# BRITISH JOURNAL OF HERPETOLOGY

THE JOURNAL OF THE BRITISH HERPETOLOGICAL SOCIETY

*Vol. I, No. 5* *November, 1951*

## CONTENTS



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# A NEW RACE OF THE ALPINE NEWT FROM YUGOSLAVIA

By Milutin Radovanovic

*Professor of Zoology, University of Belgrade*

The Alpine Newt, *Triturus alpestris*, is abundant in suitable localities all over Montenegro. In 1935 Seliskar and Pehani found in Lake Triglav in the Julian Alps neotenic specimens of this newt in company with a number of fully developed individuals. On August 9th, 1948, I found a new and interesting race of *T. alpestris* in the small lake of Bukumirsko, which lies south of the Komovi Mountains in Eastern Yugoslavia near the Albanian border. Most of the specimens in this lake were neotenic and only three to four per cent. were fully developed. Typical forms of the newt also occur in this district.

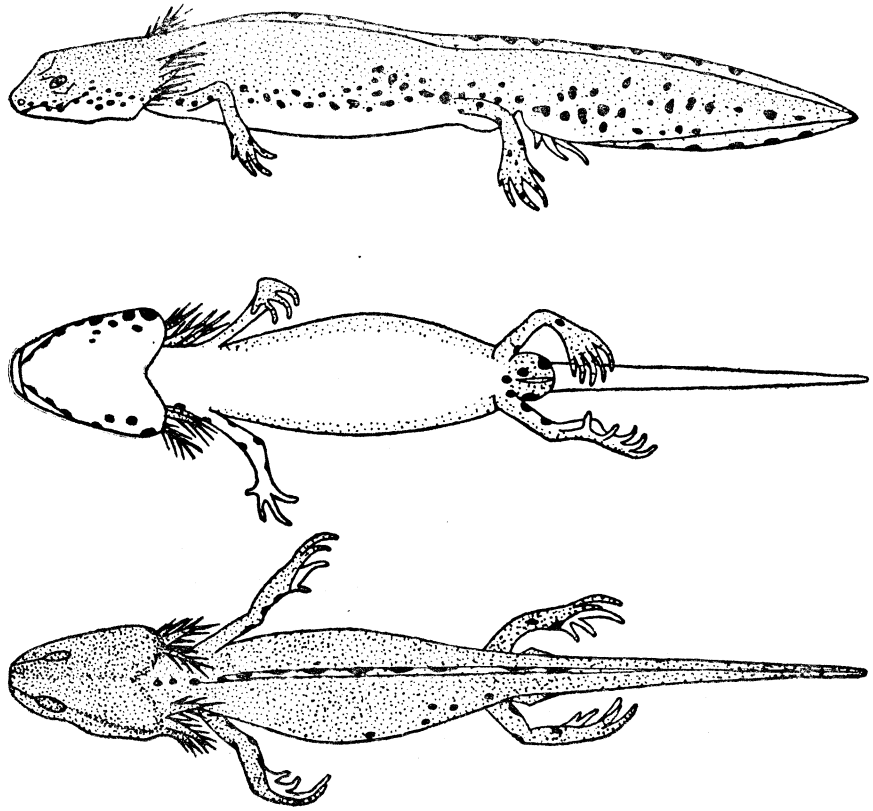

FIG. 1. Upper, lower, and side views of neotenic form of *Triturus alpestris montenegrinus*, subsp.nov. (male).

I propose for the new neotenic form, shown in fig. 1, the name of *Triturus alpestris montenegrinus*. It differs from the typical form in the following particulars. The palatal teeth are in two long curved rows converging anteriorly and posteriorly, and commencing well in front of the internal nares (fig. 2). The cleft of the mouth is small and reaches only to the level of the front of the eyes; in the typical form of *T. alpestris* it extends to the level of the posterior border of the eyes. The head is large, larger even than that of *T. a. reiseri* from Prokosko Jezero in Bosnia. The interorbital width is equal to the distance between the nostrils; the gular fold is deeply indented mesially. There is a low dorsal crest commencing in the male at the level of the scapula; in the female it begins a little further forwards. The external sexual characters of the cloacal gland are well marked in both sexes. The largest specimen is 94 mm. in total length. The average for a number of specimens is 78 mm. The tail is about three-quarters the length of the head and body together. The coloration is fairly constant. The upper parts are uniformly dark grey, usually with small rounded darker spots upon the sides of the body and tail. The belly is pale yellow to orange; it is never of the intense shade that is seen in the typical form.

