

ON A COLLECTION OF REPTILIA AND BATRACHIA FROM THE KANGRA AND KULU VALLEYS, WESTERN HIMALAYAS.

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INTRODUCTION.

The report on the herpetological researches of the Eastern Himalayas (Sikkim and Nepal) and Assam were first published by Blyth¹ as early as 1851. Subsequently Günther² in 1861 and Wall³ in 1907 and 1911, published few papers on the fauna of that area and casually dealt with some reptilian collection of the Western Himalayas. So far, no systematic and comprehensive studies have been carried out regarding the reptilian fauna of the Western Himalayas.

The present report has been drawn up on a collection made under the joint auspices of the East Punjab University and Zoological Survey of India parties during the months of May and June 1950. The value of the collection has been increased because of the accurate field notes regarding the localities, trigonometrical heights etc., at which each specimen was collected. These field notes have been available to us for writing out this report.

The collection⁴ consists of 81 specimens referable to 11 species as follows :—

Saurians :	GEKKONIDÆ 1	.
	AGAMIDÆ 3	.. SCINCIDÆ 1.
Ophidians :	VIPERIDÆ 1	..
Amphibians :	RANIDÆ 4	. MICROHYLIDÆ 1.

It has been mentioned in the Gazetteer⁵, that wild life is fairly plentiful in the Kangra district. Snakes of non-poisonous varieties are abundantly met with and only poisonous species that has been recorded is *Agkistrodon himalayanus* (Günther). "Lizards, frogs and toads are universal"

Most of the specimens have been sexed by dissection, except for some male lizards whose sexes could be determined by the femoral pores. Juvenile specimens have been left unsexed and marked "juv."

ACKNOWLEDGMENTS.

We record here our thanks to Dr. J. L. Bhaduri of the Calcutta University, Zoology Department, for checking some of the identifications of Amphibians. To Dr. S. L. Hora, Director, we are grateful for

¹ Blyth, E., *Journ. Asiat. Soc. Bengal*, XX, p. 523 (1851).

² Günther, A., *Proc. Zool. Soc. London*, pp. 1-8 (1861).

³ Wall, F., *Rec. Ind. Mus.* I, pp. 149-158 (1907); *Journ. Bombay Nat. Hist. Soc.* XXI, pp. 201-202 (1911).

