

South African Tortoises of the Genus *Homopus*, with Description of a New Species.

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Among the twenty or so species of tortoises recorded from South Africa there occur two very distinct groups. One group includes the species embraced under the genus *Homopus*, and the other *Testudo geometrica*, Linn., and its allies. As regards the genus *Homopus* five species are known, and the present paper adds another; they are restricted in their distribution to South Africa, with the exception of *H. nogueyi*, which occurs in Upper Senegal, and differ from one another in characters which seem very constant. Of the *geometrica*-group, nine species have been described, all found in South Africa. While some of these appear very distinct, there are others which are unquestionably intermediate in character when large numbers of individuals are available for comparison; their claim to specific recognition must be held as doubtful. South Africa may be considered as the centre of origin of these two strongly marked groups of tortoises, and one may assume that each series has had its own ancestry. An acquaintance with these facts strongly suggested that a thorough investigation of the two series on the spot might yield important results with regard to their geographical distribution, and perhaps reveal phases in the origin of the different species or the intergrading of one species into another.

To carry out such an investigation it is necessary that a large number of individuals should be secured from as many localities as possible, and with this in view "Museum Notes" were inserted in the local papers drawing attention to the zoological interest of the subject, and appealing for assistance to the residents in various parts of the Colony. The response was very gratifying. Within about four months over four hundred live specimens were received from about fifty different sources, and the contributions still continue. The Director of the South African Museum, Mr. W. L.

Slater, very kindly placed at my disposal for study the collection of tortoises, 53 specimens, in his charge.

Thanks are due to the many contributors who have rendered possible the study to its present extent. The notes in the present contribution are confined to the genus *Homopus*, and are somewhat preliminary in character. A large number of facts are accumulating with regard to the *geometrica*-group.

Among the individuals of *Homopus* are a few with characters different from any known form, and of such a nature as to justify the establishment of a new species. I have named it after Prof. G. A. Boulenger, F.R.S., who has done so much for South African herpetology, and assisted me with literature in the present studies.

Homopus boulengeri, n. sp.

Shell very depressed, more than twice as long as deep, flat on the vertebral region, posterior margin reverted, nearly vertical and not or feebly serrated, anterior margin not or feebly serrated; dorsal shields not swollen, concentrically striated, separated by rather deep, narrow grooves; areolae either moderately or deeply impressed; vertebral shields broader than long, as broad or a little narrower than the costals; a small, short nuchal, about as broad behind as long. Marginal plates 12 or 13, rarely 11. Plastral lobes short, from half to one-third the width of the bridge, front lobe truncate, hind lobe openly notched in the female, deeper in the male; the longest median suture is between the abdominals, and is a little over three times that between the pectorals, the suture between the caudals is about the same as that between the pectorals and the gulars, the suture between the femorals is the same or a little shorter than that between the humerals; axillaries small, inguinals large, in contact with the femoral, the abdominal, and two marginals. A pair of small prefrontal scales on the snout, usually preceded by a small median and two lateral plates of nearly the same size as the prefrontals. Beak strongly hooked, feebly tridentate.

Fore limbs covered anteriorly with large, elongated, subequal, imbricate scales or tubercles; five claws to the fore limb, four

rarely five, to the hind limb ; a large conical tubercle on the hinder side of the thigh, surrounded with smaller tubercles in the male.

Colour : Carapace nearly uniformly dark reddish or yellowish brown in living specimens, yellowish in old dead shells, anterior three or four neural shields may be narrowly edged with black in front and on the sides ; plastral shields uniformly dark olive or yellowish, often dark brown anteriorly ; naked parts of skin bright yellow when alive, with minute orange scales.

Length : Largest shell 10.5 cm.

Distribution : South Africa—Districts of Willowmore, Aberdeen, and Beaufort West.

Localities : Willowmore, male and female, presented by J. D. Hugo, Esq., C.C., R.M. Beaufort West, male and two females, presented by P. D. Morris, Esq. Locality unknown, one female ; one carapace, female. Zwart Ruggens, Aberdeen, carapace, male (South African Museum, pres. E. T. Dunn, 1881).

The relationships and distinctive characteristics of the new species can be best expressed in the following synopsis.

SYNOPSIS OF SPECIES OF HOMOPUS.

I. 1. Carapace depressed, of equal depth throughout.

a, *fore limb with four claws ; inguinal shield very small.*

1. Posterior margin of carapace not serrated ; a large femoral tubercle present or absent ; a large prefrontal shield, partly divided longitudinally from behind ; beak strongly hooked ; carapace olive, areolae reddish brown, plastron brown in the middle, yellow towards the periphery ; length, 10 cm. *areolatus.*

2. Posterior margin reverted and serrated ; a very large conical tubercle on hinder side of thigh ; a pair of large prefrontal shields, followed by a large frontal ; beak feebly hooked ; dark or pale brown above, plastral shields yellow, brown anteriorly ; each shield edged with black ; length, 13 cm. *femoratis.*

b, *fore limb with five claws ; inguinal shield large, in contact with femoral.*

3. Posterior margin of carapace feebly serrated ; no large conical tubercle on thigh ; a large frontal and a pair of prefrontal scales ; beak scarcely hooked ; carapace black, each shield with a

yellowish-brown areola ; plastron black and yellow ; length, 9.3 cm. *darlingi*.