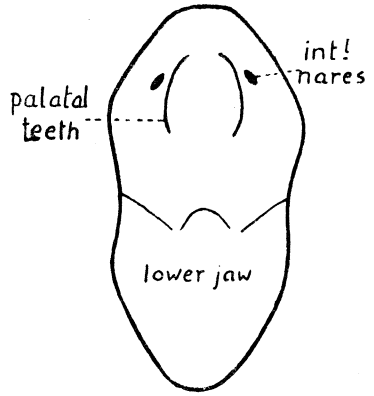


FIG. 2. Open mouth of neotenic *Triturus alpestris montenegrinus*, showing disposition of palatal teeth.

Lake Bukumirsko lies to the east of the village of Lijeva Rijeka on a grassy plateau between the mountains Djebeza and Kariman at an altitude of about 1,430 metres. In shape it is more or less circular with a diameter of between 150 and 170 metres. At the margin of the lake is a shallow shelf some 7 or 8 metres in width followed by a second one 3 or 4 metres in width. The walls then descend steeply into the centre of the lake. In August, 1949, when the water level was low, my measurements shewed a depth of 16 metres. In the spring when the snow melts and drains into



the lake the level of the water is higher. The depth throughout the year I reckon varies from 14 to 20 metres. The margins of the lake have mud in some parts, stone in others. Near the lake is a small spring which flows into it except in the summer when it dries up. There is no other visible source of supply of water. The lake is surrounded by bare or grass covered mountain slopes which are used as grazing grounds for cattle in the summer. The herdsmen wash in the lake and also use it for watering their beasts. The colour of the water when seen from the bank is dark green. The temperature of the water, taken near the edge on the last day of August was in the morning 17°C., at 10 a.m. 18°, and at mid-day 19 degrees. On July 22nd, 1950, the surface temperature was 22° with an air temperature of 26.5°. At a depth of 5 metres the temperature of the water was 20°, and at 10 metres 19°C.

Dr. Bättcher of the Institute of Hygiene, Belgrade, has kindly analysed the water for me and reports as follows :

| | | | |
|---|---|---|---|
| ph ... ... ... ... | 7.7 | Iron ... ... ... ... | none |
| Oxygen mg/l ... ... ... | 7.5 | CaO mg/l ... ... ... | 36.7 |
| Chloride mg/l ... ... ... | 2 | Hardness ... ... ... | 5.5 |
| Nitrate mg/l ... ... ... | 2 | Sulphate mg/l ... ... ... | 2.1 |
| Nitrite ... ... ... ... | none | Magnesium ... ... ... | none |
| Ammonia ... ... ... | none | Residue on evaporation ... | ... 162 mg. |

mg/l = milligrammes per litre

The margins of the lake have many species of aquatic plants, except on the western side where it is bare and stony. On that side the newts are most plentiful. Lake Bukumirsko has a rich fauna. Hairworms of the genus *Gordius* (Nematomorpha) and *Tubifex* (Oligochæta) are abundant. Mollusca are represented by very small mussels and water-snails. *Daphnia* and other small Crustacea are plentiful. There are many aquatic insects, including Caddis-Flies (Trichoptera) — *Limnophilus rhombicus* is very abundant—and the larvæ of Dragonflies (Odonata).

Examination of the stomach contents of the newts showed that their diet consisted mainly of *Daphnia* and other crustaceans, and various species of water insects. In the stomachs of some of the newts were masses of *Gordius* which were probably parasitising some of the insect larvæ eaten.

During the daytime the newts were not often seen; they spent the day in the deeper parts of the lake but towards the evening became more lively and could be observed in numbers. They were abundant in all parts of the lake but were more numerous at the edges than in the centre. On August 20th, 1949, sitting on a raft moored in the water, I watched them for a long time. Occasionally they rose to the surface of the water, swimming straight upwards, and after taking a mouthful of air, sank slowly again. In those specimens dissected the lungs appeared to be well developed.

