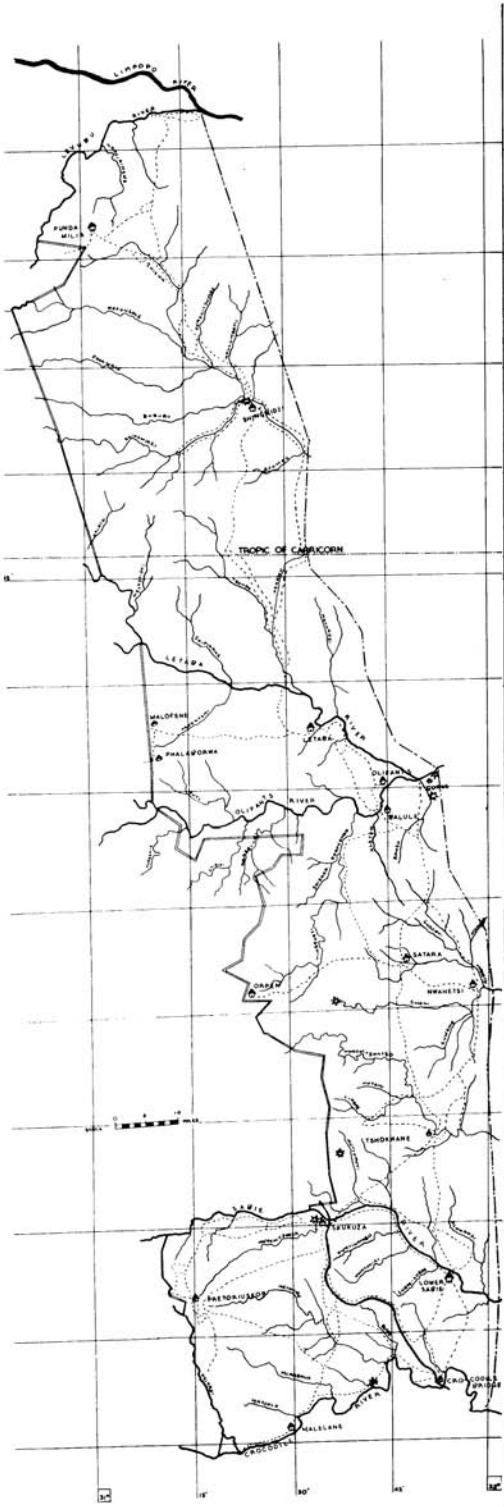

FIG. 18. *Pyxicephalus marmoratus* Peters

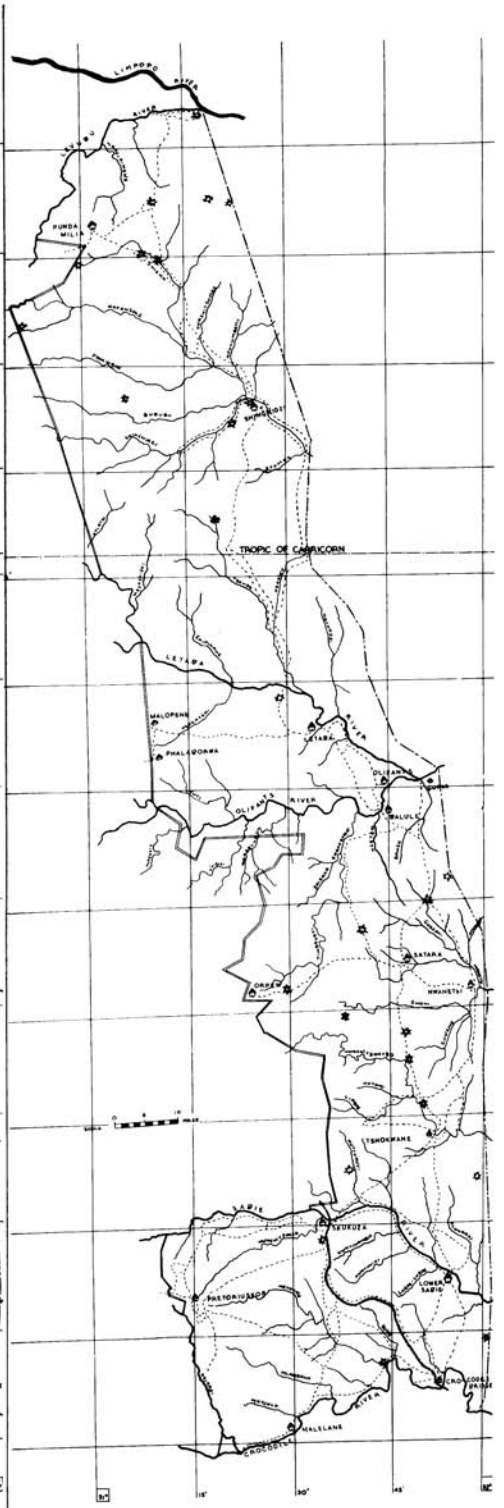