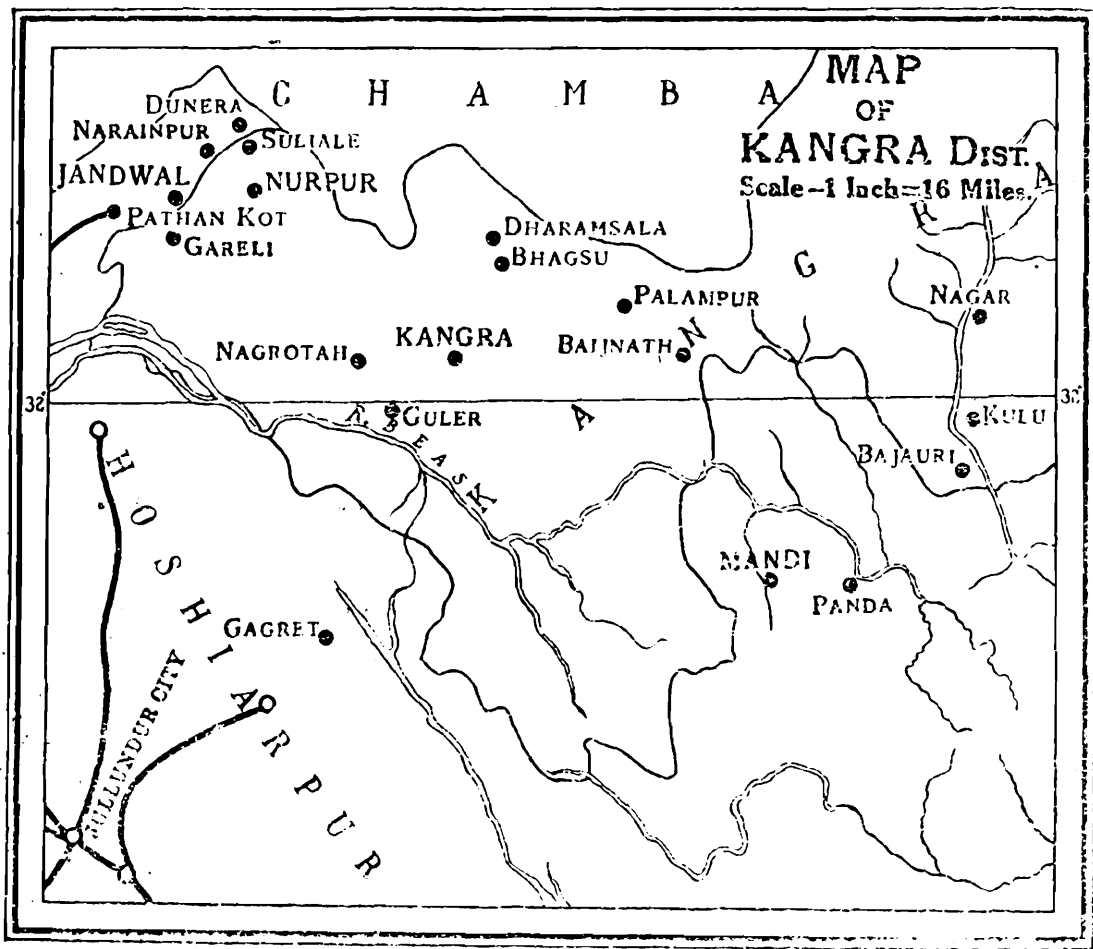
⁴ Some tadpoles in various stages of development were also collected along with other. They have been excluded from this report.

⁵ *District Gazetteers, Kangra district*, XXX A, p. 12 (1917), with Maps and photographs (Published from Lahore).

going over the manuscript and suggesting improvements and for writing a short note on the ecological conditions prevailing in the Kangra valley at the time when the collections were made.

PHYSIOGRAPHY OF THE KANGRA DISTRICT.¹

From the physiographic point of view the entire area may be divided broadly into three divisions, the plains, the mountains and a transitional zone between them, the foot hills. The Kangra district lies in the lower reaches of the Himalayas in the Punjab, bounded on the north-west by the district of Gurudaspur; on the north by the Chamba state; on the south-west by the district of Hoshiarpur; on the south-east by Kulu and the districts of Mandi and Bilaspur (Text-fig. 1).



Text-fig. 1. Map of Kangra district.

The principal river of the district is Beas, which drains the water of the entire surrounding mountains.

There is a great variation of rainfall throughout the district as well as in the surrounding areas. Lower Dharamsala and Palampur have the annual rainfall up to 114 and 110 inches respectively, whereas at Dehra Gopipur and Hamirpur have 58 and 55 inches. Kangra has an average rainfall of 78 inches annually. The average annual temperature of Kangra town is 67.6°F

¹ Adapted from *Punjab District Gazetteers*, VI (part A). pp. 1-11 (1924-25).

LIST OF SPECIMENS WITH LOCALITIES.