4. Posterior margin of carapace serrated ; a very large conical tubercle on thigh ; forehead covered with numerous small and irregular shields ; shell yellow, shaded with brown on the plastron, elegantly freckled and radiated with blackish brown on the carapace ; length, 10 cm. *signatus*.

5. Posterior margin of carapace not or but feebly serrated ; a large conical tubercle on thigh ; a pair of prefrontal scales ; beak strongly hooked ; colour nearly uniformly dark-reddish or yellowish brown above, plastral shields nearly uniformly dark yellow or brown ; length, 10.5 cm. *boulengeri*.

II. 6. Carapace very convex, gibbose behind, posterior margin not serrated ; inguinal shield large, in contact with the femoral ; fore limb with four claws ; a pair of large prefrontal scales, followed by a smaller frontal ; no enlarged femoral tubercles ; dorsal shields reddish brown, yellowish green in centre ; plastron yellowish with reddish-brown spots ; length, 13.5 cm. *nogueyi*.

From the synopsis it will be seen that *Homopus boulengeri* is a well defined species, perhaps most nearly related to *H. signatus* ; but the latter is conspicuously separated from the other species of *Homopus* by its freckled carapace, a type of colouration not hinted at elsewhere in the genus. Allowing for slight variations, the characters of the scales on the forehead (prefrontal and frontal) seem to constitute reliable specific distinctions in the genus, and those of four species are represented on the accompanying plate. A strongly marked concavity in the hinder part of the plastron of the male *H. boulengeri* distinguishes the species from others of the present genus, though common enough elsewhere ; the shell of the male is also flatter than that of the female. In one specimen 4 nails were present on one hind limb, and 5 on the other. Though large, the femoral tubercle is not so strongly developed as in *H. femoralis* : in one specimen, a male, the tubercles are altogether wanting.

From present indications the species seems to have a very restricted distribution in South Africa, being as yet known from only the adjacent districts of Willowmore, Beaufort West, and

Aberdeen. None of the other representatives of the genus have been received from these districts.

Two of the specimens, one living and the other only a shell, seem at first sight very distinct forms, but the differences can evidently be regarded as expressions of senility. The coloration is a uniform pale yellow in the old shell, and a blackish brown in the living example. The concentric lines on the shields have almost disappeared, and the areolae are scarcely recognizable, while their margins are much swollen or nodulated, giving a very irregular appearance to the upper surface of the carapace; the grooves between the shields are deeper but narrower, and the nuchal is either nearly square or much reduced; the marginals united with the bridge are rounded, having lost their feeble angularity. The sutures between the plastral shields are deeper and the surface of the plastron is pitted.

The scales or tubercles on the fore limbs are much shortened, so that they scarcely overlap; the claws are also much shorter than in ordinary specimens, and the tubercle on the thigh is much reduced.

In almost all species of tortoises somewhat similar evidences of old age occur, but not often to so marked a degree as in the present form.

Considering the genus *Homopus* as a whole, each species, as shown in the synopsis, has clearly defined, distinctive characteristics. Where many individuals are available for comparison (*areolatus*, *femoralis*, *boulengeri*) certain variations occur among the members of a species, yet these seem in no way suggestive of relationship with the other species, except perhaps in the case of the femoral tubercles in *areolatus*. In this species all stages can be found from tubercles almost as large as those met with in *femoralis* to their total absence, and, as stated above, they are wanting in one specimen of *boulengeri*. In all the other specific characters there is little or no evidence of intergrading. As will be shown in a later paper this is in marked contrast with the conditions prevailing in the *geometrica*-group, where with a large number of specimens for study specific distinctions are found to be very difficult to establish. If we assume

that the species of *Homopus* are derived from a single stock their fixed characteristics may be taken to indicate the establishment of the species at a distant period, so that their differences have become fixed and intermediate forms have died out; the many members of the *geometrica*-group on the other hand would seem to be a more recent series whose specific characters are not yet fully established or in which overlapping forms have not yet disappeared.

The well defined character of the six species of *Homopus* is further emphasized by their geographical distribution, as each is found to occupy a very distinct area. *Arcolatus* is known from the Districts of Albany, Alexandria, Uitenhage, Cape Town, and Malmesbury, and probably occurs along the whole extent of the south eastern and south western coasts, extending inland until the higher regions are reached. *Femoralis* has been obtained from the Districts of Aliwal North, Wodehouse, Cradock, Middleburg, Hanover, Colesberg, and as far to the north as Barkly West (Warrenton). It thus occupies the north-eastern part of Cape Colony, and very likely will be found extending into the Orange River Colony. *Boulengeri* so far as established has a well defined distribution south of this in the adjacent Districts of Willowmore, Aberdeen, and Beaufort West, a region included within the Karoo Plain. The single specimen of *darlingi* was found far to the north of the *femoralis* area, coming from Mashonaland, Rhodesia. *Signatus* is yet known only from Ookiep, Namaqualand, in the extreme north western part of Cape Colony, while *nogueyi* comes from Medina, Upper Senegal.

