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No. 100, 14 pages, 2 figures.

REPORT ON A COLLECTION OF  
REPTILES AND AMPHIBIANS FROM THE  
ILEMI TRIANGLE, SOUTHWESTERN SUDAN

By

**Robert C. Drewes**

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REPORT ON A COLLECTION OF  
REPTILES AND AMPHIBIANS FROM THE  
ILEMI TRIANGLE, SOUTHWESTERN SUDAN

By

R. C. Drewes

Department of Herpetology

California Academy of Sciences

In August 1971, during a survey of the "Northern Frontier" area of Kenya for the National Museums of Kenya and the California Academy of Sciences<sup>1</sup>, I led a small field party into the Ilemi Triangle in the southwestern corner of the Sudan. Because of security problems and recent incidents, our stay was limited to three days, August 22, 23, and 24, and our collecting areas were confined to the vicinity of police outposts; nevertheless, a collection of 118 reptiles and amphibians was made. Herpetologically speaking, the area is poorly known and thus the collection is of interest.

For their fine field assistance and companionship, I wish to thank Messrs. Nicholas Boyd III, Robert Ashe, Graham Napier, Stephen Spawls, Arthur Bridge, Michael Mwangi, and Miss Hillarie Kelly.

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<sup>1</sup>The collections obtained during the 1971 field season are deposited in the National Museums of Kenya and the California Academy of Sciences. However, initially, in order to retain continuity in the field records, all specimens were cataloged by the CAS, and those numbers are cited herein.

Richard E. Leakey and George E. Lindsay, Directors of the National Museums of Kenya and the California Academy of Sciences respectively, have generously given my Kenya studies financial support, and I am deeply grateful. Messrs. A. Forbes-Watson and A. Duff-MacKay of the former institution have kindly assisted me in many ways since 1969. Alan E. Leviton of the California Academy of Sciences read the manuscript and offered valuable suggestions.

The Ilemi Triangle<sup>2</sup> lies north-northwest of the north end of Lake Rudolf and is bounded to the southeast by the junction of the borders of Kenya and Ethiopia. It is a difficult area to delineate precisely as the Kenya-Sudan border is uncertain. In its southern half, the Ilemi Triangle is administrated by the Kenya Police. Because of frequent skirmishes between the latter and raiders of the Merille Tribe, the Ilemi Triangle is largely a no-man's land with few inhabitants.

Areas collected were: Kokuro [elev. 536 m.], 04°39'N., 35°43'E., and Lokomarinyang [elev. 579 m.], 05°02'N., 35°37'E. An additional reference is made to an area near Todenyang (Kenya) at 04°32'N., 35°55'E. The areas collected are within the general vegetation zone described by Keay (1959) as sub-desert steppe. Rainfall probably ranges from less than ten (254 mm.) to twenty (508 mm.) inches per year depending upon elevation<sup>3</sup>. The highest air temperature recorded was 35.6°C. at approximately 1:00 P.M. on August 24th.

Kokuro lies about 3/4 km. north of the Lomgol River (completely dry during this period) and approximately 30 km. north-west of Todenyang, Kenya. The area is largely open bush with fairly widespread Acacia and grasses of less than one meter in height. Occasional flat rocky areas with little vegetation except "Wait-a-bit" thorn are common. There is a small water hole just west of the police post (the only man-made structures in the area).

Lokomarinyang, 71 km. north of Kokuro by road, lies at the foot of Mt. Lokomarinyang, which rises to an elevation of slightly more than 1066 m. and forms the northern terminus of the Lorionetom Range. The rising slopes south of the police post have large outcrops of weathered basalt dotted with various low Euphorbia plants and tall termite mounds. The terrain to the north gradually loses elevation and grades into a large alluvial plain with short grass and thorn bush. This plain is presumably the interconnecting basin between Lake Rudolf and the Lotagipi Swamp, into which Lake Rudolf spilled during overflow periods in the late Pleistocene (Butzer et al., 1972). A large waterhole (about 60 m. in

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<sup>2</sup>Map. SK57 Kenya (special) North Sheet, 2nd Edition, Survey of Kenya, 1971.