Date of collection	No. of specimens	Localities	Name of species		
			SAURIANS	OPHIDIANS	AMPHIBIANS
28.V.1950	5	Swan Nadi, 1½ miles beyond Gagret, alt. ca. 2,000 ft., Hoshiarpur district.	X	X	Family Ranidae <i>Rana limnocharis</i> Weigm.
28.V.1950	5	From the main stream of R. Beas at Dehra Gopipur, Kangra district.	X	X	Family Ranidae <i>Rana tigrina</i> Daud.
6.VI.1950	8+2=10	Neugal Nadi, about 1½ miles from Palampur, Kangra district.	Family Agamidae : <i>Agama tuberculata</i> Gray.	X	Family Ranidae <i>Rana cyanophlyctis</i> Schneid.
7.VI.1950	2	Punhkhad, 1½ miles from Baijnath, alt. 3,330 ft., Kangra district.	X	X	Family Ranidae <i>Rana cyanophlyctis</i> Schneid.
7.VI.1950	8	Binwa Khad at Baijnath, alt. ca. 3,300, ft. Kangra district.	Family Agamidae : <i>Calotes versicolor</i> (Daud.)	X	X
9.VI.1950	9	Mandi Dak Bungalow premises ..	Family Gekkonidae : <i>Hemidactylus brooki</i> Gray.	X	X
10.11.VI.1950	10+2=12	From the main stream of River Beas at Kulu.	Family Agamidae : <i>Agama tuberculata</i> Gray. <i>Agama agrorensis</i> (Stol.)	X	Family Ranidae <i>Rana xyanophlyzria</i> Schneid.
12.VI.1950	6	Trout Farm at Katrain near Nagpur, 4,800 ft., Kulu.	Family Agamidae : <i>Agama tuberculata</i> Gray. Family Scincidae : <i>Leiolopisma himalayanum</i> Gunth.	X	X
15.VI.1950	18	Road from Nagpur to Manali, alt. 6,200 ft.	Family Agamidae : <i>Agama tuberculata</i> Gray. <i>Agama agrorensis</i> Stol. Family Scincidae : <i>Leiolopisma himalayanum</i> (Gunth.)	X	X
15.VI.1950	1+2	Naggar Nala on the road from Naggar to Manali.	X	Family Viperidae <i>Aqkistrodon himalayanus</i> Gunth.	Family Ranidae <i>Rana himalayanus</i> Bonlgr.
16.VI.1950	2	A cold spring at Vashist-Nag ..	X	X	Family Ranidae <i>Rana cyanophlyctis</i> Schneid.
23.VI.1950	1	Stream near P.W.D. Dak Bungalow at Jogindranagar.	Family Gekkonidae : <i>Hemidactylus brooki</i> Gray.	X	X

ECOLOGICAL CONDITIONS DURING MAY AND JUNE 1950.

The collections were made during the hot and dry months of the year when most of the smaller streams had dried up or had just a trickle of water with shallow pools here and there. On account of the melting of the snow, there was, however, considerable volume of cold water in the Beas river and its main tributaries. The House Gecko, *Hemidactylus brooki*, was common in the Dak Bungalow at Mandi, while two species of *Agama tuberculata* and *Agama agrorensis*, were plentiful on rocks by the road side and in the beds of the streams visited by the party. Common frogs of the genus *Rana* were to be found in pools with filamentous algae, but *Rana himalayanus* was found clinging to rocks over which the water was flowing. In such situations, its green colour harmonised with the background and it was difficult to notice it.

SYSTEMATIC DISCUSSION.

SAURIANS.

Family GEKKONIDAE.

***Hemidactylus brooki* Gray.**

1845. *Hemidactylus brooki* Gray, *Cat. Liz. Brit. Mus.*, p. 153 (type locality : Borneo ; London).

1935. *Hemidactylus brooki*, Smith, *Faun. Brit. India*, Rept. and Amph. II, p. 89. 9 specimens (4♂♂, 5♀♀), collected from Dak Bungalow premises, Mandi, 23.VI.1950. 1♂, from a stream near P.W.D. Dak Bungalow at Jogindranagar, 23.VI.1950.

Upper labials 8-10 ; lower labials 7-9 ; preano femoral pores 10-13 on each side of the male specimens.

Snout to vent of 5♂♂ 48-55 mm.

„ 5♀♀ 42-58 mm.

This species has got a very wide distribution. It has already been recorded from the Kulu Valley, Western Himalayas, *alt.* 6,000 ft.

Family AGAMIDAE.

***Calotes versicolor* (Daudin).**

1802. *Agama versicolor* Daudin, *Hist. Nat. Rept.*, III, p. 395, pl. XLIV (type locality : India ; Paris).