FIG. 19. *Pyxicephalus adspersus* Tschudi

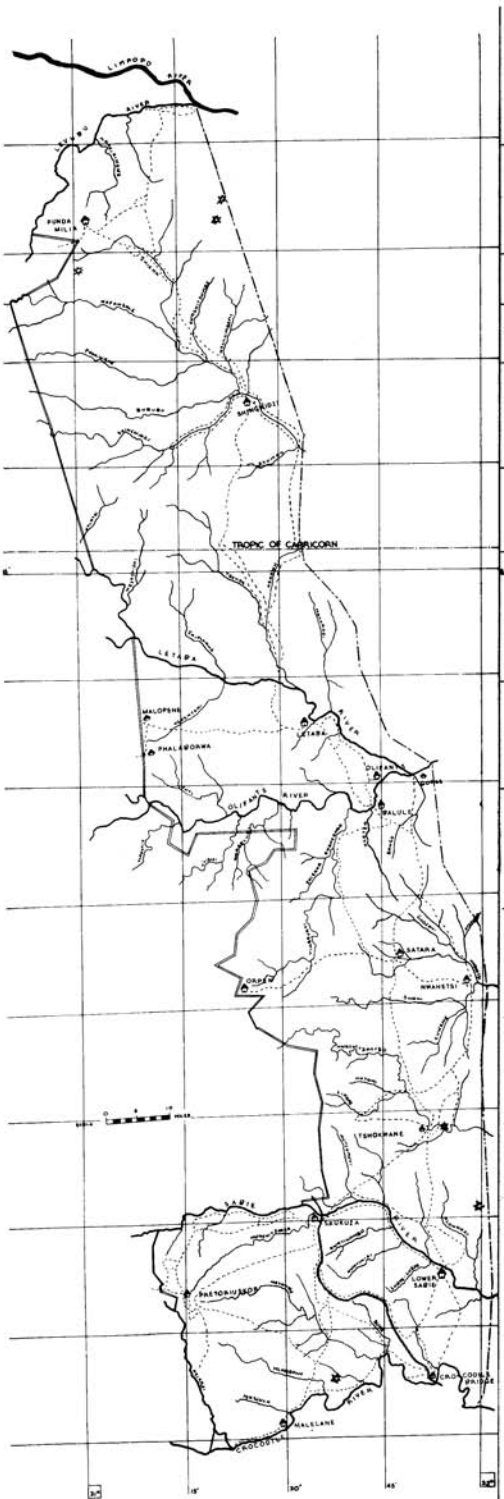

FIG. 20. *Cacosternum boettgeri boettgeri* (Boulenger)

