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NOTES ON A VERY LITTLE-KNOWN LIZARD: LACERTA PRINCEPS BLANF., WITH DESCRIPTION OF THE MALE SPECIMEN PRESERVED IN THE VIENNA NATURAL HISTORY MUSEUM.

(With Plate I.)

By the late Baron G. J. DE FEJÉRVÁRY.

The species *Lacerta princeps* was described, in 1874, by W. T. BLANFORD (2, p. 31), from a single type-specimen, a female, obtained in Southern Persia. His diagnosis runs as follows: „*L.* magna, fere sesquipedalis, dentibus palatalibus praedita; scutis postnasalibus utrinque binis, praefrontali unico, verticalis marginibus lateralibus parallelis, anteriore posterioreque in medio prominentibus; squamis temporalibus polygonalibus, antice majoribus; collari libero, denticulato; squamis dorsalibus rhombiodeis, carinatis, in series transversas ordinatis, ventralibus in series 10 longitudinales, extremas valde angustiores dispositis; poris femoralibus utrinque 14: supra griseo-olivacea, subtus albida, maculis 4—5 caeruleis, nigro marginatis, longitudinaliter ordinatis, utrinque post axillam ornata."

„Hab. in Persia meridionali."

To this diagnosis the following lines are added:

„Only a single specimen obtained. The form of the back-scales resembles that in the small species *Lacerta Fitzingeri* and its allies *(Notopholis,* GRAY, nec WAGLER)."

Since that date only three original publications have appeared on the subject:

In 1876 BLANFORD („Zoology and Geology of Eastern Persia", II, London, p. 364) (cited after 1. p. 123) gave a more detailed description of the same specimen, and stated that „it was shot" by his „collector in brushwood on a pass near Niriz, about 100 miles east of Shiraz, and at an elevation of about 7000 feet above the sea." (1, p. 125).

In 1910 L. DE MÉHELY (11, p. 592—596) described a young specimen, collected by Mr. ZAROUDNI, at Sarkhoun (or, in German transcription, Sarchun), Persia, and belonging to the Zoological Museum

of the Imp. Academy of Sciences in St. Petersburg, which previously had been, together with some other Lizards, erroneously referred by A. M. NIKOLSKI (14, p. 281) to *L. muralis* LAUR.

Finally, in 1920, G. A. BOULENGER (3, p. 95—97) described a second adult female specimen, also originating from near Shiraz, and thus almost being a „topotype" of the species. This specimen was presented, by F. H. WITHERBY, to the British Museum, whilst the type is still preserved in the Indian Museum, Calcutta.

The type was dealt with, merely on ground of BLANFORD's description, also by J. DE BEDRIAGA (1, p. 123—127)[1] who made an analysis of BLANFORD's, lepidotical terminology, which was unusual and therefore rather confusing. BOULENGER's description of the species in his „Catalogue" (4, p. 18—19) likewise derives from BLANFORD's, for at that time the British Museum did not possess the specimen mentioned above, so that until 1910, the Calcutta Museum's specimen was, of *L. princeps,* the only one available to science. Therefore, any reference to the species before 1910 and after 1876, must have relied on allopsy, and not on autopsy.

Under such circumstances it does not appear to be without serious herpetological interest to point out the fact that, in July 1931, the writer of the present lines quite accidentally lit upon a comparatively large *Lacerta* entering the group of the „Massive Lizards", which decorated one of the museum cases in the Herpetological Laboratory of the late Court Museum of Natural History in Vienna. Dr. O. v. WETTSTEIN, Curator of Herpetology in the mentioned museum, told the inquiring writer, who was immediately struck with the strange and suggestive aspect of the specimen, that it belongs to *L. princeps,* though originally it was not labelled as such.

On his last visit to Vienna, at the end of October '31, the writer of the present paper returned to the Natural History Museum, and asked Dr. v. WETTSTEIN kindly to conform with his desire to examine and describe the specimen. Dr. v. WETTSTEIN most liberally acceded to such request, and so the author was given the unmatched opportunity of reporting on the f i r s t m a l e specimen of the grown stage of *Lacerta princeps* BLANF.

Before proceeding to the description intended, and to specific comparisons, as well as to inferences bearing upon the relational conditions of the species, the writer wishes to express his heartfelt

[1] Comprising German translation, together with English citation (in footnote) of BLANFORD's original text of 1876.

thanks for the courtesy Dr. v. WETTSTEIN so loyally extended to him, his best thanks being due also to Miss CLARA DE RÁSKY, the writer's Assistant, by the work of whom facilities were granted in technical respect.

The jar, in which the specimen to be dealt with is preserved, bears the following label:

„Lacerta Brandtii de Fil. wahrscheinlich L. princeps!!
(Lacerta ocellata Eichw., L. cyaneo-ocellata Fitz.)
Persien. 1845. I. 7. Coll. Kotschy."

