Boivlerger

1. On the lizards allied to lacerta muralis etc.

I. On the Lizards allied to Lacerta muralis, with an Account of Lacerta agilis and L. parva. By G. A. Boulenger, F.R.S., F.Z.S.*

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(Plates I.—VII., and Text-figures 1—12.)

Index.

Variation: Variation in Species of Lacerta; Lines of Evolution .......... 1

Taxonomy: Revision of Genus Lacerta: L. agilis, L. parva, and Species allied to L. muralis ......................... 1

Systematic: Gallotia, Centromastix, un. nn. for Sections of the Genus Lacerta .... 3

Introduction.

In two previous contributions to these 'Transactions' †, I have dealt in detail with Lacerta muralis, and I have now extended my observations to the species that cluster around this highly polymorphic species. But, in order properly to understand the phylogenetic relationships of the members of this group, it is necessary to refer to two species belonging to another section of the genus, because I regard them as the most primitive, the keystone to the study of all the species of Lacerta, viz. Lacerta agilis,

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which also happens to be the type of the genus, and its ally, \textit{L. parea}. The extraordinarily great variations, individual and geographical, to be found in \textit{Lacerta agilis} are a subject deserving of renewed study on a large material. I will, therefore, first give an account of \textit{Lacerta agilis} and \textit{L. parea} before passing on to the descriptions of the allies of \textit{Lacerta muralis}.

A division of the very homogeneous genus \textit{Lacerta} into minor groups is a matter of great difficulty, and has baffled the efforts of those best qualified by a long and patient study to enlighten us. Leaving aside the views of Prof. L. von Méhely, as embracing for the present but a limited number of forms, the treatment of which I have criticized on previous occasions *, I will refer here only to the two complete schemes of classification which have been hitherto proposed, by Dr. J. de Bedriaga and Dr. F. Werner respectively.

1. Bedriaga, 1886 †:

Group I. \textit{L. ocellata} Daud., \textit{viridis} Laur., \textit{princeps} Blanf., \textit{agilis} L., with the intermediate forms \textit{L. pater} (\textit{ocellata}) and \textit{paradoxa} (\textit{agilis}).


Group III. \textit{L. vivipara} Jacq., \textit{praticola} Eversm.

Group IV. \textit{L. echinata} Cope.

A fifth comprises \textit{L. tessellata} Smith and \textit{teniolata} Smith, which, with \textit{Bettaia delalandii} M.-Edw., I place in the genus \textit{Nucras} Gray.

2. Werner, 1904 ‡:


I have no doubt the authors referred to would now repudiate many of these suggestions, but it is instructive to recall them with the object of showing how opinions differ, and how much has to be done in order to arrive at a more correct understanding of the relationships of these Lizards.

The arrangement I would propose, after a careful consideration of all the characters, is as follows:—


Section V. (*Centromastix*, n. n.). *L. echinata* Cope.

Section VI. (*Thelea* Gray). *L. perspicillata* D. & B.

The first section corresponds exactly to Group I. of Bedriaga and Group IV. of Werner; the inter-relationships between its components have been recognised by all recent authors, and are so obvious that no doubt can be entertained as to the species included constituting a natural association, although, in the days of Duméril and Bibron, *Lacerta ocellata* was placed with *L. muralis* in a different section on account of the granular dorsal scales. But the group is hardly capable of definition, so closely does it merge into the three following.

The second section, confined to the Canary Islands, I have no doubt was derived from some now extinct form closely related to *L. ocellata*, var. *pater*, inhabiting N.W. Africa, exceptional specimens of which still show traces of light longitudinal streaks; the two postnasals of *L. ocellata* have been reduced to one.

The third section, which I regard as directly derived from *L. agilis*, has been recognised by Bedriaga and Werner; it may be defined as combining a short snout (usually shorter than the postorbital part of the head), a single postnasal, large scales (25–50 across the body, 14–22 on the gular region), a strongly serrated collar, few femoral pores (5–15 on each side), ventral plates as in Section I., and no teeth on the palate. It should be kept distinct from the *L. muralis* association, although approaching very closely *L. muralis*, vars. *breviceps* and *cavescica*.

The fourth section is so completely linked with the first through *L. agilis*, *parva*,
taurica, peloponnesiaca, and brandti, as to preclude a rigid definition. It constitutes a natural association of forms more or less adapted for climbing, as a result of which the digits are more compressed and more slender, and the lower surface is more even, the overlapping of the ventral plates, which is very pronounced in L. agilis and L. parva, having disappeared or being much reduced, the border of each transverse series of plates forming a nearly unbroken straight line instead of being notched at the junction of every two shields—characters which increase in degree the further the advance in the chains of forms which constitute the group.

The last two sections each contain a single perfectly isolated species, from West Africa and Algeria respectively, to suggest the derivation of which we cannot appeal to any of the species known at present.

Before entering on the descriptive part, I must first state by what principles I have been guided in attempting to trace the derivation of forms in this genus—and in the L. muralis group in particular.

It is not often, when having to deal with the phylogeny of existing species, that one can point to any, actually living at the present time, as forming part of the probable ancestral stock; and yet, in this case, I feel pretty confident that L. agilis and its close ally L. parva have preserved the primitive characters out of which the series represented in Sections I., III., and IV. of the above classification have been evolved. L. agilis is a widely distributed species, now ranging over the greater part of Europe and a considerable part of Northern and Temperate Asia; it is highly variable both in its lepidosis and in its markings, and, even without imagining a greater amplitude of variation than is known in the existing individuals, we find in it a combination of characters which realise the ideal archaic type leading, through more or less broken chains of forms, still in existence, to the most extreme modifications to be found in the three groups mentioned.

So far as the very scanty paleontological material allows us to judge, the genera Lacerta and Nacerus are the only representatives of the family Lacertidae known to occur as far back as the Oligocene and the Miocene *, and these two, which are intimately connected and barely separable, must be looked upon as the original ancestral types, out of which the allied genera Latasta, Acanthodactylus, Psammodromus, Cabrita, Ophiops, Eremias, etc., have been derived by a series of modifications which may be formulated as follows:—

1. Reduction and disappearance of the teeth on the palate.
2. Flattening and weaker ossification of the skull (reduction of the postfronto-squamosal arch), together with elongation and acumination of the rostrum, accompanied by approximation of the nares to each other (reduction in width of the ascending

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process of the premaxillary, as shown in text-fig. 1); reduction in some series, increase in others, of the osteo-dermal plates.

3. Disappearance of the foramen parietale.

4. Disintegration of the head-shields: division of the elements surrounding the nostril; intercalation of granules around the supraocular shields; multiplication of the temporal and labial shields; reduction or division of the lower part of the subocular, ultimately excluding it from the oral border.

5. Formation of a transparent disk in the lower eyelid, and ultimate fusion of the latter with the upper eyelid.

6. Formation of a denticulation or a fringe of scales in front of the ear-opening.

7. Reduction or increase in the size of the scales on the body and tail, decrease in the imbrication of the shields on the belly, reduction and loss of the collar.

8. Lengthening and compression of the digits, accompanied by an increase in the number of inferior lamella; multiplication of the scales round the digits; development of keels on the subdigital lamellae, or of a pectination on one or both sides of the digit.

9. Lengthening of the tail, perhaps accompanied by an increased fragility of the organ.

10. Modification of the patterns of markings, starting from striation, leading on the one hand to ocellation (in longitudinal, irregular, or transverse series), on the other to spotting (longitudinal, irregular), reticulation, and barring. Assumption of vivid colours.

I will now explain how these principles work out when applied to the Lacertidae, and to the species of Lacerta in particular:—

1. Teeth are present on the pterygoids in all members of Sections I. and II. of the genus Lacerta, forming a cluster of two or three series in L. agilis and parca. In Section IV. they persist, constantly or with rare exceptions, in L. taurica, peloponnisiaca, brandti, levii, and jayakari, but disappear in the other species, with rare individual exceptions. They are usually absent in the other Sections.
2. The subject has been discussed in relation to Prof. v. Méhely’s proposal to reverse the series as I conceive it, and I have appealed, in support of my contention, to examples drawn from other groups of Vertebrates; my opinion is also based on considerations derived from a study of Reptilian morphology in series which palaeontology conclusively shows to have evolved in a definite direction. In the case of *Lacerta*, the internarial bony space and the postfronto-squamosal arch are broader in *L. agilis* than in any other member of the genus *. The osteodermal plates are most reduced in the forms with strongly flattened skulls; on the other hand, they increase in development in *L. viridis, ocellata*, and *galloti* (in a different line of evolution), in which a flattening of the head and an elongation of the snout obtain as in Section IV., though to a less extent.

3. It is not necessary to give reasons for regarding the parietal foramen (in relation to the vestige of the pineal eye) as a primitive character. It is absent in three species only of the genus *Lacerta*—*L. jacksonii, vaneselli*, and *echinata*—referred to different sections; also in a few African species of other genera †.

4. Considerations derived from the study of other families of Lizards lead me to assume that the original condition of the nostril is to be pierced in the centre of a single nasal shield. This condition is not found in any of the Lacertidae. The next step is for the nasal to divide into two: nasal proper and postnasal, without the first labial entering the nostril, as we find in some species of *Nucras* and, as an exceptional occurrence, in *Lacerta agilis* and *L. parva*. As the nomenclature of the shields round the nostril has given rise to misunderstandings in *L. agilis*, due to a variability in that species, such as we do not find in any other, it is well to deal here fully with the matter . As becomes a species which is held to be the starting-point of several diverging series of forms, *L. agilis* is evidently in a fluctuating state as regards a character which has been deemed of great importance for the definition of species, even of genera.

In their key to the identification of the species of *Lacerta*, Duméril and Bibron § define *L. agilis* (stirpium) as having “deux naso-frénaires (=postnasals) superposées, la supérieure un peu en arrière de l'inferieure,” and *L. viridis* as with “deux naso-frénaires superposées bien régulièrement,” and this diagnosis has been copied by many later authors. If, however, we turn to the description of the species a little further on in the same work, we find a statement which throws doubt on the interpretation of

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* Cf. Leydig, ‘Die in Deutschland lebenden Arten der Sauurier,’ pls. i.-iii. (1872); Degen, P. Z. S. 1911, p. 23, fig. 6.
† Cf. Degen, t. e. p. 30. I have previously used the presence or absence of the foramen for distinguishing species in the genus *Draco* (P. Z. S. 1897, p. 198).
‡ The interpretation which I gave of the nasal and loreal shields in the ‘Catalogue of Lizards,’ iii, p. 19, has been followed, and supported by a series of suggestive illustrations, by Méhely, in Zichy’s Zool. Ergebn., z. Asiat. Forschungsgr. ii, p. 51, pl. vii. (1901).
§ ‘Erpétologie Générale,’ v. p. 189.
the "deux naso-frénaires" of L. agilis. "Un des caractères distinctifs du Lézard des souches, c'est d'avoir deux plaques naso-frénaires, dont une, la supérieure, est supportée moitié par l'inferieure, moitié par la post-naso-frénale (=anterior loreal). . . . La narine n'est jamais bordée en arrière que par la naso-frénale inférieure, qui, chez quelques individus, se trouve divisée dans le sens longitudinal de la tête en deux parties moins souvent égales qu'inégales et, dans se dernier cas, c'est presque toujours la petite partie qui est la supérieure. D'autres fois, mais c'est beaucoup plus rare, la naso-frénale supérieure est intimement soudée à la post-naso-frénale, se qui rend l'entourage squameux de la narine semblable à celui du Lézard vivipare." Nothing could be more contradictory. If the so-called upper postnasal does not touch the nostril, it is not a postnasal, it is a part of the anterior loreal, as the authors themselves imply by their comparison with L. vivipara, and when the so-called lower postnasal is divided there is no difference from the condition ascribed to L. viridis. But if the authors of the 'Erpétologie' had carefully examined a larger material, they would probably have found specimens which would have justified, to a certain extent, their interpretation of the shields behind the nostril. I have come across a few cases, both in the typical form and in the var. exigua, which answer to the definition in the synopsis quoted above, and I cannot help thinking that such cases, which are to be explained as due to a fusion of the upper postnasal with the anterior loreal, have been at some time examined by them and afterwards forgotten, thus accounting for the confusion in their statements*. In the following series of figures (text-fig. 2), I have represented the principal variations in the nasal and anterior loreal shields of L. agilis.

The condition in a, which I regard as the most primitive, and which agrees with that in the genus Nucras, is a very rare exception, met with by Méchely in a specimen from Hungary and by me in two females, from Swanage and Lausanne; b (♂, Bourestonmouth) and c (♀, Odensjö, Sweden) represent the usual state of things in the typical form, and e is frequent in the var. exigua, with this restriction, that the separation of the lower part of the nasal as a distinct shield is a rare anomaly; d is taken from a specimen from near Paris (♀, Senart); e (♂, Southport) occurs sometimes in the typical form, and is the rule in the var. spinalis; f (♀, Ringwood), in which the anterior loreal is reduced to the upper half, the lower having fused with the lower

* Many of the minor defects of the 'Erpétologie Générale,' which in the last century has been the recognised standard work for the study of Reptiles, are to be accounted for by the fact that the publication of the ten volumes of this monumental work extended over twenty years (1834-1854), some of them having appeared long after they were written, and the process of revision and interpolation must have been a matter of considerable difficulty, especially for the later volumes, after Duméril had been deprived of the assistance of his collaborator Libron, whose premature death occurred in 1848. The synopsis of the species of the genus Lacerta in the appendix to the ninth volume has been prepared with extraordinary levity; the diagnosis there given of L. erpeton (=agilis) may be quoted as an example:—"Ecailles des hexagones en toit, non imbriquées, d'un brun rougeatre tacheté ou occlé de noiratre; dunes verdâtres."
postnasal, is exceptional; \( g (\delta, \text{Zorleni, Romania}) \) occurs in the vars. chersomensis and exigua, but never in the typical form; \( h (\delta, \text{Lepsinskaja Staniza}), \) in which the anterior loreal is suppressed, or fused with the postnasals, is to be found in many specimens of the var. exigua; \( i (\delta, \text{Suchum Kaleh}) \) is due to a fusion of the upper postnasal with the anterior loreal; \( k (\varphi, \text{Vladikaukas}) \) is of very exceptional occurrence, but highly interesting as reproducing the condition normal in \( L. \text{viridis}, \) the frontonasal being in contact with both upper postnasal and anterior loreal.

The arrangement in \( b \) and \( e \) are both frequent in \( L. \text{vivipara} \); one postnasal followed by one anterior loreal is normal in \( L. \text{muralis} \) and several species of the same group, whilst other species of the latter, as well as \( L. \text{para}, \) \( \text{viridis}, \) and \( \text{ocellata}, \) have normally two superposed postnasals followed by a single anterior loreal. Absence of the anterior loreal is not infrequent in \( L. \text{viridis} \) and \( L. \text{vivipara}. \)

As a further stage of evolution in the genus \( \text{Lacerta}, \) I regard the participation of the rostral to the border of the nostril, as in \( L. \text{viridis} \) and \( \text{ocellata}, \) and more or less constantly in some of the members of the \( L. \text{muralis} \) group. A step further still, the nasal portion of the rostral becomes detached as a small shield in front of the nostril, as in some specimens of \( L. \text{danfordii}, \) which in this respect shows the farthest departure from the primitive type in the genus \( \text{Lacerta}. \) In one of the specimens of \( L. \text{agilis} \) (text-fig. 2, \( c \)) and in some \( L. \text{vivipara}, \) it is the lower part of the nasal which has been severed to form a distinct shield between the rostral and the nostril. The presence of this additional shield has lately been used as a specific character, but it is never constant, and it should be regarded as an individual anomaly. This will probably also prove to
be the case in *L. frasii*, known from a single specimen, which appears to be very closely related to *L. vivipara*, some specimens of which have nearly smooth dorsal scales and the parietal shield excluded from contact with the upper postocular.

In *L. agilis*, as in *L. vivipara*, the superciliaries and the supraoculares are in contact with each other, only in rare cases are a few granules intercalated between them. The absence of granules is retained in many specimens of typical *L. ciceris*, in *L. pelopomnesiaca*, and, as an exception, in *L. taurica*; in other species a more or less complete series of granules separates the superciliaries from the supraoculares, and in the extreme form *L. oxycephala* the series is often partly double, whilst the first supraocular shows a tendency to break up into small scales. In some

![Text-figure 3.](image)

Temporal lepidosis in *Lacerta agilis* (a. Bournemouth, b. Farnham, c. Southport), *L. parva* (d), *L. levis* (c), and *L. jagulani* (f).

species of allied genera, such as *Acanthodactylus* and *Eremias*, the disintegration of the borders of the supraoculares into small scales or granules may be carried further still.

In *L. agilis* the temple usually bears very large shields, few in number, but there is much variation, as may be seen from text-fig. 3; in *L. parva* a finer scaling is the rule, and, as we proceed in the *L. muralis* series, we reach a stage in which the temple is covered with minute granules, with or without a central (masseteric) shield, which can be traced back to *L. agilis*. The large upper temporal shields and the tympanic shield may also become reduced or disappear entirely through breaking up into scales. The upper temporal shields, primarily two in number, are deeper in *L. agilis*, and also in *L. ciceris*, than in any other species, and are situated partly on the upper surface of the head (where the anterior forms a suture with the fourth
supraocular), partly on the side, thus combining the two extreme positions met with in *L. muralis* and allies, which Méhely explains as due to the shields not being homologous. I regard them as certainly homologous: if lateral in position, they have been reduced in width and pushed aside by the greater lateral extension of the parietals; if dorsal, the lower portion has disappeared through disintegration. Méhely would agree, I should think, that either case must be a reduction from the condition in *L. agilis*. Méhely’s interpretation answers better in the case of the lizards of the Section *Gallotia*. It seems that the anterior temporal shield, which conforms to the *L. agilis-ocellata* type in *L. stehlini* and *L. simoni*, has in the other species actually fused with the parietal shield, a view which is supported by the fact that, occasionally, in *L. galloti*, a short cleft is present in the parietal, exactly in the position which the suture between the two shields would occupy, and explains why, in this species, unlike most others, the last upper temporal is large as compared to those preceding it.

I conceive five to be the original number of shields on the upper lip to below the eye, the fifth being the subocular. This subocular becomes more and more differentiated from the labials proper by narrowing inferiorly, and may ultimately be excluded from the labial border, as in some *Eremias* and *Acanthodactylus*. In *L. agilis* this shield is very variable in shape, and is usually preceded by four upper labials. Five or six anterior upper labials become normal in several forms of the *L. galloti* and *muralis* groups, and the number is often reduced to three in the *L. vivipara* group. As a general rule, the number of labials increases with the length of the snout.

5. The lower eyelid is opaque, usually with more or less enlarged scales in the middle, in all species of *Lacerta* but one, *L. perspicillata*. In *L. parea, danfordii*, and *angesi* these large scales have a tendency to become translucent, but in *L. perspicillata* a perfectly transparent disk, formed of a single large scale, occupies the centre of the lid. We know of no connecting-links in the genus *Lacerta* leading to this remarkable feature, but we can realize the process of formation of the disk by examples drawn from the genera *Latastia* and *Eremias*, in which we find a varying number (2 or more) of central scales becoming enlarged and transparent, and by their fusion realising the condition in *L. perspicillata*. In *Cubrita* the transparent disk is very large, occupying nearly the whole of the lower eyelid, and, a step further, in *Ophisops*, the lower eyelid has lost its mobility and fused with the upper, such Lizards having been regarded as deprived of eyelids.

6. A denticulation formed by projecting, more or less pointed scales in front of the ear-opening is known in a single species of *Lacerta*, *L. atlantica*, but I find a slight indication of it in some specimens of *L. muralis*, var. *campestris*, and in *L. jayakuri*. The character is further developed and reaches its highest degree in species of *Acanthodactylus*. 
7. The rather large, rhombic or hexagonal, keeled dorsal scales of *L. agilis* lead through various gradations to the smooth granules of *L. ocellata*, and of many of the members of the *L. muralis* group; a tendency to imbrication, more or less marked in *L. agilis* and *L. viridis*, leads to *L. princeps* and, with an increase in size, to *Albiroides* and *Psammodromus*. The distinctly overlapping character of the scales and shields of the lower parts in *L. agilis* is lost in the *L. muralis* group, and the number, 6 or 8, of longitudinal rows of these shields, gradually merging into the lateral scales, may be increased, as in *L. ocellata* and *galloti*, or the differentiation may be more abrupt through disintegration of the small outer shields as in many members of the *L. muralis* group. The large plates forming the so-called collar may be reduced in size and increased in number, at the same time losing the notches between them on their free border, as in *L. muralis* and allies, or they may become adherent to the middle of the breast, as in *Acanthodactylus*; or the whole collar may lose its freedom, and the gular scales pass gradually into the ventral plates, as in *Psammodromus*.

8. Of all the species of *Lacerta*, *L. agilis* has the shortest digits, and they are not at all compressed. In the *L. muralis* group the digits become longer and more compressed, especially distally, as the climbing habits become more and more marked. The series *L. taurica-campestris-serpa* is instructive in this respect. In *L. agilis* the subdigital lamellae are smooth and undivided, or divided into two. In Lizards adapted for arid sandy tracts the subdigital lamellae acquire one or several keels (A. Latastia, *Acanthodactylus*, *Eremias*), and a series of pointed scales may form a serration or fringe on one or both sides of the digit (*Acanthodactylus*). These are clearly adaptations to a special mode of life. I cannot conceive the direction of the series reversed, viz., compressed or serrated digits leading to the simple form of *L. agilis*.

9. If ontogeny is a guide to phylogeny, *L. agilis*, which has the shortest tail in the genus *Lacerta*, must be regarded as the most primitive species in this respect, Lizards at birth having invariably a shorter tail in proportion to the body*. Ménély, who considers the longer tail as the more primitive, observes that extremely long, slender, whip-like tails—as in *L. oxycephala*, for instance—are endowed with greater fragility. This may be true—and here again I would look upon extreme fragility of the organ as a specialization,—but I must say that in *L. agilis*, which has a short and thick tail, individuals with the organ in a regenerated condition appear to me as frequent as in most other species of the genus, and more so than in *L. echiata*, which has the longest and most whip-like tail (spinose at the base, hence the name *Centromastix*).

10. According to Eimer†, whose views have been endorsed by Cope‡ and by

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† Arch. f. Naturg. xlvi. i. p. 239, pls. xiii.—xv. (1881).
Gadow*, but which have been opposed by Méhely†, the primitive type of Lizard is striated, the original light and dark streaks breaking up into spots, and these spots further becoming confluent into transverse lines—tend to form cross-bands, whilst, in another direction, the markings disappear altogether; in the course of the changes—ontogenetic or phylogenetic, as the case may be—the pattern of the posterior part of the body anticipates the evolution of that of the anterior part. Text-fig. 4 makes these principles clear.