1935. *Calotes versicolor*, Smith, *Faun. Brit. India* (Rept. and Amph.) II, p. 189. 1♂, from Binwa Khad at Baijnath, Kangra district, *alt.* 3,300 ft., 7.VI.1950.

It has been recorded from Darjeeling district, Nepal valley, *ca.* 4,500—6,500 ft. (I.M. Register No. 18413) in the Eastern Himalayas and from the Kumaon hills, Western Himalayas at an elevation of 6,000 ft.

***Agama tuberculata* Gray.**

1827. *Agama tuberculata* Gray, *Zool. Journ.* III, p. 218 ; *Illus. Indian Zool.* II, pl. Ixxii (1830-35) ; (type locality : Bengal).

1949. *Agama tuberculata*, Constable, *Bull. Mus. Comp. Zool.* CIII (No. 2), p. 94.

37 specimens as follows :—

8 specimens (5♂♂, 1♀, 2 juv.) from Neugal Naddi about 1½ miles from Palampur, Kangra district, 6. VI. 1950 (Coll. Nos. : 9-16).

7 specimens (4♂♂, 2♀♀, 1 juv.) from Binwa Khad at Baijnath, alt. 3,300 ft. 7. VI. 1950 (Coll. Nos. : 2-8).

4 specimens (3♂♂, 1♀) from main stream of River Beas and its tributaries at Kulu, 10-11. VI. 1950 (Coll. Nos. : 19, 28, 29).

5 specimens (2♂♂, 2♀♀, 1 Juv.) at Trout farm at Katrain near Naggar, alt. ca. 4,800 ft. 12. VI. 1950. (Coll. Nos. : 48-52).

13 specimens (9♂♂, 3♀♀, 1 Juv.) on road from Naggar to Manali, ca. 6,200 ft. 15. VI. 1950 (Coll. Nos. : 28, 31-33, 35, 36, 42-47).

From 5 different localities 37 examples (23♂♂, 9♀♀, 5 juv.) were collected. They measure as follows :—

Snout to vent of 23 ♂♂ : 90—150 mm.

„ 9 ♀♀ : 80—120 mm.

„ 5 juv. : less than 75 mm.

The longest measurement : 120 mm., while Smith¹ recorded measurement of adult as 140 mm.

Out of 9 females, 8 were egg bound (except Coll. No. : 3). 5 had semi-matured eggs (Coll. Nos. : 2, 16, 27, 31 and 36), size varying between 12×9 mm. to 8×6 mm.

2 specimens (Coll. Nos. : 46, 49) were full with 10 and 6 matured eggs, size varying between 22×11 mm. to 20×12 mm. and were ready for expulsion.

From the statistical data presented above, it will be seen that there were 62.2 per cent males, 24.3 per cent females and 13.5 per cent juveniles. There is a great preponderance of males in proportion to females.

Dodsworth² has mentioned that the breeding period of this species commences from the month of May and continues to the early part of August. Our observations also support his views. During the breeding season, the males become very agile and pugnacious and are often seen fighting with each other, as a result of which some time they lose their tails. Specimens with stumpy or regenerated tails are often met with.

During the cold weather, they hibernate but some of them are occasionally seen basking in the sun. In the summer months they are found in abundance.

Agama agrorensis (Stoliczka).

1872. *Stellio agrorensis* Stoliczka, *Proc. Asiat. Soc. Bengal*, p. 128 (type locality : Sussel Pass, Hazara district, N. W. Punjab, India ; Calcutta).

1949. *Agama agrorensis*, Constable, *Bull. Mus. Com. Zool.* CIII (No. 2), p. 95.

6 specimens (2♂♂, 3♀♀, 1 juv.) from the main stream of the river Beas and its tributaries at Kulu, 10-11-VI. 1950 (Coll. Nos. : 18-20, 22-24).

3 specimens (2♂♂, 1♀) on road from Naggar to Manali, ca. 6, 200 ft. 15. VI. 1950 (Coll. Nos. : 39-41).

