

NOTES ON A COLLECTION OF BATRACHIA FROM S. WAZIRISTAN

By

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(With two text figures.)

The material collected by Capt. C. M. Ingoldby was kindly sent to me by the Honorary Secretary, Bombay Natural History Society, to be examined and commented upon. The specimens are referable to the following species:—

(?) <i>Rana hexadactyla</i> .	<i>Rana cyanophlyctis</i> .	<i>Rana limnocharis</i> .
<i>Rana tigrina</i> .	<i>Rana sternosignata</i> .	<i>Rana strachani</i> .
<i>Bufo melanostictus</i> .	<i>Bufo olivaceous</i> .	<i>Bufo stomaticus</i> .

(?) *Rana hexadactyla*, Less.1920. *Rana hexadactyla*, Less., Rec : Ind. Mus., Vol. xx., p. 10.

LARVA.

1918. Annandale and Rao, Rec., Ind. Mus., p. 31, Pl. ii., Fig. 2.

There is only one specimen in the collection, without any label as regards the locality where it was taken, and according to Dr. Boulenger this species is purely S. Indian in its occurrence. The specimen itself is not in a very good condition of preservation and I assign it provisionally to this species. It agrees well with Dr. Boulenger's description.

Rana cyanophlyctis, Schneid.1920. *Rana cyanophlyctis*, Schneid, Boul, Rec. Ind. Mus., Vol. xx., p. 12.

LARVA.

1918. Annandale and Rao, Rec. Ind. Mus., p. 30, Pl. ii., Fig. 1.

The bulk of the collection comprises this species, and concerning these forms Capt. Ingoldby writes that "all the frogs were obtained from small pools and overflow or cultivation canals from the Gumal river and the Tank Zam". I seized the opportunity of comparing the measurements of these numerous specimens with my own collection and with the figures given by Dr. Boulenger (Rec. Ind. Mus., Vol. xx., p. 14) for the British Museum collection. The law that governs the proportion of development of the first finger, the diameter of the tympanum and the eye, the length of the snout and the interorbital width is very arbitrary and perhaps very complex. I have examined nearly one hundred specimens of particular sizes of this species and of *R. hexadactyla*, *R. tigrina* and *R. limnocharis* with a view to discover any relation subsisting among the structures mentioned, and within certain limits one can approximately fix the measurements of these structures, provided one of them is given. Thus the length of the first finger will be about $\frac{1}{8}$ in the total length of the body, $\frac{1}{3}$ in the length of first finger nearly equals the interorbital space in *cyanophlyctis*, slightly more in *tigrina*, less in *limnocharis*, and *hexadactyla* lies between the latter two in this regard ;

$\frac{4}{5}$ to $\frac{5}{8}$ in the length of first finger nearly equals the diameter of the eye in *cyanophlyctis*, *hexadactyla* and *limnocharis* and the two are of equal length in *tigrina* ;

$\frac{1}{2}$ of the length of first finger in *cyanophlyctis* and *limnocharis* nearly represents the diameter of the tympanum, less in *hexadactyla* and more in *tigrina*.

The length of the first finger nearly equals the length of the snout in *cyanophlyctis*, *limnocharis* and *hexadactyla* and $1\frac{1}{2}$ times in *tigrina*.

The formula I have stated above is fairly constant in about 85 per cent. of the cases I have examined and the limits of error in the remainder lie between .75 and .5 of the normal proportions. The curves I have attempted to draw

to express the proportionate relation of the different parts I have selected are most discontinuous and as I have mentioned already the equation that underlies them is most complex.

Structurally, the most noteworthy character common to the S. Waziristan specimens is the development of a cornified papilla on the outer margin of the external nares, which is a secondary protective adaptation developed in all the batrachians subjected to dust storms which frequently occur in the hot weather in these parts.

Rana limnocharis, Wregm.

1920. *Rana limnocharis*, Boul. Rec. Ind. Mus., Vol. xx., p. 28.

LARVA.

1918. Annandale and Rao., Rec. Ind. Mus., Vol. xv., p. 32.

There are several specimens of this species in the collection, taken in the same area with *R. cyanophlyctis*. I can discover no differences of any importance between these specimens and the S. Indian forms.

Rana tigrina, Daud.

1290. *Rana tigrina*, Boul. Rec. Ind. Mus., Vol. xx., p. 17.

LARVA.

1918. Annandale and Rao., Rec. Ind. Mus., Vol. xv., p. 34.

There are only two specimens in the collection and both agree well with Dr Boulenger's description.

Rana sternosignata, Murr.