The additional note „wahrscheinlich L. princeps" exhibits the handwriting of Dr. v. WETTSTEIN.

It is rather unconceivable how the specimen could have been identified, by some early determiner, as *L.Brandtii* DE FIL., having nothing to do, indeed, with that small-sized species which, according to BOULENGER (3, p. 301), presents characters intermediate between the *L. muralis* group and *L. parva* BLGR. The presence of axillar ocelli — followed, in *L. Brandtii,* by other ocelli on the flanks — does by no means account for the commitment of such diagnostical l a p s u s. As to a *„L. ocellata"* described precisely by EICHWALD, I must confess to be at a loss of my literary knowledge, for I am in ignorance of the fact that EICHWALD would have described any Lizard under such name. FITZINGER's *„Lacerta cyaneo-ocellata"* appears to be a museum name especially adapted to this specimen, for it fits it absolutely, but, on the other hand, it does not occur, so far as I am informed, in literature.

These local museal remarks bearing upon the diagnostical history of the specimen under inspection, should be completed by the observation that BOULENGER's supposition, — according to which „It is possible that a female specimen from Angora, noticed by STEINDACHNER (Denkschr. Ak. Wien, LXIV, 1897, p. 696) under the name of *L. viridis,* belongs to this species, in which case its range would extend to Asia Minor" — seems to base upon a misinterpretation of STEINDACHNER's data, for Dr. v. WETTSTEIN, who kindly directed my attention to the respective passage (p. 97) in BOULENGER's „Monograph", assured me to have made a thorough examination of the whole of the Vienna Museum's material concerned, and thus having come to the conclusion that all the Anatolian Lizards entering, in this respect, into consideration, belonged to the specific complex of *L. viridis* LAUR. to which also subsp. *strigata* EICHW.

pertains: this form being probably the one to which BOULENGER's allusion applies.

BOULENGER, in the description given in his „Monograph" (p. 90) of *L. viridis* LAUR. var. *Woosnami* BLGR., says that „in the lepidosis of the body" this variety „approaches *L. princeps*" — a statement which I am unable to confirm, if such lepidotical details be considered that are really characteristic of. *L. princeps*. For neither the perusal of BOULENGER's descriptions of the variety mentioned, nor the examination of a male cotype of it, which I obtained for the Hungarian National Museum from Mr. H. W. PARKER of the British Museum, did afford evidence in support of a similar visualization.[2]

Description of the adult male of *L. princeps* BLANF., based upon the specimen preserved in the Natural History Museum in Vienna, with references to BLANFORD's, BOULENGER's and DE MÉHELY's descriptions the female and young, respectively:

Habit: robust, on the whole reminding that of *L. ocellata* DAUD. subsp, *pater* LATASTE. — Head pyramidocephalous, comparatively short, very broad in temporal region, snout rather abruptly pointed, relatively narrow and short; length of head four times contained in length from snout to vent; pileus about 2⅓ times as long as broad; length of snout (taken from anterior corner of eye to its tip) as long as the distance between posterior corner of eye (where eyelids meet) and about the hindmost of pre-tympanal shield rows; temporal hight (from mouth to lateral border of parietal) equalling the distance between anterior corner of eye and about the middle region of nostril, which, in this case, means the point just somewhat rostrad of the lower anterior corner of postnasal; greatest temporal width equalling the distance from tip of snout to posterior corner of the greatest superior postocular; contrarily to BOULENGER's statement (3, p. 95), there appears not to be much likeness about the shape and proportions of the head — at least in the male — with

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[2] By the way, I should like to suggest an examination of the question whether DE BEDRIAGA's *L. viridis* var. *Vaillanti* and even the much earlier described *L. viridis* var. *astrabadensis* of EICHWALD (*cfr.* DE BEDRIAGA, op. cit., p. 100), the latter of which seems to have totally escaped BOULENGER's attention, might be considered, or not, as names that, according to the law of priority obtaining in Nomenclature, should be substituted for BOULENGER's term: var. *Woosnami* — for it does not seem impossible to me that the latter denomination might prove to be a synonyme of one — or both — of these designations prevailing in time.

those obtaining in the typical *L. viridis* LAUR. — Limbs medium sized, as stated by BLANFORD (1, p. 124, footnote), not long, as indicated by DE MÉHELY regarding the young (11, p. 594); claw of fourth finger of rostrad adduced fore limb reaching to about the anterior border of 4th supralabial (which is the last of the set anterior to subocular); in BLANFORD's type specimen (♀) the 4th finger is stated to reach the nostril; claw of fourth toe of rostrad adduced hind limb not quite reaching the axillar groove; in this respect there seems to exist, in this species, contrarily to the conditions met with in many other *Lacertae*, no serious difference between the two sexes, for both BLANFORD and BOULENGER communicate similar data with respect to the female; according to DE MÉHELY the 4th toe reaches, in the young, the collar. — Tail rather massive, distal part wanting; its length is said to be, in the female, a little more (BLANFORD[3]) or a little less (BOULENGER) than twice the length of from snout to vent. (No length is indicated, by DE MÉHELY, regarding the young.)