Text-figure 4.

Variation of markings in Cnemidophorus, after Cope.
(A–F, C. tessellatus; G–L, C. gularis.)

In most cases the young show a more primitive pattern than the adult, but never the reverse, as would be the case if Méhely's view were correct. The more advanced pattern, on the other hand, may appear at birth, and forms in which this is the case are therefore to be regarded as the most remote from the primitive type.

The ancestral type of *Lacerta* I conceive to have had five ‡ white streaks, separated

‡ Six may be postulated for the Lacertidae, to explain the markings in other genera, such as *Latuslia* and *Acanthodactylus*.
by black, on the upper surface, and three, also separated by black, on each side—11 white streaks in all. Of these, the outer dorsal starts from the superciliary border, and is prolonged on the tail; the upper lateral starts from the posterior corner of the eye, passes above the tympanum, and ends above the hind limb; the median lateral originates on the upper lip, passes through the tympanum, above the fore limb, ends on the anterior face of the thigh, reappears on the posterior face of the thigh, and is continued on the tail; the lower lateral proceeds from the lower lip, extends on the anterior face of the fore limb, and reappears on each side of the belly, ending on the lower anterior face of the thigh. This arrangement is exemplified by a young *L. agilis*, var. *exigua*, assuming the pale brown colour between the black edges of the white dorsal stripes to have been originally white also *, but it is also to be traced, though in a less primitive condition, in some young of the typical form of that species. I regard the disposition of the streaks in the young *Acanthodactylus* here figured as due to an antero-posterior reduction in their number, by which their position may be shifted;

* The ideal primary striation, as seen on the nape of *Acanthodactylus*, has not actually been observed in *L. agilis*, but I expect it will be found some day when larger series of young of the var. *exigua* can be examined.
thus the streaks on the nape are the same in number and position as in the archaic young *Lacerta*, but the vertebral terminates a little beyond the shoulders, and the upper lateral streak is present only on the temple; on the body the latter is absent as such, though represented, as in *L. parea*, by a series of spots; in *L. muralis* we also can trace this series of spots, of which the large blue ocellus so often present above the shoulder is one, whilst the lower series is represented by the blue spots on the side of the belly; the median light dorsal streak has vanished in all the members of the *L. muralis* group, except on the nape of certain specimens of *L. peloponnesiacaca*. It is clear that, in this case, the vertebral streak on the base of the tail is not the homologue of that on the nape. That the markings on the nape should be more primitive than those on the body, as in *L. peloponnesiacaca* and in the above example of *Acenthodactylus*, is fully in accordance with Eimer’s law, and it applies also to *L. agilis*. The scheme given by Mühly for a uniform nomenclature of what he terms “streaks” (light) and “bands” (dark) is correct as regards *L. muralis*, but does not carry us sufficiently far back to be applicable to all the species of *Lacerta*. Further, the topographical terms used are open to objection when we consider the shifting in position which the so-called “superciliary streak” undergoes in *L. agilis*, or the “parietal band” in certain varieties of *L. muralis*; such terms would lead to misunderstandings if applied throughout the genus. A glance at text-fig. 5 will show that the homologising of the streaks is not so simple a matter as one might think at first.

With the disappearance—the squeezing out, so to speak—of the light vertebral streak, the dark area comprised between the inner dorsal streaks may contract, to form a dark vertebral stripe, broad or narrow, and this is to be found in some specimens of *L. agilis*, *L. vieipara*, *L. muralis*, etc., thus constituting another series which leads to the breaking up of the stripe into spots and their disappearance. The light spots which sometimes appear on the dark bands, as in *L. muralis*, var. *pitiusensis*, I regard as secondary. The dark light-edged vertebral stripe is the initial form of Eimer’s scheme, based on *L. muralis*. According to the theory here propounded, one may distinguish three grades in the dorsal pattern of striated members of the genus *Lacerta*, beginning

* It is a remarkable fact that in all these Lizards, when a light vertebral streak or its representative in the form of spots is present, it never extends beyond the base of the tail, although the dorso-lateral streaks are continued farther back.

† I know of only one exception to this law in the genus *Lacerta*, and it is to be found in the aberrant *L. echinata*.


§ Tr. Zool. Soc. xx. 1913, p. 147, fig. 3.

|| It is surprising that Eimer should have omitted to take *Acenthodactylus* into consideration, if we bear in mind that he suggested regarding the species of that genus as varieties of *L. muralis* (l. e. pp. 401, 404). As I have already pointed out, the lack of judgment in the appreciation of structural characters detracts much from the value of his otherwise admirable memoir.
with the most primitive: (a) a light vertebral stripe, (b) a dark vertebral stripe, (c) no vertebral stripe or series of spots. Each of these leads independently to the ocellated, spotted, reticulated, or cross-barred types.

In the evolution of colours, leaving out of consideration the bright yellow, red, or blue tails which form part of the juvenile livery of some Lizards*, the vivid hues (yellow, green, blue, or red) appear first as a seasonal character of the breeding male, before persisting throughout life; they are afterwards passed on to the female. In all Lizards the young at birth are black and white, grey, or greyish brown (blackish in *L. vivipara). In *L. agilis the typical form retains the grey or brown colour, the males being green on the sides during the spring and early summer only; but very exceptionally the green may extend to the upper surface in males, and may appear on the sides in females; in the vars. *chersonensis and *exigua, some specimens of which are further advanced in the direction of *L. viridis, males are sometimes, and females less frequently, green all over, and this colour is retained beyond the breeding-season. In *L. viridis both sexes are usually green when adult, and at all seasons; but in some localities the females retain throughout life the brown colour of the young. Blue over the throat and the sides of the head, or as spots or ocelli on the flanks, occurs more frequently in males than in females, and in some forms is the exclusive endowment of the former. Green may be replaced by bright yellow (upper parts of *L. ocellata, *L. muralis, var. nigricentr is, lower parts of *L. viridis). Red, as an intensification of yellow, passing through orange, adorns the lower parts of many Lizards, especially during the breeding-season, or, derived from reddish brown, the back of certain specimens of *L. agilis (var. rubra), appearing in the same order as does the green; or it may accompany the blue as part of the nuptial garb in the males (*L. peloponnesiaca). The importance of colour for defining species, or even varieties, has been much exaggerated by most authors.

I have now explained the principles which have guided me in my attempt to trace the derivation of forms in the genus *Lacerta. They are entirely at variance with those recently advocated by Prof. v. Meheley. I submit them to the consideration of future investigators, and now pass on to the descriptions of the species, with comments on their relationships.

* Lacertidae, Teiidae, Scincidae, Agamidae. As regards the coloration of the rest of the body, I cannot call to mind a single instance in Lizards in which the young is more brightly coloured than the adult, though in many cases the markings are more sharply defined or the patterns more elegant. This is remarkable, considering that the reverse is the case in many Snakes, Tortoises, and Batrachians.
I.—LACERTA AGILIS AND LACERTA PARVA.

LACERTA AGILIS.

FORMA TYPICA.


Seps argus Laur. Syn. Rept. pp. 61, 161, pl. i, fig. 5 (1768).

Seps ruber Laur. op. cit. pp. 62, 162, pl. iii, fig. 3.

Seps cernulescens Laur. op. cit. pp. 62, 171, pl. i, fig. 3.


Lacerta laurentii Daud. l. c. p. 227.

Lacerta arvensiola Daud. l. c. p. 230, pl. xxxviii, fig. 2.


Lacerta agilis, var. erythrornota Fitzing, N. Classif. Rept. p. 51 (1826).

Lacerta sicula Glückedl, Lotos, 1851, p. 113.


Lacerta agilis, var. annulata, dorsalis Werner, op. cit. p. 30.


Habit stout *, body not depressed. No very great differences in the proportions between the sexes, these differences sometimes very slight †. Head short and convex,

* In spite of its name, the least agile species of the genus.
† The difficulty of deciding on the sex of certain adult specimens from external characters is increased by the fact that females occasionally assume the bright green coloration of males.
1\(\frac{1}{2}\) to 1\(\frac{3}{4}\) times as long as broad, its depth, in the tympanic region, equal to or a little greater than the distance between the anterior corner of the eye and the anterior border of the tympanum; its length 3\(\frac{3}{4}\) to 4 times in length to vent in males, 4 to 5 times in females; cheeks more or less swollen, especially in males; snout obtuse, as long as postorbital part of head as distance from eye to anterior border of tympanum. Pileus 1\(\frac{3}{4}\) to 2 times as long as broad. Neck as broad as the head, or broader, rarely a little constricted. Limbs short, slightly overlapping when pressed against the body, or hind limb reaching as far as the elbow in males, just meeting or hind limb reaching the wrist in females; foot as long as the head or a little shorter; digits cylindrical, covered with two series of scales, one above and one below, or lower series divided into two. Tail cylindrical, often squarish at the base, thick, gradually thinning out in the second third, 1\(\frac{2}{3}\) to 1\(\frac{3}{4}\), very rarely 1\(\frac{3}{4}\) times length of head and body, but little over one-half of the total length in the very young.

Nostril pierced between two*, three, or four shields. Rostral well separated from the nostril, bent back on the upper surface of the snout, its upper borders sometimes meeting at right angle†; frontonasal nearly always broader than long, sometimes divided into two by a longitudinal cleft, narrower than the internarial space‡, in contact with the upper part of the anterior loreal, hardly ever with the postnasal §; suture between the nasals very short, rarely half the length of the frontonasal, sometimes absent through the rostral forming a narrow suture with the frontonasal ||; prefrontals usually forming an extensive suture, sometimes with an azygous shield between them; frontal as long as its distance from the rostral or from the end of the snout, 1\(\frac{1}{4}\) to 1\(\frac{3}{4}\) times as long as broad, broader behind than the supraoculairs, except in the very young; parietals 1\(\frac{1}{4}\) to 1\(\frac{3}{4}\) times as long as broad, outer border forming an angular suture with the two upper temporalis; occipital usually shorter (\(\frac{1}{2}\) to \(\frac{3}{4}\)) than the interparietal, rarely as long, the two shields equal in width or either the one or the other the broader. Four supraoculars, first very small and in contact with the second loreal ¶, second and third large, second usually longer than third, fourth small and in contact with the first upper temporal **; 4 to 6 (very rarely 3 or 7)

* Only in two female specimens (from Swanage and Lausanne) is the first labial excluded from the nostril, such a condition answering to the definition of the allied genus *Xenops*.
† In the female from Swanage just mentioned.
‡ As broad as the internarial space in a male from Düsseldorf.
§ Exception is a female from La Roche-en-Brie, Côte-d’Or, also distinguished by the presence of 4 or 5 granules between the supraoculairs and the supraciliaries. In a female from Lausanne the shield is entirely enclosed between the nasals and the prefrontals.
|| In males from Arlon, Prague, Vienna, in females from Ringwood, Paris, Porté, Lausanne, Mondorf, and in two young from the last locality. In a male from Berlin an azygous shield separates the nasals behind the rostral.
¶ Except in two females from Berlin and in one from Churt. Absent on the left side in a male from Freiburg, Baden.
** Except in a female from Tilford.

VOL. XXI.—PART I. NO. 3.—JUNE, 1916.
superciliaries, first longest, all in contact with the supraoculars, granules being absent or reduced to a few *; suture between the first and second superciliaries as often vertical as oblique. One or two postnasals, followed usually by two superposed anterior loreals, as shown on text-fig. 2, p. 8; the anterior loreal exceptionally single, smaller than the second, or even entirely absent†, the second usually in contact with the second upper labial; 4 upper labials, rarely 5 ‡ or 3 §, anterior to the subocular, which is very variable in shape, sometimes nearly as long as above, sometimes much shorter. Two large and deep upper temporals, usually equal in length, sometimes first or second the longer, each very rarely divided into two; these shields partly on the upper surface of the head, the first rarely forming a slightly convex suture with the parietal ||; the temple below them covered with smaller shields very variable in size and shape (9 to 25 in number), but generally large, among which a central masseteric and a tympanic are often distinguishable (see text-fig. 3, p. 9), the tympanic usually in contact with the second upper temporal. Lower eyelid opaque, with 6 to 10 enlarged, vertically hexagonal scales in the middle, or with two superposed series of such scales.

Pterygoid teeth constantly present, in a small cluster.

14 to 21 (usually 16 to 19) scales and granules in a straight line between the symphysis of the chin-shields and the median collar-plate; gular fold feebly marked or absent, rarely very distinct. Collar with strongly serrated edge, composed of 7 to 12 plates, usually 8 to 10.

Scales on vertebral area (8 to 12 rows) very narrow, elliptic or hexagonal, strongly keeled, juxtaposed, more or less sharply differentiated from the larger dorsolaterals¶, which are much broader, rhombic or hexagonal, subimbricate, and also strongly keeled; lower down on the sides the scales becoming smaller, feebly and diagonally keeled, and then again increasing in size, oval, round, or squarish, smooth or faintly keeled, and passing more or less gradually into the outer ventral plates; 33 to 47 scales (usually 36 to 40) across the middle of the body; 2, or 2 and 3, lateral scales correspond to a ventral plate; 16 (female) to 30 (male) transverse series of scales, in the middle of the back, correspond to the length of the head. Ventral

* 1-2 in a female from Bazias, 2-3 in a male from Frencham Common and in a female from Arlon, 3-4 in a female from Farnham, 3-5 in a young from Mondorf, 4-5 in a female from La Roche-en-Breuil.
† Out of 240 cases I note for the postnasal and anterior loreal: 1, 1 10 times, 1, 2 140 times, 2, 2 55 times, 2, 65 times, 2, 7 2 times, 2, 0 19 times. ‡ means that the anterior loreal is partly fused with the postnasal. §, 1 frequent in the vars. chernomensis and excisa, does not occur at all.
‡ Male from Farnham, female from Chart, male and female from Southport, male and female from Hermannstadt, female from Düsseldorf, 5 specimens from Berlin and Vienna.
§ Female from Freiburg, male from Hermannstadt, young from Lausanne.
¶ Female from Bazias, males from Lausanne, Vienna, and Hermannstadt.
* There are, however, rare exceptions, as in males from Lausanne and in a female from Vienna in which the difference is very feebly marked.
plates overlapping, more or less distinctly detached from each other on the posterior border, in 6 or 8 longitudinal and 24 to 31 transverse series (21 to 29 in males, 27 to 31 in females); the plates of the second series from the median line much broader than the others; the outer plates, when 8 series are present, $\frac{1}{4}$ to $\frac{2}{3}$ the size of those of the adjacent series.

Preanal plate large*, bordered by one, rarely by two semicircles of smaller plates or scales, none of which is much enlarged; usually 6 to 8 scales bordering the preanal.

Scales on upper surface of tibia smaller than dorsals, strongly keeled, sometimes rugose with granular asperities†. 16 to 23 (usually 18 to 21) lamellar scales under the fourth toe. 10 to 17 (usually 11 to 14) femoral pores on each side ‡.

Caudal scales rather narrow and straight above and beneath, broader and more or less oblique on the sides, dorsals and laterals strongly keeled, without or with rather indistinct apical sensory pits, pointed posteriorly §; the whorls nearly equal in length, the fourth or fifth behind the postanal scales containing 24 to 36 scales.

Text-figures 6.

Lepidosis of middle of body, Lacerta argus, ♂; from Berlin.

The coloration and the markings are highly variable, and the latter cannot be well understood without a knowledge of the var. crigua, which is evidently in a less advanced condition in this respect.

It has been stated that the young at birth is marked all over with yellowish white, brown or black-edged ocelli, irregularly distributed or with a mere tendency to form longitudinal series, and that this livery represents the Seys argus of Laurenti. A reference to Laurenti's description || and figure shows, however, that the young examined by him had the ocelli disposed in regular longitudinal series. It is quite true that some individuals show at birth a somewhat irregular disposition of the ocelli, as also happens in the adult; but I am fully convinced that when this is the

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* Divided in a female from Olausjo, Sweden, and in another from Southport.
† A male from Vienna is in this respect very similar to L. nanovarata.
‡ S-9 in a male from Poole, Dorsetshire, according to Bell.
§ In a male from Bournemouth, the point is as obtuse as in some specimens of the typical L. muralis.
|| "Ocelli medio dari, circulo nigro cincti; dorsales obsoletiores, minus distincti; ad nueham vagis, sed extime lacunam affectant. Laterales distinctissime, in sole aureo-fulgide, in tres phalanges, quarum intima utrinque imperfectior, ordinata."
In case these spots will not, later in life, arrange themselves in longitudinal series. I have before me a young example, one day old, from Churt, which does not differ from its mother in the character and arrangement of its markings (longitudinal dark bands and ocellar spots). Further, in the young of the so-called var. rubra the dorsal region does not bear any ocelli. The "argus" livery is not a constant one for the young, as the descriptions of some authors would lead us to believe. In addition to ocelli the very young, which are grey or greyish brown above and white beneath, often have a continuous or interrupted yellowish or white vertebral streak *.

In a number of young, 50 to 35 millim. long from snout to vent, taken in August at the same spot in Luxemburg, I find the following variations (text-fig. 7).

Text-figure 7.

Young *Lucerta agilis* from Mondorf, Luxemburg.

In all of them three dark longitudinal bands run along the body and tail; the median, 8 to 10 scales broad, much narrower than the pileus; the lateral, about 6 scales broad, occupies the space between the upper border of the upper temporal shield and the middle of the posterior border of the tympanum. In most of them the dark median band is divided on the nape by a narrow light streak, which in some

* It is very remarkable that among the very numerous adult specimens I have examined from England and Northern and Central Europe, I should never have come across one in which this streak has persisted uninterrupted, as in the var. *spinalis.*
is continued all along the body, whilst in others it is broken up into a series of spots which are dark-edged on the sides, and a similar series of spots extends along the border of the dark band, thus making three series of dorsal ocelli; or the spots bordering the band are more or less confluent into a light dark-edged streak. On each side there is an upper series of large ocellar spots, starting from above the tympanum and terminating above the hind limb; a light dark-edged streak or a series of ocelli from the tympanum to the thigh and reappearing on the tail; a broad, light, dark-edged streak along each side of the belly on the outer ventral plates; sometimes this ventral streak sends off upward processes which break up into spots, thus forming a fourth lateral series of ocelli. A more or less complete light ring surrounds the tympanum, and the lateral streaks or series of spots never extend on the temple as they do in the vars. *exigua* and *chersomenesis*. Only exceptionally is a light line present from the supraciliary edge along the suture between the parietal and the upper temporals behind which it joins the light line bordering the dark vertebral band, which widens towards the occiput.

In other young, from Baden and Basle, we find a tendency for the lateral ocelli to multiply and to lose their regular arrangement, as is frequently the case in adult males.

The three light dorsal streaks or series of spots evidently correspond to the better-defined streaks of the young of the var. *exigua*, but the outer, bordering the dark dorsal band, have become disconnected from the supraciliary streak. In some cases, however, as has been stated above, the connexion has persisted. That the dark dorsal and lateral bands represent the same in *L. vivipara* and *L. muralis* is beyond question.

This explanation is necessary, as at first sight one might be embarrassed in homologising the markings with those of, say, *L. muralis*, var. *campestris* or var. *fiumana*, in which a dark vertebral band is bordered on each side by a light streak which appears to correspond to that in the same position in *L. agilis*, but which the above evidence shows to have been lost in most specimens of the typical form of this species; there are, however, exceptions, in which the five original light dorsal streaks are represented by as many series of white dots. It would also be impossible to reconcile this pattern of striation with that of *Acanthodactylus vulgaris*, if the key to the problem were not offered by the young of the var. *exigua* (figured in the Introduction, p. 13), which is the least remote from the hypothetical ancestral type.

In the adult the dark borders of the ocelli usually become enlarged into spots (var. *annulata* Werner), often squarish in shape, and other spots may be added and so crowded as to cover the greater part of the dark dorsal band of the young, which may be edged with black, and the same may take place on the sides; the lighter

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* In connexion with these remarks I must observe that I regard Werner's diagrammatic figures 58 and 59 in Zool. Jahrb., Syst. vi. 1892, pl. ix., as incorrect.
ground-colour between the bands may then be reduced to a narrow streak along each side of the back. Sometimes the dark markings are confluent into a vertebral stripe with or without light spots. The whitish eyes of the ocelli or the light dorsal streaks usually persist as central spots or short lines in one, three, or five longitudinal series on the dark vertebral band. The sides bear three or four longitudinal series of black and white ocelli, the upper being the largest and composed of 10 to 15 ocelli from behind the ear to above the hind limb. The ocellar spots are sometimes arranged irregularly or with a tendency to a transverse instead of a longitudinal disposition, but, however irregular they may appear, there are never more than five white eyes in a transverse series on the back (the remains of the five original white streaks) and four on each side—as shown on Pl. I. figs. 4 & 11. In males the lateral ocelli may totally disappear and be replaced by crowded black dots (var. dorsalis Werner). It would be endless to further enumerate the variations in the arrangement of the spots that may be met with in specimens from the same locality. In males and young the upper surface of the head is usually unspotted or with small darker dots, or irregularly arranged spots; in many females and in a few males there are large symmetrical dark brown or black markings, which may form a curved band on the inner border of the supraocular region, and a dark upper temporal band may be well defined. The dark longitudinal bands or series of spots are continued on the tail, the striation or longitudinal arrangement being, however, absent when it has disappeared from the body.

Males, at least in spring and early summer, are yellowish green or grass-green, rarely yellow, on the sides of the head and body, very rarely on the whole body with or without the exception of the median dorsal band which, according to Norman Douglas, may be brick-red instead of brown. Females are grey or brown above, with the darker markings varying from reddish brown to dark brown or black; in rare cases the sides assume the green colour of the males. The lower parts, including the base of the tail, are green or greenish white in males, nearly always dotted with black or with black vermicolations or markings suggestive of Arabic characters†, cream-colour or pale yellow in females, often immaculate, sometimes with black dots all over or restricted to the sides.

A remarkable variation, which affects male as well as female specimens, occurring promiscuously with the more normal type in France, Germany, and Austria, is that known as var. rubra or erythromutus. The back is unspotted, reddish brown to brick-red, the red brighter during the breeding-season, the sides being coloured and

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* For the reason that the vertebral light streak is never continued beyond the base of the tail (see above, p. 14), the median dorsal dark spots, however well they may be developed, are invariably devoid of the white central eye which may accompany each spot on the body.