<sup>3</sup>Map. SK53D, Rainfall Probability, Population and Main Drainage Basins. Oxford University Press in association with D. A. Hawkins, Ltd., Nairobi, 1967.

diameter) fed by a sulfurous hot spring at its eastern end and surrounded by tall, coarse grass lies in a rocky depression approximately 3/4 km. west of the police post. A similar but slightly larger body of water lies about 1 1/3 km. east of the post.

## AMPHIBIANS

Bufo lughensis Loveridge.

MATERIAL COLLECTED (7). Kokuro. (CAS 131443-131449).

REMARKS. The specimens differ from Loveridge's description (1932) in having the toes, except the fourth, one-half rather than two-thirds webbed. In addition, the metatarsal tubercles are conical instead of smooth and flat, and in young specimens the inner metacarpal tubercle tends to be indistinct, thus giving the impression that there is only one.

All these toads were caught while emerging from burrows between 7 and 8 P.M. Several of the burrows were excavated and found to be about 5 cm. deep and to run parallel to the surface for a distance of 1/2 to one meter. The burrows are assumed to have been dug by the toads as their diameters were roughly "toad size" and there was no detritus or other evidence to indicate occupation and/or construction by rodents or arthropods. This was unexpected because other specimens of B. lughensis caught in Kenya (Lokichoggio, Kakuma, Kargi, Buna, El Wak, and Baringo) were found under rocks and other objects on the surface. The proportional measurements of the Kokuro series compares favorably with data given by Loveridge (1932) and with data taken from the series we obtained in northern Kenya.

## Measurements (in mm.)

	Snout-vent	Hind limb from anus	Foot from metatarsal tubercle	Tibia
131443♀	31	34	11	11
131444♀	30	33	11	9.5
131445♀	47	47	14	13
131446 juv.	28	29.5	10.5	8
131447♂	33	36	12.5	11
131448♂	36	37	12	11
131449 juv.	24.5	25.5	9	8

Ptychadena mascareniensis (Duméril & Bibron).

MATERIAL COLLECTED (34). Lokomarinyang. (CAS 131451-131484; 8 ♂♂, 15 ♀♀, 11 juv.).

REMARKS. This series was taken in tall coarse grass in and around a permanent pond approximately 1 1/3 km. east of the Lokomarinyang police post. Snout-vent lengths range from 20-51 mm. The frogs were abundant both here and in a similar

pond which lies about 3/4 km. to the west of the police post. The second pond is fed by a hot springs, and frogs, frightened by our approach, were observed to enter the water briefly at its hottest point (near the mouth of the spring). I estimated the water temperature here to be near 71° C., as I could not leave my hand immersed for longer than a few seconds.

Kassina senegalensis cf. somalica Scortecci.

MATERIAL COLLECTED (6). Lokomarinyang (CAS 131486-131491).

REMARKS. Approximately 3.2 km. south of the Lokomarinyang police post, these specimens were found in a deep pool at the bottom of a twenty-foot granite shaft at an estimated elevation of 731 m. on Mt. Lokomarinyang. Difficulty was experienced in assigning these frogs using Laurent's key (1957; Gans et al., 1965, pp. 21-22) as there is, in my sample, marked variation in body proportions, which are important in Laurent's dichotomies. In general, however, the specimens agree with the original description of K. somalica (Scortecci, 1932) with the exception of the smaller interorbital space (only slightly greater than the upper eyelid, as opposed to 1 3/4 greater) and the length of the first finger. With respect to the latter, Scortecci is inconsistent. In the original description, the first finger is described as longer than the second; yet in a later work in which the description is repeated almost verbatim, the second digit is the longer (Scortecci, 1933). My material agrees with the latter.

Measurements (in mm.)

	Snout-vent	Tibia	Tarsus	Foot	Forearm	Third digit
131486♀	25	10.4	6.6	10.5	6.8	5
131487♀	23	9.8	6.5	10.3	6.2	5.3
131488♂	32	11.5	7.7	11.4	7.8	5
131489♀	26	10.5	6.6	12.2	6.8	5.5
131490♀	26	11	6.7	10.5	7.1	4.6
131491♀	23	9.5	6.4	9.7	6.2	4.8

REPTILES  
CHELONIANS

Pelomedusa subrufa subrufa (Lacépède).

MATERIAL COLLECTED (2). Lokomarinyang. (CAS 131450, 131485).