Measurements[4] of the Male in the Vienna Nat. Hist. Museum:

Total length	395	mm
Length of head	36	„
Width of head	25	„
Heigth of head (from mouth to lateral border of parietal)	12	„
From anterior corner of eye to tip of snout	14.4	„
From posterior corner of eye to tympanum	14.5	„
From snout to vent	143	„
Tail (broken)	cca 252	„
Fore limb (from axillar groove to point of 4th finger's claw)	46	„
Hind limb (from groin to point of 4th toe's claw)	78.5	„
Foot (from very basis of 1st toe to point of 4ht toe's claw)	40.2	„

Lepidosis:

Rostral largely entering the nostril which is pierced between 5 shields; nasals forming a rather long suture behind the rostral, thus separating it from the frontonasal; in the female examined by

[3] BLANFORD gives the measurements in inches.

[4] Dr. v. WETTSTEIN kindly communicated to me these measurements.

BOULENGER this suture is stated to be short; frontonasal about $^1/_5$ times broader than long, surrounded by 8 shields, the four laterals of which are the upper postnasal and the loreal of either side; its shape is rather octagonal than hexagonal (DE MÉHELY describes it as a transversely elongate octagon in the young), the two anterior sides of the hexagon being somewhat longer than the two posterior ones, whilst the lateral sides are the shortest; prefrontals meeting in a moderately long median suture, medioposteriorly ending in a short tranverse line (i. e. not pointed), broadly separating the frontal from the first supraocular; frontal as long as the distance of its medio-anterior end from the anterior point of frontonasal; its anterior part escutcheon-like, with 4 corners (⌐⁀¬), the median part being very bluntly rounded forming a nearly straight line; lateral sides slightly concave; posterior end tricuspid, the median cusp, or point, being the longest; in the middle region broader than the width of the whole of the supraciliary lamina[5] measured in the same transversal line; supraciliary granules present only in the medial portion of the supraciliary plate's length, forming an uninterrupted series composed of 3 granules on either side between supraoculars and superciliaries; the number of granules is „very few" „along the exterior edge of the central superciliaries" in BLANFORD's type (1, p. 124 footnote), 6 on the right and 4 on the left in the young described by DE MÉHELY, 4 and 3 in the female of the British Museum examined by BOULENGER; superciliaries 5 on either side, the 1st being the longest; suture between 1st and 2nd rounded caudad; this suture is oblique in dorso-caudal direction in the young, „very oblique" in the female of the British Museum; parietals considerably longer than the distance between the anterior border of frontal and the tip of the snout, about as long as the distance between the medio-posterior point of frontal and the half of the frontonasal's length; lateral border much convex largely separated from 1st supratemporal intruding between them; occipital large, subtriangular, anteriorly rather rounded; posterior border twice as broad as greatest width of interparietal, its length about equalling the distance measured from its anterior border to somewhat rostrad of sharply pronounced pineal eye which lies in the anterior part of interparietal. Interparietal medium sized, pentangular, its length equalling half of the frontal's.

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[5] = Supraoculare II. + granules + supraciliaria.

Two superposed postnasals, the lower one almost entirely upon the first supralabial, only its lower posterior corner joining the second supralabial; lower postnasal somewhat larger than upper one; in the young described by DE MÉHELY the lower postnasal is said to rest merely upon the first supralabial. First loreal meeting the frontonasal and forming a rather long suture with the prefrontal; widely separated from the rostral by the upper postnasal. Median length of second loreal nearly equalling its distance from the superior end of the suture between rostral and first supralabial; in the young this length equals, according to DE MÉHELY, the distance between the 2nd loreal and the hind border of the nostril. Two preoculars on both sides, the first larger than the second, especially the latter one being strongly keeled; the keel proceeding to, and continuing upon, the subocular, forming the upper edge of it, which is ventrally delimited by a deep and broad furrow; both the keel and the furrow are vanishing caudad; in DE MÉHELY's specimen the occurrence of a single preocular is stated. Four upper labials anterior to the subocular which is considerably narrower beneath than above; three well developed supralabials posterior to subocular. Temple covered with large, polygonal shields; masseteric distinct on the right, less visible on the left side, separated from postoculars and supratemporals by a single, and from the tympanic by a double, row of shields; on the right side 1, on the left side 2 rows of shields separating the masseteric from the supralabials; tympanic comparatively small; the same features occur, though less pronounced, in the young in the female examined by BOULENGER; a small shield separates the tympanic from the 2nd supratemporal. 2 large supratemporals, 1st not much larger than 2nd; no post-supratemporal granule, which is contrary to what I have found obtaining in all of the Massive Lizards known to me.