¹Smith, M. A., *Faun. Brit. India, Rept. and Amph.* II, p. 215 (1935).

²Dodsworth, P. T. L., *Journ. Bombay Nat. Hist. Soc.* XXII, p. 40 (1913).

Agama dayana (= *Stellio dayanus* Stol.) was described from Hardwar, U. P. in 1871. Subsequently it was merged with *A. tuberculata* (*loc. cit.*, p. 214), as there are no distinguishing characters to rank it as a separate species. According to Smith's conception "Both *dayana* and *agorensis* have no doubt been derived from a more widely distributed *tuberculata*, and both have progressed along the same lines. *A. agorensis* appears to be confined to a small area of a country in the extreme north-west of the Punjab and the adjacent hills in Kashmir"

With the collection under report, it has been observed that both *tuberculata* and *agorensis* were collected almost in the same locality, alt. 3,300—6,200 ft. They were found to live under the same ecological conditions with the same type of food habits. The gut contents of both the species showed that mostly insects were eaten. No vegetable matter could be traced. They were heavily infected with nematode worms¹ *Thelandros baylisi* Chatterji.

The chief distinguishing characters on which the two forms have been separated are as follows :

<i>A. tuberculata</i>	<i>A. agorensis</i>
1. Median dorsal scales sub-equal, roundish-hexagonal, imbricate, keeled, 10-15 rows across the middle of the back. Scales about as large as ventrals.	Median dorsal scale distinctly larger than some time twice as large as ventrals, more strongly keeled than <i>tuberculata</i> . 8-12 longitudinal rows across the middle back, may be divided by vertebral series of small scales.
2. Preanal patch of callose scales (6 or 7 rows) and elongated abdominal patch in males.	Abdominal patch usually absent, preanal patch of callose scales present in males.
3. Scales on the flanks with a few scattered enlarged keeled scales.	Flanks with numerous enlarged strongly keeled scales. A large oblong patch on the middle of the flanks always present.
4. Maximum length from snout to vent 140 mm.	Maximum length from snout to vent 110 mm.

In the Indian Museum collection there are 4 specimens (2♂♂, 2 juv.) of *agorensis*, out of which one ♂ (I. M. Register No. 4206) is the type. On examining this specimen, it was observed that the abdominal callose scales on the flanks are absent. Vertebral series of small scales are present between the rows of the median dorsal enlarged scales (Text-figure 2b). Nine specimens identified as *agorensis* from the Kangra valley show these character to a marked degree, except three longitudinal stripes on the back which are present only in juvenile specimens.

Out of 8 adults (♂ and ♀), 7 measure more than 110 mm. from snout to vent and in one specimen it is 132 mm. Total length of a ♀, as recorded by Constable (*loc. cit.*, p. 95), is 226 (74+152) mm.

¹ We are thankful to Dr. B. S. Chauhan and Mr. T. D. Soota for identifying these worms.

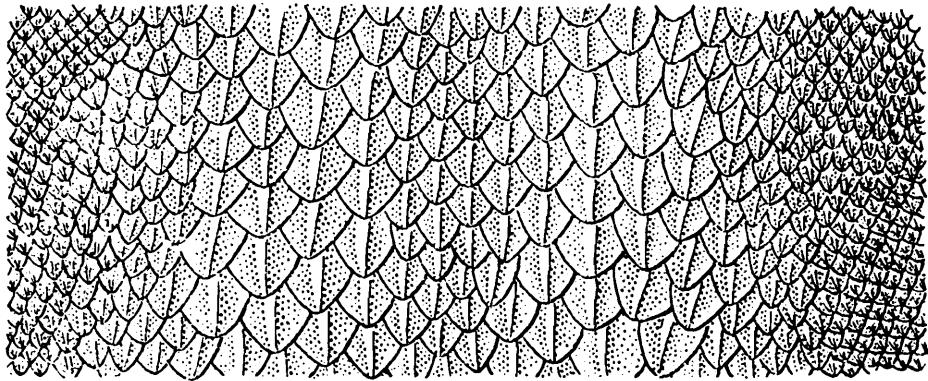
3 ♀♀, specimens measuring from :—

Snout to Vent : 125 mm., had 5 eggs, size 12×9 mm.