REMARKS. The small female was found with Kassina senegalensis (see above) in a deep granite pool at the bottom of a twenty-foot shaft. The male was caught in a large pond about 1 1/3 km. east of Lokomarinyang.



## Measurements

	Carapace length (mm.)	Carapace width (mm.)	Verte- brals	Cos- tals	Mar- ginals	Supra- caudals
131450♂	150	100	5	4	22	2
131485♀	76	63	5	4	22	2

## LIZARDS

Hemidactylus brookii Gray.

MATERIAL COLLECTED (11). Twenty-four km. north of Todenyang<sup>4</sup>. (CAS 131436); 16 km. south of Kokuro. (CAS 131437); Kokuro. (CAS 131441-131442); Lokomarinyang. (CAS 131493-131494, 131516, 131538-131540, 131552).

REMARKS. The "races" of H. brookii are so poorly defined, I hesitate to refer these specimens to H. brookii "angulatus," although they agree with the description given by Loveridge (1947). CAS 131436 was found under a large rock very close to a large scorpion (ca. 105 mm.), [Pandinus pallidus].

## Measurements

	Snout- vent (in mm.)	Preano- femoral pores	Scansors, 1st toe	Scansors, 4th toe	Upper labials	Upper labial
131436 juv.	30		5	9	9-8	8-7
131437♂	54	34	5	7	9-9	7-7
131441♀	48		5	8	9-8	8-7
131442♀	58		4	7	9-9	7-7
131493 juv.	32		4	8	9-9	7-7
131494 juv.	28		5	9	10-9	9-7
131516♂	64	31	5	9	9-8	7-8
131538♂	59	34	5	8	9-9	7-7
131539♂	65	34	5	9	9-9	7-7
131540♂	59	34	5	9	9-9	7-7
131442 juv.	35		5	8	9-8	7-8

Hemidactylus isolepis Boulenger.

MATERIAL COLLECTED (10). Kokuro (CAS 131438-131440); Lokomarinyang. (CAS 131492, 131519-131523, 131541).

<sup>4</sup>I do not know whether this locality is in Kenya or the Sudan.

## Measurements

	Snout-vent (mm.)	Midbody scale rows	Scansors, 1st toe	Scansors, 4th toe	Prenal pores
131438♂	33	62	5	8	6
131439♂	38	60	5	8	6
131440♀	40	68	5	8	
131492♂	34	60	5	7	5
131519♀	34	65	5	7	
131520 juv.	22	68	5	7	
131521♀	40	58	7	8	
131522♂	36	60	5	7	4
131523♂	34	61	5	7	6
131541♂	34	63	5	7	6

Agama ruppelli occidentalis Parker.

MATERIAL COLLECTED (6). Lokomarinyang. (CAS 131525-131530).

REMARKS. The number of vertebral scales in this series ranges from 35-41, slightly higher than given by Parker (1932).

## Measurements

	Snout-vent (mm.)	Vertebral scales
131525♂	64	39
131526♂	63	35
131527♀	61.5	39
131528♀	55.5	38
131529♂	63	41
131530♂	50	36

Agama species.

REMARKS. A large adult belonging to Agama was observed sunning itself on a rock on Mt. Lokomarinyang near the waterhole from which the specimens of Kassina senegalensis and Pelomedusa subrufa were taken. The head was orange-red and the rest of the body bright turquoise. I estimated the snout-vent length to be at least 100 mm. The animal very closely resembled an adult male of Agama a. lionotus Boulenger.

Eremias spekii sextaeniata Stejneger.

MATERIAL COLLECTED (3). Lokomarinyang. (CAS 131524, 131542-131543).

REMARKS. Although Boulenger expressed some doubt as to the validity of this subspecies (1921, p. 238), the three specimens at hand agree well with its description, having six dorsal light streaks and suboculars excluded from the labial margin. In addition, measurements and counts agree

with those given by Boulenger for specimens taken north of the Tana River, Kenya, with the exception of the number of subdigital lamellae under the fourth toe, which is slightly higher.

Measurements

	Snout-vent (mm.)	Middorsal scale rows	Femoral pores (one side)	Subdigital lamellae, 4th toe
131524♂	46	69	16	27
131542♀	48	66	13	25
131543♀	41	61	13	24

Latastia longicaudata Reuss.

MATERIAL COLLECTED (3). Lokomarinyang. (CAS 131497, 131537, 131553; 1 ♂, 2 ♀♀).