36 scales across the middle of body; 34 in BLANFORD's, 37 in BOULENGER's, and 35—36 in DE MÉHELY's specimen; scales granular on the nape, with faint trace of a top-keel, smooth on the sides of the neck. Scales on back large, subimbricate, very strongly keeled; the keels are rather mesial than diagonal in position, which is contrary to the respective statements of BLANFORD, BOULENGER and DE MÉHELY; according to the latter author the keels are converging caudad towards the axis of the body; in the Vienna male I found the keels to be rather longitudinally subparallel. With respect to the occurrence of keels as sharp as that, *L. princeps* is, within its genus,

paralleled only by the East-African *L. Jacksoni* BLGR. as already pointed out by DE MÉHELY.[6] On the flanks the scales are somewhat smaller than on the back, and their keels diminish in sharpness ventrad. About 20 transverse series of scales — counted in the centro-median region of the trunk — correspond to the length of the head. In the average 2 lateral scales correspond to one ventral plate, towards the axil and groin their number easily amounting to 3.

Dorsal scales of tail long, especially in its middle portion, sharply keeled, much pointed caudad, forming rather equal whirls; 5th to 6th whirl whirl consisting of 36 scales. Intercalary scales and transversally split ones may occur; in one instance a transversal tripartition was observed, in connection with the total absence of a keel. No pits and no horny „buds" (the latter of which have been demonstrated by DE MÉHELY as characterizing some species gathered by him into his artifical group termed *„Archaeolacertae"* and — so far as I see — erroneously supposed to represent „sense organs"). Scales on upper surface of tibia smaller than those on back, rhomboidal, strongly keeled; about 6½ of tibial scales of the transversal rows centro-median dorsal surface corresponding to 4 transversal rows of centro-median dorsal scales (whilst to 8 of the former 5 of the latter are corresponding); according to DE MÉHELY, 8 tibial scales correspond to 6 dorsal ones.

Gular scales rather large, longitudinal, polygonal. Sulcus gularis distinct, formed of rather small, almost granular scales. 21 gular scales — 20 according to DE MÉHELY and BOULENGER — in a straight line between symphysis of chin shields and median collar plate; collar strongly serrated, composed of 8 plates; the same number was found by DE MÉHELY in the young, whilst BLANFORD records 7, and BOULENGER 9 plates. Mental large, visibly longer than broad. Number of typical sublabials 7 on both sides. Typical submandibulars 5 (or 6) on both sides.

Ventral plates overlapping in 10 longitudinal and 31 (32) — in the young described by DE MÉHELY 29 — transverse series; the plates of the second longitudinal series, reckoned from the median line (i. e. the 4th series if counted from the most lateral one), broadest; the 2 median series are comparatively narrower; the 2 series following lateral of the broadest one are subequal, whilst the outermost series is formed of rather small plates. Some larger scales may be consi-

[6] „Betreffs vieler Merkmale erinnert *Lacerta princeps* an *Lacerta viridis*, von der sie aber infolge ihrer fremdartigen Rückenbeschuppung sehr entfernt steht". (11, p. 596.)

dered as forming a supplementary row of ventral plates; the outermost of the longitudinal series of ventral plates is composed in the very post-axillar region of so small elements that they appear rather to be supplementary ventral plates than true ventrals. Anal plate („preanal" in BOULENGER's terminology) large, about 2½ times broader than long, bordered by 2 semicircles of small plates, of which there are 8 — 6 according to DE MÉHELY and BOULENGER — in the inner, i. e. posterior, row, the median pair of which is enlarged and constitutes the well developed preanals; the outer, or anterior, semicircle is composed of 12 scales, forming a rather irregular row. Fine granular scales present at the hind border of anal; BLANFORD and BOULENGER do not mention this character, whilst according to DE MÉHELY, no scales are to be found posteriorly bordering the anal.

Ventral surface of upper and lower arm presenting granular scales that are smaller in the latter than in the former, the granules being smallest in the elbow-bent; the zone of small antebrachial granules ends at about half the length of the lower arm, and forms a distad pointed elongate subtriangular figure. — Femoral pores 15 on the right and 17 on the left side; 14 in the type, 15—16 in both DE MÉHELY's and BOULENGER's specimens. 5 longitudinal rows of scales between femoral pores and largest series of plates on lower surface of thigh; 6 rows present in the young specimen, according to DE MÉHELY; formula of plates on ventral surface of tibia; 1 (feebly keeled) — 1 — 1 — 2 (—1 feebly keeled); DE MÉHELY records altogether 5 longitudinal series of tibial plates; BLANFORD and BOULENGER omit the description of such details, BLANFORD only observing that the scales „on the lower portion of the fore-arm and tarsus very little larger than on the humerus and thigh", (1, p. 124, footnote) in which case, of course, the expression „tarsus" is wrong, for BLANFORD meant the tibia.