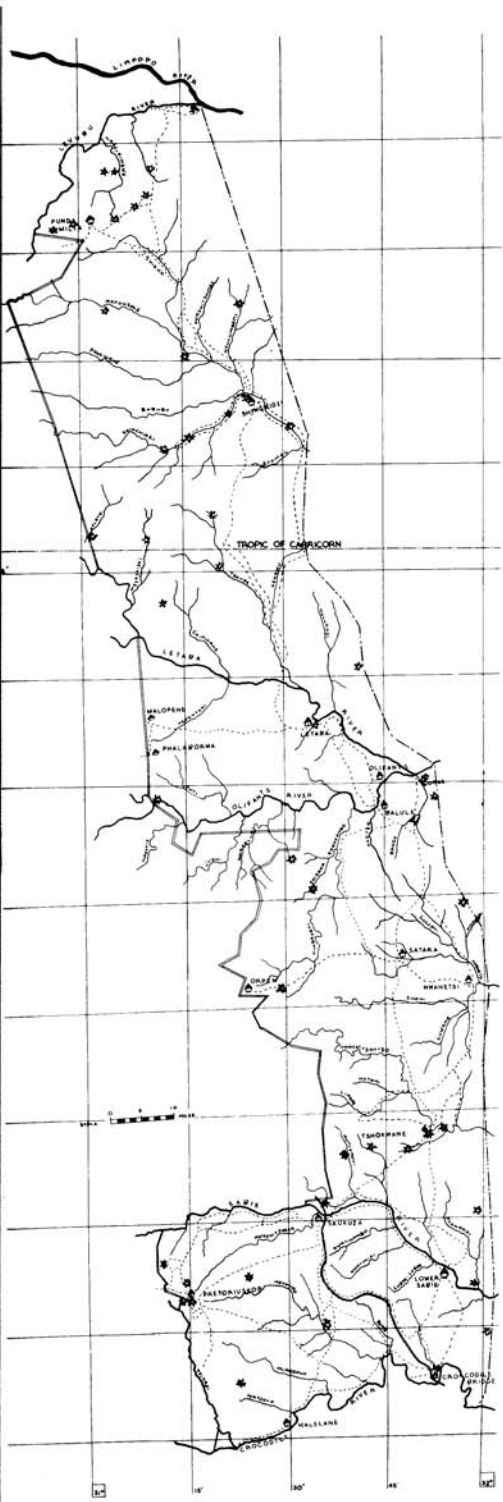

FIG. 21. *Phrynobatrachus natalensis* (Smith)

FIG. 22. *Phrynobatrachus utingensis mababiensis* FitzSimons.