1920. *Rana sternosignata*, Boul., Rec. Ind. Mus., Vol. xx., p. 71.

LARVA.

1918. Annandale and Rao., Rec. Ind. Mus., Vol. xv., p. 36.

There are more than half a dozen specimens in the collection from Ladha, 5,500 ft., which is just below Kaniguran, the Mahsud capital. I notice that Capt. Ingoldby's specimens differ somewhat widely in respect of measurements given by Dr. Boulenger (op. cit., p. 72), and I give them below as worthy of being put on record. Apart from measurements, the other peculiarities noticeable in several of the specimens are the cornification of the tips of digits, the corrugation of the abdominal skin, the presence of short glandular folds on the flanks. The warts on the skin, tipped with horny spines, are usually surrounded by a circlet of smaller warts similarly tipped with spines.

THE MEASUREMENTS OF *R. sternosignata* IN MM.

Two typical forms are selected.						1	2
From the tip of the snout to vent	..	..	..	..	..	72	72
Length of the head	..	..	..	..	..	26	26.5
Width of the head	..	..	..	..	..	30	30
Snout	..	..	..	..	..	11	11
Inter-nasal width	..	..	..	..	..	6	6

Two typical forms are selected.								1	2
Inter-orbital width anterior	5·5	post.	8	mm.	..	..	..	6	6
Distance between the eye and nostril	..	..	..	..	..	..	..	5	5
Diameter of the eye	..	..	..	..	..	..	..	8	8
„ of the tympanum	..	..	..	..	..	..	..	4	4
Distance between the eye and tympanum	..	..	..	..	..	..	..	4·5	5
Anterior limb (including the digit)	..	..	..	..	..	..	..	46	47 (16+31)
1st Finger	..	..	..	..	..	..	..	9·5	10·5
2nd „	..	..	..	..	..	..	..	11·5	13
3rd „	..	..	..	..	..	..	..	14·5	11
4th „	..	..	..	..	..	..	..	11·5	10
Hind-limb	..	..	..	..	..	..	..	105·5	111
Femur	..	..	..	..	..	..	..	25	26
Tibia	..	..	..	..	..	..	..	33	31
Tarsus	..	..	..	..	..	..	..	16	18
Foot	..	..	..	..	..	..	..	31	36
1st toe	..	..	..	..	..	..	..	12·5	12
2nd „	..	..	..	..	..	..	..	18	16
3rd „	..	..	..	..	..	..	..	24·5	21
4th „	..	..	..	..	..	..	..	31	30
5th „	..	..	..	..	..	..	..	22·5	23
Metatarsal tubercle (inner)	..	..	..	..	..	..	..	5	5
Breadth of tibia	..	..	..	..	..	..	..	11	10·5

The measurements of the remaining six specimens agree with the above in general proportions.

Included in the collection there are several tadpoles of all stages, belonging to this species, and Dr. Boulenger writes about them as follows (op. cit., p. 72):—“The large tadpoles (up to 90 mm. long) from Quetta, 5,700 ft., for which I am indebted to Dr. Annandale, are remarkable for the very strongly marked lines of sensory canals, which are black (preservation in formalin).” In the des-

cription of the larvæ in the paper cited above, no reference is made to the "Sensory Canals" which are certainly a striking character. A piece of skin, cleared in acetic acid, bearing these Sensory Canals, shows under the low power of the

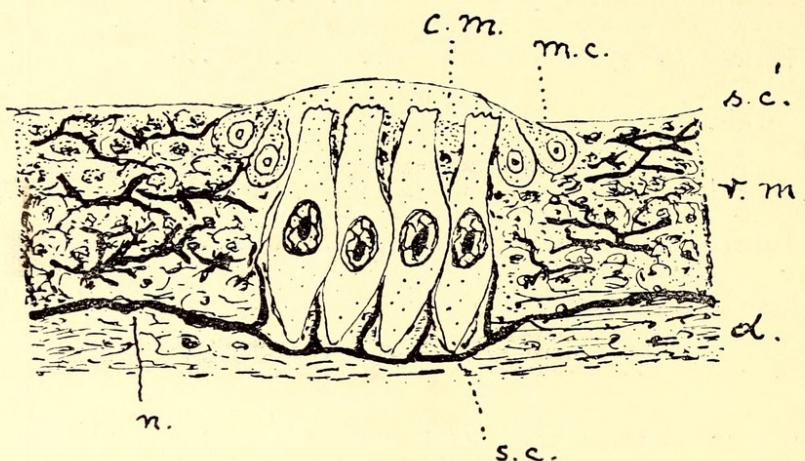


Fig. 1.