Lower caudal scales somewhat less sharply keeled than the dorsals, bluntly pointed, i. e. not so sharply pointed as in the dorsals; median pair of longitudinal series of ventral caudals somewhat broader than the other ones, in the first three whirls only, especially so in the second and third whirl; according to DE MÉHELY the median rows are not broader than the lateral ones; according to BOULENGER the lower caudals too are strongly keeled, whilst the lateral caudal scales are very oblique.

Himatology: pileus light olive, with a rusty hue, especially in the parietal region, present on the upper surface of fore limbs,

supero-anterior part of thigs and dorsal surface of foot. Second half of tail lighter, olive. Back brownish olive. No designs, the lateral ocellii excepted, which occur from the axillar region to the middle part of the trunk; their size decreases caudad; the ocellii are of bright blue bordered with deep black; these ocellii are, phylogenetically, the remnants of the band called vitta temporalis by DE MÉHELY in his most adequate and comprehensive terminology of the Lacertian livery, and perfectly applicable to the livery of any Vertebrate class in general, affording a safe basis upon which the several elements composing the striped livery or its derivatives, in Fishes, Amphibians, Reptiles, Birds and Mammals may be homologized. The black circuit of the ocellii corresponds to the black meshwork of the reduced and partly totally vanished vitta temporalis, whilst their blue centre represents the light interstices that have occurred between the dark meshes.

Belly yellowish, about as in *L. ocellata* DAUD.; ventral surface of tail passing into olive brownish colour. No perceptible traces of a bluish tint in the gular region. — BLANFORD describes the type as follows: „Olivaceous grey above, whitish below; there are a few small black spots on the back and sides of the neck, and a row of 3 or 4 blue ocelli (those in front double), with black margins, behind each shoulder, extending in a line for a short distance down each side. The sides of the head are bluish, a tint especially marked on the labials; throat yellow." (3, p. 96). BOULENGER, after having quoted — though, in formal respect, with some lack of preciseness — BLANFORD's description, adds the following observation: „The specimen in the British Museum differs in being of a pale brownish grey above, without spots on the neck; there are three ocellar spots on each side, the first and second with two superposed blue centres; posterior two thirds of tail reddish." The livery of the young is described by DE MÉHELY as follows: „Ground colour olive grey above. Pileus unspotted, back, flanks, and upper surface of tail bestown with small, irregularly scattered spots. Flanks in the axillar region with indication of several light blue ocelli. Sides of head bluish grey. Lower surface of body yellowish white." (Translated from the German text 11, p. 596.).

The above data afford evidence in favour of such supposition that there are no constant sexual differences set out in the livery, and if such should exist at all, they may consist in mere gradations

only, bearing upon the quantity in which the small dark spots occur on the dorsal surface.

The livery of the young proves, on the other hand, to be most instructive in developmental — both phylogenetical and individual — and relational respect. It clearly points to the evolution of the livery having proceeded, in *L. princeps,* along the same line as in *L. ocellata* DAUD. subsp. *pater* LATASTE and its minor sized race *tangitana* BLGR.: namely, it draws its origin from a pattern that was obviously much like that of *L. ocellata* DAUD. s. str., which consists in a black reticulation through the meshwork of which the bright ground colour appears in the form of insuliform designs, whilst along the flanks handsome blue ocelli appear within the range of the temporal band, that are nothing but a multiplication of the 1 or 2 blue axillar spots occurring in many Lacertidae, which, after such numerical increase, gradually invade the flanks. In *L. ocellata* DAUD. s. str. this livery is persistent, in subsp. *pater,* however, and in *tangitana,* the development of the livery advanced to a higher degree: it reached the phase of a renewed uniformity, i. e. designlessness, in its phylogenetical history. In the ontogenetical development, however, the penultimate phase is still repeated, as may well be seen in the young and halfgrown *pater,* and traces of this earlier pattern may be preserved, more or less, even in some adult specimens. The same phenomenon of repetition, or biogenetical recapitulation, of the penultimate phase in the history of the livery's development, is to be found, e. g., in the different systematical units belonging to the species *L. viridis* LAUR. as well, which, in its most advanced forms of livery development, also proves to have incurred reiterated uniformity (7, p. 533—537). The largest, and, apart from *L. princeps,* most interesting member of the Massive Lizard's group, *L. Simonyi* STEIND. s. str. from the Roques del Zalmore near Hierro island (Canaries), together with its subsp. *Stehlini* STEIND. from Gran Canary (3, p. 124), also exhibits a phylogenetical reiteration of uniform coloration; ocelli, himatologically homologous with those present in the forms of *L. ocellata* and in *L. princeps,* also occur in this species, with the exception that they are of a pale dirty yellowish colour instead of being blue; they extend far down, along the flanks, just as in the case of another Canarian *Lacerta, L. Galloti* D. & B., which lives on Tenerife, varieties of it being known from Las Palmas, Gomera, Hierro and the largest of the Rocques del Zalmore (6, p. 74). Also this species tends, to a certain degree, to uniformity — the livery