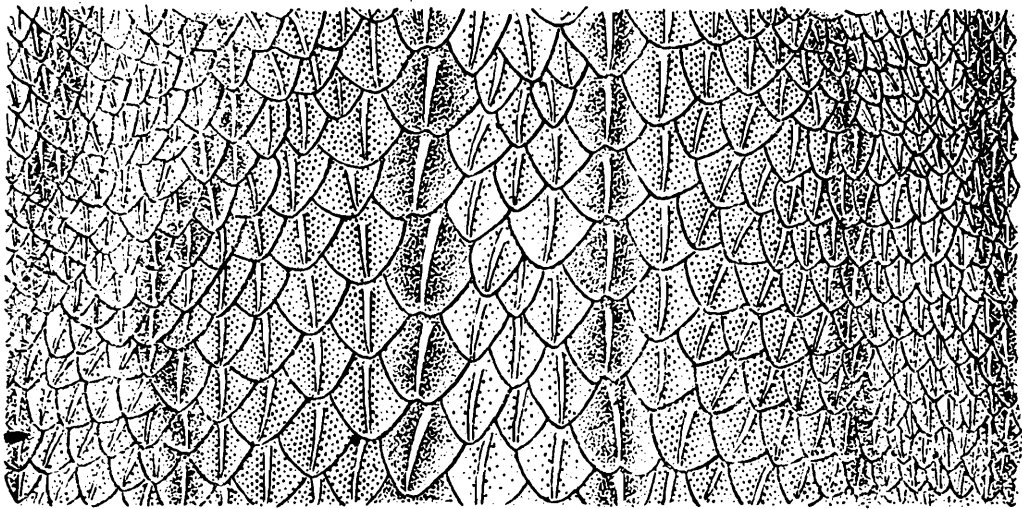
„ 120 mm., 8 „ „ 13×9 mm.

„ 100 mm., 6 „ „ 9×8 mm.

Hitherto *agorensis* was known only from Agror valley, alt. 6,000 ft., N. W. Punjab. In the present case it has been recorded from the western Himalayas (Kangra and Kulu valleys) along with the species *tuberculata*.



a



b

TEXT-FIG. 2.—Dorsal scale pattern of *Agama agorensis* (Stol.) *a*. From Kangra valley : × 6 ; *b*. Type specimen (Register No. 4206) : × 9.

Family SCINCIDAE.

Leiopisma *himalayanum* (Günth).

1864. *Eumeces himalayanus* Günther, *Rept. Brit. India*, p. 86, pl. X, fig. H (type locality : W. Himalayas : London).

1935. *Leiopisma himalayanum*, Smith, *Faun. Brit. India*, Rept. and Amph. II, p. 229.

3 specimens (unsexed) from the road from Naggar *ca.* 6,200 ft., 15. VI. 1950.

1 specimen from Trout farm at Katarin *alt. ca.* 4,480 ft. 12 VI. 1950.

Scales round the mid-body 26-30 ; lamellae under fourth toe 14-18 limbs rather short.

In the western Himalayas, it has been recorded between 4,000 ft. and 7,000 ft. Alcock collected one example (I. M. Register No. 13854) from Borzil Pass, Kosh, Pamir at an elevation of 12,000 ft.

OPHIDIANS.

Family VIPERIDAE.

Sub-family CROTALINAE.

Agkistrodon himalayanus (Günther).

1864. *Halys himalayanus* Günther, *Rept. Brit. India*, p. 393, pl. XXIV, fig. A (type locality : Garhwal, Western Himalayas ; London).

1949. *Agkistrodon himalayanus*, Constable, *Bull. Mus. Comp. Zool.* CIII (No. 2), p. 157.

1 specimen (unsexed) from Naggar Nala at Naggar on the road from Naggar to Manali ca. 6,200 ft., Kulu district, 15. VI. 1950.