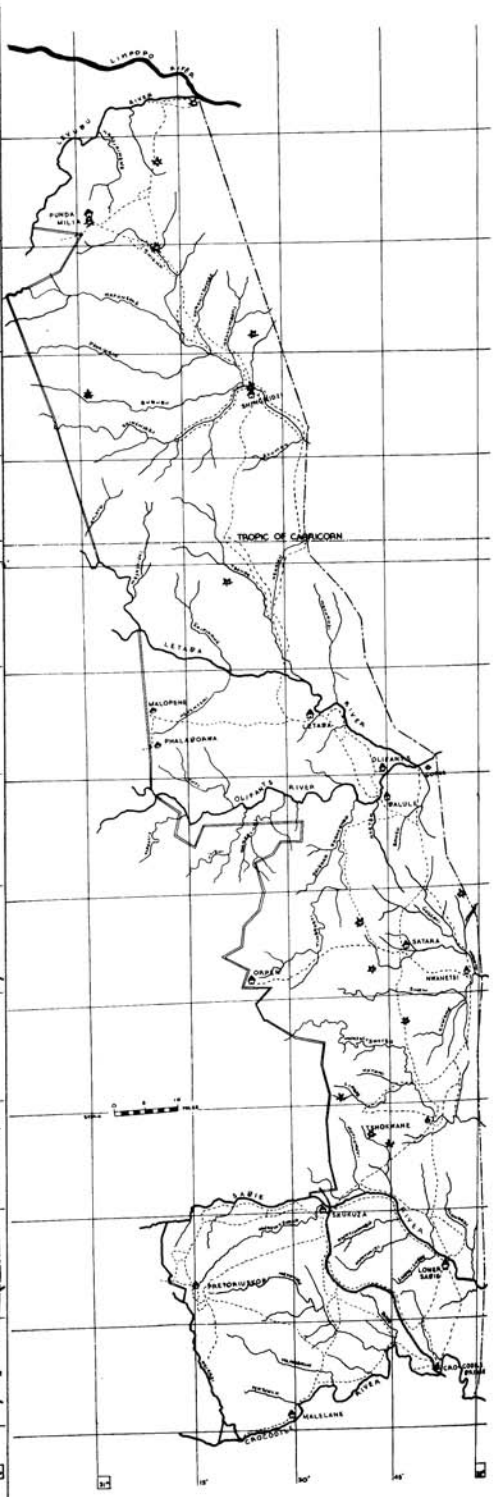

FIG. 23. *Hemisus marmoratum marmoratum* (Peters)

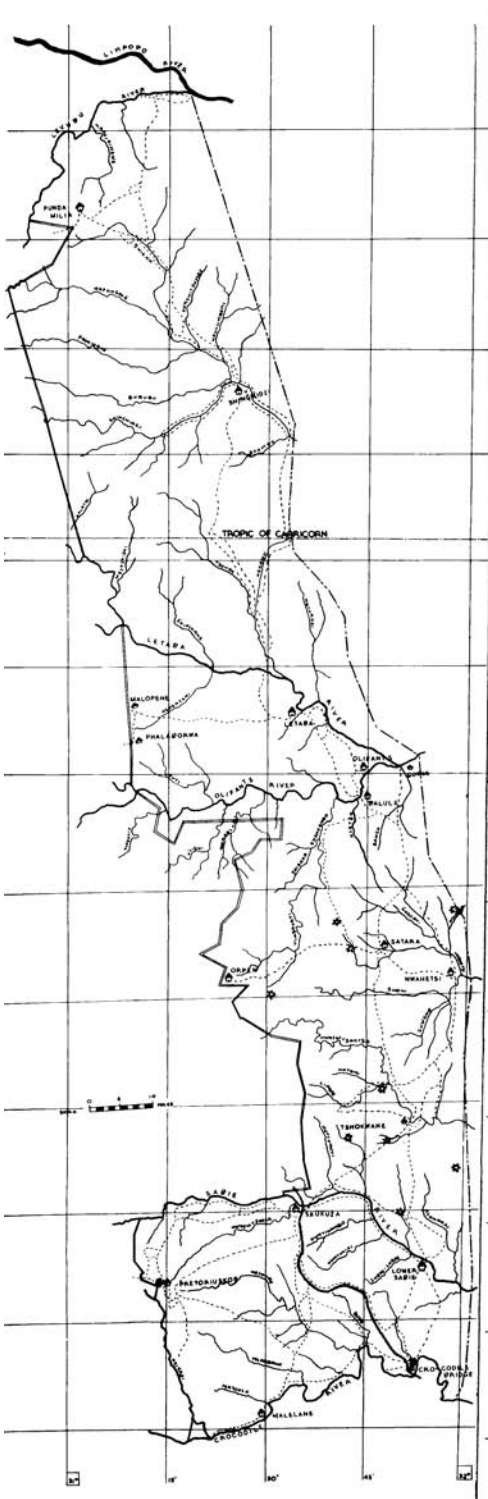

FIG. 24. *Afrixalus brachycnemis brachycnemis* (Boulenger)