of subsp. *Caesaris* LEHRS being considered, by CAESAR R. BOETTGER, contrarily to the opinion emitted by PH. LEHRS, „not a primitive one, but" „highly specialized" — but the ocelli are, in spite of the dark, rather melanotic colour of the animal, of a shiny blue instead of the dull yellowish tint obtaining in *L. Simonyi.* In all of these species, with which the livery of *L. princeps* has been both genetically and descriptively compared, the ocelli of the temporal band (vitta temporalis) extend much more caudad than in *L. princeps.* In this species the ocelli are less numerous and more axillar and ad-axillar, i. e. they exhibit a more primitive condition in their occurrence than in the rest of the forms alluded to. If, however, such condition is, in the phylogenetical lineage — i. e. in the euthygenetical (8, p. 351 and 9, p. 475) series — of *L. princeps,* really primitive, or if it is due to a reduction process bearing upon the number of the ocelli, the more caudad ones having already vanished in the lapse of preceding generations, that is a question we cannot answer at present. Our knowledge of the livery in the young *L. princeps* suggestively pleads in favour of the former supposition. As compared to the livery of *L. viridis,* the eventual inclination of the female sex towards the preservation of designs characteristic of the young, may be noticed, as a parallel feature, in *L. princeps,* presumed, of course, that the dark spots mentioned by BLANFORD, but wanting in the specimen of the British Museum, should prove to be present in a higher percentage in the females than the males — a detail that cannot be clarified on the strength of the two adult females and the one adult male we actually know of. Before closing this analysis of the livery, it should be remarked, still in connexion with *L. viridis,* that ocelli occurring on the flanks are by no means himatologically homologous in every case. The young, and even the semiadult, of *L. viridis* LAUR. subsp. *Schreiberi* DE BEDR. (from Spain and Portugal) also presents lateral ocelli, such specimens having been figured by BOULENGER (3, p. 92). It must be emphasized, however, that the ocelli occurring on the flanks and along the sides of the back, i. e. along the dorsal limit of the flanks, are in no wise homologous with one another. The uppermost range (in *L. viridis Schreiberi)* is homologous with the remnants of the supraciliary stripe (stria supraciliaris, MÉHELY), whilst the series following upon it, is retraceable to the light fields enclosed by dark meshes within the boundaries of the temporal band (vitta temporalis), the ground colour of which appears — from analogy drawn from the phylogenetically very instructive livery obtaining

in the young *L. agilis* subsp. *exigua* EICHW., the elements of the latter being, in their turn, easily homologizable with those present in the different stages of *L. viridis* LAUR. subsp. *strigata* EICHW. and subsp. *maior* BLGR. — to be somewhat lighter than the dark spots forming, by confluence, the meshwork just mentioned. Finally, the lowermost, or third, series of lateral ocelli occurring in the livery of the young *Schreiberi,* represents the residua of the subocular stripe (stria subocularis, MÉHELY). In strongly ocellate forms, such as the young specimens of *L. ocellata pater,* e. g., or even some young of the „typical" *ocellata* (from Portugal, for instance) further ocelli may be seen dorsad of the series corresponding to the supraciliary stripe, these ocelli apparently constituting the remnants of the dorsal stripe (stria dorsalis, MÉHELY) running, at both sides, along the unpaired dorso-median band which is the vitta occipitalis (MÉHELY). In the cases just cited there is no difference in colour to be seen between those ocelli that are the descendants of effectively white, or yellowish, striae, and those which have come out of the light interstices of the parietal band, to which range the typical axillar ocelli also pertain, often being of a blue colour that may successively extend caudad, invading the postaxillar ocelli as well, and even those that belong to the series of the subocular stripe; such is the case with *L. ocellata,* in which two superposed series of parietal band ocelli may occur, ventrally followed by the ocelli of the subocular stripe, also blue in colour, ventrad of which a fourth blue series is following, within the range of the maxillary band (vitta maxillaris, MÉHELY), the light interstices of its meshwork of yore having also evolved into ocelli. The dark elements surrounding the ocelli are in every case remnants of bands (vittae), and not of stripes (striae), becoming, sometimes, transversely attached to one another so as to form, in the young, dark crossbars containing the ocelli which, by such mode of connexion, appear as if they were disposed in transverse, instead of in longitudinal, rows. With respect to the pigmentation of the ocelli it should be remarked that in the *L. viridis* group blue is absent so far as back and flanks are concerned, this colour being confined to the head and neck only, where it occurs in the male and arrhenic females of certain forms, e. g. the „typical" form *(L. viridis* LAUR. s. str.) and the South Italian var. *Fejérváryi* VASV., whilst in others, such as subsp. *strigata* EICHW. and subsp. *maior* BLGR., it is never to be met with in any part of the body. In the *L. ocellata* group, on the other hand, blue is characteristic of the