No other amphibians except the Fire-bellied Toad (*Bombina pachypus*) were seen at this lake although frogs are abundant everywhere in other mountain lakes in Montenegro. The reason for this is probably the un-

usual depth of the water and the steepness of the walls of the lake. On one occasion a Ringed Snake (*Natrix natrix natrix*) was observed swimming in the centre of the lake. There are no fish. I did not see any newts in the neighbouring lake of Rikava nor indeed in any other mountain lake in which there are trout.

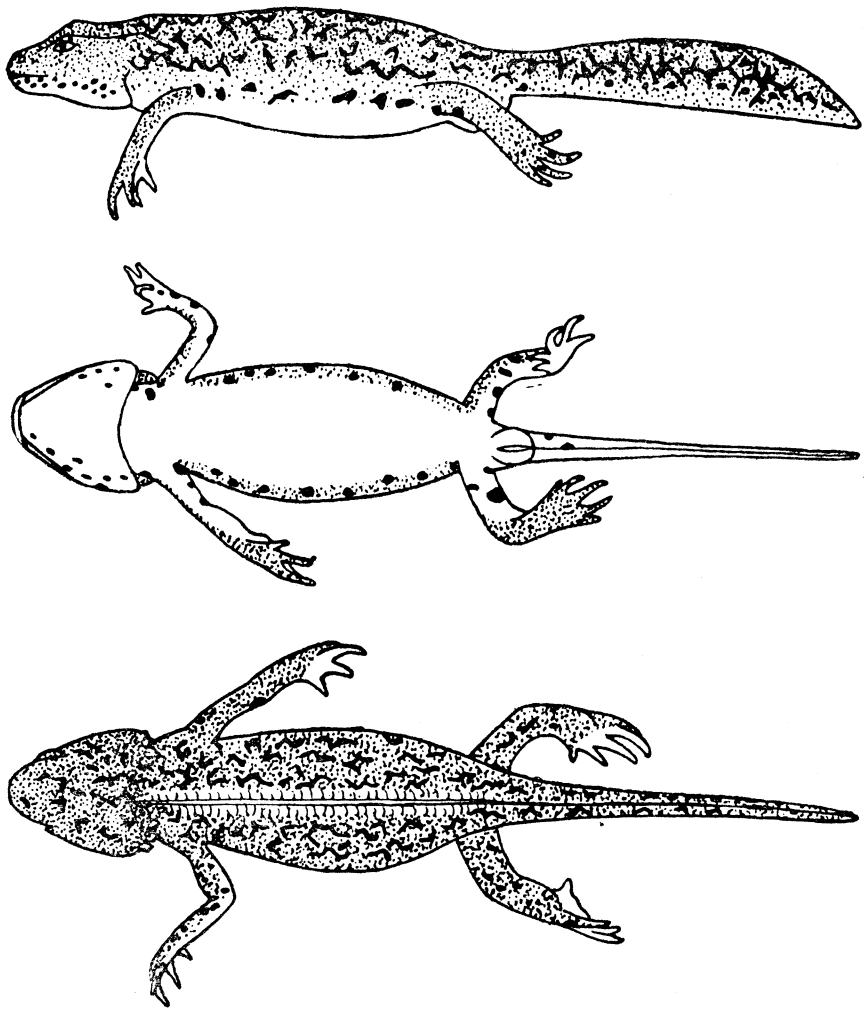

FIG. 3. Upper, lower, and side views of *Triturus alpestris montenegrinus* after incomplete metamorphosis (female).

Specimens of this new neotenic form were brought to Belgrade University and kept in an aquarium. In most of them no change took place and



they lived for about a year. Some individuals did not live so long and a partial metamorphosis took place before they died. There was shrinkage of the gills, the gular fold disappeared and the palatal teeth extended posteriorly and became slightly divergent. The tail increased in length and diminished in depth. The coloration became lighter and the markings more pronounced (fig. 3). In spite of these changes the newts from Lake Bukumirsko were always easily recognisable from the typical form. I did not observe complete metamorphosis in any individual. Female newts kept during the winter in the aquarium laid eggs in May and June, 1950. Unfortunately there were no males with them.