† I have come across only one case of a male with scarcely any spots on the lower parts. It was obtained at Southport by Mr. O. Grieg (Pl. I. fig. 2).
marked as usual. In very rare cases there are no spots at all on the body, which retains the three dark dorsal lands (var. immaculata Dürigen). Entirely or nearly entirely black specimens have been described (var. atra F. Müll., vars. nigricans, melonata Dürigen).

We thus see that the evolution of colour-variations proceeds in several directions. Firstly, the light striation, which is so well defined on the dorsal side of the young of the var. exigua, tends to disappear, to be replaced by ocelli, which, without losing the serial arrangement of the white eyes, may become irregular or even form crosslands, as is frequently the case in L. ocellata. Secondly, the dark markings may subsist alone to form the three longitudinal bands which are so often present in L. vivipara and L. muralis. Thirdly, the dorsal markings entirely disappear (var. rubra), or the lateral band and the ocelli are replaced, as in some males, by a uniform puncticulation, or even the lateral markings are lost (var. immaadafa). Black specimens appear to be the result of an invasion of the ground-colour by the black markings, not of a darkening of the ground-colour as in some of the black insular forms of L. muralis.

Measurements (in millimetres):

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1. ęż, Lausanne, Switzerland. 2. ęż, Höllstein, Baden. 3. ęż, Transylvania. 4. ęż, Farnham, Surrey. 5. ?, Mondon, Luxemburg. 6. ęż, Odensjö, Sweden. 7. ęż, Vienna. 8. ęż, Swanage, Dorset.

Contrary to the rule in many species of this genus, but in agreement with the majority of lower vertebrates, females are, on an average, larger than males.

**Particulars of Specimens examined.**

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ALLIED TO LACERTA MURALIS.

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**Germany.**

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| ♀, "   | 74  | 34  | 28  | 10  | 16  | 13-12| 20  | 2   | 2   |
| "   | 73  | 36  | 29  | 8   | 16  | 13-12| 19  | 1   | 2   |
| ♂, Freiburg | 80  | 42  | 28  | 11  | 15  | 13-12| 20  | 1   | 2   |
| "   | 79  | 39  | 28  | 10  | 17  | 12-11| 21  | 2   | 2   |
| "   | 58  | 38  | 23  | 9   | 18  | 17   | 18  | 1   | 1-2 |
| "   | 80  | 36  | 27  | 11  | 17  | 14   | 22  | 1   | 1   |
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| "   | 58  | 40  | 25  | 8   | 15  | 12-13| 21  | 1   | 1   |
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| ♀, "   | 85  | 36  | 30  | 10  | 19  | 15-14| 20  | 2   | 2   |
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| "   | 84  | 38  | 30  | 9   | 19  | 12-13| 17  | 1   | 2   |
| ♂, Dresden | 79  | 37  | 27  | 10  | 17  | 13   | 20  | 1   | 2   |
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| "   | 67  | 34  | 27  | 9   | 16  | 15   | 19  | 1   | 2   |
| ♀, "   | 75  | 40  | 29  | 10  | 18  | 12   | 19  | 1   | 2   |

**Austria-Hungary.**

| ♀, Prague | 73  | 35  | 24  | 10  | 15  | 13-14| 20  | 1   | 2   |
| "   | 70  | 37  | 28  | 10  | 17  | 11-13| 19  | 1-2 | 2   |
| "   | 66  | 40  | 27  | 11  | 18  | 13   | 21  | 1   | 2   |

*Vol. xxii.—Part i. No. 4.—June, 1916.*
1. Length (in millimetres) from snout to vent. 2. Number of scales across middle of body. 3. Transverse series of ventral plates. 4. Number of plates in collar. 5. Number of scales and granules between symphysis of chin-shields and median collar-plate. 6. Number of femoral pores (on right and left sides, if differing). 7. Number of subdigital lamellae under the fourth toe. 8. Number of postnasals. 9. Number of anterior loreals.

**Habitat.** Southern Sweden, Denmark, England, France (absent from the West), Belgium, Holland, Switzerland, Germany, Austria-Hungary, North-Western Russia, from Southern Finland to Poland. Highest altitude in the Alps, 1300 m. Generally distributed in the central parts of Europe, it becomes more local to the West. The British localities where its presence has been ascertained are in Surrey, Sussex, Hampshire, Berkshire, Dorsetshire, and Lancashire.

**Var. spinalis Werner.**


Schreiber's var. *bosnica* is founded on the presence of a single postnasal and a single anterior loreal ("Das obere Postnasale mit dem Frenale zu einem einzigen hohen Schildchen verschmolzen") in specimens from Bosnia, a condition which occurs
ALLIED TO LACERTA MURALIS.

but exceptionally in the typical form. In his notes on *L. agilis* from Bosnia and Herzegovina, Werner mentions that out of 38 cases examined, one postnasal and one anterior loreal occurs 25 times; in 6 cases there are one postnasal and two superposed anterior loreals, in 2 cases two postnasals and two anterior loreals, in 3 two postnasals and no anterior loreal, and in 2 one postnasal and no anterior loreal. One postnasal and one anterior loreal, a combination which is very exceptional in the typical form and never occurs in the var. *exigua*, is therefore the rule in this variety.

The two specimens examined by me are here tabulated:

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The number of scales is below the average in the typical form, the dorsal scales are not abruptly differentiated from the dorso-laterals, and Werner refers to the large size of the outer ventral plates—a character, however, not shown by the specimens before me, to the low number of gular scales (13 to 16) and of femoral pores (11 to 13). In one of his specimens the occipital is absent and the rostral is in contact with the frontonasal.

Otherwise the proportions and the lepidosis are as in the typical form, and so is the coloration, except for the median light spots being confluent to form a vertebral streak (var. *spinalis* of Werner), which, according to Schreiber, is but exceptionally interrupted.

Some specimens are said to have the back uniform red or reddish brown, without any markings, as we occasionally find in the typical form and the following variety.

Schreiber regards the Bosnian Lizard as more nearly related to the var. *exigua*, to which it has actually been referred by Boettger (Katal. Rept. Mus. Senckenb. i. p. 82).

*Habitat.* Dinaric Alps (up to 2000 m.), Mountains of Bosnia and Herzegovina (up to 1500 m.), and probably Bulgaria.

**Var. chersonensis** Andrzej.


As pointed out by Kiritzescu, the Roumanian specimens from the Carpathian districts do not differ in any respect from the typical form, whilst the others, which I refer to the var. *chersonensis*, approach the var. *exigua* and also *L. viridis*.

The head is a little smaller than in the typical form, being contained 4 to 4 1/2 times in length to vent in males. One postnasal followed by one anterior loreal, as in the var. *spinalis*, is frequent (18 cases out of 38), but there are often two postnasals, followed by one or two anterior loreals; one postnasal and two anterior loreals,
forming a triangle, as in the typical form, is the exception (7 cases); postnasal or postnasals never in contact with the frontonasal. As in the var. exigua the length of the suture between the nasals varies from one-third to two-thirds the length of the frontonasal, which is often as broad as the internarial space. Frontal 1½ to 2 times as long as broad, sometimes not broader than the major supracaudals. Occipital usually shorter than the interparietal. Subocular much narrower beneath than above. Shields on the temple smaller than the average in the typical form; tympanic usually indistinct. Scales a little smaller, on an average, than in the typical form, more as in var. exigua (17 to 21 along the throat, 38 to 46 across the

Text-figure 8.

Young *Lacerta agilis*, var. chersonensis, from Zorleni, Moldavia.

body), those on the vertebral area much narrower than the dorso-laterals, as in the typical form. Ventral usually in 6 longitudinal series. Präanal plate large, as in the typical form. Femoral pores more numerous (14 to 18, rarely 13), as in var. exigua. According to Kiritsescu, the tail is sometimes nearly twice as long as head and body.

The markings are very variable. Some specimens (Pl. II, fig. 2) have a dark brown vertebral band, measuring ½ to ⅔ the width of the pileus, bearing black spots, in one or two series or irregular, or bordered on each side by a more or less distinct light
line; that this light line is the superciliary streak of Mehely is shown by its condition in one male specimen from Zorleni, Roumania, in which, after having followed the outer border of the occiput, it suddenly turns at an angle towards the middle of the nape, as is also the case in certain specimens of the typical form; the dark vertebral band is sometimes divided by a continuous or interrupted light median streak; the sides show two or three lateral series of black and white ocellar spots, of which the upper are the largest, as in the typical form. Two specimens from Bucarest correspond to Andrzejowski's L. chersonensis*, the analogue of the so-called var. rubra of the typical form, the back between the upper lateral series of ocelli being uniform reddish brown, a little darker in the middle; vestiges of the superciliary light streak are visible on the nape, and preserve their primitive course as a series of whitish dots above the lateral ocelli (Pl. II. fig. 1), thus showing the displacement described above to be in relation with the black vertebral spots. The ground-colour is grey or brown above in females, green in males, all over or except on the head and vertebral band†. Belly greenish in males, profusely speckled with black, yellowish in females, uniform or scantily speckled with black.

The markings of the young vary as much as those of the adult, and the light vertebral streak is likewise exceptional. Some young are highly suggestive, at first glance, of striated specimens of L. muralis, vars. campestris and flumana; but what one would take to represent the light "dorsal" streaks of Mehely are in reality the "superciliaries," which extend likewise along the upper surface of the tail.

Measurements (in millimetres):—

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1, 2. ♂, Kiew. 3. ♂, Zorleni. 4. ♀, Zorleni. 5. ♀, St. George.

* "Corpus fusceum: supra unicolor immaculatum, ad utrinque latus maculis irregularibus nigris versus abdomem deescentibus, lineisque albidis interraptis tribus pictum." The name is therefore not a strict synonym of Kessler's var. orientalis, as believed by Bedringer.

† Kiritsesu confirms for this variety Bedriaga's observation on the var. donicae that the green colour of the males is not seasonal, as in the typical form, but is preserved throughout the year. Some male specimens examined by him have lost all traces of the stripes and ocelli, and are uniform green or green speckled with black, such specimens corresponding to the so-called varieties concolor and punctata of L. viridis.
**Particulars of Specimens examined.**

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The numbers heading the columns are explained under the Table on p. 26.

**Habitat.** Southern Russia along the Dnieper and westwards; Roumania, south and east of the Carpathians.

**Var. exigua Eichw.**


*Lacerta syrificola* Eversm. t. c. p. 344, pl. xxxi. fig. 3.


*Lacerta stirpium* Eichw. op. cit. p. 67.

*Zootoca exigua* Eichw. op. cit. p. 71, pl. x. figs. 1-3.

*Novius exiguus* Gray, Cat. Liz. p. 34 (1845).


*Lacerta paradoxa* (non Razoum.) Bedirg., t. c. p. 170, pl. —, fig. 23.


Lacerta agilis, var. colchica, cremoides, concolor Schreib. op. cit. p. 482.

The proportions are the same as in the typical form, but the length of the head in males is contained 3 1/3 to 4 1/3 times in the length to vent and the pileus is 2 to 2 1/3 times as long as broad. Tail sometimes up to 1 1/3 times length of head and body.

Nearly always two superposed postnasals, followed by one or, more frequently, two superposed anterior loreals, or anterior loreal absent*. The suture between the nasals usually longer, 1/2 to 3/4 the length of the frontonasal, which is usually as broad as or a little broader than the internarial space †. First supraocular sometimes very small, or even almost reduced to a granule, and not touching the second loreal ‡. Superciliaries sometimes reduced to two or three §. Temporal lepidosis very variable, sometimes consisting of a few large shields, sometimes of small, almost granular scales ||; tympanic often indistinct; the two upper temporals, of which the first is nearly always much longer than the second, usually less broad, sometimes but narrowly in contact with the fourth supraocular, or even not touching that shield ¶. Occipital small or very small, sometimes minute. 5 anterior upper labials is very exceptional.

15 to 23 (usually 17 to 20) gular scales. 8 to 13 (usually 9 to 12) plates in the collar. 34 to 52 scales across the middle of the body, usually 40 to 49. In some specimens the scales on the vertebral region are much narrower and abruptly differentiated from the

* Out of 150 cases, 2 postnasals and 2 anterior loreals occur 61 times; 2 postnasals and 1 anterior loreal 36 times; 2 postnasals and no anterior loreal 39 times; 1 postnasal and 2 anterior loreals 14 times; the upper or the lower part of the anterior loreal sometimes fused with one of the postnasals (this is expressed in the table by $) Specimens with these and other head-shields abnormally multiplied by division have been figured by Cugunov, l. e.

† Narrower in specimens from Moscow, Tomsik, Novorossik. Urkatch, Ala Tau, Lepsinskaja Staniza, Altai; in contact with both postnasal and anterior loreal in 5 specimens (Jelenowka, Vladikaukas, Lepsinskaja Staniza, R. Kungess).

‡ In 14 specimens. It is curious to read that Bedriaga (l. e. p. 135) regarded this condition as more characteristic of L. viridis.

§ Specimens from R. Kungess. A female from Vladikaukas is exceptional in having a series of 8-10 granules between the superciliaries and the supraoculare. According to Bedriaga, a series of granules may be present in specimens from the Volga district. Otherwise, I have never found more than one or two granules.

¶ Male from Altyn Emel, and male from Jelenowka.

‖ In the types of L. paralecta (Pl. 11. fig. 9) and in a male from Batum.
dorso-laterals, as in the typical form, whilst in others, often from the same locality, the
dorso-laterals are only a little broader than the mid-dorsals, and as this peculiarity is
usually accompanied by an increase in the number of scales across the body (45 to 52),
the scaling of such specimens does not differ in any way from that of a typical
*L. viridis*. The ventral plates are usually in 6 rows; if in 8, the outer plates are
usually very narrow; in some specimens the differentiation between the ventral plates
and the lateral scales is quite abrupt.

Praanal plate usually smaller than in the typical form (its length equal to or less
than its distance from the anterior femoral pores), bordered by two semicircles of
scales, two of which in front of the plate are often much enlarged and plate-like *", as
figured on Pl. II. fig. 8, or even fused to one plate as large as the praenal, as in the
type figured by Eichwald.

Femoral pores rather more numerous, 12 to 18 on each side †, usually 13 to 16.
30 to 36 caudal scales in the fourth or fifth whorl.

Young, brown above, constantly with three light, sometimes black-edged, well-
defined longitudinal streaks; the median begins behind the occipital shield and ends
on the base of the tail, the lateral usually extends from the fourth supraocular near
the end of the tail, or, losing its connexion with the superciliary border, from the
outer third of the parietal shield. Three or four whitish lateral streaks, or series of
whitish black-edged ocellar spots on each side, the two upper originating on the side
of the head, as figured on p. 13.

These markings usually persist in the adult, with the addition of a series of large
squarish or irregular dark brown or black spots between the light dorsal lines (Pl. II.
figs. 5, 6), which may be edged with black (Pl. II. fig. 4). In males, which are often
green all over, and permanently, including the light dorsal streaks, the spots may be
accompanied by numerous black dots (Pl. II. fig. 5). Some specimens lose more or
less completely the markings and are uniform green above, or green finely speckled
with black as we often see in *L. viridis*. Females are usually grey or brown, but
sometimes green like the males †. A female from Minussinsk, Yeniséisk (Pl. II.
fig. 7) is pale reddish brown, with a yellowish vertebral streak and a bluish-grey
dorso-lateral band; only scanty vestiges of the ocellar spots on the sides. Schreiber
describes a var. *concolor*, uniform olive-brown.

Lower parts yellowish or greenish white, or yellow, uniform or dotted with black,
the dots usually more profusely distributed in males than in females.

† Up to 20 according to Rathke; 10 to 16, usually 12 to 15, according to Cugunov, who has tabulated
the variations in 89 specimens from the Iwanškaia district on the Trans-Siberian Railway.
‡ According to Bedriaga, wholly green specimens (var. *danicus* Bedr.) are so in both sexes in Southern
European Russia, whilst in Transcaucasia and in the Kirghiz Steppes the females are brown. A similar
colour-dimorphism in females, according to districts, appears to occur also in *L. viridis*. 
Measurements (in millimetres):

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**Particulars of Specimens examined.**

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**Habitat.** South-Eastern and Central Russia in Europe East of the Dnieper, Transcaucasia and Armenia, Western Siberia and Central Asia Eastwards to the Yenisei and the Altai and Tian Shan Mountains. Ascends the Caucasus to the altitude of 2000 metres.

The forms into which *L. agilis* is divided may be defined as follows:—

**Forma typical.** Usually 1 or 2 postnasals and 2 anterior loreals; suture between the nasals very short, rarely half the length of the frontonasal, which is narrower than the internarial space (with rare exceptions); 33 to 47 scales across the body, usually 36 to 40; preanal plate large, bordered by one, rarely by two semicircles of scales; 8 to 17 femoral pores on each side, usually 11 to 14; light vertebral streak never continuous in the adult.

**Var. spinalis.** Usually 1 postnasal and 1 anterior loreal; suture between the nasals very short; frontonasal narrower than the internarial space; 32 to 35 scales across
the body; praeanal plate large, bordered by one semicircle of scales; 11 to 13 femoral pores; a light vertebral streak usually present.

Var. chersonensis. 1 or 2 postnasals and 1 or 2 anterior loreals; suture between the nasals \( \frac{1}{4} \) to \( \frac{2}{3} \), the length of the frontonasal, which is often as broad as the internarial space; 38 to 46 scales across the body, usually 40 to 45; praeanal plate large, bordered by one semicircle of scales; 14 to 18 femoral pores, rarely 13; a light vertebral streak usually absent in the adult.

Var. exigua. Usually 2 postnasals; anterior loreals 1 or 2 or absent; suture between the nasals \( \frac{1}{4} \) to \( \frac{3}{4} \), the length of the frontonasal, which is usually as broad as the internarial space; 34 to 52 scales across the body, usually 40 to 49; praeanal plate usually rather small, bordered by two semicircles of scales, one or two of which, in front of the plate, are often much enlarged and plate-like; 10 to 20 femoral pores, usually 13 to 16; a light vertebral streak usually present.

I should like to emphasize the fact that these forms are not sharply definable, and to express the hope that future writers will refrain from availing themselves of the above characters for the purpose of raising the varieties to the rank of species, as has been done by Schreiber in the analogous case of L. viridis, basing his definitions chiefly on characters first pointed out by me nearly 30 years ago, but leaving out of consideration the numerous exceptions which justify the course I have followed.

I consider L. agilis, and more especially the var. exigua, as the ancestral type from which L. viridis on the one hand and the species of the L. muralis group on the other have been evolved. As regards the latter, the Oriental species with two superposed postnasals are connected with it through L. parea. The other species, with primarily a single postnasal, are separated by a wider gap, which is only partly filled up by L. taurica and L. peloponnesiaca. If I am right, South-Eastern Europe and the neighbouring part of Asia are to be regarded as the centre of origin of the existing species of the genus Lacerta.

How the markings of the striated forms of the L. muralis group can be derived from the more primitive pattern of the young L. agilis, var. exigua, is explained further on, when dealing with L. parea.

Difficulty has often been experienced in distinguishing the Eastern varieties of L. agilis from L. viridis. I will, therefore, point out an additional character which does not seem to have received attention before, and by which, except in very rare cases, the correct determination will be ensured. In L. agilis the frontonasal shield is not broader than the internarial space, and is surrounded by three pairs of shields: the nasal, the anterior loreal (or the postnasal), and the prefrontal; in L. viridis the frontonasal is broader than the internarial space, and is bordered by four or five pairs of shields, both the postnasal and the anterior loreal being nearly always in contact with it, and sometimes also the second loreal.

Dr. de Bedriaga has stated that the presence of a series of granules between the
superciliaries and the supraocularrs is not a constant character for the separation of *L. viridis* from *L. agilis*, and he alluded to specimens from Turin and Persia as being devoid of such granules. I may add that out of 37 specimens from France and the Channel Islands, 12 lack the granules altogether, whilst in 9 others they are reduced to one, two, or three.

Among other characters, not clearly formulated before for the identification of perplexing individuals of the two species, I would mention the number of subdigital lamellae under the fourth toe (16 to 23, usually 18 to 21, in *L. agilis*; 21 to 31, usually 23 to 27, in *L. viridis*) and the number of shields bordering the nostril (3 or 4, rarely 2, in *L. agilis*; 5 or 6, rarely 4, in *L. viridis*). The more elongate head of *L. viridis*, though pretty striking in most cases, is not a character to be absolutely relied upon, as I can lay side by side individuals of the two species which are absolutely identical in this respect. The same is true of the length of the tail, which, although usually at least twice as long as head and body in the adult *L. viridis*, varies between 1 2/3 and 2 2/3 times, and between 1 1/3 and 1 2/3 times in *L. agilis*; there is, therefore, a considerable overlap which must be borne in mind when making use of this character for the identification of critical specimens.

Although it is undeniable that a nearly complete passage exists between *L. agilis* and *L. viridis*, a sufficient number of characters are available, taken in combination, to remove all doubts as to the correct naming of any individual, however aberrant, out of the very large number that have hitherto passed through my hands. But these characters are not those usually given in books, and I would, on this occasion, allude to one in particular—Schreiber’s new edition of the *Herpetologica Europae*,—to warn beginners from placing too much reliance on descriptions which contain an undue proportion of errors, often the result of uncritical compilation, errors which must mislead the student unable to distinguish what is original from what is second-hand. I regard the treatment of the genus *Lacerta* in that work as particularly unfortunate, the key intended to facilitate the distinction of the species being most misleading.

**Lacerta parva.**


Head and body feebly depressed. Head small, 1 1/3 to 1 2/3 times as long as broad, 4 1/3 to 4 2/3 times in length to vent in males, 4 2/3 to 5 times in females, its depth equal to the distance between the anterior corner of the eye and the tympanum; snout obtusely pointed, as long as the distance between the eye and the tympanum, with feebly concave loreal region; checks not much swollen; length of pilaeus twice its

* Fatio (Vert. Suisse), usually so careful in his descriptions, is certainly mistaken in stating "la plus grande longeur égalant, en général, la moitié de la longeur." According to my measurements, the width is 1 1/2 to 1 3/4 times in the length.
width. Neck as broad as head, or slightly constricted. Limbs rather short; hind limb reaching the wrist, the elbow, or the axil in males, limbs just meeting or hind limb reaching the wrist or the elbow in females; foot longer than the head; digits feebly compressed. Tail cylindrical, \( L _ { 3 } \) to \( L _ { 3 } \) times as long as head and body.