Scales in the mid-body 15 ; ventral 159 ; sub-caudals 48 in pairs ; upper labials 7, not touching the loreal pit.

Total length : 510 mm., tail 76 mm.

Bluish brown above with indistinct black spots. Upper lips dirty brown ; ventral part light bluish with no spots.

It is essentially a montanic form and has been recorded (I. M. Register No. 12875) below the glacial line at Dharamsala alt. 16,000 ft.

AMPHIBIANS.

Family RANIDAE.

Rana cyanophlyctis Schneider.

1799. *Rana cyanophlyctis* Schneider, *Hist. Amph.* I, p. 137.

1920. *Rana cyanophlyctis*, Boulenger, *Rec. Ind. Mus.* XX, p. 12.

2♂♂, from Neugal Naddi, about 1½ miles from Palampur, 6. VI. 1950.

2 adult (1♂, 1♀ egg bound) collected from the cold spring¹ at "Vashist Nag", 16. VI. 1950.

2 juv. (unsexed) from Punh Khad, 1½ miles from Baijnath ca. 3, 300 ft., 7. VI. 1950.

2 adult ♀♀, from the main stream of the River Beas and its tributaries at Kulu, 10-11. VI. 1950.

The total length (snout to vent) of 6 adults (3♂♂, 3♀♀) varies between 30 to 35 mm.

In the Himalayas, it has been recorded (*loc. cit.*, p. 15) from an altitude of 6,000 ft., while in Southern India Annandale and Sewell collected one specimen (I. M. Register No. 18993) from a "Small stream near Kotagiri, Nilgiris", alt. 5,700 ft.

¹ In the Kangra district there are many hot and cold springs. They contain good quantity of minerals and some of them are beneficial to health and said to cure goitra. For detailed description and water analysis see *Punjab Distrct Gazetteers*, VII, (Part A), p. 328 (1924-25).

Rana tigrina Daudin.

1803. *Rana tigrina* Daudin, *Rain. Gren. Crap.* p. 64, pl. XX.

1920. *Rana tigrina*, Boulenger, *Rec. Ind. Mus.* XX, p. 17 (*forma typica*).

4 adults (2♂♂, 2♀♀) from Dehra Gopipur *alt. ca.* 3,350 ft., 29. VI. 1950. Field notes "From wells on the way to Jwalamukhi from Dehra Gopipur".

The total length of 4 specimens varies between 69 to 93 mm.

Boulenger (*loc. cit.*, p. 20) has separated *Rana tigrina* (*forma typica*) into two distinct varieties e.g. *crassa* Jerdon and *pantherina* Firtz. The separation is mainly based on the presence or absence of the glandular folds found on the dorsal aspect of the specimens. The number of longitudinal glandular fold of the specimens under report are as follows :—

2♀♀, specimens with 12 and 8 folds.

2♂♂, ,, 8 and 6 ,,

The number of glandular folds of the specimens under report tallies with that of *Rana tigrina* (*forma typica*).

The variety *crassa* Jerdon is distributed from the United Provinces to Ceylon through Madras and Malabar, while *pantherina* Firtz., is found in Burma, Siam, French Indo-China. The typical form of the species is very widely distributed. In the Eastern Himalayas it has been recorded from the Darjeeling district *alt. ca.* 7,000 ft.

Rana limnocharies Weigm.

1835. *Rana limnocharies* Weigm., *Nr. Acta Ac. Leop-Carol.* XVII, p. 255.

1920. *Rana limnocharies*, Boulenger, *Rec. Ind. Mus.* XX, p. 28.

5 juv. (unsexed) from Swan Naddi, 1½ miles beyond Garget *alt.* 2,000 ft., Hoshiarpur district, 28. VI. 1950. Field notes: "A large number of frogs were present among wet pebbles by the side of the stream".

1 juv. (unsexed) from "A stream near P. W. D. Dak Bungalow at Jogindranagar", 23. VI. 1950.