The factors producing neoteny in this lake are not known. Altitude alone cannot be the cause as I have found normally metamorphosing colonies of newts in lakes at greater height (2,000 metres) in Montenegro, Bosnia and Macedonia. The water of Lake Bukumirsko is not particularly cold. There are lakes in the country with lower temperatures. At the end of July, 1950, after a long hot spell the temperature of the water rose to 22°C. and I thought then that the gills of the newts appeared to be reduced in size. On the other hand, in specimens kept in the aquarium with water at higher temperatures there was no reduction in the size of the gills. The chemical composition of the water according to Dr. Bättcher represents nothing unusual and does not differ from that of other mountain lakes in Yugoslavia.

### References

Seliskar, A. and Pehani, H. (1935). Limnologische Beiträge zum Problem der Amphibienneotenie. Beobachtungen an Tritonen der Triglavseene. *Verh. int. Vereinig. Limnol. Beograd.* **7**, 1, 263-271.

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# A PROPOSED STANDARD SYSTEM OF COUNTING VENTRALS IN SNAKES

By

Herndon G. Dowling

*University of Michigan Museum of Zoology, Ann Arbor, Michigan*

The use of the ventral count as an item in the identification of snakes dates back to pre-Linnaean times. Several standard systems of counting ventrals have been proposed, but none of these has attained full acceptance, due to their subjective or other objectionable features.

The posterior end of the ventral count is easily defined; ventrals are usually counted to, but not including, the anal plate. It is the anterior end of the count that is the more difficult to determine. Thompson (1914 : p. 380) defined the anterior end of his ventral counts as beginning with "the

first . . . one that is nearly the standard width; it is frequently distinguished by having a colour similar to the rest of the ventrals and not white or cream like the throat." Most other workers, both before and since, have been less specific, or have failed even to indicate the method of counting. Schmidt and Davis (1941 : p. 26) recommended starting the count with the "first one distinctly wider than long." Other workers have used the "first enlarged plate," and still others the first one "definitely enlarged to form a ventral scute." A considerable amount of subjective judgment enters into all of these methods, and certain of them carry other disadvantages as well. For example, using the definition of "distinctly wider than long" adds the variation of divided or undivided gulars to the variation of added or subtracted ventrals and gives a false indication of the extent of variation in ventral number. The method presented below is an attempt to eliminate these disadvantages.

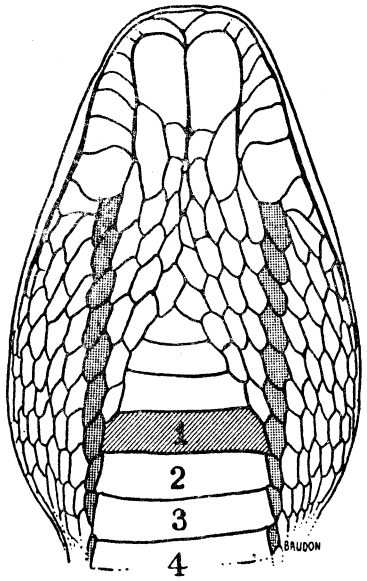


FIG. 1. Ventral side of head of *Elaphe subocularis* (Brown) showing the first row of dorsals (stippled) and the first ventral (oblique lines) as defined herein.

When the ventral surface of a snake is observed, it will be noted that the first row of dorsals (by definition) borders the ends of the ventral plates from the anal plate anteriorly to near the head. In the head region, however, scale rows from the chin and throat (gulars) begin to invade the lateral edges of the ventral row, and as more gular rows are added the



ventrals become smaller and smaller until often they approximate the size of the gular rows before reaching the chin shields. In most, if indeed not in all, snakes with gular rows there is no distinct line of demarcation between "gulars" and "ventrals" anterior to the point where the first lateral gular row is inserted between the first row of dorsals and the ventral series, and any attempt to define a "ventral" in this region (as shown above) is quite subjective. On the other hand, there is often a considerable difference in size and appearance between the ventral scale at this point and the one immediately posterior (Fig. 1). This posterior ventral scale is that scute usually referred to as the "first true ventral" by previous workers and may be defined accurately as shown. Therefore, it is recommended that the starting point for the ventral count be defined as *the first plate bordered on both sides by the first row of dorsals.*