REMARKS. Boulenger (1921) recognized several geographical races based on differences in femoral pores, gular scales, and number of lamellar scales beneath the fourth toe. On these parameters and others, these specimens agree with both the typical form and L. l. revoili (Vaillant) having 10-11 femoral pores, 32-37 gular scales, and 26-28 subdigital scales beneath the fourth toe. Future material may show the distribution of Latastia longicaudata to be a cline, rather than isolated in geographically distinct units.

Chalcides ocellatus bottegi (Boulenger).

MATERIAL COLLECTED (7). Lokomarinyang. (CAS 131510-131515, 131535; 7 ♀♀).

REMARKS. These specimens are in close agreement with Boulenger's description (1920). I have compared them with 12 additional specimens from four different localities in Turkana District, Kenya (7 from Lokitaung, 1 from Lodwar, 3 from Kakuma, and 1 from Loarengak) and found the entire series to be remarkably uniform. With one exception (Kakuma) all have 22 midbody scale rows, and enlarged median dorsal rows, which together separate C. o. bottegi from the typical form. These appear to be the first records for the genus in Kenya. Although I have collected both to the east and west of the Rift Valley in northern Kenya, I have not uncovered Chalcides in any favorable appearing habitat east of Lake Rudolf or south of Lodwar.

Mabuya brevicollis Weigmann.

MATERIAL COLLECTED (5). Lokomarinyang. (CAS 131498-131501, 131536).

REMARKS. Although unmistakably belonging to M. brevicollis, these specimens and many I have collected in Kenya differ from Boulenger's description (1887) as follows:

the subdigital lamellae are often either uni- or bicarinate rather than smooth; the prefrontals are frequently separated rather than forming a median suture; and the supranasals are as often separated as in contact behind the rostral.

Measurements

	Snout-vent (mm.)	Midbody scale rows
131498♀	121	32
131499♀	102	31
131500♂	102	32
131501♀	66	30
131536♂	99	30

Mabuya quinquetaeniata quinquetaeniata (Lichtenstein).

MATERIAL COLLECTED (12). Lokomarinyang. (CAS 131495-131496, 131517-131518, 131544-131551).

Measurements

	Snout-vent (mm.)	Midbody scale rows
131495 juv.	41	38
131496 juv.	47	40
131517♀	62	39
131518 juv.	45	36
131544♂	84	36
131545♀	53	38
131546♀	88	38
131547 juv.	49	37
131548♀	68	38
131549 juv.	49	38
131550 juv.	40	38
131551♀	53	38

Mabuya striata (Peters).

MATERIAL COLLECTED (8). Lokomarinyang. (CAS 131502-131509).

REMARKS. These specimens appear to be of stouter habitus than those I have collected in various locations of middle elevation in Kenya. The coloration also seems to be slightly different, the dorsolateral yellow stripes being more diffuse and the ground color of the dorsum tending toward light brown to ashy grey. In all specimens of this series, the subocular fails to reach the lip.

## Measurements

	Snout-vent (mm.)	Midbody scale rows	Upper labials	Lower labials
131502♀	86	34	7-7	8-7
131503♀	85	34	8-8	8-7
131504 juv.	33	34	7-8	7-7
131505♂	54	35	7-8	7-7
131506♀	44	34	7-7	7-7
131507♀	48	34	7-8	7-7
131508♂	84	33	8-7	8-6
131509♀	81	32	8-8	7-7

## SNAKES

Bitis species.

REMARKS. The middle portion of a large shed skin was found on Mt. Lokomarinyang at an elevation of about 608 m.

Echis carinatus leakeyi Stemmler & Sochurek.

MATERIAL COLLECTED (4). Lokomarinyang. (CAS 131531-131534).

REMARKS. All were found under rocks in the large field just north of the police post. Stemmler and Sochurek (1969) based their description of the taxon from Lake Baringo, Kenya, on comparison with E. c. pyramidum from Egypt only. Although there is considerable overlap in most of the characters they examined, a cline is impossible to demonstrate without more Sudan material. Work now in progress on 93 specimens collected in various localities in Turkana District, Kenya, may shed some light on the relationships between the East African populations, at least.

FOOD. The stomachs of CAS 131531 and 131532 contained a large scorpion and a large centipede, respectively.

