

## 1. NUCRAS.

*Nucras*, Gray, Ann. N. H. i, 1838, p. 280; Lataste, Ann. Mus. Genova (2), ii, 1885, p. 124; Bouleng. Cat. Liz. iii, p. 52 (1887), and Ann. S. Afr. Mus. xiii, 1917, p. 195.

*Lacerta*, part., Dum. & Bibr. Erp. Gén. v, p. 174 (1839); Bedriaga, Abh. Senck. Ges. xiv, 1886, p. 24.

*Nucras*, part., Gray, Cat. Liz. p. 33 (1845).

*Zootoca*, part., Gray, op. cit., p. 27.

*Bettaia*, Bedriaga, t.c., p. 435.

Head-shields normal. Nostril well separated from the labials, pierced between two or three nasals. Lower eyelid scaly. Collar well-marked. Dorsal scales small; ventral shields feebly imbricate, smooth. Digits cylindrical or very feebly compressed, with smooth lamellae inferiorly. Femoral pores. Tail long, cylindrical.

Tropical and South Africa.

When, nearly 30 years ago, the late Dr. R. Klebs submitted to me the oldest known Lacertid (Oligocene) with the lepidosis preserved through imbedding in amber, a careful comparison with recent lizards led me to refer it to the genus *Nucras*, although the essential generic character of the position of the nostril could not be ascertained, my conclusion being based on an examination of the digits and of the scaling of the gular and pectoral regions, more similar to those of *Nucras tessellata* than of any other lizard with which I was acquainted.\* Since then I have made a more thorough study of the Lacertidæ from the point of view of their probable evolution, and independent, correlative reasons have confirmed my provisional identification so far that, quite apart from any palæontological consideration, I am now inclined to regard *Nucras* as, on the whole, the most primitive genus of the Lacertidæ. At the time I examined the lizard in amber the representatives of the genus were believed to be confined to Africa no further north than the Zambesi basin, and my suggested identification may, therefore, have seemed somewhat risky from the standpoint of zoogeography. We must, however, bear in

\* Cf. R. Klebs, Schrift. Phys.-oek. Ges. Königsberg, li, 1910, p. 227. I have since proposed to designate the lizard as *Nucras succinea*.

mind that, in Tertiary times, the general character of the reptile fauna of the northern parts of what is now the Palæartic Region differed very strongly from that of the present day. Iguanidæ, now confined to the New World, Fiji, and Madagascar, occurred in the Miocene of Europe, and the Pelomedusid Chelonians, at the present time found only in Tropical and South Africa, Madagascar and South America, were represented in the Eocene as far north as England. Within the last fifteen years the range of *Nucras* has been ascertained to extend further to the north in Africa (Lake Victoria), and, in accordance with the view of the probable origin of these lizards, the northernmost species (*N. emini*) has every claim to be considered, from the morphological standpoint, as the most primitive of the genus. I therefore believe that *Nucras* had a northern origin—an opinion further supported by the fact that the Lacertidæ, like the Agamidæ, being absent from Madagascar, must have extended their range towards the south after the connexion of Africa with that island had been severed, whilst the presence of Iguanidæ, Gerrhonotidæ and Chamæleontidæ may be explained by these having reached Madagascar from Africa at a period previous to the southern extension of the Lacertidæ and Agamidæ.

The reasons for regarding the genus *Nucras* as the most primitive of the Lacertidæ are the same as set forth in my remarks on the derivation of the species of *Lacerta* (p. 29), in which *L. agilis* is held to be the surviving representative of the ancestor of most if not all of the species of the genus *Lacerta* with which we are at present acquainted. Of the 10 characters, or sets of characters, there mentioned, 8 are in accordance with this view, the only two (7, 9) pointing to *Nucras* as not so primitive being the reduction of the dorsal lepidosis to smooth granules and the long tail,\* in which all the species at present known agree. Otherwise we find (1) constant presence of teeth on the palate; (2) a non-depressed or feebly-depressed skull of moderate ossification (no supraorbital fontanelle, no dermal ossifications in the temporal region), although less primitive than that of *L. agilis*, owing to the narrower internarial space (comparable to *L. vivipara* in *N. delalandii*, to *L. muralis* in *N. tessellata*); (3) presence, in some forms at least, of the foramen parietale; (4) nostril between two or three nasals, the first upper labial being well separated from it, and absence, in some species, of small scales between the supraoculars and the