Nostril pierced between the nasal and two postnasals, usually also the first upper labial. Nasals forming a short or very short suture; frontonasal broader than long, broader than the internarial space, in contact with the upper postnasal and the anterior loreal; frontal as long as its distance from the end of the snout, \( L _ { 3 } \) to \( L _ { 3 } \) times as long as broad, usually narrower behind than the major supraoculars; parietals \( P _ { 3 } \) to \( P _ { 3 } \) times as long as broad, outer border convex, not in contact with the upper postocular; occipital \( O _ { 3 } \) to \( O _ { 3 } \) the length of the interparietal, as broad as or broader than the latter, rarely a little narrower; second supraocular longer than third; 5 or 6, rarely 4, superciliaries, first or second longest, the suture between these two usually oblique, rarely vertical; a series of granules between the major supraoculars and the superciliaries, the series complete or incomplete, through the first or first and second superciliaries forming a suture with the supraocular, or, rarely, reduced to 2 or 3 granules.

Rostral not touching the nostril; first upper labial not always entering the nostril, and if so only at a small point; two superposed postnasals; two loreals, first as long as or shorter than second. 4 upper labials anterior to the subocular * , the lower border of which is much shorter than the upper, sometimes † very short owing to a part of the shield having become detached as an accessory fifth anterior upper labial. Temporal region with moderately large shields or small scales; masseteric shield present, small or large, sometimes divided into two ‡ ; tympanic present, large; a rather large upper temporal, forming a suture with the fourth supraocular, followed by 2 to 4 scales.

Lower eyelid in the middle with one or two series of 6 to 8 enlarged scales, which have a tendency to become semitransparent.

Pterygoid teeth strongly developed.

17 to 20 scales and granules in a straight line between the symphysis of the chin-shields and the median collar-plate; gular fold distinct. Collar strongly serrated, composed of 7 to 10 plates § .

Body covered with moderately large, juxtaposed or subimbricate, hexagonal or rhombic scales, which are strongly and diagonally keeled on the back, larger and losing the keels towards the ventrals; 33 to 43 scales across the middle of the body, 2 transverse series (rarely 3 here and there) corresponding to a ventral plate, 19 to 30

* 3 on one side in a female from Angora.
† In one male from Berchetti Mandan, this reduction of the lower part of the subocular being the nearest approach, in the genus Lacerta, to a condition frequent in Ameiurus cotillus and Erinnias.
‡ Rarely indistinct, according to Werner.
§ 7 to 12, according to Werner.
in the middle of the back corresponding to the length of the head. Ventral plates overlapping, more or less distinctly detached from each other on the posterior border, in 8 (rarely 6) longitudinal and 27 to 33* transverse series (27 to 30 in males, 31 to 33 in females); the plates of the 6 principal rows subequal in size, or those of the second series from the median line the broadest; if in 8 rows, outer plates usually narrow, exceptionally half as broad as those of the adjacent series.

Preanal plate moderate or rather small, sometimes divided into three, bordered by two semicircles of small plates.

Scales on upper surface of tibia much smaller than dorsals, strongly keeled. 19 to 23 lamellar scales under the fourth toe. 14 to 20 femoral pores on each side.

Caudal scales obtusely pointed, the upper more or less oblique, diagonally and strongly keeled, the lower also keeled, except quite at the base; the whorls usually not very unequal in length; 24 to 30 scales in the fourth or fifth whorl behind the postanal granules.

Grey or pale brown above, with two darker dorsal bands, each bearing a series of dark brown† spots, which may be large and squarish or small and irregular, or replaced by a series of small ocelli on both sides of the dark dorsal bands; bordering these spots on each side a small white spot or streak, the outer of which is the continuation of a streak proceeding from the outer border of the parietal; nape usually with a short dark brown vertebral streak or series of spots; a more or less distinct whitish streak on each side from the upper lip to the thigh; between it and the dorso-lateral series of light spots a dark band with a series of large squarish or round dark brown spots mostly with a white centre, or of white, black-edged ocelli, which in males may be very large and blue; upper surface of head without spots, or with small dark markings following the curved inner border of the supraocular region; tail with a more or less distinct dark lateral band, and with or without a dorsal dark band or series of large dark spots. Lower parts white in the female, pale yellow in the male; in the latter some small blue spots may be present on the sides of the belly. According to Werner, the young differs only in having the light streaks more distinct, more continuous.

The pattern of coloration is derivable from that of the young of *L. agilis*, var. *exigua*, figured above, p. 13. The remains of a dark vertebral band, which persist on the nape only, result from the fusion of the dark borders of the light vertebral streak after the absorption of the latter, as in the typical form of *L. agilis*; the paired dorsal spots represent the breaking up of the inner dark border of the dorso-lateral light streak, which retains its normal course instead of being shifted towards the vertebral area; the large lateral spots or ocelli on the sides correspond to those in *L. agilis* and the third or lower lateral streak is absent or represented by the blue spots on the sides of the belly. Thus, although the markings seem to differ very strikingly from

* Up to 35, according to Werner.
† Sometimes reddish brown in females, according to Werner.
those of any of the patterns known in *L. agilis*, they can be easily traced back to the more primitive type represented by the young alluded to above. They agree very well with those of various striated forms of the *L. muralis* group.

When describing *L. parva* nearly thirty years ago, from a single female specimen, I regarded the species as nearly allied to *L. agilis* and *L. viridis*. In this view I am confirmed by further study of a better material, but at the same time I consider *L. parva* as a link between *L. agilis* and *L. brandti*, so perfect that it is difficult to decide whether it is more closely related to the one than to the other.

Measurements (in millimetres):

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**Particulars of Specimens examined.**

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</table>

Table as for *L. agilis*, p. 26, but without columns 8 and 9, the number of postnasals and anterior loreal being constantly 2.1.
Habitat. Steppes of Eastern Asia Minor, from Eski-Shihir to Kaisarieh. I am indebted to M. H. Gadeau de Kerville for the privilege of examining a good series of specimens recently obtained by him in the district of Angora, where this lizard occurs together with the far commoner Ophiops elegans, some individuals of which are strikingly similar to Lacerta parva in their proportions, coloration, and general appearance. The species is also reported from Transcaucasia (L. Goksha), but the identification of the specimens requires confirmation, and it is quite possible that the report is due to confusion with another form, intermediate between L. parva and L. brandti.

II.—THE SPECIES ALLIED TO LACERTA MURALIS.

Synopsis of the Species.

I. Normally a single postnasal *.
A. Pterygoid teeth constantly, or nearly constantly, present.
A series of granules between the supraoculars and the superciliaries (rarely reduced to 2 to 5); collar serrated; caudal scales more or less pointed behind L. taurica Pall.
Granules between the supraoculars and the superciliaries absent (rarely 1 to 3); collar not serrated; caudal scales truncate or very obtusely pointed behind L. peloponnesiana Bibr.
B. Pterygoid teeth absent, with rare exceptions; collar entire or feebly serrated, rarely strongly serrated.
A parietal foramen †; dorsal scales, if distinctly hexagonal and keeled, not larger than the laterals; ventral plates in 6 (exceptionally 8) longitudinal series L. muralis Laur.
A parietal foramen; dorsal scales more or less distinctly hexagonal and keeled, larger than the laterals; ventral plates in 6 longitudinal series; collar distinctly serrated; 27 to 32 lamellar scales under the fourth toe L. chlorogaster Blgr.
No parietal foramen; ventral plates in 8 longitudinal series; collar not or but slightly serrated; 22 to 26 lamellar scales under the fourth toe L. jacksonii Blgr.

II. Normally two superposed postnasals ‡; collar not or but feebly serrated.
A. Pterygoid tooth constantly or nearly constantly present.
Ventral plates in 8 longitudinal rows; masseteric shield present; 50 to 55 scales across the middle of the body, smooth; 25 or 26 lamellar scales under the fourth toe L. brandti De Fil.

* Exceptions rather frequent in L. muralis, var. bedriagae.
† Indicated externally by an impression or a light dot in the centre of the parietal shield.
‡ Exceptions rather frequent in L. mosorina.
Ventral plates in 6 (rarely 8) longitudinal rows; masseteric shield large; 49 to 62 scales across the middle of the body, keeled; 27 to 35 lamellar scales under the fourth toe.

\[ L. \text{levis} \text{Gray}. \]

Ventral plates in 8 longitudinal rows; temple covered with minute granules, which are smaller than the dorsal scales; 85 to 95 scales across the middle of the body, smooth or faintly keeled; 29 or 30 lamellar scales under the fourth toe.

\[ L. \text{jayakari} \text{Blgr}. \]

B. Pterygoid teeth absent, with rare exceptions.

1. A large upper temporal.

52 to 66 scales across the middle of the body; median subcaudal scales not enlarged; 27 to 32 lamellar scales under the fourth toe.

\[ L. \text{danfordii} \text{Gthr}. \]

59 to 75 scales across the middle of the body; median subcaudal scales strongly enlarged, the largest at least twice as broad as long; 22 to 26 lamellar scales under the fourth toe.

\[ L. \text{oxycephala} \text{D. & B}. \]

36 to 45 scales across the middle of the body; median subcaudal scales feebly enlarged; 22 to 25 lamellar scales under the fourth toe.

\[ L. \text{mosorensis} \text{Kolomb}. \]

2. Upper temporal and masseteric shields absent; 54 to 61 scales across the middle of the body.

\[ L. \text{dugesii} \text{M.-Edw}. \]

The division into two groups according to the presence of one or of two postnasal shields is merely for convenience *. It does not express the true relationships, as I regard \( L. \text{dugesii} \) as more nearly related to \( L. \text{muralis} \) than to the species with which it is associated in this key. To remove the difficulties imposed by the necessity of a serial arrangement, and to convey the affinities as I conceive them, the following diagram has been drawn up:

\[
L. \text{chloropaster} \quad L. \text{jacksonii} \quad L. \text{jayakari} \quad L. \text{levis} \quad L. \text{danfordii} \quad L. \text{oxycephala} \]

\[
L. \text{muralis} \quad L. \text{dugesii} \quad L. \text{mosorensis} \]

\[
L. \text{taurica} \quad L. \text{petropomusina} \quad L. \text{brandii} \]

\[ L. \text{agilia} \quad L. \text{parra} \]

\[ \text{Lacerta taurica} \]


\*[As stated in the Introduction (p. 6), I take the single postnasal to be the more primitive; but, although the division of the shield into two has become fixed in the forms which I regard as evolved out of \( L. \text{parra} \), I can see no reason for rejecting the possibility of a reversion by fusion to a single shield, as the tendency in \( L. \text{mosorensis} \) shows.]

\[ \text{vol. xx.} \text{— part i. No. 6.} \text{— June, 1910.} \]


*Zosteca taurica*, part., Gray, Cat. Lix. p. 29 (1845).


Head rather small. 4 to 4 1/4 times in length to vent in males, 4 1/2 to 4 3/4 times in females, as deep as broad or not much broader than deep, 1 1/2 to 1 3/4 times as long as broad, exceptionally 1 3/4 times*; occipital region convex; the depth of the head, in the tympanic region, equal to or a little greater than the distance between the anterior corner of the eye and the anterior border of the tympanum; snout obtusely pointed, with straight or slightly convex upper profile, as long as the distance between the eye and the tympanum. Neck as broad as the head, or a little narrower or a little broader. Body feebly or moderately depressed. Hind limb reaching the axil, the shoulder, or the collar in males, the wrist or the elbow of the adpressed fore limb in females; foot as long as the head or a little longer (not more than 1 1/4 times). Tail cylindrical, 1 1/2 to slightly over 2 times the length of head and body.

Nostril pierced between the nasal, a postnasal, the first upper labial, and nearly always the rostral. Nasals forming a short suture behind the rostral†; frontonasal much broader than long ²; frontal as long as or shorter than its distance from the end of the snout, 1 3/4 to 1 3/4 times as long as broad, nearly as broad, behind, as the major supraoculars; parietals 1 1/4 to 1 3/4 times as long as broad, with straight or convex outer border, nearly always in contact with the upper postocular§; occipital very variable in shape, usually shorter than the interparietal ⅟, sometimes fused with it or separated by a small shield. Major supraoculars equal or first a little the longer; 5 or 6

* In a male from Nision, Greece.
† In a female from Nision, Greece, the frontonasal forms a suture with the rostral; in a male from Cephalonia the nasal is in contact with the anterior loreal, above the postnasal.
² Broken up into four shields in a female from Bazias.
§ Except in a male from Budapest-Franzstadt.
⅟ As long as the interparietal in a few specimens from Greece and the Ionian Islands.
superciliaries, first or second longest, the suture between the first and second usually oblique, sometimes vertical; an incomplete series of granules between the supraoculars and the superciliaries, the first superciliary being constantly in contact with the second supraocular, the granules sometimes minute or reduced to 2 to 5.

Rostral entering the nostril, often largely †; postnasal single ‡; anterior loreal much shorter than second; 4 upper labials anterior to the subocular §, the lower border of which is shorter than the upper. Scutellation of the temple very variable, the two extremes (text-fig. 9) approaching L. agilis and L. muralis, var. canapestris, respectively; masseteric and tympanic shields usually distinct, the former sometimes very large and in contact with the upper temporals, of which there are usually 2 or 3.Ⅰ.

Pterygoid teeth nearly always present.

19 to 28 scales and granules in a straight line between the symphysis of the chin-shields and the median collar-plate; gular fold always well marked. Collar formed

Text-figure 9.


(From P. Z. S. 1907, p. 558, text-fig. 162.)

of 8 to 12 plates (usually 9 to 11), the edge more or less distinctly serrated; the extremes of serration are shown on text-fig. 10, representing two female specimens, one (a) from Sebastopol, the other (b) from Cephalonia, but these figures are not meant to convey the impression that the serration is generally stronger in the typical form than in the var. ionica.

Scales on body juxtaposed, oval or oval-hexagonal, very small and more or less diagonally keeled on the back, larger and smooth or very feebly keeled towards the ventrals. Exceptionally the scales on the back may be almost perfectly round granules.

* In specimens from Crimea, Bulgaria, Hungary, Cephalonia, and Corfu.
† I have observed only two exceptions (female from Szabadka and female from Corfu), in which the rostral is narrowly separated from the nostril.
‡ Two superposed postnasals in a male from Nision.
§ 5 on one side in a female from Szabadka and in another from Rutshuk; three on each side in a male from Cephalonia.
Ⅰ Only one in a male from Szabadka.
with a feeble straight keel * or even almost without a trace of a keel †. In a male from Rakos, Hungary, which has very strongly keeled dorsal scales, and in another from Corfu, the scales on the flanks, right down to the ventral plates, show a feeble yet distinct keel. The number of scales across the body varies from 42 to 61 ‡; on the flanks, 3 or alternately 2 and 3 series of scales correspond to a ventral plate; 36 to 50 scales, in the middle of the back, correspond to the length of the head. Ventral plates in 6, exceptionally 8 §, longitudinal and 25 to 32 transverse series (25 to 29 in males, 25 to 32 in females); the plates of the second series from the median line usually much broader than the others.

Preanal plate moderately large or rather small, with 2 or 3 semicircles of small plates or scales, one or two of the median plates of the inner semicircle sometimes considerably enlarged.

Text-figure 10.

![Text-figure 10](image)


(From P.Z.S. 1907, p. 563, text-fig. 164.)

Scales on upper surface of tibia usually smaller than dorsals, more or less distinctly keeled. 22 to 29 lamellar scales under the fourth toe. Femoral pores 15 to 20 (usually 16 to 19) in the typical form ||, 15 to 25 (usually 18 to 21) in the specimens from Greece and the Ionian Islands (var. ionica).

Caudal scales oblique, more or less obtusely pointed behind, the upper strongly keeled, the lower smooth or feebly keeled; the whorls subequal in length; 30 to 37 scales in the fourth or fifth whorl behind the postanal granules.

* Females from Crimea and Szabadka.
† Female from Rutskuk.
‡ 42 is exceptional and occurs only in one female from L. Stymphalos, two males from the same locality having 50 and 55 respectively. 48 to 55 is the usual number in the typical form, 52 to 60 in the var. ionica.
§ In a male from Greci, in a male from Constantinople, in a female from Bazias, and in a male from Tyrias-Mykèna.
|| 15 to 22, according to Kessler.
This species has been divided into two, *L. taurica*, from the countries bordering the north and west of the Black Sea, extending westwards to Budapest, and *L. ionica*, from Greece and the Ionian Islands. Although the extremes are rather different in form and coloration, they are so completely linked as to render a good definition of *L. ionica* impossible, and I have therefore reduced the latter to the rank of variety, characterized. in its most accentuated form, by a rather longer head with less convex snout, rather longer hind limbs, more numerous femoral pores, and especially by the coloration. As I regard the Greek-Ionian lizard, in which a vertebral series of black spots sometimes persists, as the more primitive, its coloration is here dealt with first.

Green on the head and neck and on the back, brown on the sides of the body, with a more or less distinct light streak along each side of the back, usually with black spots above and below it, these spots sometimes large, more usually small; a vertebral series of small black spots occasionally present (Pl. III. fig. 5); a more or less distinct ocellar spot with blue centre sometimes present above the shoulder; a pale brown or golden colour forms spots or a band on each side of the posterior part of the body and on the base of the tail; a more or less distinct light streak from below the eye to the thigh; fore limbs green, hind limbs and tail brownish grey with light spots. Some specimens are unspotted (var. *olivicolor* Schreiber) uniform green, with the sides of the body partly or entirely reddish brown, or green above and olive-brown on the sides, with a whitish dorso-lateral line (Pl. III. fig. 6). Belly greenish or yellowish white, or pale yellow, with pale blue spots on the outer ventral plates, which may also bear small black spots.

In the typical form (text-fig. 11, a) a brown shade predominates on the upper parts, with the exception of a more or less broad vertebral stripe, which is of a more or less bright green; a light streak may extend from the outer border of the parietal shield to
the base of the tail and another from below the eye to the groin (Pl. III. figs. 3 & 4); the sides of the body outside the green area are more or less spotted or marbled with black, and the black spots may extend across or over the light dorso-lateral streaks, which often entirely disappear, especially in males (Pl. III. fig. 2); a few black spots may be present in the middle of the green area on the nape. In some specimens * the black markings predominate over the ground-colour (text-fig. 11, b, and Pl. III. fig. 1) and enclose small whitish spots, whilst in others they are large and few, forming two or three regular series on each side of the body, or small and numerous, or with the upper series confluent into a wavy line bordering inwards the light dorso-lateral streak †; in the latter case, the green dorsal area is much broadened, and such specimens (text-fig. 11, c) approach the var. ionica. The lower parts are white, yellow, or deep orange, without spots or with small black spots on the sides; pale blue spots are present on the outer ventral plates and just above them. The dark and light spots on the tail combine to form a more or less distinct but ill-defined striation.

In its markings the typical form is often very suggestive of certain specimens of L. viridis (so-called var. biliunato).

Measurements (in millimetres):—

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1. 2. ♂, Nision, Morea. 3. ♂, Roumania. 4. ♀, Nision, Morea. 5. ? L. Stymphalos, Morea. 6. ♂, Rakos, Hungary.

### Particulars of Specimens examined.

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* Males from Hungary. † Male from Roumania.
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Var. ionica.

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MR. G. A. BOULENGER ON LIZARDS

1. Length (in millimetres) from snout to vent. 2. Number of scales across middle of body. 3. Transverse series of ventral plates. 4. Number of plates in collar. 5. Number of scales and granules between symphysis of chin-shields and median collar-plate. 6. Number of femoral pores (on right and left sides, if differing). 7. Number of subdigital lamelle under the fourth toe.

This explanation applies to the tables for the species following, unless otherwise stated.

Habitat. Crimea and the North Coast of the Black Sea, Roumania, Bulgaria, Turkey in Europe, Serbia, Hungary, Greece, and Ionian Islands.

I regard *Lacerta taurica* as one of the most primitive species of the *L. muralis* group, owing to its palatal dentition, short head, serrated collar, often hexagonal and keeled dorsal scales, more or less pointed caudal scales, etc. The var. *ioniaca* connects it with *Lacerta muralis*, vars. *campestris* and *fumana*. If I am right in regarding a dark vertebral stripe or series of spots as a primitive character, the typical *L. taurica*, in which it is always absent or merely represented by a few spots on the nape*, may be derived from the var. *ioniaca*, in which it is sometimes present. As I have observed above, the brown colour is more primitive than the green, and the young *L. agilis* and *L. taurica* show no green; but, whereas in the evolution of *L. agilis* the green colour appears first on the sides, before invading the back, the reverse obtains in *L. taurica* and *L. muralis*.

**Lacerta peloponnesiaca.**


*Lacerta muralis* (non Lauer.), Bibl. l.c. figs. 2, 3.


* In accordance with the theory of Elmer that the evolution of markings proceeds from back to front.
In shape and general proportions not unlike *L. taurica*, but head usually larger and longer, and limbs rather longer. Head large (usually not 4 times in length to vent in males), feebly depressed; snout sometimes very obtuse, sometimes very pointed, as long as the distance between the eye and the tympanum; preocular region rather deeply concave. Neck as broad as the head, or a little broader. Hind limb reaching the collar or between the collar and the ear in the male, the elbow or the axil in the female. Foot always longer than the head. Tail cylindrical, twice as long as head and body or a little shorter or a little longer.

Nostril pierced between the nasal, the postnasal, the first upper labial, and the rostral. Nasals forming a short or very short suture behind the rostral *; frontonasal as long as broad or broader than long; frontal not longer than frontoparietals, anterior borders very concave, meeting at an acute angle, the shield often appearing trilobate with long median lobe in front, in adult male specimens; parietals about once and a half as long as broad, in contact with the upper postocular, outer border convex; occipital very variable in size, sometimes longer, sometimes shorter, and usually broader than the interparietal, from which it may be separated † by a short suture formed by the parietals. Supraoculars in contact with the superciliaries, rarely one to three granules intervening between them; the second usually a little longer than the third, both

* In two specimens the frontonasal forms a narrow suture with the rostral; similar exceptions have been pointed out by Werner, *l.c.*
† In 6 specimens out of 16.

**Text-figure 12.**

Upper and side views of head of male and female of *Lacerta peloponnesiaca.*

(From *P. Z. S.* 1911, p. 38, text-fig. 8.)
broader than the posterior part of the frontal; 5 or 6 (rarely 4) superciliaries, first or second usually longest, the suture between the first and second usually oblique, sometimes vertical.

Rostral largely entering the nostril; postnasal single*; first loreal much shorter than second. 4 or 5 upper labials anterior to the subocular †, the lower border of which is much shorter than the upper. Usually rather large, irregular shields cover the temple, often as in an average *L. agilis*; sometimes the temporal lepidosis is as small as in an average *L. muralis*; a more or less distinct masseteric shield; tympanic shield distinct, sometimes small; a more or less enlarged upper temporal anteriorly, followed by 3 or 4 smaller shields.