FIG. 25. *Chiromantis scerampelina* Peters

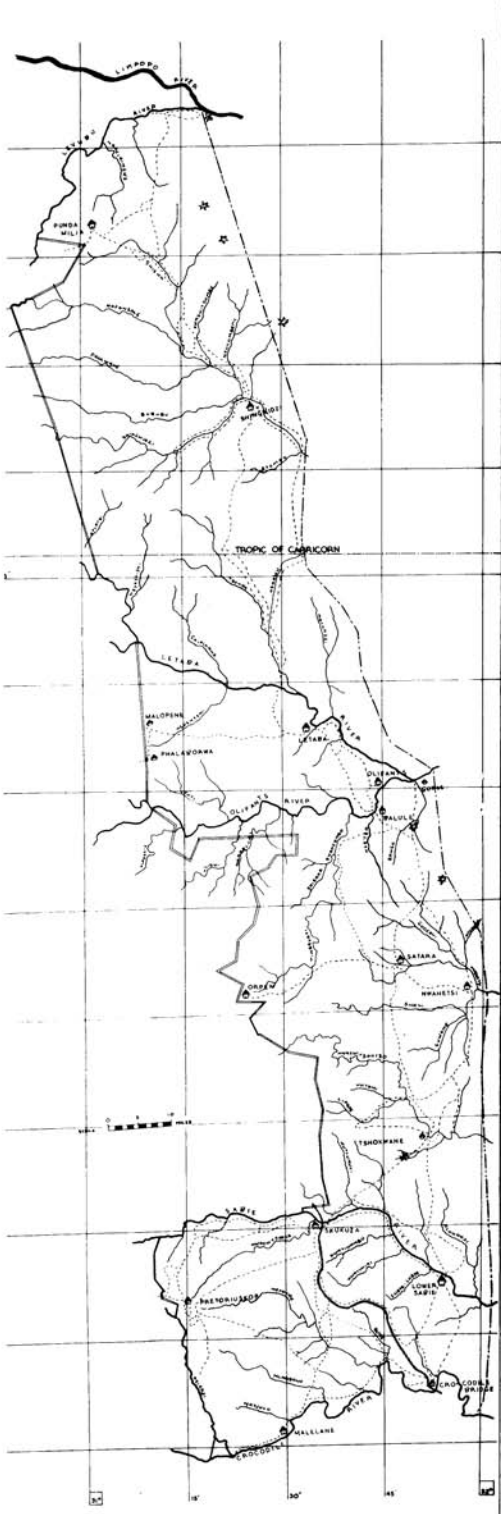

FIG. 26. *Hylambates maculates* Duméril

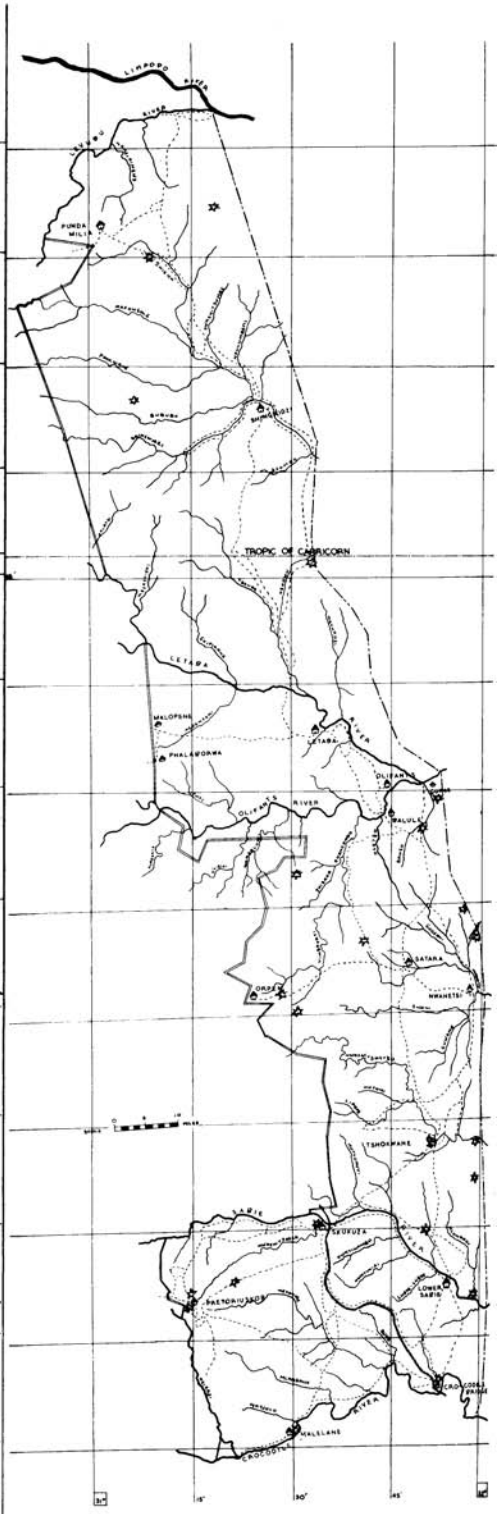

FIG. 27. *Hyperolius marmoratus taeniatus* Peters
Striped phase.