In specimens of ten colubrid genera which have been studied, the anterior edge of the first ventral, as defined above, has been found to correspond in position with the *axis* or the *atlas-axis* articulation of the vertebral column. Thus the ventrals, at least in these ten genera, are anatomically significant in that they agree exactly with the number of dorsal vertebræ. The practical advantages of using the above outlined method of determining the first ventral are twofold : (1) there is a definite and distinct point for beginning the ventral count which may be determined by rapid inspection and which is not subject to interpretation; (2) the apparent variation of the ventral count is reduced by omitting the most anterior ventral scutes which may be divided "gulars" or entire "ventrals," depending upon their size and proportions.

### Literature Cited

Schmidt, Karl P. and D. Dwight Davis (1941). *Field Book of Snakes of the United States and Canada.* G. P. Putnam's Sons, N.Y.: 13 + 365 pp.

Thompson, Joseph C. (1914). Further Contributions to the Anatomy of the Ophidia. *Proc. Zool. Soc. London*: 379-402.

## THE WALL LIZARD *(LACERTA MURALIS)* IN ENGLAND

An unexpected discovery that has recently been made is the existence of a well-established colony of the Wall Lizard in south-eastern England. The district they inhabit—a good deal of which is private property and has not been disturbed for many, many years—has a number of old walls of brick and stone and these, no doubt, provide an ideal habitat for this wall-loving species and account for its survival there. The origin of the colony dates from May, 1932, when 12 specimens were purchased from a dealer in London and liberated in a garden adjoining their present abode. Two more were introduced the following year. Young ones were seen in October, 1933, and a gravid female in the summer of 1934. Fighting

between the males in the spring has been observed on several occasions in recent years. The examination of specimens caught shews that they belong to the typical form *Lacerta muralis muralis,* widely distributed and exceedingly common in most parts of western Europe. It is hoped that those who know of the existence of this colony will not disturb it.

In 1937, some 200 Wall Lizards from France were liberated at Paignton on the south coast of Devon. Some of these are still living in a green-house in the locality but the others have disappeared.

*Pyrford, Surrey.* MALCOLM SMITH.

## UNUSUAL SIZE OF THE SLOW-WORM *(ANGUIS FRAGILIS)* AND THE ADDER *(VIPERA BERUS)* IN THE BRITISH ISLES

Unusually large specimens of the Slow-worm and the Adder have recently been caught in this country and as they are bigger than any previously recorded, deserve mention. The Slow-worm, a male, was obtained at Abbey Wood in the County of London by Mr. Leonard Powell. Its measurements, taken when alive, are as follows: head and body 214, tail 246, total length 460 mm.

The Adder was caught at Westwell, near Ashford in Kent, by Mr. Jack Lester. It was a very brightly marked individual and on that account when first seen was thought to be an unusually large male. Subsequent dissection, however, shewed that it was a female. It measured when freshly killed: head and body 660, tail 80, total length 740 mm. The largest female previously known from this country is the one recorded by Leighton in his *Life History of British Serpents.* It measured 28½ inches, approximately 712 mm. MALCOLM SMITH.

## BOOK REVIEWS

*Zwischen Atlantik und Pazifik. Zoologisches Reiseskizzen aus Nordamerika.*

By Robert Mertens. Stuttgart, 1951. 127 pp. and 60 plates.

Dr. Mertens, the author of this book, is the Director of the Senckenburg Museum and Professor at the University of Frankfurt-on-Maine. His particular interest is herpetology. The book, written in German, describes a 3 months' visit to the United States of America. One month was spent in studying the herpetological collections at the American Museum of Natural History and the remainder of the time in excursions into the country, chiefly in California and Florida. The author makes comparisons of the fauna of Europe with that of the United States, commenting on the



similarity as well as the absence of species in both countries. Birds and fishes are mentioned but the main chapters of the book deal with herpetology. There are 60 excellent plates reproduced from photographs taken of the living animals. Most of them are of the North American amphibians and reptiles. M. A. SMITH.