Pterygoid teeth strongly developed.

28 to 34 scales and granules in a straight line between the symphysis of the chin-shields and the median collar-plate; gular fold distinct. Collar with even edge, composed of 9 to 12 plates‡.

Scales on back juxtaposed, granular, round, suboval, or subhexagonal, smooth or feebly or faintly keeled, on flanks towards the ventrals larger, flat and subimbricate, smooth; 53 to 65 scales across the middle of the body; 2 and 3 or 3 and 4 transverse series, on the sides, corresponding to a ventral plate, 48 to 60 in the middle of the back corresponding to the length of the head. Ventral plates in 6 longitudinal series, subequal or the second series from the middle line the broadest; 28 to 33 transverse series (28 to 30 in males, 31 to 33 in females).

Praeanal plate rather large, with 2 or 3 semicircles of small shields or scales.

Scales on upper surface of tibia as large as or a little smaller than dorsals, distinctly keeled. 26 to 31 lamellar scales under the fourth toe. 20 to 26 femoral pores on each side.

Caudal scales truncate or very obtusely pointed behind, the upper narrow and slightly oblique, or rather broad and more oblique, more or less strongly keeled, the whorls subequal in length; 28 to 38 scales in the fourth or fifth whorl behind the postanal granules.

The coloration varies much according to individuals. Females and young are beautifully striped with dark brown or black, some specimens may even be described as black above with 5 or 6 light longitudinal streaks or even 7 in front (9 on the nape, as in *Acanthodactylus vulgaris*). The adult female (Pl. III. fig. 9) may be of a reddish brown, with two broad blackish bands along each side, the outer proceeding from the eye; these bands bordered above and below by a narrow white streak and separated from each other by a third light streak (proceeding from the superciliary edge), which is pale yellow or pale green; one or two small round blue spots above the axil; hind limbs with round light spots edged with blackish; lower parts white or pale yellow,

* Two superposed postnasals in one specimen (♀, Morea).
† 4 on both sides in 8 specimens, 4 on one side and 5 on the other in S, 5 on both sides in 1.
‡ Up to 14, according to Werner, *l. c.*
often tinged with rosy or lilac on the sides. Traces of this striation may persist in some adult males (Pl. III. fig. 7), or may disappear entirely, the back being uniform brownish or dull green, with small blackish spots or vermicular lines on the sides. In the breeding male the top of the head is a reddish brown, sharply contrasting with the green of the nape, which gradually fades to olive or brown on the posterior part of the body; the sides of the head and body and the lower parts of a bright vermilion-orange, relieved by a patch of azure-blue in the axillary region and a broad band of the same colour occupying the outer row of ventral shields and extending a little way up the scaly part of the side. Some males may have a pattern of markings not unlike that of *L. taurica*, but with a blackish vertebral stripe on the anterior part of the back; this stripe may be divided by a light streak on the nape (Pl. III. fig. 8).

Measurements (in millimetres):

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*Particulars of Specimens Examined.*

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* For explanation of numbers, see p. 48.

**Habitat.** This species appears to be restricted to Morea, up to 1000 m. altitude, its reported occurrence in Crete requiring confirmation.

*Lacerta peloponnesiae* is most nearly related to *L. taurica*, from which it differs,
as first shown by Bedriaga in 1888, chiefly in the larger head in the male, the non-serrated collar, the truncate or very indistinctly pointed caudal scales, and the nearly constant absence of granules between the supraoculares and the superciliaries. The latter character and the strong palatal dentition separate it from *L. muralis*.

In some respects (stronger palatal dentition, absence of granules between the supraoculares and the superciliaries, more pronounced striation) this species is phylogenetically less advanced than *L. maurica*, but in all others it has evolved further from the hypothetical ancestral form.

For reasons explained above (p. 12) I look upon the coloration of the young as the most primitive in the *L. muralis* group, as in some specimens the original five light dorsal streaks are preserved on the nape; but on the sides the light streaks are reduced to one, the median lateral of *L. agilis*.

**Lacerta chlorogaster.**


Head and body moderately depressed. Head rather large in males (rarely 4 times in length to vent), 1½ to 1¾ times as long as broad, its depth equal to the distance between the anterior corner or the centre of the eye and the tympanum; occipital region convex; snout obtuse, as long as postocular part of head; cheeks not much swollen in the male; length of pileus about twice its width. Neck sometimes as broad as head, usually narrower. Hind limb reaching the shoulder or the collar in the male, the elbow or the axil in the female; foot longer than the head. Tail cylindrical, about twice as long as head and body.

Nostril pierced between the nasal, a postnasal, the first upper labial, and sometimes the rostral. Nasals forming a suture behind the rostral; frontonasal broader than long; frontal as long as or a little shorter than its distance from the end of the snout, 1½ to 1¾ times as long as broad, as broad, behind, as the principal supraoculares, sometimes in contact with † or narrowly separated from the first supraocular; parietales 1½ to 1¾ times as long as broad, usually not in contact with the upper postocular ‡, the outer border straight and oblique or more or less emarginate in front for the reception of the upper temporal; occipital usually shorter and broader than the

* Lacerta boettgeri* Mekely, Ann. Mus. Hung. v. 1907, p. 88, is a mere nomen nudum. No definition, not even an indication of the habitat.

† In 4 specimens out of 23.

‡ 3 exceptions out of 23 specimens.
interparietal, sometimes as long or as broad. The two major supraoculares, of which the first is usually the longer, separated from the superciliaries by a complete series of granules; the fourth supraocular usually in contact with the first upper temporal; 6, rarely 7, superciliaries, first or second longest, the suture between the first and second vertical.

Rostral often touching or entering the nostril *; a single postnasal †; two loreals, first usually shorter than second. 4 upper labials anterior to the subocular ‡, the lower border of which is much shorter than the upper. Temple covered with small scales, with a large, moderate, or small § masseteric shield, which is sometimes divided, and a curved tympanic; a large anterior upper temporal, followed by smaller shields.

No pterygoid teeth.

19 to 27 gular scales in a straight line between the symphys of the chin-shields and the median collar-plate, these scales usually rather large towards the collar; gular fold feeble or very indistinct. Collar with feeably serrated edge, composed of 7 to 9 plates.

Dorsal scales usually hexagonal, longer than broad, strongly keeled, juxtaposed or feeably imbricate, rarely more oval and less strongly keeled; lateral scales more feeably keeled, smooth towards the ventrals, a little smaller, 3 or 4 corresponding to the length of a ventral plate; 32 to 42 scales, in the middle of the back, corresponding to the length of the head; 44 to 52 scales across the middle of the body. Ventral plates in 6 longitudinal series, the second series on each side from the median line the broadest; 24 to 27 transverse series in males, 27 to 30 in females.

Preanal plate large, bordered by a single semicircle of scales.

Scales on upper surface of tibia smaller than dorsals, keeled. 27 to 32 lamellar scales under the fourth toe. 14 to 19 femoral pores on each side, usually 15 to 17.

Upper caudal scales straight or slightly oblique, strongly keeled, posterior border obtusely pointed, sometimes nearly truncate, the whorls alternately longer and shorter; 22 to 28 scales in the fourth or fifth whorl behind the postanal granules.

Head and back greyish olive or greenish in the male, with or without small black spots or vermiculations; sides and limbs yellowish green with a black network, often enclosing rather large whitish occellar spots, or black with small yellowish-grey spots; a few turquoise-blue spots may be present behind the shoulder. Pale brown or golden-brown above in the female, with small blackish spots and a dark brown lateral band with wavy outlines; sometimes a dorso-lateral series of small whitish spots. The markings of the body usually continued on the anterior part of the tail. Lower parts yellowish green to bright grass-green in the males, with a series of turquoise-blue spots

* In 25 cases out of 40.
† Two superposed postnasals in one specimen from Lenkoran, according to Michely.
‡ 5 in a single specimen.
§ Large in 17 specimens, moderate in 2, small in 4.
on the outer ventral plates, which are usually also spotted with black, and with the throat often blue or bluish green; anal region and lower surface of hind limbs often lemon-yellow.

The very young is described by Méhely as uniform brown above, the belly dotted or spotted with blackish.

**Measurements (in millimetres):**

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**Particulars of Specimens examined.**

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* For explanation of numbers, see p. 48.
Allied to Lacerta muralis.

Habitat. The South and South-West Coast of the Caspian Sea; the specimens examined by me are from Enzeli and Resht, in Persia, those described by Méhely are from Lenkoran and Baku in Transcaucasia and Astrabad in Persia.

In the shape of the head, in the serrated collar, in the pointed caudal scales, L. chlorogaster bears some resemblance to L. taurica, and Méhely finds a great similarity between the skulls of the two species; the green colour of the lower parts and the keeled dorsal scales contrasting with the smaller laterals are characters shared by L. praticola. Yet I do not think there is any close relationship between the three species. There is, on the whole, more in common with L. muralis, var. saxicola and caucasicus, as recognised by Méhely. L. chlorogaster differs from all the forms of L. muralis in combining keeled hexagonal dorsal scales with smaller laterals. It would perhaps be as well to regard L. chlorogaster as a variety of L. muralis, more primitive in most respects than any of the Transcaucasian-Persian forms with which we are present acquainted.

Apart from the shape of the head, it is not without resemblance with the African L. jacksonii, the two often agreeing very closely in the markings (cf. Pl. IV. figs. 1, 3), and, although its true affinities are still a puzzle, I cannot think of a better position for it in the serial arrangement that has to be followed than between L. muralis and L. jacksonii.

Lacerta jacksonii.


Head and body much depressed. Head large in the full-grown male (3/4 to 4 times in length to vent), 1/2 to 1/3 times as long as broad, its depth equal to the distance between the posterior corner of the eye and the anterior border of the tympanum; occipital region quite flat; snout obtusely pointed, shorter than the postocular part of head; cheeks swollen in the male; length of pileus twice or a little more than twice its width. Neck as broad as head. Hind limb reaching the axil, the shoulder, or the collar in the male, the elbow in the female; foot as long as the head in the male, usually a little longer in the female. Tail cylindrical, 1/2 to 1/3 times as long as head and body.

Nostril pierced between the nasal, a postnasal, and the first upper labial. Nasals forming a suture behind the rostral *; frontonasal broader than long; frontal as long as its distance from the rostral or the end of the snout, 1/2 to 1/3 times as long as broad, as broad, behind, as the major supraoculars or a little broader; parietals

* In one of the specimens examined by Peracca, the frontonasal touches the rostral.
1½ to 1¾ times as long as broad, outer border convex, usually not in contact with the upper postocular, or, if in contact, very narrowly. Of the two major supraoculars, the first is the longer; 5 or 6 superciliaries, the suture between the first and second oblique; an incomplete series of granules between the supraoculars and the superciliaries, the granules sometimes reduced to 2 or 3*. No foramen in the interparietal†. Occipital usually shorter than the interparietal, sometimes broader.

Rostral not entering the nostril; a single postnasal; anterior loreal shorter than second. 4 (rarely 5) upper labials anterior to the subocular, the lower border of which is not or but little shorter than the upper. Temple covered with small scales, as large as or smaller than dorsals‡, these scales sometimes feebly keeled; no masseteric shield; tympanic shield sometimes moderate, sometimes small, sometimes absent; upper temporal moderately broad, long or short, followed by a series of smaller shields§.

No pterygoid teeth.

21 to 26|| gular scales in a straight line between the symphysis of the chin-shields and the median collar-plate, these scales strongly increasing in size towards the collar; gular fold more or less distinct. Collar even-edged or very slightly serrated, composed of 7 to 10 plates.

Dorsal scales rhombic-hexagonal, more or less distinctly keeled, juxtaposed or sub-imbricate; laterals a little smaller, feebly and diagonally keeled, or nearly smooth. 37 to 43 scales across the middle of the body¶; 23 (♀) to 35 (♂) scales, in the middle of the back, corresponding to the length of the head, 2 or 3 on the sides corresponding to a ventral plate. Ventral plates in 8 longitudinal series, the second series on each side from the median line much broader than the others, the outer series composed of very narrow plates; 23 or 24 transverse series in males, 27 or 28 in females**. Premaxillary plate large, with one or two semicircles of smaller plates, one of the median of which is more or less enlarged, and may be described as a second premaxillary.

Scales on upper surface of tibia smaller than dorsals, strongly keeled. 22 to 26 lamellar scales under the fourth toe. 16 to 20 femoral pores on each side††.

* In one specimen examined by Peracca the series of granules is complete on one side and totally absent on the other. The series is complete in one of the specimens described by Sternfeld.

† This important character, first pointed out by Degen, is found in two other species of the genus Lacerta, the East African L. vampirnelli Torn., and the West African L. rachmanis Cope. That it is not to be regarded as of generic importance is shown by the genera Dresco, Nncras, and Latania, where we find the foramen present in some species and absent in others.

‡ Larger in specimens from the Kilimanjaro district (subsp. Kilimanjariensis Lübb.).

§ Absent in a female from Kukumeki.

|| Up to 28, according to Degen and Sternfeld.

¶ 32 to 39, according to Peracca and Sternfeld; up to 49, according to Degen.

** 23 to 25 in males, 21 to 28 in females, according to Peracca, Degen, and Sternfeld.

†† 14 to 20, according to Peracca and Sternfeld.
ALLIED TO LACERTA MURALIS.

Upper caudal scales oblique, strongly keeled, with truncate or very obtusely pointed posterior border; the whorls alternately longer and shorter; 26 to 23 scales in the fourth or fifth whorl behind the postanal granules.

Brown above, sometimes more or less greenish olive in life*, with small black spots irregularly disposed; sides darker, with 4 or 5 series of white, black-edged ocelli, the upper series very regular and extending from the outer edge of the parietal shield to the base of the tail; a large black spot on each upper labial; limbs with small ocellar spots. Lower parts bright yellow, or belly bluish green, in life (whitish or bluish in spirit); belly sometimes with large black spots, or with small black spots on the sides. Tail with small dark and light spots above, the dark spots sometimes disposed quincunxially.

The specimen figured on Pl. IV. fig. 3 is the type.

Measurements (in millimetres):—

<table>
<thead>
<tr>
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<th>1.</th>
<th>2.</th>
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<tbody>
<tr>
<td>From end of snout to vent</td>
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<td>70</td>
<td>75</td>
<td>71</td>
</tr>
<tr>
<td>&quot; .. „ fore limb</td>
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<td>27</td>
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<tr>
<td>Head</td>
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<td>17</td>
<td></td>
</tr>
<tr>
<td>Depth of head</td>
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<td>11</td>
</tr>
<tr>
<td>Fore limb</td>
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<td>41</td>
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1. ♂, Mt. Elgon. 2. ♂, Mau Ravine (type). 3. ♀, Kakumera. 4. ♀, Mt. Ruwenzori.

Particulars of Specimens examined.

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<td>.. „</td>
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<td>26</td>
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<td>.. „</td>
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<td>22</td>
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<tr>
<td>.. „, Kakumera (Nairobi Museum)</td>
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<td>.. „</td>
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<td>♀, „</td>
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<td>2</td>
<td>8</td>
<td>26</td>
<td>18-18</td>
<td>23</td>
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</tbody>
</table>

* For explanation of numbers, see p. 48.

Habitat. East and Central Africa. The type is from the Mau Mountains in British East Africa, where it was discovered by Sir F. J. Jackson. The species occurs also in the Kilimanjaro and Usambara districts, on Mount Ruwenzori, and at Lake Kivu.

* "I saw once or twice green-headed and more or less green backed lizards run up on the trunks of big cedar-trees. I had, unfortunately, no means of securing them, but I have no doubt that they were Jackson's Lizards" (Lüderitz, l.c. 1911). The variation in colour is therefore exactly as in L. chlorogaster, which may be precisely similar in its markings.

It is a mountain-form, the specimens in the British Museum having been obtained between the altitudes of 7000 and 8500 feet.

The absence of the parietal foramen distinguishes this species from all other members of the group. There is much in common with *L. chlorogaster*, both as regards lepidosis and coloration, but the head is much flatter, the snout shorter in proportion to the postocular part of the head, the dorsal scales are larger, the toes shorter, etc.

The East African Lizard described by Tornier, in 1902, under the name of *L. vauesiellii* and regarded by him as related to *L. jacksonii*, has since been pronounced by Sternfeld (1912) to have nothing to do with this species, and it appears from his description to belong to the group of *L. vieipara*. Head shorter and more convex, collar serrated, ventrals in 6 longitudinal and 18 to 22 transverse series, 7 to 10 femoral pores on each side; a vertebral series of dark spots often present.

*Lacerta brandthii*.


Head and body feebly depressed, as in *L. taurica*. Head about 1½ times as long as broad, its depth equal to the distance between the anterior corner of the eye and the tympanum; snout obtuse, as long as postocular part of head; cheeks not much swollen in the male; length of pileus twice its width. Neck a little constricted. Hind limb reaching the shoulder in the male, the elbow or the axil in the female; foot longer than the head. Tail cylindrical, about twice as long as head and body.

Nostril pierced between the nasal, two postnasals, and the first upper labial. Nasals forming a suture behind the rostral; frontonasal broader than long; frontal 1½ to 2 times as long as broad, nearly as broad, behind, as the principal supraoculars, not in contact with the first supraocular; parietals 1½ to 1¾ times as long as broad, not in contact with or just touching the upper postocular, the outer border straight or slightly concave; occipital small, ½ to ¾ the length of the interparietal, which is equally broad or a little broader. The two major supraoculars, of which the first is the longer, separated from the superciliaries by a complete series of granules, or the first in contact with the first or first and second superciliaries; the fourth supraocular usually in contact with the first upper temporal; 6 or 7 superciliaries, first usually longest, the suture between the first and second more or less oblique.

Rostral touching or nearly touching the nostril; two superposed postnasals; anterior loreal not more than half as long as second. 5 upper labials anterior to the subocular*, the lower border of which is much shorter than the upper. Temporal

* "Nahezu constant," Boettger.
region with rather large scales; masseteric shield present, small or large; tympanic present; two or three upper temporals, first largest and usually extending to the upper surface of the head.

Pterygoid teeth strongly developed.

23 to 25 scales and granules in a straight line between the symphysis of the chin-shields and the median collar-plate; gular fold distinct. Collar not or but very feebly serrated, composed of 7 to 9 plates.

Body covered with small, smooth granules, which are slightly smaller on the sides than on the back; 50 to 55 scales across the middle of the body, 3 or 4 transverse series corresponding to a ventral plate, 38 to 42 in the middle of the back corresponding to the length of the head. Ventral plates in 8 (or 10!*) longitudinal series, broader than long, subequal, or the second series from the median line the broadest; in 28 to 30 transverse series.

Preanal plate rather large, bordered by two semicircles of scales. Scales on upper surface of tibia smaller than dorsals. 25 or 26 lamellar scales under the fourth toe. 16 to 20 femoral pores on each side.

Caudal scales truncate, the upper rather oblique, diagonally and rather strongly but obtusely keeled, the lower smooth (in the basal third); apical pits very distinct; the whorls not very unequal in length; 28 or 30 scales in the fourth whorl behind the postanial granules.

The coloration of the type-specimens is thus described by Blanford:—Centre of back olive-grey; a rather irregular whitish line down each side [originating behind the supratemporal shields], breaking up behind into white spots, with irregular mottling and spots of black forming an indistinct band inside and outside the white one; another ill-marked pale line down the lower portion of each side, the ground-colour of which, and of the breast and abdomen, is pale greenish blue, the anterior and inner margins of most of the ventral plates near the sides being black. According to De Filippi, there are some blue spots near the axillary region, and the anal region and lower part of the tail are tinged with fiery red.

The following notes refer to three well-preserved specimens recently received from M. L. A. Lantz.

Male pale brown above, with small black spots having a tendency to form a reticulation; sides of head and body with numerous whitish dark-edged ocellar spots, the largest in and above the axil; throat and belly white; outer ventrals blue, with small black spots; anal region, lower surface of thighs, and lower surface of tail reddish.

Female (Pl. II. fig. 13) not unlike the preceding, but with the white dorso-lateral streak distinct on the nape and continued as a regular series of spots on the body;

* De Filippi gave ten as the number of longitudinal rows. Blanford, redescribing the type-specimens, two in number, says:—"Eight longitudinal rows, all nearly equal in size; in one of the specimens there is an additional row of much smaller scales on each side, but it is broken up in the other specimen."
a second series of white spots from the ear to the side of the body, which is marked
with small black and whitish spots; a series of black spots along each side of the
back, within the dorso-lateral light streaks or series of spots; two or three large,
blue, black-edged ocelli above the axil; except for the absence of a dark vertebral
streak on the nape, the markings of this female are very similar to those of certain
specimens of *L. parea*, and they are obviously derivable from them. Throat and belly
bluish, with small black spots on the outer ventrals; anal region, thighs, and lower
surface of tail reddish. A dark streak along each side of the tail, on the base of
which the dark and light dorsal markings are continued.

Young greyish above, the sides with a blackish network enclosing round white
spots; two series of vermicular black markings along the back; two large, blue,
black-edged ocelli above the axil.

Measurements (in millimetres):—

<table>
<thead>
<tr>
<th></th>
<th>♂</th>
<th>♀</th>
</tr>
</thead>
<tbody>
<tr>
<td>From end of snout to vent</td>
<td>66</td>
<td>58</td>
</tr>
<tr>
<td>&quot;    &quot; fore limb</td>
<td>25</td>
<td>22</td>
</tr>
<tr>
<td>Head</td>
<td>17</td>
<td>14</td>
</tr>
<tr>
<td>Width of head</td>
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<tr>
<td>Depth of head</td>
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<td>Hind limb</td>
<td>35</td>
<td>28</td>
</tr>
<tr>
<td>Foot</td>
<td>19</td>
<td>16</td>
</tr>
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</table>

Particulars of Specimens examined.

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<td>66</td>
<td>54</td>
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<td>23</td>
<td>9</td>
<td>18-19</td>
<td>25</td>
</tr>
<tr>
<td>♀ &quot; Rasano, Talisch</td>
<td>58</td>
<td>53</td>
<td>29</td>
<td>25</td>
<td>7</td>
<td>18</td>
<td>26</td>
</tr>
</tbody>
</table>

* For explanation of numbers, see p. 48.

Habitat. Known only from North-Western Persia and the neighbouring Trans-
caucasian Province of Talisch. The type-specimens are from Basmink, between
Tabriz and Teheran. Mr. Lantz's specimens are from a salt lake near Ardebil.