## Measurements

	Midbody scale rows	Ventrals	Sub- caudals	Total length	Interoculars
131531♀	29	172	32	355	8
131532♂	28	161	36	423	8
131533♀	30	180	32	180	8
131534♀	31	175	35	295	8

## DISCUSSION

The importance of the Ilemi Triangle lies in its apparent role as a corridor for faunal exchange in recent

times. Those portions of the desert and semi-desert herpetofauna of East Africa which are of northern, non-tropical origin could only have penetrated southward 1) from the northeast around Ethiopia via Somalia or 2) from the northwest, between the moist highlands of Ethiopia and Uganda, the Ilemi Corridor.

Although evidence for a narrow faunal corridor is based on relatively new and somewhat meager collection data, nevertheless, examination of a few distributions is instructive. For example, the Echis populations from Lokomarinyang south through Turkana District to Lake Baringo, Kenya (a distance of over 500 km.), are virtually the same. However, the populations east of Lake Rudolf (and the Rift Valley) are disjunctly distributed, and there is evidence that they are diverging significantly (Drewes and Sacherer, in progress). It seems reasonable to suggest that the western populations are recent entrants through the Ilemi Corridor, and that those to the east are much older, having entered by way of Somalia. In support of this argument there is evidence that large contiguous areas of Somalia have been arid for a long time (Moreau, 1966) while recent work by Butzer et al. (1972) indicates that up until only a few thousand years ago there were fluctuations in the level of Lake Rudolf which would have induced marked changes in the habitat of the Ilemi Corridor owing to evaporation and overflow through it. Thus, during these periods (3,000, 8,000, 10,000 B.P.) the Ilemi Corridor would have been a barrier to the expansion of desert and semi-desert forms, leaving Somalia as the only open arid route.

Chalcides ocellatus bottegi is another form which probably only recently arrived in Kenya through the Ilemi Corridor and is now present west of Lake Rudolf. Although the genus has hitherto been unknown from Kenya, Gans et al. (1965) collected C. o. ocellatus in Somalia. It may be suggested that this form either retreated from northeastern Kenya where it may once have existed, or for unknown reasons never got there.

Such distributions as that of Stenodactylus sthenodactylus, an obvious Saharan form, are equally intriguing. However, this species is still too poorly known in the southeastern part of its range to offer grounds for more than tantalizing speculation. Hitherto reported from the Olo (Omo) River, Lake Rudolf, Ethiopia (Loveridge, 1957), the unmistakable remains of one of these little geckos was found in the stomach of a beaked snake, Rhamphiophis o. rostratus, I collected west of Lake Rudolf at Kakuma, Turkana District, Kenya.

Other interesting distributions include Mabuya striata, a southern savannah form that presumably reached Lokomarinyang by "hill-hopping" during earlier, cooler, drier periods. It does not occur in the Turkana lowlands between the Mt. Kenya massif and Lokomarinyang. Forms associated with permanent sources of water such as Kassina senegalensis,

Pelomedusa subrufa<sup>5</sup>, and Ptychadena mascareniensis probably arrived from the south during warmer wetter periods.

The status of the interesting diminutive toad Bufo lughensis, which appears to be distributed across northern Kenya but not necessarily near water sources (Kokuro, Lokocho, and Kargi, Kenya), is uncertain. Widespread forms such as Mabuya brevicollis, Hemidactylus brookii, and Bitis arietans were expected and found. Most of the remaining specimens collected in the Ilemi Triangle seem to have southern affinities with the exception of Eremias spekii which is possibly of Somali origin.

The relative contributions of northern areas through the Ilemi Corridor and Somalia to the herpetofauna of northern Kenya are impossible to assess without more intensive collecting and study. Certain reports such as the unsolicited description made to this author by a missionary, of a horned viper (Cerastes?) at Loyengalani, on the east shore of Lake Rudolf, must be investigated. Potentially, investigation of such reports may be highly significant in developing a meaningful concept of the herpetogeography of arid East Africa.

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<sup>5</sup>There is some speculation that Pelomedusa can burrow into the ground and aestivate for several years at a time in order to escape dessication (Loveridge, 1941).

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FIGURE 1. View of part of the Ilemi Corridor taken from the north slopes of Mt. Lokomarinyang. Note the police post in the left center.