axillar region and the flanks, down to the limit of the ventral plates, being, contrarily to what obtains in the mentioned forms of *L. viridis,* totally absent on head and neck.

Returning now, after such comparative analytical considerations, to the livery of *L. princeps,* it proves to enter into the type obtaining in the ocellata group, closely paralleling, in this respect, subsp. *pater* LAT. The ocelli form a short double range, the lower of the two ranges formally lying within the course that has been followed by the totally vanished subocular stripe. I do not believe, however, that the lower row of ocelli may be looked upon as heterogenous, in origin, from the upper one. On the contrary, both the size and disposition of the elements under discussion seem to suggest that they actually belong to the area of the temporal band, their origin being either directly retraceable to a lower row of mesh interstices, having occurred, of yore, in the vitta temporalis, and having undergone, later on, in the form of ocelli, a secondary enlargement and, with it, a ventrad expansion, or „drift", of the original inter-reticular elements encroaching now upon the range of the disappeared subocular stripe, or simply consisting in practically new elements due to the splitting up of the upper series of ocelli, by means of a successive increase of their blue and black pigment, thus representing, on the whole, evolutionarily new, i. e. accessory or additional, components of livery. — So far as may be stated from the examination of the single male specimen known of *L. princeps,* as well as on the scarce account of the two females, described by BLANFORD and BOULENGER, no fixation of juvenile, or archaic, characters, is to be stated in the male, and but faint traces of such might be presumed to obtain, in some instance, in the female (see p. 12. of the present paper). If such condition should prove, on the strength of a larger material, to prevail in *L. princeps,* this species would parallel, in this respect, rather *L. viridis* (and the „*muralis*-like" Lizards) than *L. ocellata,* for in subsp. *pater* I have severally observed the maintenance of juvenile, or archaic, livery characters in the male, whilst the female gets, in her ontogenetical development, sooner rid of the early markings than the male. Thus the female of *pater* more easily exhibits a total and real uniformity of its advanced livery than the male, and the same fact obtains in t h o s e of the females of *L. viridis,* which finally quite lose their juvenile share of coloration. For the male of *L. viridis,* which, in his livery, shows, on the whole, much less inclination toward the late persistence of juvenile characteristics, often acquires

a livery called „piquée" in French, and consisting in a subequal alternation of fine black spots, or rather dots, and bright green or yellowish ones on the dorsal surface. This coloration has nothing whatever to do, phylogenetically, with the livery of the young, being himatologically throughout different from it. In some instances the black dots may take, and considerably, the overhand in the performance of the general coloration of such specimens. In females such kind of dottedness, or sprinkledness, that does not consist in the preservation of early livery-characters, being, on the contrary, due to a new and different grouping of the pigments concerned, is comparatively rare, whilst the tendency toward the production of a uniformly bright green livery is more marked in the female than in the male. The livery referred to as „piquée" phylogenetically constitutes a parallel to the reiterated uniformity of the coloration, which means that these two stages mark the same degree of advancement on the evolutional scale. In the „typical" *L. ocellata* the pattern has come to a special form of development which is very much like a modification of the piquée type, but differs from it partly in the formation of dark brown or black circlets, the ocelli — those on the back being „blind" in comparison to those on the flanks, for in the latter place they are blue-centred, whilst on the back their centres exhibit the ground colour —, and partly in the important developmental fact that in the piquée livery of *L. viridis* the early elements of the juvenile coloration are, as such, i. e. himatologically, practically absent, whereas in *L. ocellata* presence of the black design in the adult is due to more than to a mere physiological, or biochemical, continuity in the individual existence of the dark pigments, for the pigment masses to which the dark pattern is due, prove, topographically and dispositionally, to be directly retraceable to juvenile livery elements: by which fact the strictly himatological — i. e. both substantial and formal — continuity in the development of certain components of coloration is maintained. Adopting such grounds of visulization, the full stage of the piqueté-like livery obtaining in *L. ocellata* DAUD. s. str. and in some of the specimens of subsp. *pater* (and its var. *tangitana)* — I mean those in which the uniformity in coloration has not been brought about — is not equivalent, neither phylogenetically nor ontogenetically, to the true piqueté stage of the livery in *L. viridis.* For in subsp. *pater* the piqueté-like stage — which shall be called, in this special instance, the „ocellate" — respresents a lower degree on the scale of himatological