Though the specimens hitherto received can be considered as only very incompletely representative of the wide area of South Africa, still the results are significant as far as determined. As yet there is no overlapping of one species with another; no two species have been obtained from any one district. Moreover, the areas indicated above are characterised by distinct geographical and floral features. It is remarkable how closely they conform with the Floral Regions recognised by Dr. H. Bolus in his paper "Sketch of the Floral Regions of South Africa."¹ The South

¹ *Science in South Africa*, Capetown, 1905.

Eastern and South Western Regions of Bolus are the home of *areolatus*, his Karoo Region contains *boulengeri*, the Upper Region is characterized by *femorialis*, in the Western Region bordering on the Kalahari Region is found *signatus*, while *darlingi* in Mashonaland is in a different region from these. The suggestiveness of the facts already established are sufficient to warrant the prosecution of the enquiry ; they lend support to the recent dictum of President D. S. Jordan¹ : " In nature a closely related distinct species is not often quite side by side with the old. It is simply next to it, geographically or geologically speaking, and the degree of distinction almost always bears a relation to the importance or the permanence of the barrier separating the supposed new stock from the parent stock."

It is questionable how far any of the characters relied upon as of specific value can be considered as adaptive or helpful to the animal in the struggle for existence. The colours vary from yellow and green through brown to black, and may be partly protective to the individual when walking over the veld, or resting partly hidden under vegetation or rocks ; the femoral tubercles are certainly protective, covering as they do an otherwise vulnerable part of the creature when retracted. It can, however, scarcely be of much importance to the individual animal whether it has four or five claws to the fore limbs, large or small inguinal shields, a few large or many small head shields, or slightly larger or smaller plastral shields. The specific characters are probably best regarded as expressions of tendencies along certain lines of development which have now become more or less fixed in the different species as a result of isolation and adaptation, and can be relied upon for taxonomic purposes

EXPLANATION OF PLATE XI.

- Fig. 1. *Homopus boulengeri*. Ventral view.
 Fig. 2. *Homopus boulengeri*. Side view.
 Fig. 3. Head scales on *H. darlingi*.
 Fig. 4. " " *H. areolatus*.
 Fig. 5. " " *H. boulengeri*.
 Fig. 6. " " *H. femoralis*.

¹"The Origin of Species through Isolation." *Science*, p. 546, Nov. 3, 1905.

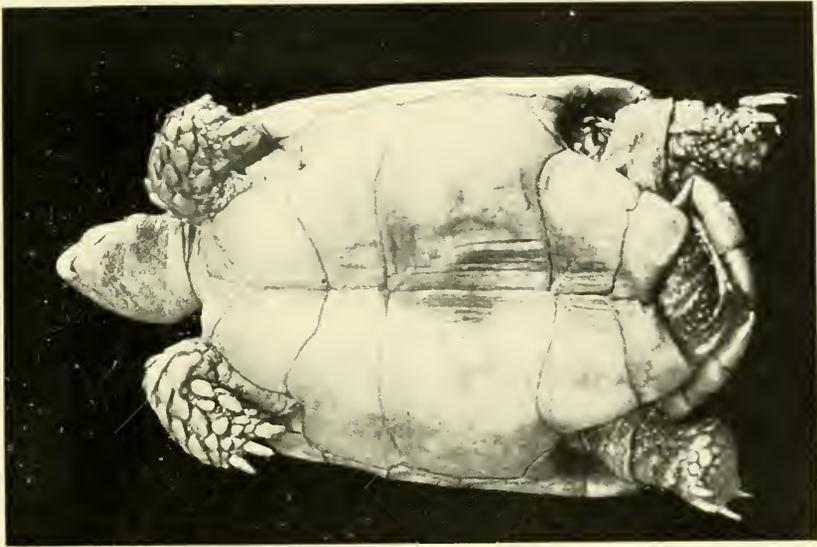


Fig. 1.



Fig. 2.

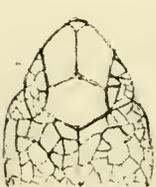


Fig. 3.

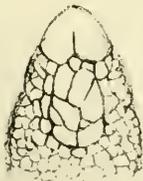


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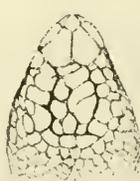


Fig. 5.

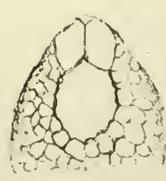


Fig. 6.

Homopus boulengeri.