I regard *L. brandtii* as one of the most primitive members of the *L. muralis* group,
which it connects with *L. parea*. Among the species with two superposed postnasals
it agrees with *L. levis* in having teeth on the pterygoids, but differs in the temporal
lepidosis, in the smaller occipital, in the 8 (or 10) rows of ventrals, and in the
shorter toes.

**Lacerta levis.**


Size and shape of head and elongation of body very different according to the
sex, the difference even greater than in *L. peloponnesiaca*. Head $1\frac{1}{2}$ to $1\frac{3}{4}$ times
as long as broad, rather strongly depressed in the female, but little broader than deep
in the full-grown male, its depth in the tympanic region equal to the distance between
the anterior corner or the centre of the eye and the tympanum, its length 4 to 5 times
in length to vent in the female, $3\frac{1}{2}$ to $3\frac{3}{4}$ times in the male: snout obtusely pointed,
as long as or a little shorter than postocular part of head; cheeks moderately swollen
in the male; pilous 2 to 2$\frac{1}{4}$ times as long as broad. Neck as broad as the head or a
little narrower. Body moderately depressed. Hind limb reaching the wrist or the
elbow, rarely the axil, in females, the collar or between the collar and the ear in
males; foot longer than the head. Tail cylindrical, often a little flattened at the
base, twice or a little over or a little under twice as long as head and body.

Nostril pierced between the nasal, the postnasals, the first upper labial, and the
rostral. Nasals forming a suture behind the rostral; frontonasal as long as broad or
a little broader than long; frontal as long as or shorter than its distance from the
end of the snout, $1\frac{1}{2}$ to 2 times as long as broad, nearly as broad, behind, as the
major supraoculares or a little broader; in large males the frontal sometimes trilobate
in front, as in *L. peloponnesiaca*; parietals $1\frac{1}{2}$ to $1\frac{3}{4}$ times as long as broad, usually
not in contact with the upper postocular, outer border convex, or oblique in front,
where it forms a suture with the upper temporal, but not concavely emarginate;
occipital constantly broader than the interparietal, sometimes broader than the frontal,
at least as long as the interparietal in males, usually shorter in females. Of the two
major supraoculares, the first is usually the longer; fourth supraocular usually in
contact with the upper temporal *; 5 to 7 supraoculares, first usually longest; suture
between the first and second nearly as often oblique as vertical; a series of granules
between the supraoculares and the supraoculares, the series complete or the first or
first and second supraoculares in contact with the supraoculares.

Rostral entering the nostril, usually largely; two superposed postnasals †; anterior
oral shorter than second. 5, rarely 4 or 6 $\frac{1}{2}$ upper labials anterior to the subocular,
the lower border of which is usually much shorter than the upper. Temporal
scales granular, about as large as the dorsal scales or a little larger; a large or very

* 14 exceptions out of 106 cases.
† I have come across one exception only, in a male from Damascus, which has a single postnasal on
the right side.
‡ 4 in 10 cases out of 106, 6 in 3 cases.
large masseteric shield*; tympanic shield distinct; a large upper temporal, followed
by a row of very small shields or mere granules.
Pterygoid teeth usually present.
18 to 24 scales and granules in a straight line between the symphysis of the chin-
shields and the median collar-plate; gular fold indistinct. Collar with even or very
feebly serrated edge, composed of 9 to 13 plates, exceptionally 7.
Scales on body juxtaposed, oval or hexagonal, keeled, the keel usually stronger in
males than in females, rather smaller on the sides than on the back; minute granules
in the interstitial skin †; 49 to 62 scales (usually 50 to 58) across the middle of the
body, 3 or 4 transverse series, on the sides, corresponding to a ventral plate, 33 to 55,
in the middle of the back, corresponding to the length of the head. Ventral plates
in 6 longitudinal series, or if in 8 ‡ the outer very small; all broader than long, the
median pair narrowest, the other two nearly equal in width; 24 to 27 transverse series
in males, 26 to 29 in females.
Preanal plate large, bordered by one or two semicircles of small plates.
Scales on upper surface of tibia smaller than dorsals, with a strong keel, often with
small tubercles or short secondary keels in addition. 27 to 35 lamellar scales under the
fourth toe, usually 29 to 32. 16 to 24 femoral pores on each side, usually 18 to 21.
Upper caudal scales rather narrow, straight or slightly oblique, strongly keeled,
the keel sometimes accompanied by a groove on each side §, truncate or very obtusely
pointed behind, mostly with a distinct apical sensory pit; the whorls more or less
unequal in length, sometimes very slightly; 24 to 34 scales in the fourth or fifth whorl
behind the postanal granules.
Grey or pale brown above, the back uniform or scantily dotted or spotted with
blackish, occasionally with larger spots having a tendency to arrange themselves in
transverse series; upper surface of head without spots; a black lateral band, passing
through the eye, sometimes well-defined by a white streak above and beneath, to
above the shoulder, where its lower limit shades off into the lighter colour of the
flanks and its upper border is festooned or crenulate; white dots or round white spots
on the back of the sides; sides sometimes only a little darker than the back, with
black and white ocelli; limbs with a dark network, often enclosing round white spots;
tail uniform or with small dark spots irregularly disposed. Lower parts white, throat
of male sometimes bluish, without spots, except, in males, a series of rather distant
blue black-edged spots along each side of the belly.

* Only one exception, in a female from Damascus, in which the shield is hardly distinct on the right side.
† As first pointed out by Pederiva, these accessory granules are to be found in nearly all species of
Lacerta, when the skin is distended, and they are more distinct still in L. jayakari, not to mention L. gilotti.
‡ In two male specimens from Damascus; these outer plates about half the width of those of the third
series from the middle line.
§ As in L. danfordii, var. greca.
**ALLIED TO LACERTA MURALIS.**

Measurements (in millimetres):—

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<td>30</td>
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<td><strong>Width of head</strong> . . . . . . . . . . . . . .</td>
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<td><strong>Depth of head</strong> . . . . . . . . . . . . . .</td>
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<td>13</td>
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<td>6</td>
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*Particulars of Specimens examined.*

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*For explanation of numbers, see p. 48.*
Lacerta jayakari.  

Head and body moderately depressed. Head $\frac{3}{4}$ to $\frac{3}{4}$ times as long as broad; snout pointed, as long as postocular part of head; depth of head in the tympanic region equal to the distance between the anterior corner of the eye and the tympanum; cheeks rather swollen in the male; pileus $\frac{3}{4}$ to $\frac{3}{4}$ times as long as broad. Neck.
slightly constricted. Hind limb reaching the collar or a little beyond in the male, the axil or the shoulder in the female; foot as long as the head or a little longer. Tail cylindrical, a little more than twice the length of head and body.

Nostril pierced between the nasal, two postnasals, the first upper labial, and the rostral. Nasals forming a rather long suture behind the rostral; frontonasal as long as broad or a little broader than long; frontal usually shorter than its distance from the rostral, $1 \frac{1}{2}$ to $1 \frac{1}{2}$ times as long as broad, as broad, behind, as the major supraoculars in the adult (narrower in the young); parietals $1 \frac{1}{2}$ to $1 \frac{1}{2}$ times as long as broad, with straight or slightly convex outer border, not in contact with the upper postocular; occipital usually as long as and much broader than the interparietal, sometimes shorter and but little broader. Major supraoculars, of which the first is usually the longer, separated from the superciliaries by a complete series of granules; 7 to 9 superciliaries, the suture between the first and second sometimes vertical, sometimes oblique.

Rostral largely entering the nostril; two superposed postnasals; anterior loreal much shorter than second; 6 upper labials anterior to the subocular *, the lower border of which is usually but little shorter than the upper. Temple covered with minute granules, which are smaller than the dorsal scales; the granules in front of the ear may have a tendency to form a denticulation; no masseteric shield; tympanic shield usually well developed, sometimes very small; a large anterior upper temporal shield, in contact with the fourth supraocular, followed by a series of 2 or 3 smaller shields.

Pterygoid teeth present.

45 to 50 granular scales in a straight line between the symphysis of the chin-shields and the median collar-plate; no gular fold. Collar with feebly serrated edge, composed of 13 to 16 plates, all except the median very small.

Scales on body very small, granular, round, convex, smooth or very indistinctly keeled, mostly with a distinct sensory pit; the interstitial skin with very minute granules; 85 to 95 scales across the body; 4 or 5 lateral scales correspond to the length of a ventral plate; 48 to 68 transverse series of scales, in the middle of the body, correspond to the length of the head. Ventral plates in 8 longitudinal and 27 to 29 transverse series; the plates of the second series from the median line usually broader than the others, those of the outer series smallest.

Premax. plate small, bordered by 2 or 3 semicircles of smaller plates.

Scales on upper surface of tibia a little larger than dorsals, obtusely keeled. 29 or 30 lamellar scales under the fourth toe. 25 to 29 femoral pores on each side, the two series nearly meeting in the middle.

Upper caudal scales narrow, straight or nearly straight, strongly keeled, truncate.

* 7 on one side in one of the specimens.
with a very distinct apical sensory pit; the whorls nearly equal in length; 42 to 50 scales in the fourth or fifth whorl behind the postanal granules.

Young (Pl. IV. fig. 7) olive-grey above, with numerous black and whitish spots, which have a tendency to run together to form wavy transverse bars; a black spot on each upper labial shield; temple white with three black vertical bars; lower parts yellowish white. These markings disappear with age, the adult (Pl. IV. fig. 6) being uniform pale greyish or brownish olive, with more or less distinct traces of the spots on the body and of the markings on the sides of the head.

Measurements (in millimetres):—

- From end of snout to vent. 152 155
- Fore limb. 65 65
- Head. 38 37
- Width of head. 27 22
- Depth of head. 23 20
- Fore limb. 56 55
- Hind limb. 90 85
- Foot. 42 39
- Tail. 320 —

Particulars of Specimens examined.

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* For explanation of numbers, see p. 48.

Habitat. *Lacerta jayakari,* named after its discoverer, the late Surgeon-Major A. S. G. Jayakar, is known only from Muscat, Arabia.

This is the giant of the Section *Podarcis.* In conformity with the frequent if not absolutely general rule in this genus that in allied forms an increase in size is accompanied by a finer scaling (*L. agilis-viridis-ocellata, L. muralis typica-nigripunctata*—*bedriaga*) the size of the scales is so much reduced as to render the definition of this species by a numerical formula extremely easy. It is true that the same high number of scales across the body and of plates in the collar is reached in *L. muralis,* var. *lilfordi,* but the number of gular scales remains lower (40 the maximum), the temporal scales are larger, there are fewer longitudinal rows of ventral plates and anterior labials, and the postnasal is single.

I regard *L. lavis* as the nearest ally of *L. jayakari.* The greater difference in the general proportions between the two sexes, the shorter head, the coarser lepidosis,
the presence of a large masseteric shield, the number of ventral plates and of femoral pores, and the pattern of markings are the most striking characters distinguishing the former from the latter, which is one of the most sharply defined species of the genus *Lacerta*. But I do not suggest a derivation of *L. juyakiri* from *L. levis*; I imagine these two species to have been independently evolved out of forms closely related to *L. brandti*, nearly all the characters of which appear to support such an assumption.

*Lacerta danfordii.*


The following description is drawn up exclusively from the type-specimens, from Zebil Bulghar Dagh, Cilician Taurus.

Head and body rather strongly depressed, but less than in *L. oxycephala*, more as in some specimens of the typical *L. muralis*. Head 1½ to a little over 1¾ times as long as broad, its depth, in the tympanic region, equal to the distance between the anterior corner or the centre of the eye and the anterior border of the tympanum; snout obtusely pointed, as long as or a little shorter than postocular part of head; cheeks not much swollen in the male; length of pilaeus 2 to 2½ times its width. Neck at least as broad as head. Hind limb reaching the shoulder or the collar in the male, the axil in the female; foot as long as the head or a little longer (not more than once and one-third). Tail cylindrical, nearly twice or more than twice as long as head and body.

Nostril pierced between the nasal, two postnasals, the first upper labial, and the rostral. Nasals forming a suture behind the rostral; frontonasal as long as broad or, more often, broader than long, 2 to 3 times as long as the suture between the prefrontals. Frontal 1½ to 1¾ times as long as broad, as long as its distance from the rostral or the end of the snout, as broad as or a little narrower, behind, than the
principal supraoculars, not in contact with the first supraocular, although sometimes very narrowly separated from it. Parietals 1½ (young) to 1¾ times as long as broad, usually not in contact with the upper postocular*, the outer border more or less distinctly notched for the accommodation of the large temporal. Occipital as long as or shorter than †, and as broad as or broader than the interparietal. The two major supraoculars, equal in length or the first longer, separated from the superciliaries by a complete series of granules; the fourth supraocular usually in contact with the upper temporal. 6 or 7 superciliaries, second longest, the suture between them all vertical or nearly so.

Two superposed postnasals; two loreals, first usually shorter than second. A rather large semitransparent area in the lower eyelid, with 7 to 9 vertically elongate shields. 5 upper labials anterior to the subocular‡, the lower border of which is much shorter than the upper. Temporal region with small granular scales; masseteric shield small or absent §; tympanic present; a large anterior upper temporal, followed by granular scales.

No pterygoid teeth ‖.

22 to 27 scales and granules in a straight line between the symphysis of the chin-shields and the median collar-plate; gular fold absent or merely indicated. Collar not serrated, composed of 9 to 12 moderate or small plates.

Body covered with small smooth granules (sometimes faintly keeled on the posterior part of the back), which are a little smaller on the sides than on the back; 55 to 62 scales across the middle of the body, 3 or 4 transverse series corresponding to a ventral plate, 31 to 44 in the middle of the back corresponding to the length of the head. Ventral plates as often in 8 as in 6 longitudinal series, the fourth series on each side composed of smaller but quite well-developed plates; in 26 to 29 transverse series.

Praeanal plate small or very small, in one (male) specimen divided into two, bordered by two or more series of small plates or scales; granules between the praeanal plate and the anal cleft ¶.

Scales on upper surface of tibia obtusely keeled, smaller than dorsals. 27 to 31 lanicular scales under the fourth toe. 20 to 25 femoral pores on each side **.

Caudal scales truncate, the upper more or less oblique, diagonally and strongly but rather obtusely keeled, the lower smooth; apical pits usually very distinct; the

* In contact in 3 cases out of 16.
† In one specimen barely half as long.
‡ Rarely 4 or 6, according to Werner.
§ Present in 5 cases only out of 16.
‖ Minute teeth or their traces may be present, according to Méhely.
¶ Absent, however, in one of the specimens (lateral). The importance of this character has been exaggerated by Méhely. I have shown that it is also found in L. greca, as well as in some specimens of L. maralis.
** Rarely 16 to 19 and 26, fide Bedriaga, Werner, and Méhely.
whorls not very unequal in length; 30 to 34 scales in the fourth or fifth whorl, two, behind the postanal granules, enlarged in males (Pl. V. fig. 16).

Adult males (Pl. V. fig. 1) olive-grey or brownish above, with blackish dots and traces of round light spots; younger males with round whitish spots edged with dark brown; sipes closely speckled with black, with dark-edged, round, light spots; head, including lips, speckled with black; limbs speckled or reticulated with black, with more or less distinct, round, light spots; tail without spots, except at the base; belly greenish white (in spirit), with blackish dots *.

Females and young (Pl. V. fig. 2) with black dots or spots or a black network enclosing round light spots; a light unspotted area along each side of the back, from each parietal shield; belly unspotted or with small black spots.

Measurements (in millimetres):—

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<th>$\omega$</th>
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<tbody>
<tr>
<td>From end of snout to vent</td>
<td>75</td>
<td>62</td>
<td>56</td>
<td>52</td>
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<td>&quot; &quot; &quot; fore limb</td>
<td>32</td>
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<td>Head</td>
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<td>Width of head</td>
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<td>6</td>
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<tr>
<td>Fore limb</td>
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<tr>
<td>Hind limb</td>
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<tr>
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<tr>
<td>Tail</td>
<td>152</td>
<td>140</td>
<td>—</td>
<td>93</td>
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Habitat. The types are from Zebil Bulghar Dagh, 4000 feet, presented by Mr. C. G. Danford. Dr. Werner’s specimens are from Dumbellek Dagh, also in the Cilician Taurus. The young specimen from Kaisarich, referred to this species in the ‘Catalogue of Lizards,’ belongs to *Lattastia coppadocica* Werner. The Syrian specimen mentioned by Barbour (Proc. N. Engl. Zool. Club, v. 1914, p. 84) under the name of *Lacerta danfordii* should be compared with *L. lucis*.

Var. *anatolica* Werner.

The type-specimen (female) of this form is from near Eski Shekîr, in Central Asia Minor, and I am indebted to Dr. Werner for the examination of two males from the same locality, one of which he has presented to the British Museum and is figured on Pl. V. fig. 3. *L. oertzzeni* Werner, based on Boettger’s *L. danfordii* from Rhodes, Samos, and Nicaria (S. Sporades), is regarded by Mêchély as identical with *L. anatolica*, although he has omitted to refer to Werner’s name in the synonymy.

According to Werner’s original description, *L. anatolica* is similar to *L. danfordii*, but nearer to *L. oxycephala*. I can see no reason for any near approximation to the latter species, and Mêchély more correctly regards *L. anatolica* and *L. danfordii* as

* Reddish white or red in life, according to Werner; the lips are also red or reddish, according to the same author.
"Schwesterarten," agreeing in the most important morphological characters and conforming to the same primary pattern of coloration.

The only important difference resides in the longer head, which is 1\(\frac{3}{4}\) times as long as broad in the specimen before me (pileus nearly twice as long as broad, parietal shields nearly twice as long as broad), a difference, however, not greater than between two extreme specimens of the var. tiliguerta of L. muralis, or even of the typical form in the wide sense. I am also far from convinced that this character would hold good if put to the test of a considerable material (which has not been the case); in fact, if Schreiber's figure of one of the type-specimens of L. oertzeni is to be at all trusted, the shape of the head may be absolutely the same as in a typical L. danfordii (length 20, width 14, parietals barely once and a half as long as broad).

Another character to which undue importance has been accorded by both Werner and Méhely is the number of longitudinal rows of ventral plates, supposed to be 6 in L. danfordii and 8 in L. anatolica. However, I have already pointed out that there may be 8 series in the types of L. danfordii, and 6 or 8 is given as the number in L. oertzeni, which is united with L. anatolica by Méhely. There is no constancy in another character appealed to by the latter author, viz., the presence of a detached portion of the rostral between it and the nostril, an anomaly which may occur in any species of Lacerta, and which, besides, is not shown by Werner's male specimen. The divided anal* is also inconstant, and is besides shown by one of the types of L. danfordii, the very one figured by Günther when first describing the species.

The continental specimens have 53 to 60 scales across the body, 8 longitudinal and 27 to 29 transverse series of ventrals, and 15 to 21 femoral pores on each side. Those from the S. Sporades (Rhodes, Simi, Samos, Nicarim) have, according to Boettger, 62 to 66 scales, 6 or 8 longitudinal rows of ventrals, and 15 to 21 femoral pores. There are sometimes 6 anterior upper labials, as in the type of L. anatolica.†

The type-specimen of L. anatolica is described as greyish above, with grey reticulation and two series of black spots with a tendency to form a network; a blackish lateral band with a series of whitish ocellar spots; below this a second series of less distinct ocellar spots; limbs with large white, dark-edged, round spots and small black dots; sutures between the labials black; lower parts with black dots. This coloration agrees very closely with that of young specimens of L. danfordii. Boettger describes his Nicaria adult specimens (L. oertzeni) as bluish grey above, with three longitudinal bands of black spots, and the lower parts uniform bluish tinged with orange, and the young as quite black above, with four pale green longitudinal streaks, the outer broken up into spots. There is, therefore, much variation in the markings of the specimens referred to L. anatolica by Méhely, who also figures some covered with round whitish spots, and with dark cross-bars on the tail, and observes that, although

* Which Schreiber incorrectly describes as a very small anal.
† Out of 5 specimens from the same locality, described later by Werner, 4 have 5 anterior upper labials, as in the typical L. danfordii.
at first sight very different from *L. danfordii*. closer examination reveals these different patterns to belong to the same fundamental plan.

**Measurements (in millimetres) of a male from near Eski Shehir:**

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<tr>
<td>Head</td>
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<td>Width of head</td>
<td>12</td>
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<td>Hind limb</td>
<td>40</td>
</tr>
<tr>
<td>Foot</td>
<td>21</td>
</tr>
</tbody>
</table>

According to Werner, the variation in the proportion of length to width of head is 1, 38 to 1, 44 in *L. danfordii*\(^*\), 1, 53 to 1, 74 in *L. anatolica*. This is really the only difference on which the two forms can be based, and I believe it would break down were the specimens from the Southern Sporades re-examined. All the other characters that have been adduced in favour of separation (viz., relation of rostral to nostril, number of longitudinal rows of ventrals, anal scutellation, shape and size of the occipital, and coloration) are subject to such variation as to be useless, and are mostly disposed of by an examination of the series of specimens on which *L. danfordii* was established.

**Habitat.** Asia Minor and Southern Sporades.

**Var. greca, Bedriaga\(^\dagger\).**

This is a distinct form, known only from Southern Greece, which is, however, so closely related to, and so completely connected with, *L. danfordii* that, according to the standard adopted in the genus *Lacerta* (*L. ocellata, L. viridis, L. muralis*), I cannot accord it higher rank than that of subspecies. That is, after all, perhaps only a matter of opinion, but what is important is to dispose of the statements hitherto made by different authors as to the characters which were believed to justify a specific separation, such as a longer and flatter head, longer limbs, the shape and size of the occipital shield, the temporal scutellation, the coloration, etc., by showing how far they are to be relied upon, and what importance is to be attached to them by analogy

\(^*\) 1, 55 in one of the specimens of which measurements are given above.

\(^\dagger\) The name *modesta* Bedriaga, which has priority over *greca*, cannot be used, being preoccupied in the genus (*L. muralis, var. modesta Eimer*).

\(^\dagger\) It may be interesting to reproduce here the reasons given by the original describer of *L. greca* for distinguishing it from *L. danfordii*. "Da man kurzlich versucht hat *L. danfordii* mit *L. greca* zu vereinigen, so will ich hierzuland auf die Hauptunterschiede, welche ich zwischen dem mir vorliegenden Exemplar von *L. danfordii* und den *greca* gefunden zu haben glaube, hinweisen: *L. danfordii*. Kopf pyramidal, Rumpf nahezu waagerecht. Ocelliptale kleiner als das Interparietale, Masseterium vorhanden; gewölbt, gegen den Schwanz hin gekielt, Rumpfschuppen. 10 Schenkelhärten. *L. greca*. Kopf und Rumpf abgeflattet, Ocelliptale grösser als das Interparietale; Masseterium fehlend; ziemlich flacher, gegen den Schwanz hin schwach eingerückte Rumpfschuppen. 22–24 Schenkelhärten." (Bedriaga, *op. cit.* p. 248.)
with the variations recognised in other better-known allied species, such as *L. muralis* and *L. oxycephala*.