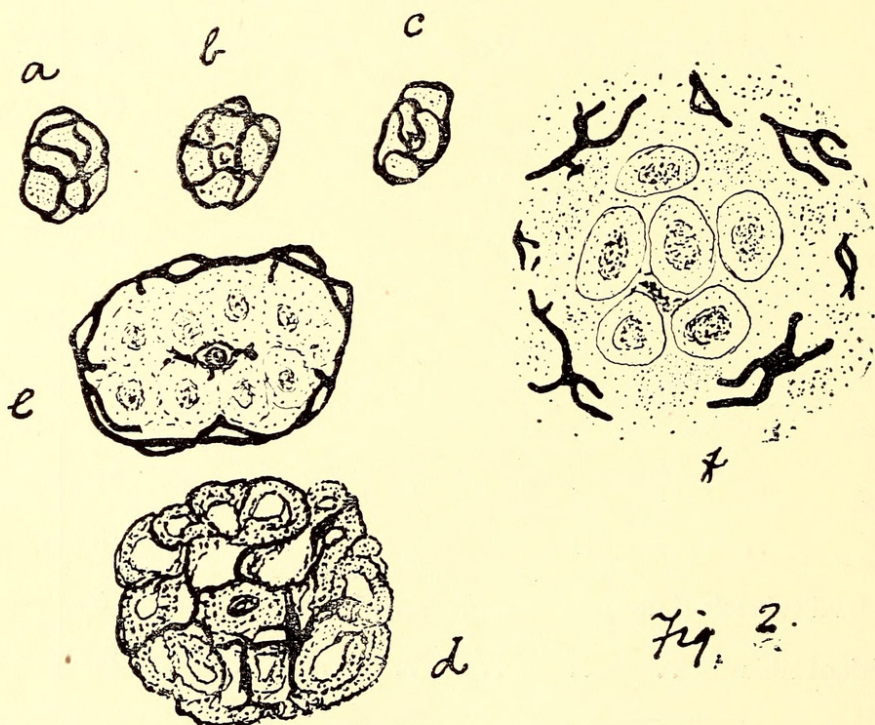


Fig. 2.

microscope a series of peculiarly shaped melanoblasts arranged in rows. In text figure 2, *a*, *b*, *c* represent such cells: *d* is an isolated cell mounted in glycerine. This cell embraces a number of ordinary epidermal cells within its dendritic branches, thus simulating the appearance of a sensory structure. In the examples at my disposal it is possible to follow the fate of these curious

melanophores. At the posterior parts of the "canals," they are in a process of disintegration, the dendrites become thick melanin cords and still surround, as in *e* Fig. 2, the cutaneous cells, in the midst of which the nuclear remains are visible. In Fig. *f*, the degeneration is complete and the pigment bodies have separated and lie round the group of integumentary cells which they held together. For the propose of comparision with these bodies, I am giving in Fig. 1, a section of the true tactile sensory body from the larva of *Rhacophorus maculatus*.

Rana strachani, Murr.

1920. *Rana strachani* Boul., Rec. Ind. Mus., Vol. xx., p. 106.

There is only a single specimen in the collection and I have nothing to add to the excellent description of this species by Murray

Bufo melanostictus, Schneid.

1890. *Bufo melanostictus*, Boul., F. B. I. Rept. Batr., p. 505.

These are several examples of this species in the collection and they do not call for any remark.

Bufo olivaceous, Blanf.

1890. *Bufo olivaceous*, Boul., F. B. J. Rept. Batr., p. 504.

The two specimens included in the collection agree well with Dr. Boulenger's description.

Bufo stomaticus, Lütke.

1920. *Bufo stomaticus*, Rao, J. B. N. H. Soc., Vol. xxvii., No. 1., p. 125.

As regards this toad, of which there are several examples in the collection, Capt. Ingoldby writes that they "were dug up from dry stony ground with no apparent means of exit. One of these specimens was buried some 4 ft., when found it was just alive, but almost without power of movement; it was caked up with hard soil which could not have been disturbed for a great length of time. We found it in the course of digging out a specimen of *Uromastix hardwickii* which are abundant in that part (Kaur bridge)." A prolonged period of æstivation on the part of batrachians affecting dry situations subject to periods of long drought is fairly common and the specimen alluded to by Capt. Ingoldby is in a state of emaciation.



Rao, C R N. 1923. "Notes on a Collection of Batrachia from S. Waziristan." *The journal of the Bombay Natural History Society* 29, 131–135.

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