\* Unless it be true that the tail of *N. boulengeri* is only  $1\frac{1}{4}$  to  $1\frac{1}{2}$  times the length of head and body, as stated in the original description; but it is not improbable that the fact of the organ being in a regenerated condition has been overlooked.

superciliaries; (5) lower eyelid without transparent disc; (6) no denticulation in front of the ear-opening; (8) cylindrical or feebly compressed digits with smooth lamellæ inferiorly; (10) the ideal type of primitive markings in some forms, no vivid colours on the head or body.

The main principles of the evolution of markings, as held by me, are well supported by a study of the genus *Nucras*, which embraces striated, ocellated, and barred forms. The most primitive pattern, with 11 light longitudinal streaks, at least anteriorly, occurs in *N. intertexta*, var. *holubi*, and in *N. tessellata* (*tæniolata*, Smith). In the latter species the markings may vanish towards the posterior part of the body and the streaks on the sides break up into spots, and, further, rearrange themselves into cross-bars, as happens also in *N. intertexta*, var. *holubi*. The dorsal striation may disappear and lead to ocellated forms (*N. intertexta*, typical). The most pronounced ocellar pattern, accompanied by the loss of the longitudinal streaks, is exemplified by *N. delalandii*, in which, further, the ocelli may disappear, to be replaced by black cross-bars.\* As a rule, the white longitudinal streaks are more numerous on the nape than on the body, but I find one individual exception in a typical *N. tessellata*, where three dorsal streaks are present on the nape and four on the body.

There are two important points in which the striation in *Nucras* differs from that in *Lacerta*: (a) the outer light dorsal streak, instead of starting from the superciliary edge, originates on the border of the frontal shield and then follows the supraorbital border and the parietal shield; (b) the vertebral streak, instead of ending on the base of the tail, may be continued a considerable distance along that organ—a primitive condition in accordance with Eimer's law.

*Synopsis of the Species.*

- I. No small scales between the supraoculars and the superciliaries, or one to three exceptionally present; head not or but little broader than deep; 16 to 22 lamellar scales under the fourth toe.

Head 4 to 5 times in length to vent†; foot as long as or a little longer than head; parietal foramen present; 40 to 51 scales across middle of body; ventrals in 28 to 32 transverse series; transversely enlarged plates under the fore-arm.

1. *N. emini*, Blgr., p. 10.

\* Cf. Ann. S. Afr. Mus. xiii, 1917, pls. vi and vii, where the principal patterns of markings have been figured.

† The head is measured to the posterior border of the ear-opening, the skull being considerably longer than the pileus, thus accounting for Bedriaga's statement that the ear-opening is situated further back than in *Lacerta*, "on the side of the neck."

Head  $4\frac{1}{2}$  to  $5\frac{1}{2}$  times in length to vent; foot not longer than head; parietal foramen usually absent; 34 to 42 scales across middle of body; ventrals in 32 to 37 transverse series; transversely enlarged plates under the fore-arm absent or small . . . . . 2. *N. delalandii*, M.-Edw., p. 13.

Head  $4\frac{1}{2}$  to 5 times in length to vent; foot shorter than head; 45 to 53 scales across middle of body; ventrals in 27 to 34 transverse series . . . . . 3. *N. boulengeri*, O. Neum., p. 16.

II. A series of 2 to 7 small scales between the supraoculars and the superciliaries; 40 to 60 scales across middle of body; transversely enlarged plates under the fore-arm.

Head  $3\frac{3}{4}$  to  $4\frac{1}{2}$  times in length to vent; not or but little broader than deep; foot not or but slightly longer than head; parietal foramen usually present; ventrals in 27 to 34 transverse series; 20 to 26 lamellar scales under the fourth toe . . . . . 4. *N. intertexta*, A. Smith, p. 17.

Head 4 to  $4\frac{3}{4}$  times in length to vent, considerably broader than deep; foot considerably longer than head; parietal foramen usually absent; ventrals in 25 to 33 transverse series; 25 to 31 lamellar scales under the fourth toe.

5. *N. tessellata*, A. Smith, p. 24.