The head is often somewhat flatter and more elongate than in *L. danfordii*, but not constantly, one adult male (from Kambos) being in this respect absolutely identical with one of the types from Asia Minor (see p. 69, measurements, column 2). This individual variation, which is not even so great as in *L. muralis*, var. *bocagii*, is best shown by measurements of a few specimens:

<table>
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<th>7.</th>
<th>8.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length of head</td>
<td>20</td>
<td>19</td>
<td>19</td>
<td>17</td>
<td>17</td>
<td>17</td>
<td>16</td>
<td>15</td>
</tr>
<tr>
<td>Width of head</td>
<td>12</td>
<td>12</td>
<td>13</td>
<td>11</td>
<td>10</td>
<td>10</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Depth of head</td>
<td>8.5</td>
<td>9</td>
<td>9</td>
<td>8</td>
<td>8</td>
<td>7</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Length of pupils</td>
<td>19</td>
<td>18</td>
<td>18</td>
<td>17</td>
<td>16</td>
<td>15</td>
<td>14</td>
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<tr>
<td>Width of pupils</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>8.5</td>
<td>8.5</td>
<td>8</td>
<td>7.5</td>
<td>7</td>
</tr>
</tbody>
</table>


The head is thus seen to be roughly $1\frac{1}{2}$ to $1\frac{1}{3}$ times as long as broad, the length of the pupils about twice its width; the depth of the head equals the distance between the centre of the eye and the anterior border of the tympanum; snout obtusely pointed, as long as or a little longer than postocular part of head. Proportions of limbs and tail as in the typical form.

Rostral usually entering the nostril, sometimes narrowly separated from it. Upper head-shields as in the typical form, except that, when the head is more elongate, the frontal and frontonasal are longer in proportion; first supraocular often * in contact with the frontal; parietal rarely in contact with the upper postocular †; occipital usually as long as and broader than the interparietal, sometimes much broader and longer, though always narrower than the frontal ‡; 6 to 8 superciliaries, first usually longest. Of the two superposed postnasals, the upper is divided into two in one specimen; first loreal sometimes as long as second, sometimes shorter. 5 anterior upper labials, rarely 6 §; lower border of subocular usually but little shorter than the upper, but sometimes much shorter; upper temporal sometimes very small; no mastetery shield ¶.

26 to 33 scales and granules between the chin-shields and the collar, which is composed of 9 to 12 plates.

Scales smooth or faintly keeled on the posterior part of the body ¶, 52 to 61 across the body **. Ventral plates constantly in 6 longitudinal series and in 25 to 30 transverse series.

Preanal plate rather large, bordered by one or two series of scales; the granules

* In 5 specimens out of 10 in the British Museum, in 8 out of 10 examined by Méhely.
† In 5 cases out of 22.
‡ Sometimes smaller than the interparietal, according to Schreiber.
§ In 2 cases out of 22. ¶ Exceptionally present, *fide* Schreiber.
¶ More distinctly keeled in a male from Kambos than in any of the typical *L. danfordii*, ** 48 to 65, *fide* Méhely.
between the anal plate and the anal cleft, believed to be characteristic of *L. danfordii* and *L. anatolica*, as often present * as absent (Pl. V. fig. 5 b).

Caudal scales truncate, not or but slightly oblique, the upper with obtuse keels bordered on each side, in the posterior two-thirds of the scale, by a more or less distinct depression or groove †; apical pits very distinct; the whorls usually not very unequal in length, sometimes nearly equal; 30 to 40 scales in the fourth or fifth whorl. 27 to 32 lamellae under the fourth toe. 20 to 28 (usually 21 to 24) femoral pores on each side ‡.

Grey, brownish, or olive above, uniform on the back (Pl. V. fig. 4), or with blackish dots or rather large blackish spots (Pl. V. figs. 5-7) irregularly disposed or forming two more or less regular longitudinal series from the occiput to the base of the tail, which is uniform or spotted like the body, but more cross-barred; upper surface of head uniform or with small black spots, sides, including the lips, much spotted, the temples often with round, light, dark-edged spots; sides of body usually darker than the back, with a dark network enclosing lighter spots or with very well-marked ocellar spots, one of which, above the shoulder, may be enlarged and of a blue colour; upper surface of limbs often with round, light, dark-edged spots. Belly greyish or pale yellow in females, bright yellow in males §, uniform or with small black spots, or black edges to the shields; blue spots on the outer ventral shields. In their markings, some of the specimens of *L. greca* and *L. danfordii* are almost identical.

I have not seen the young of the Greek form, nor have I been able to find an allusion to it in the descriptions to which I have had access.

Measurements (in millimetres):—

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
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<tbody>
<tr>
<td>From end of snout to vent</td>
<td>76</td>
<td>73</td>
<td>65</td>
<td>69</td>
<td>61</td>
</tr>
<tr>
<td>&quot; &quot; &quot;</td>
<td>32</td>
<td>29</td>
<td>27</td>
<td>27</td>
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</tr>
<tr>
<td>Head</td>
<td>20</td>
<td>19</td>
<td>17</td>
<td>17</td>
<td>15</td>
</tr>
<tr>
<td>Width of head</td>
<td>12</td>
<td>11</td>
<td>11</td>
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<td>9</td>
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<tr>
<td>Depth of head</td>
<td>8.5</td>
<td>8</td>
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<tr>
<td>Fore limb</td>
<td>27</td>
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<td>21</td>
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<tr>
<td>Hind limb</td>
<td>42</td>
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<tr>
<td>Foot</td>
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<td>18</td>
<td>17</td>
</tr>
<tr>
<td>Tail</td>
<td>170</td>
<td>153</td>
<td>---</td>
<td>---</td>
<td>110</td>
</tr>
</tbody>
</table>

1. ♂, Langa de. 2. ♂, Tzargatos (one of the types). 3. ♂, Kambos. 4. ♀, Megali. 5. ♀, Luka.

* In 6 specimens out of 11.
† This peculiarity, which is to be found, though less marked, in some specimens of the typical *L. danfordii*, is conveyed, in a somewhat exaggerated form, by Meek’s figure 7 on pl. xiii.
‡ In one of the specimens (one of Bednaga’s types) there are a few additional pores, forming a second series.
§ Werner has attached great importance to the coloration in defining *L. greca* as distinct from *L. danfordii*, the former being yellow beneath (in life) and the latter red or reddish. There are several forms of *L. murals* in which such a difference is to be found among different individuals, often even in the same locality. The statement that the loreal region is unspotted is contradicted by some of the specimens before me.
Habitat. This form is so far known only from a small part of Southern Greece (Morea), the Taygetos Mountains and neighbouring hills.

**Particulars of Specimens examined.**

<table>
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<th>1.</th>
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<td>27</td>
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<tr>
<td>&quot;</td>
<td>74</td>
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<td>23-22</td>
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<tr>
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</tr>
<tr>
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<td>56</td>
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<td>23-22</td>
<td>28</td>
</tr>
<tr>
<td>&quot;</td>
<td>52</td>
<td>55</td>
<td>8</td>
<td>28</td>
<td>11</td>
<td>22</td>
<td>20-21</td>
<td>27</td>
</tr>
</tbody>
</table>

Var. anatolica.

| ♂, Eski Shehir | 72 | 53 | 8  | 27 | 13 | 25 | 19-20 | 27 |
| "           | 69 | 56 | 8  | 29 | 12 | 24 | 20-21 | 27 |

Var. grceca.

| ♂, Taygetos, type (Lataste Coll.) | 73 | 56 | 6  | 26 | 12 | 27 | 23-24 | 27 |
| ♂, Langada, nr. Sparta | 76 | 59 | 6  | 26 | 10 | 27 | 23-24 | 32 |
| ♂, Kambos | 62 | 58 | 6  | 29 | 11 | 26 | 20-21 | 28 |
| ♂, "  | 75 | 60 | 6  | 28 | 10 | 33 | 26-28 | 29 |
| "    | 73 | 53 | 6  | 26 | 10 | 28 | 22-23 | 29 |
| "    | 65 | 61 | 6  | 26 | 10 | 29 | 25-24 | 27 |
|:" | 66 | 53 | 6  | 25 | 9  | 29 | 24-23 | 28 |
| ♂, "  | 61 | 58 | 6  | 27 | 9  | 29 | 22-24 | 28 |
| ♂, Megali | 55 | 59 | 6  | 28 | 10 | 30 | 21-25 | 32 |
| ♂, "  | 69 | 53 | 6  | 28 | 9  | 29 | 23-22 | 30 |
| "    | 67 | 52 | 6  | 30 | 10 | 28 | 21-29 | 27 |

Column 3 refers to the longitudinal rows of ventral plates, 4-8 as in 3-7 of preceding tables.

The three forms may be diagnosed as follows:—

**Forma typica.** Head about $1\frac{1}{3}$ to $1\frac{1}{2}$ times as long as broad; ventrals in 6 or 8 longitudinal rows; praanal small or very small, usually undivided; upper caudal scales oblique; femoral pores 16 to 25.

Var. anatolica. Head about $1\frac{1}{3}$ to $1\frac{1}{2}$ times as long as broad; ventrals in 8 (rarely 6) longitudinal rows; praanal usually divided; upper caudal scales oblique; femoral pores 15 to 21.

Var. grceca. Head about $1\frac{1}{2}$ to $1\frac{3}{4}$ times as long as broad; ventrals in 6 longitudinal rows; praanal rather large, undivided; upper caudal scales straight or slightly oblique; femoral pores 20 to 28; frontal often in contact with first supraocular.

To allow these three forms the rank of species would be to impair the sense of proportion in comparison with other species, taken even in the narrow conception adopted by Mchély, as, for instance, his *L. saxicola*, in which at least equally
important differences in the shape of the head, in the lepidosis, and in the number of femoral pores* are used for the definition of varieties or subspecies only.

_**Lacerta danfordii**_ is intermediate between _L. lavis_ and _L. oxycephala_. From the former it differs chiefly in the absence or vestigial condition of the pterygoid teeth, in the more depressed head, in the absence or faintness of the gular fold, in the absence or small size of the masseteric shield, in the smaller occipital shield in the male, and usually in the absence of keels on the dorsal scales; from the latter in the less pointed snout, in the less flattened head, in the more frequent absence of the masseteric shield, in the longer toes with more numerous lamellae inferiorly, and in the absence of strongly enlarged subcaudal scales, the latter difference being a very striking one, accompanied by that furnished by the markings on the tail.

**Lacerta oxycephala.**


Head and body strongly depressed. Head 1.3 to 1.5 times as long as broad, its depth, in the tympanic region, equal to the distance between the centre or the posterior corner of the eye and the anterior border of the tympanum; occipital region quite flat or even a little concave; supraocular region rather convex; snout pointed, as long as or a little longer than postocular part of head; cheeks more or less swollen in the male; length of pileus 2 to 2.5 times its width. Neck at least as broad as head. Hind limb reaching the shoulder or the collar in the male, the elbow or the axil in the female; foot as long as the head in the male, a little longer in the female; toes comparatively short. Tail cylindrical, flattened at the base, about twice as long as head and body.

Nostril between the nasal, two postnasals †, and the first upper labial, the rostral being always excluded. Nasals usually in contact with each other, the median suture often very short; exceptionally ‡ the rostral forms a more or less extensive suture with

* It was at one time believed that _L. anatolica_ differs from _L. danfordii_ in having fewer femoral pores. A more recent statement by Werner (1903) has, however, disposed of this supposed difference, which, even if it had been confirmed, could not be accorded much importance, considering the range of variation in species known from a large material (13-25 in the typical _L. muralis_, 16-24 in _L. lavis_, and _L. oxycephala_, 12-24 in _L. danfordii_).

† I have come across but one exception, a male from Lissa, in which the postnalis is single on the right side.

‡ In one specimen from Curzola and in two from Brestea.
the frontonasal, which is usually at least as long as broad; suture between the prefrontals often very short; an azygous shield rarely present between the prefrontals. * Frontal $1^{1/2}$ to $1^{3/4}$ times as long as broad, as long as its distance from the rostral or from the end of the snout, narrower, behind, than the principal supraoculars, often † in contact with the first supraocular or the several small shields or granules into which it may be disintegrated. | Parietals $1^{1/2}$ (young) to $1^{3/4}$ times as long as broad, usually not in contact with upper postocular ‡. Occipital always shorter than the interparietal and usually broader, sometimes much broader. The two major supraoculars, which are equal in length or the first slightly the longer, separated from the superciliaries by a complete series of granules, sometimes by two; the fourth supraocular usually in contact with the upper temporal. 6 to 8, rarely 9, superciliaries, the suture between them all vertical or nearly so.

Two superposed postnasals; anterior loreal shorter than second. Usually 5, sometimes 6, rarely 4 §, upper labials anterior to the subocular, the lower border of which is as long as the upper, or a little shorter. Temporal region with small granular scales; masseteric shield large or small, sometimes absent †; tympanic present; a large upper temporal, well visible from above, usually followed by one, two, or three smaller shields.

No pterygoid teeth in the specimens examined ‡.

30 to 39 (usually 33 to 37) scales and granules in a straight line between the symphysis of the chin-shields and the median collar-plate; gular fold very indistinct or totally absent. Collar not serrated, composed of 10 to 13 (exceptionally 8 or 6) small or very small plates, which may be scarcely larger than the scales in front of them.

Body covered with small, flat, roundish granules, which are a little smaller on the sides than on the back; 50 to 75 (usually 63 to 70) scales across the middle of the body, 3 or 4 (rarely 5) transverse series corresponding to a ventral plate. 31 to 50 in the middle of the back corresponding to the length of the head. Ventral plates in 6 (rarely 8) longitudinal and 25 to 30 transverse series; the plates of the six rows sometimes subequal in width, sometimes unequal, those of the median row from the middle line the broadest; when in 8 series, the plates of the outer row very narrow **. Premaxillary plate moderate or rather small, bordered by one or, more usually, two series of small plates, of which a median pair may be more or less enlarged.

* In one specimen from Dalmatia (Bedriaga Collection) and in one from Curzola.
† In 22 cases out of 58.
‡ In 29 cases out of 38.
§ 5 labials in 23 cases, 6 in 11, 4 in 4.
‖ Large in 18 cases, small in 13, absent in 7.
七星 (Sitzb. Ak. Wiss. Wien, ciii. i. 1894, p. 254) says they are present.
** 8 rows in 5 out of 10 specimens in the British Museum.
Scales on upper surface of tibia obtusely keeled, as large as or a little larger or a little smaller than largest dorsals. 22 to 26 lamellar scales under the fourth toe. 19 to 23 femoral pores on each side; sometimes a second series of rudimentary pores.

Caudal scales truncate, oblique, the upper smooth or more or less strongly, but obtusely and diagonally keeled, the lower smooth; the median dorsal pair sometimes a little larger than those adjacent to it, the median ventral pair strongly enlarged, the largest at least twice as broad as long; regenerated tail sometimes with a single series of large plate-like scales inferiorly; the whorls longer and shorter alternately; 18 to 30 scales in the fourth or fifth whorl behind the postanal granules. The sensory apical pits on the caudal scales usually more distinct than in any other species of the *L. muralis* group.

Grey or bluish grey above with a dark network enclosing very numerous, small, roundish, light spots or with small ocellar markings having a tendency to form transverse series (Pl. VI, fig. 1); upper surface of head often with symmetrical blackish markings and dark edges to the shields; lower parts greyish white or bluish grey; tail more bluish, with regular black annuli, which are interrupted inferiorly. Young like the adult. Some specimens (var. *atra* Bedr., *tomasinii* Schreib.) black or blackish brown (Pl. VI, fig. 2), with more or less distinct paler brown spots, dark grey or blue beneath.

Measurements (in millimetres):—

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<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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</thead>
<tbody>
<tr>
<td>From end of snout to vent</td>
<td>60</td>
<td>62</td>
<td>63</td>
<td>60</td>
</tr>
<tr>
<td>... fore limb</td>
<td>27</td>
<td>24</td>
<td>28</td>
<td>25</td>
</tr>
<tr>
<td>Length of head</td>
<td>15</td>
<td>15</td>
<td>17</td>
<td>15</td>
</tr>
<tr>
<td>Width of head</td>
<td>10</td>
<td>9</td>
<td>11</td>
<td>9</td>
</tr>
<tr>
<td>Depth of head</td>
<td>6</td>
<td>5</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Fore limb</td>
<td>23</td>
<td>22</td>
<td>21</td>
<td>22</td>
</tr>
<tr>
<td>Hind limb</td>
<td>33</td>
<td>33</td>
<td>36</td>
<td>31</td>
</tr>
<tr>
<td>Foot</td>
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<td>17</td>
<td>16</td>
</tr>
<tr>
<td>Tail</td>
<td>110</td>
<td>—</td>
<td>125</td>
<td>—</td>
</tr>
</tbody>
</table>


* 16 to 24, *fide* Schreiber.
† As frequently occurs in *L. muralis*, var. *virena*.
‡ Sometimes brownish, yellowish, or greenish, according to Schreiber.
§ After some time in spirit, these light spots become more distinct and certain preserved specimens may be said to be absolutely intermediate between the typical form and the black variety. Werner (1907) alludes to specimens from a great altitude in Herzegovina as only "ziemlich dunkel." The supposed structural differences between the two forms, pointed out by Michely, have no existence in fact.
Particulars of Specimens examined.

<table>
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<tr>
<th>Forma typica.</th>
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<td>28</td>
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<td>39</td>
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<td>27</td>
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<td>35</td>
<td>22-21</td>
<td>22</td>
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<tr>
<td>♂ Gelsa, Dalmatia</td>
<td>61</td>
<td>75</td>
<td>8</td>
<td>27</td>
<td>13</td>
<td>38</td>
<td>20-22</td>
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<tr>
<td>♂ Lassa . . . .</td>
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<td>64</td>
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<td>29</td>
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<td>37</td>
<td>22-26</td>
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<tr>
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<td>27</td>
<td>12</td>
<td>30</td>
<td>19-23</td>
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<td>♂ Korito, Dalmatia</td>
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<td>8</td>
<td>28</td>
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<td>37</td>
<td>20-22</td>
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<tr>
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<td>26</td>
<td>13</td>
<td>33</td>
<td>23-19</td>
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Var. Tomasinii.

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<td>6</td>
<td>27</td>
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<td>♂ Gacko, Cetinje, Montenegro</td>
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<td>33</td>
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</table>

* For explanation of numbers, see p. 74.

Habitat. Dalmatia, Herzegovina, Montenegro, and neighbouring islands; the typical form from sea-level to 1000 m. altitude, the var. tomasinii from 500 to 1400 m.

Distinguished from *L. muralis* by the two superposed postnasals, the much enlarged subcaudal scales, and the frequent separation of the prefrontal from the second supraocular. It bears considerable resemblance to *L. muralis*, var. bedriagae, but I regard this as a case of convergence, such as we know, within the limits of the species *L. muralis*, in the vars. monticola, horvathi, and saricola. The real affinities are with *L. daudotii*, and both species were probably derived from the same ancestor.

**Lacerta moorrensis.**


Head and body much depressed, as in *L. oxycephala*. Head 1 1/2 to 1 3/4 times as long...
as broad, its depth, in the tympanic region, equal to the distance between the centre or the posterior corner of the eye and the anterior border of the tympanum; snout pointed, as long as postocular part of head; cheeks moderately swollen in the male; length of pileus 2 to \(2\frac{1}{4}\) times its width. Neck at least as broad as head. Hind limb reaching the axil or the shoulder in the male, the wrist or the elbow in the female; foot as long as or a little longer than the head. Tail cylindrical, flattened, and with a median dorsal groove at the base, \(1\frac{1}{2}\) to a little over 2 times as long as head and body.

Nasal between the nasal, one or two postnasals, and the first upper labial, the rostral being always excluded. Nasals separated from each other, the rostral forming a more or less extensive suture with the frontonasal \(^*\); prefrontals forming a median suture. Frontal usually as long as its distance from the rostral, sometimes a little longer or a little shorter, \(1\frac{1}{2}\) to \(1\frac{3}{4}\) times as long as broad, usually broader, behind, than the supraoculars. Parietals \(1\frac{1}{2}\) (young) to \(1\frac{3}{4}\) times as long as broad, not in contact with the upper postocular. Occipital much shorter than and as broad as or a little broader than the interparietal. The two major supraoculars, which are equal in length or the first slightly the longer, separated from the superciliiaries by a usually complete series of granules \(\dagger\); first supraocular small, never in contact with the frontal; fourth also small and in contact with the anterior upper temporal \(\ddagger\). 6 or 7, rarely \(8\frac{1}{3}\), superciliiaries, first largest, the suture between first and second usually vertical, rarely oblique.

Usually two superposed postnasals \(\parallel\); anterior loreal sometimes as long as second, usually shorter. As often 4 as 5 upper labials anterior to the subocular \(\ddag\), the lower border of which is not or but slightly shorter than the upper. Temporal region with small or rather large granular scales; masseteric shield usually large, oval or elliptic, rarely small; tympanic present; a large upper temporal, well visible from above, usually followed by one or two smaller shields.

No pterygoid teeth in the few specimens examined.

\(23\) to \(30\) (usually \(25\) to \(27\)) scales and granules in a straight line between the symphysis of the chin-shields and the median collar-plate; gular fold very indistinct or totally absent. Collar not serrated, composed of \(7\) to \(10\) plates (usually \(9\)), which may be very small.

\(\ast\) There are, however, rare exceptions, according to Schreiber.

\(\dagger\) According to Schreiber, the series may sometimes be reduced to a few granules. I have myself seen a specimen (Dalmatia, Bedricht Collection) with only 4 granules on one side and 5 on the other.

\(\ddag\) "Fast immer," filed Schreiber.

\(\ddagger\) Or 5, according to Mekely.

\(\parallel\) Schreiber, who has examined more than \(60\) specimens, regards a single postnasal as very exceptional. It is therefore remarkable that out of \(12\) specimens received from Prof. Kolombatovic, \(5\) have a single postnasal.