FIG. 30. *Kassina senegalensis* Girard

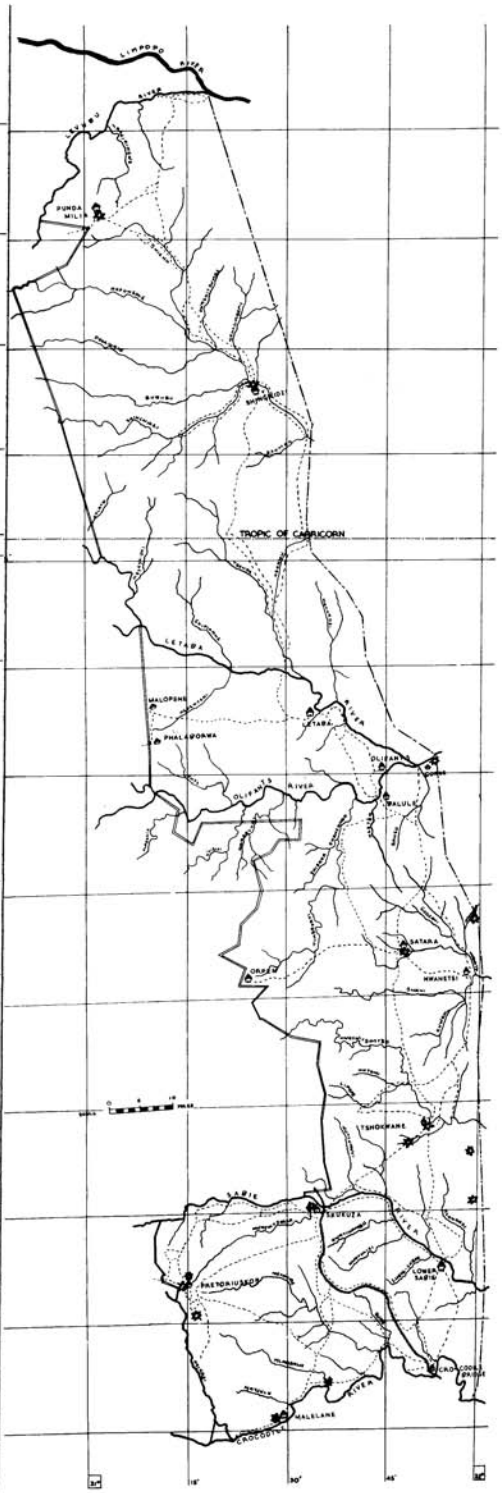

FIG. 31. *Leptopelis concolor* Ahl

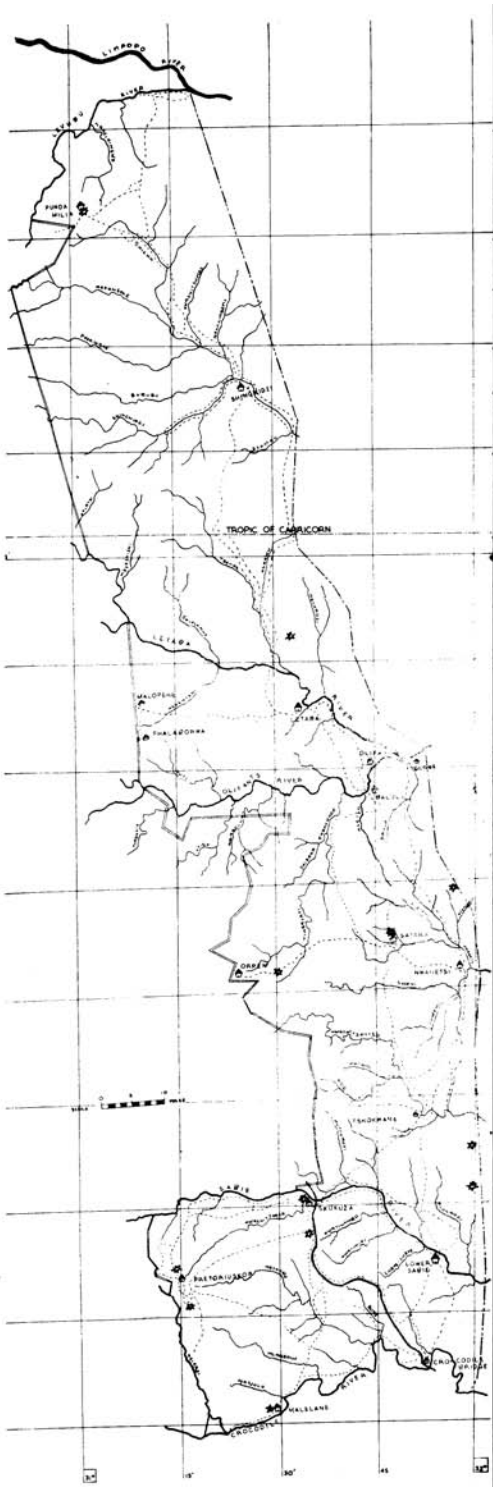