In the Eastern Himalayas (Sikkim), it was collected from an *alt.* 7,000 ft. It has also been recorded from the plains as well as from the high hills in the Western Himalayas.

Rana himalayana Boulenger.

1888. *Rana himalayana* Boulenger, *Ann. Mag. Nat. Hist.* (6) II, p. 50 (type locality : Darjeeling district, Eastern Himalayas, *alt.* not mentioned).

1920. *Rana himalayana*, Boulenger, *Rec. Ind. Mus.* XX, p. 219.

2 adult ♂♂, from Naggar Nala at Naggar on the road from Naggar to Manali *alt. ca.* 6,200 ft., Kulu sub-division of the Kangra district, 15. VI. 1950.

In both the specimens the hind limbs are long and the toes with larger discs, but smaller than those of the fingers and instead of being completely webbed, they are webbed from little below the tip. Fingers rather slender and less stouter than the specimens found in the Eastern Himalayas.

In 1888, Boulenger (*loc. cit.*, p. 50) designated 4 specimens (2♂♂, 2♀♀) collected from Darjeeling, Eastern Himalayas as the types. It will be evident from the measurement chart that the Kangra valley specimens are slightly smaller in size than the types, with the exception of snout (1 mm.); eye (0.5 mm.) and the first finger (1 mm.), and with the rest of the measurements they almost tally with the types.

Measurements in millimeters.

	Type specimens ¹ E. Himalayas			Kangra valley Coll. W. Himalayas			
	♀	+	Average	♀	♀	Average	Deviation
From snout to vent ..	83	80	81.5	79	77	78	3.5
Head ..	27	27	27	27	25	26	1
Width of the head ..	28	29	28.5	28	27	27.5	1
Snout ..	9	9	9	10	10	10	1
Eye ..	9	9	9	9	10	9.5	0.5
Inter orbital width ..	7	6	6.5	6	6	6	0.5
Tympanum ..	3	3	3	3	3	3	..
Fore limb ..	67	65	66	64	65	64.3	1.5
First finger ..	11	11	11	12	12	12	1
Second finger ..	15	15	15	14	14	14	1
Third finger ..	23	22	22.5	23	22	22.5	..
Fourth finger ..	17	17	17	16	14	15	2
Hind limb ..	150	162	156	151	145	148	8
Tibia ..	50	52	51	44	42	43	8
Third toe ..	26	28	27	26	26	26	1
Fourth toe ..	39	42	40.5	35	37	36	3.5
Fifth toe ..	30	31	30.5	27	31	29	1.5

It has been recorded from the Eastern Himalayas, Lebong alt. 6,000 ft., Darjeeling district. In the Indian Museum collection there was a specimen² (I. M. Register No. 13587), collected from Simla, Western Himalayas by A. Newnham in 1891. The specimen is not traceable now.

Family MICROHYLIDAE.

Microhyla ornata (Dum. and Bibr.).

1841. *Engystoma ornatum* Dum. and Bibr., *Erpet. Gen.* VIII, p. 745 (type locality: Malabar coast).

1934. *Microhyla ornata*, Parker, *Mongr. Microhylidae*, p. 139 (British Museum publication).

1♂ specimen from the main stream of the River Beas at Dehra Gopipur alt. ca. 3,350 ft. 29. VI, 1950.

Traces of the rudiment of webs present in the toes. There is a distinct fold across the chest.

Length from snout to vent 24 mm.

In the Eastern Himalayas it has been recorded from Sukhna, Darjeeling district. Boulenger³ has mentioned about a specimen collected from Kashmir.

¹ We have not been able to examine the type specimens as they are not available in the Indian Museum collection. For the sake of preparing a comparative chart, the measurements of the ♀ type specimens have been drawn from Boulenger's paper in the *Rec. Ind. Mus.* XX, p. 220 (1920).

² Slater, W. L., *List of Snakes in the Indian Museum*, p. 11, (1892).

³ Boulenger, G. A., *Faun. Brit. India*, Rept. and Batr. p. 492 (1896).