*The Zoological Record.*

Vol. 85 of the *Zoological Record* is now available, and can be obtained from the Secretary, Zoological Society of London, N.W.8. This publication is of the greatest value to workers in all fields of zoology; its object is to give a reference (with full title and other particulars) to every article or book of zoological importance throughout the world which has appeared during the previous year. Section 16 of the Record deals with Amphibia and Reptilia and costs three shillings. The current number contains the literature mainly of the year 1948. A. d'A. B.

*The British Amphibians and Reptiles.* By Malcolm Smith.

The New Naturalist Series. Collins, London, 1951. Price 21/-.

In this new volume of the survey of British Natural History, which is being published under enlightened editorship, Dr. Malcolm Smith does justice not only to his distinguished reputation, but to his subject. Those in Britain with herpetological interests find themselves in an island with an exiguous and apparently unexciting reptilian and amphibian fauna. They may, therefore, from time to time find it necessary to explain their "fixation" to other biologists who can boast of more extensive material or of interests of more direct relevance in application to immediate human welfare. To any, therefore, who are ignorant of, uninterested in, or frightened by the charming and fascinating creatures about which Dr. Malcolm Smith writes, reference can now be made to this new and illuminating survey. Members of the British Herpetological Society can rejoice that its President has provided such an adequate *Apologia,* if such is required, for the status of that branch of vertebrate biology which the Society fosters.

The author has wisely commenced his book with an introductory chapter on herpetology and its early history. Space requirements obviously insisted that such an introduction should be brief. As it is, the reviewer feels that the treatment here is, in fact, too brief so that a staccato, almost breathless, effect is created. A short second chapter on geographical distribution and on the origin of British amphibia and reptiles, however, acts as a transition from breathlessness to a normal rate of full respiration in the third chapter which initiates, in its account of the newts, the real business of the book. The following 240 pages will be a joy to anyone with a developed interest in newts, frogs, lizards and snakes and, as has been suggested above,

will be a most attractive introduction to these animals for those who do not yet possess this interest. Dr. Malcolm Smith, as those who know him will have expected, writes from his heart, for he loves as well as knows the beasts he describes. But he writes with his head in that his approach is balanced by a deep knowledge of the systematics, ecology, physiology, ethology and anatomy of reptiles and amphibia. We all have our foibles and our own treasured obsessions. As an anatomist, therefore, the reviewer would have been happy to see even more about structure. A physiologist, an animal psychologist, an ecologist, or a natural historian could each, likewise, be able to find gaps which they would willingly see filled. But in such matters a wise sense of proportion is paramount and it is because this volume possesses just this wise sense of proportion that it is bound to be so useful to so many workers.

Chapter 8 deals with the parasites of British reptiles and amphibia. In this specialised field the author has called on the services of Dr. Baylis (for parasitic worms) and Dr. Hawes (for protozoa). Each of these contributors stresses how much still remains to be done in this bewildering and largely unexplored field. For one reader, however, these well-written contributions have opened a new field of interest. There is also a short account of the acarine parasites.

The last chapter deals with some unsolved problems of herpetology and is as refreshing as it is stimulating. There are appendices on classification and a key to British Frogs. A useful glossary, for the general reader, a full bibliography and an index complete the volume. It can be a matter of some pride to the British Herpetological Society that, although only established for three years, a number of references in the bibliography are to papers that have appeared in the Society's journal.

The volume is excellently illustrated in the attractive manner characteristic of the series to which it belongs. There are 88 text figures and diagrams, 33 black and white photographs and 18 excellent, some superb, colour photographs by W. S. Pitt.

It is dangerous to predict the future for any new book. In the present instance, however, the reviewer feels justified in suggesting that Dr. Malcolm Smith has produced a volume that will long be considered a classic contribution to our knowledge of the natural history and biology of Great Britain. He has put every herpetologist in his debt and has crowned a lifetime's work on reptiles and amphibia.

J. D. BOYD.



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