FIG. 32. *Breviceps adspersus adspersus* Peters

FIG. 33. *Breviceps mossambicus* Peters

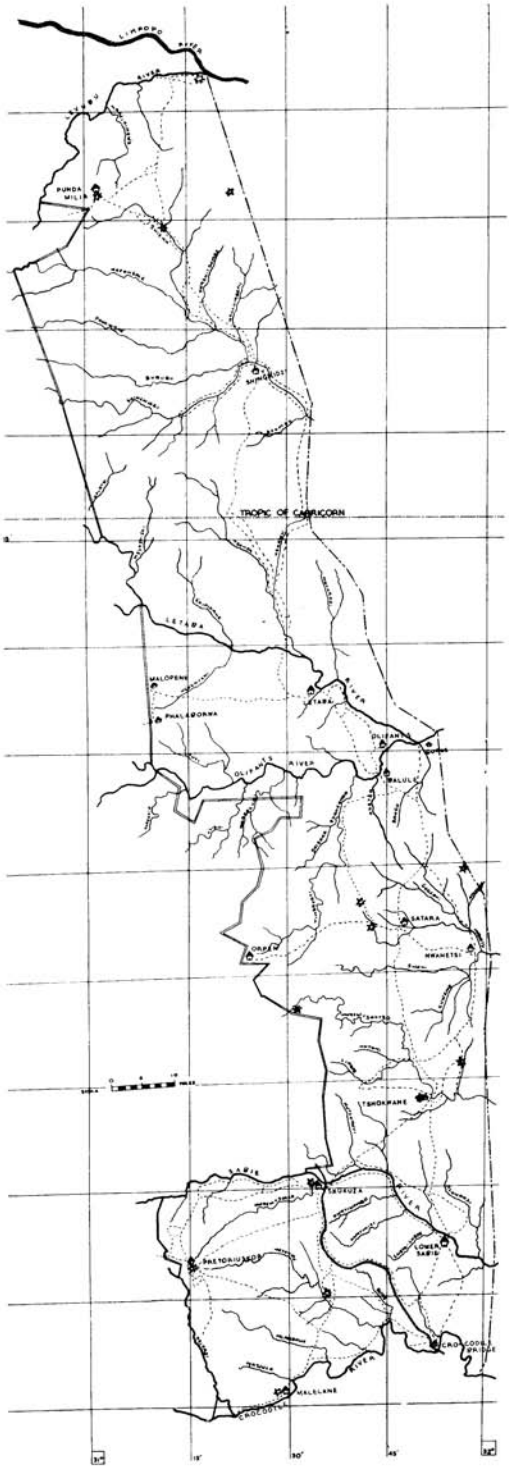

FIG. 34. *Phrynomerus bifasciatus bifasciatus* (Smith)