\(\parallel\) Out of \(24\) cases, \(1\) find \(12\) with four labials and \(12\) with five. Mekely finds usually five, often four, rarely six.
Body covered with large, flat, round, subtetragonal or subhexagonal, smooth or faintly keeled granules, which are larger, often much larger, on the back than on the sides; 36 to 42 scales across the middle of the body *, 2 and 3 or 3 and 4 transverse series corresponding to a ventral plate, 22 to 29 in the middle of the back corresponding to the length of the head. Ventral plates in 6 longitudinal and 25 to 28 transverse series; the plates of the second row from the middle line usually the broadest. Prenal plate rather large, sometimes preceded by a smaller plate or a pair of smaller plates, and bordered by one or two semicircles of scales or small plates.

Scales on upper surface of tibia rhombic, rough, tubercular or strongly keeled, as large as or a little smaller or a little larger than largest dorsals. 22 to 25 lamellar scales under the fourth toe. 16 to 20 femoral pores on each side †.

Caudal scales rather broad, truncate, oblique, the upper rather strongly but obtusely keeled, the lower smooth, the median pair, above and beneath, mostly broader than the others; the whorls, markedly longer and shorter alternately, well detached at the sides, forming a serrated outline; 18 to 24 scales in the fourth or fifth whorl behind the postanal granules.

Grey, brown, or olive above ‡, usually a little darker on the sides than on the back, uniform (Pl. VI, fig. 5) or with black spots or reticulations all over or restricted to the sides or to the sides and the vertebral region (Pl. VI, figs. 3, 4); no dark vertebral line or series of spots; the black spots on the sides sometimes so crowded as to constitute the ground-colour, the true ground-colour appearing as small light spots. Spots on the tail, if present, often forming cross-bars, but never such regular annuli as in *Oxycephalus*; in addition to these bars, sometimes a median series of spots. Pale yellow or greenish yellow beneath §, without dark spots; blue spots may be present on the outer ventrals.

Young uniform or with small dark and light spots.

Measurements (in millimetres):—

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<td>Tail</td>
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1, 2, 3. Biokovo Mt. 3. 4. Biokovo Mt. 4. §, Coputne Randina.

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* Up to 45, *vide* Mehely.
† Up to 25, *vide* Mehely.
‡ Sometimes yellow or almost grass-green, according to Tomassini.
§ Sometimes orange, according to Tomassini, or pearl-grey or blue, according to Mehely.
ALLIED TO LACERTA MURALIS. 81

Particulars of Specimens examined.

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Habitat. Mountains of Dalmatia, Herzegovina, and Montenegro, between 700 and 1400 m. altitude.

Lacerta mosovensis, in general appearance, occupies an intermediate position between L. muralis (especially such mountain-forms as vars. monticola, horethi, and chatyldena) and L. oxycephala. Well distinguished among all other species by the large rugose scales on the upper surface of the tibia, and from the two above-named by the larger dorsal scales compared with the laterals. Its real affinities are doubtful and it may well be that its resemblance to L. oxycephala is a case of parallelism, both species being independently derived from some more generalized type akin to L. brandtii.

**Lacerta dugesii.**


Form and general proportions much as in the typical L. muralis. Head 1\(\frac{1}{2}\) to 1\(\frac{3}{2}\) times as long as broad, its depth, in the tympanic region, equal to the distance between the anterior corner or the centre of the eye and the anterior border of the tympanum; snout pointed *, rarely rather obtuse, as long as postocular part of head; cheeks more or less swollen in the male; length of pilus 1\(\frac{2}{3}\) to 2 times its width. Neck at least as broad as head; body rather strongly depressed. Hind limb reaching the axil. the shoulder, or the collar in the male, the wrist or the axil in the female. Foot usually longer than the head, as long as the head in very large specimens. Tail cylindrical or depressed at the base (elliptic in section) 1\(\frac{1}{2}\) to 2 times as long as head and body.

* Particularly in specimens from Porto Santo.
Nostril between the nasal, two postnasals, and the first upper labial; rostral nearly always excluded *. Nasals forming a median suture; præfrontals forming an extensive median suture, unless (very rarely) separated by an azygous shield. Frontal as long as or a little shorter than its distance from the rostral, $1\frac{3}{4}$ to $1\frac{1}{3}$ times as long as broad, broader throughout than the supraoculars. Parietals $1\frac{1}{2}$ to $1\frac{3}{4}$ times as long as broad, in contact with the upper postocular, outer border straight or convex. Occipital † as long as or shorter than and as broad as or broader than the interparietal, sometimes twice as broad as the latter and as broad as the frontal. The two major supraoculars, of which the first is nearly always the longer, separated from the superciliaries by a complete series of granules; first supraocular small, sometimes broken up into two, never in contact with the frontal; fourth also small and sometimes broken up into two. 6 or 7 superciliaries, first largest, the suture between first and second as often oblique as vertical.

Two superposed postnasals; anterior loreal shorter than second. A rather large semitransparent area in the lower eyelid, with 5 or 6 vertically elongate shields. 5 (rarely 4) upper labials anterior to the subocular, the lower border of which is often not or but slightly shorter than the upper, although liable to as much variation in form as in the typical L. muralis. Temporal region covered with granules, or granules and irregular small shields; masseteric shield absent ‡, tympanic present, sometimes preceded by a second similar shield; upper temporals absent.

No pterygoid teeth §.

25 to 38 (usually 28 to 32) scales and granules in a straight line between the symphysis of the chin-shields and the median collar-plate; gular fold distinct. Collar not serrated, composed of 8 to 13 plates (usually 9 to 11).

Scales on body granular, round or suboval, smooth or very faintly keeled, a little larger on the sides than on the back, 54 to 81 (usually 60 to 70) across middle of body, 3 or 4 transverse series corresponding to a ventral plate, 37 to 60 in the middle of the back corresponding to the length of the head. Ventral plates in 6 (very rarely 8 ‖) longitudinal and 24 to 31 transverse series (24 to 28 in males, 25 to 31 in females); the plates of the two median series narrower, often much narrower, than those next to them. Praeanal plate usually large, but variable in size, bordered by one or two semicircles of small plates.

Scales on upper surface of tibia granular, smooth, usually smaller than those on the

* Exception in one half-grown specimen from Paul, Madeira.
† The occipital is absent in the type-specimen described by Milne-Edwards—an individual anomaly, as pointed out by Bedriaga.
‡ Present in a male from Gracieoa, Azores.
§ Sometimes present, according to Bedriaga.
‖ In a female from Madeira (Macgillivray) and in another from Paul; these outer plates very small, but as long as the adjacent plates.
back, rarely nearly as large. 25 to 33 lamellar scales under the fourth toe. 16 to 21 femoral pores on each side (12 to 19 in specimens from Great Salvage).

Caudal scales narrow, truncate or very obtusely pointed, the upper obtusely or rather strongly keeled, the lower usually feebly keeled, the keels straight; the whorls markedly longer and shorter alternately; 34 to 40 scales in the fourth or fifth whorl behind the postanal granules.

Ground-colour grey, brown, or green, or dark brown or blackish speckled with yellowish or green; a pair of light bands, sometimes dark-edged, from behind the supraciliary edge to the base of the tail, constantly present in the young, is usually retained by the females; sides often with a black or dark brown band with or without light dots. Upper surface of head with small dark spots or vermiculations. Markings on the tail similar to those on the body; no cross-bars. Lower parts yellow, orange, or red, usually uniform, sometimes with black dots; no blue spots on the outer ventral plates.

The British Museum Collection contains a totally black specimen (? ) from Madeira. A male from Bugio, S. Deserta, is nearly black above with traces of lighter markings, and the belly is black with whitish variegations.

Measurements (in millimetres):—

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<th>2.</th>
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1. ♂, Paul, Madeira. 2. ♀, Paul. 3. ♂, Madeira. 4. ♀, Madeira. 5. ♂, Great Salvage. 6. ♀, Great Salvage.

Particulars of Specimens examined.

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* For explanation of numbers, see p. 48.
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ALLIED TO LACERTA MURALIS.

Habitat. Madeira, Porto Santo, and neighbouring islets; also found in the Azores, on the island of Graciosa, where it is said to have been introduced in the last century*. Duméril and Bibron reported this lizard from Teneriffe, and a young specimen was obtained on that island by the ‘Challenger’ Expedition; the British Museum possesses, besides, a specimen stated to be from Orotava.

I do not think this species, although not unlike L. danfordii in many respects, bears any special affinity to that and other Oriental forms of the group characterized by two postnasals; it stands nearer L. muralis, from which it is well distinguished by the constant presence of the two postnasals combined with the absence of masseteric and upper temporal shields. In the absence of a dark vertebral stripe or series of spots it agrees with L. muralis, var. vaucheri and boivagii, which are the continental forms geographically nearest to it (Spanish Peninsula and North-West Africa), and a direct derivation from either of these forms or their common ancestor is highly probable.

List of the Specimens in the British Museum.

LACERTA AGILIS L.

Forma typica.

<table>
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<td>Odensjö, Småland, Sweden</td>
<td>Prof. E. Lönnberg</td>
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<td>2-5</td>
<td>♂ ?</td>
<td>Southport, Lancashire</td>
<td>L. Greening, Esq.</td>
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<td>6-10</td>
<td>♂ ?</td>
<td>Studland Heath, near Swanage, Dorset</td>
<td>Dr. G. Leightoun</td>
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<td>O. Grieg, Esq.</td>
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<td>W. Thompson, Esq.</td>
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<td>G. A. Boulenger, Esq.</td>
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<td>Devil’s Jumps, Frenchham Common</td>
<td>E. Britten, Esq.</td>
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<td>? &amp; yg</td>
<td>Tilford, Surrey</td>
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<td>Ax-les-Thermes, Ariège</td>
<td>G. S. Miller, Esq.</td>
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* The occurrence of the lizard on Santa Maria is doubtful; I have not been able to find a reference to it in the work of Merelot, ‘Les Açores’ (1890), which has been quoted as the source of the information.
MR. G. A. BOULENGER ON LIZARDS

31–32. ♂ ♀.
33–46. ♂ ♀ & yg.
47–60. ♂ ♀ & yg.
61–67. ♂ ♀ & yg.
68. Yg.
69–74. ♂ ♀ & yg.
75–79. Yg.
80–83. ♂.
84–85. ♂.
86–95, 96. ♂ ♀ & hgr.
97–101, 102–103. ♂ ♀.
104–110. ♂ ♀.
111–117, 118–121. ♂ ♀ & yg.
122. ♂.
123. ♂.
124–125. ♂ ♀.
126–127. ♂ ♀.
128. ♂.
129. ♂.

Arlon, Belgium.
Mondorf, Luxembourg.
Binningen, near Basle.
Lausanne.
Gryon, Vaud, 1000 ft.
Düsseldorf.
Baden-Baden.
Freiburg, Baden.
Hüllsteig, Baden, 2430 ft.
Berlin.
Prague.
Vienna.
Bazias, S. Hungary.
Kronstadt, Transylvania.
Hermannstadt, Transylvania.
Transylvania.
Sinaia, Carpathians, Roumania.

VAR. SPINALIS WERNER.

1. ♂.
2. ♂.

Bosnia.
Babaplana, Herzegovina, 4500 ft.

VAR. CHERSONENSIS ANDRZEJ.

1–3. ♂.
4–15. ♂ ♀ & yg.
16. ♂.
17–18, 19. ♂ ♀ & yg.

Kiew.
Zorleni, Burul Valley, Moldavia.
St. George, Danube Delta.
Bucarest.

VAR. EXIGUA EICHW.

1–2. ♂.
3–4. ♂ & yg.
5–6. ♂.
7–8. ♂ & yg.
9. ♂.
10. ♂.
11. ♂.
14. ♂.
15. Yg.
16–20. ♂ ♀.

Moscow.
Charkov.
Saratov.
Dongus, near Orenburg.
Ural.
Astrachan.
Vladikaukas, Caucasus.
Suchum Kaleb, Caucasus.
Novorossik, W. Caucasus.
Tiflis.
Jelenovka, L. Gokscha.

Rev. G. Fournier.
G. A. Bouleger, Esq.
Dr. J. Roux.
W. Morton, Esq.
Mrs. Watson.
W. F. Kirby, Esq.
G. A. Bouleger, Esq.

Dr. C. Florecie.
Dr. F. Werner.

Petrograd Museum.
M. A. L. Montandon.

Moscow University.
Petrograd Museum.

Dr. J. de Bedringa.
Dr. G. Rabbe.

Petrograd Museum.
ALLIED TO LACERTA MURALIS.

21. \(\delta\).
22. \(\delta\).
23. \(\delta\).
24. \(\delta\).
25-27. \(\varphi\ & \text{hgr.}\)
28-30. \(\varphi\).
31. Yg.
32-33. \(\varphi\ & \text{hgr.}\)
34-36. \(\varphi\ & \text{yg.}\)
37-39. \(\varphi\ & \text{hgr.}\)
40-42. \(\varphi\ & \text{yg.}\)
43-44. \(\varphi\ & \text{yg.}\)
45-47. \(\varphi\ & \text{hgr.}\)
48-49. \(\varphi\).
50. \(\varphi\).
51-52. \(\varphi\).
53-55. \(\varphi\ & \text{hgr.}\)
56-60. \(\varphi\ & \text{yg.}\)
61-68. \(\varphi\ & \text{hgr.}\)

LACERTA PARVA Blgt.

1. \(\varphi\) (type).
2-4. \(\varphi\).
5-7. \(\varphi\).
8-13. \(\varphi\).

LACERTA TAURICA Pall.

Forma typica.

1. \(\varphi\).
2-3. \(\varphi\ & \text{yg.}\)
4-5. \(\varphi\ & \text{hgr.}\)
6. \(\varphi\).
7-11. \(\varphi\ & \text{hgr.}\)
12. \(\varphi\).
13. \(\varphi\).
14. \(\varphi\).
15-16. \(\varphi\).
17-18. \(\varphi\).
19-20. \(\varphi\).
21-22. \(\varphi\).
23. \(\varphi\).

Var. ionica Lehrs.

1-2. \(\varphi\).
3-6. \(\varphi\ & \text{yg.}\).
7-10. \(\varphi\).
11. \(\varphi\).

Batun, Transcaspia.
Van, Kurdistan.
Kirghiz Steppes.
Isk R.
Altyn-Emel, between Kopen and Vernoje.
Kungess R., S. of Kulja.
Upper Bi.
Leipsinskaja Staniza.
Between Semipolatinsk and Ajagus.
Aret Mts., near Semipolatinsk.
Ourkatch, distr. of Tourgaiisk.
Tomsk.
Minussinsk, Yeniseisk.
Ala Tau.
Lepsa, Ala Tau.
Tian Shan Mts.
Kamaika R., Altai Mts.

Kuisarich, Asia Minor.
Sari Keny.
Berrichetti Mandum, Antiumus.
Angora.

Crimea.
Bakal, Crimea.
Sebastopol.
Romania.
Cerna Voda, Dobrudja, Rommania.
Greci, Rommania.
Rutshuk, Bulgaria.
" "
Bazias, S. Hungary.
Budapest-Franzstadt.
Rakos, near Budapest.
Tsbadka, Hungary.
Constantinople.

Tyrins to Mykena, Morea.
L. Stymphalos.
Nision, Mesenia.

Dr. G. Raidde.
Lyons Museum.
Petrograd Museum.
" 
" 
Geogr. Society of Bremen.
M. Nazarow.
Petrograd Museum.
" 
Geogr. Society of Bremen.
Petrograd Museum.
Lord Rothschild.
Mr. M. E. Meyer.

C. G. Danford, Esq.
Dr. F. Werner.
Hr. M. Holtz.
M. H. Gadeau de Kerville.

Petrograd Museum.
Petrograd Museum.
Dr. F. Werner.
M. A. L. Montandon.
" 
Dr. F. Werner.
M. Kowatschew.
Dr. F. Werner.
Dr. P. Lehrs.
Prof. L. v. Mehely.
" 
Dr. R. Ehner.
Norman Douglas, Esq.
Hr. M. Holtz.
Hr. L. Müller.
MR. G. A. BOULENGER ON LIZARDS

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<td>Jayakar.</td>
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ALLIED TO LACERTA MURALIS.

LACERTA DANFORDII Gthr.

FORMA TYPICA.


VAR. ANATOLICA Werner.

1. ♂ .

Near Eski Shelir, C. Asia Minor. Dr. F. Werner.

VAR. GRECA Bedr.

1-2. ♂ .

Kambos, Taygetos. Dr. M. Holtz.

3. ♂ .

" " Hr. L. Müller.

4-5. ♂ .

Langhada, "

6-8. ♂ ♀ .

Megali, "

9-10. ♂ ♀ .

Lada, "

LACERTA OXYCEPHALA D. & B.

1. ♂ .

Dalmatia. Dr. J. de Bedriaga.

2-3. ♂ .


4. ♂ .

Cruzola Id., Dalmatia. Florence Museum.

5-7. ♂ ♀ .

" " Prof. Kolombatovitch.

8. ♂ .

Lissa Id. Hr. L. Müller.

9-10. ♂ ♀ .

Gelsen, Lesina Id. Dr. F. Werner.

11. ♂ .

Bilak, Herzegovina. Hr. L. Müller.

12. ♂ .

Korito, " , 3300 ft. Dr. F. Werner.

13. ♂ .

Trebinje, "

14. Vg.

Ljubinje, "

15-17. ♂ ♀ (var. tomasiini). Brez-tien, Herzegovina, 4000 ft. "

18. ♂ .

Gacko, " , 3000 ft. "

19. ♂ .

Cettinje, Montenegro. "

LACERTA MOSORENSIS Kolomb.

1-10. ♂ ♀ .

Biokovo Mt., Dalmatia, 4200 ft. Prof. Kolombatovitch.

11. ♂ .

Dalmatia. Dr. J. de Bedriaga.

12. ♂ .

Coputne Rundine, Montenegro. Hr. L. Müller.

LACERTA DUGESII M.-Edw.

1. ♂ (type of T. paniculata).

Madeira. Prof. T. Bell.

2-4, 5. ♂ ♀ .

" " Capt. Parry.

6-11. ♂ ♀ .

" " A. Christy, Esq.

12-15. ♂ ♀ .

" " J. Maegillvray, Esq.

16-17. ♂ .

" " W. R. Ogilvie-Grant, Esq.

18-24. ♂ ♀ .

" " M. J. Nicoll, Esq.

25-32, 33. ♂ ♀ & hgr. "

vol. xxl.—part i. no. 12.—June, 1916.
LIZARDS ALLIED TO LACERTA MURALIS.


44-46. ♂. Porto Santo.
54. ♂. R. McAndrew, Esq.
55-64. ♂♀ & yg. Graciosa, Azores. H.M.S. 'Challenger.'
65. ?. Orotava, Teneriffe.
66. Yg. Teneriffe.

W. R. Ogilvie-Grant, Esq.
C. F. Blandy, Esq.
W. R. Ogilvie-Grant, Esq.
R. McAndrew, Esq.
H.M.S. 'Challenger.'
PLATE I.

Fig. 1. *Lacerta agilis*. ♂, from life. Near Farnham, Surrey.
2a. " " ♂ " " Lower view.
5. " " ♂, Freiburg, Baden. Lower view.
LACERTA AGILIS.
PLATE II.
PLATE II.

Fig. 1. *Lacerta agilis* var. *chersonensis*. δ, Bucarest. Upper view.
2. " " " " " " φ, Zorleni, Moldavia. Upper view.
4. " " " " " " δ, Saratov, Volga. Upper view.
5. " " " " " " φ, Tomsk, Upper Obi. Upper view.
6. " " " " " " φ, Kanaik R., Altai. Upper view.
7. " " " " " " φ, Minussinsk, Yeniseisk. Upper view.
8. " " " " " " φ, Ielenovka, Caucasus. Posterior part of body, lower view. × 2.
9. " " " " " " δ, type of *L. paradoxa*. Suchum Kaleh, Transcaucasia. Head, × 2.
PLATE III.

Fig. 1. *Lacerta taurica*. ♂, Cerna Voda, Rommania. Upper view.
2. " " ♂, Rakos, near Budapest.
3. " " ♀, Cerna Voda, Rommania.
4. " " ♀, Rutshuk, Bulgaria.
6. " " " " " " ♀, " " " " " "
7 a. " " " " " " " " " " Lower view.
8. " " ♂, " " " " Upper view.
9. " " " " ♀, " " " " " "
1-6. LACERTA TAURICA. 7-9. L. PELOPONNESIACA.
PLATE IV.
PLATE IV.

Fig. 1. *Lacerta chlorogaster*  ♂, Resht, Persia. Upper view.
2. " " " " " " Lower view.
4 a. " " " " " " Lower view.
5. " " " " " " Upper view.
6 a. " " " " " " Upper view of head.
7. " " " " " " Upper view.
7 a. " " " " " " Side view.
PLATE V.
PLATE V.

Fig. 1. *Lacerta danfordii*. ♂, type. Zebil Bulghar Dagh, Cilician Taurus. Upper view.

1a. " " " " Zebil Bulghar Dagh. Side view. ×2.
1b. " " " " Zebil Bulghar Dagh. Lower view of posterior part of body. ×2.
5. " " " " " " Side view. ×2.
5a. " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " 

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100 LIZARDS ALLIED TO LACERTA MURALIS.
LACERTA DANFORDII.
PLATE VI.

Fig. 1. *Lacerta ozycephala*. d, Bilak, Herzegovina. Upper view.
1a. " " " " " Lower view.
1b. " " " " " Upper view of head. \( \times \frac{21}{2} \).
1c. " " " " " Side view of head. \( \times \frac{21}{2} \).
3a. " " " Lower view.
3b. " " " " " Upper view of head. \( \times \frac{21}{2} \).
3c. " " " " " Side view of head. \( \times \frac{21}{2} \).
4. " " " q, Biokovo Mt., Dalmatia. Upper view.
5. " " " " " " 
1-2. LACERTA OXYCEPHALA. 3-5. L. MOSORENSIS
PLATE VII.

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*Fig. 1. Lacerta dugesii. 9, Madeira. Upper view.*

" Upper view of head. \( \times 2\frac{1}{2} \)."  
" Upper view of head. \( \times 2\frac{1}{2} \)."  
" Upper of head. \( \times 2\frac{1}{2} \)."  
" Upper view.  
" Upper view of head. \( \times 2\frac{1}{2} \)."  
" Upper view.  
" Upper view.  
" Upper view.  
" Upper view.

*2, Paul, Madeira. Upper view.*  
*Regenerated hind limb. \( \times 2 \)."  
*Porto Santo. Upper view of head. \( \times 2\frac{1}{2} \)."  
*Great Piton. Upper view.*  
*Graciosa, Azores. Upper view.*  
*Lower view.*  
*Side view of head. \( \times 2\frac{1}{2} \)."  
*Upper view.*
LACERTA DUGESII.