development than the piqueté, the latter one being, as stated above, equal in degree to the stage of re-acquired, total uniformity, whilst the former still presents a trace of conservatism, or adherence to a more ancient pattern repeated in ontogenetical development, and obviously precedes the phase of reiterated uniformity, as clearly proved by the developmental tendency, evidenced by ontogeny and individual variation, in subsp. *pater* and var. *tangitana*. It is, perhaps, not necessary to insist upon the fact that ancestral and reiterated uniformity — I prefer not speaking, in this complex case, of „primary" and „secondary", for examining the question on a large scale, comprising the phylogenetical lineage, i. e. euthygenetical set concerned, and not applying only to such short a series in descent as expressed by e. g., a family or even a genus, it is impossible to decide the ordinal number of repetition — may be, of course, but, in the majority of cases, are surely not, identical in colour and pattern, such full coincidence of himatological details presupposing conditions that hardly ever will effectively occur in the biohistory of any evolutional series of biotypes, and the admittance of the turning up of such cases has to be admitted from a theoretical standpoint, i. e. on principle, only. The ontogenetical series of *L. viridis, L. ocellata,* and any other Lacertain species considered, prove that concolority is a reappeared character precisely only with respect to the uniformity of the livery, the first, or biogenetically repeated, colour of the hatched young, not being, else, the same as that of the adult. Ancestral coloration appears to be, as a rule, rather dark, often dull, whilst the modern one uses to be lighter, and bright. (Dull coloration occurs, however, in so-called „olivaceous" forms (10, p. 7—8), which, in spite of such dull tints, are typically progressive, olivaceism being due to the advancing obliteration of pattern.) — On account of such comparative record we may state that *L. princeps* represents the most advanced stage to be reached in such development of the Lacertid livery as was followed by the group of the Massive Lizards. *L. princeps* shows — so far as may be judged from the scanty material we dispose of — no tendency toward the production of a piqueté type, and, in this respect too, it differs from *L. viridis*. But it disagrees also with *L. ocellata,* in not showing any trace of „blind" ocellation. On the other hand, however, it agrees with certain members of both of these species, in having produced a concolor livery which is evidently reiterated, a tendency carried into effect in the himatologically most modernized *viridis*

and *ocellata* forms only, with the difference that within the frame of individual variation many specimens of the latter forms are, in himatological respect, still falling back to their immediate ancestors.

Having thus closed the discussion of the external characteristics that enter the field of eidonomical and himatological inquiry, there remains a word to be said on those cranial features which are accessible to examination without dissection. The pterygoid is toothed, according to BLANFORD who refers to the presence of „Palatal teeth" which term, of course, is not quite exact. The type of the skull is decidedly pyramidocephalous, as in all Massive Lizards. DE MÉHELY points at the presence of a large membraneous fontanel, to be established by palpation, on the supraciliary lamina of the Sarchun specimen. Very correctly he adds, however, that the presence of this fontanel is merely due to the juvenile condition of the individual. Prof. DE MÉHELY has demonstrated the existence of such fontanel in numerous Lacertids that are bearing it throughout their life. In others he found it only in the young, the lamina superciliaris being fully ossified in the adult. In some cases, however, the fontanel may ossify in old males pertaining to the first group, whilst, on the other hand, it may persist in some females and adult males belonging to the second group. The species belonging to the first group were gathered by him, as *„Archaeolacertae"*, into a separate systematical unit that still is regarded by him as a genetical entity different from the species with a more ossified cranial type, which were classed by him into another systematical complex which he provided with the name *„Neolacertae"*. Also this group is considered by DE MÉHELY as constituting a natural, i. e. genetical, unit. The membraneous type of skull is looked upon by DE MÉHELY as representing a more ancestral, i. e. more primitive, grade on the phylogenetical scale, whilst the ossified Lacertian cranium is pretented, by him, to be expressive of a higher development. In the latter instance the presence of a fontanel in early ontogenetical stages should simply mean the biogenetical recapitulation of a condition having obtained in a more remote period of Lacertian euthygenesis (i. e. linear development). In this place I do not wish to enter into a more detailed discussion of such fundamentally erroneous way of interpreting facts that are, i n s e, i. e. so far as their existence be concerned, correctly established — which should be stated to the benefit of the d e s c r i p t i v e part of the work DE MÉHELY has carried on along the line we are, at present, interested in, and in disfavour of the evolutionary theories,

or speculations, constituting the inferential substance of his investigations into the organization of the *Lacertidae*. What I wish to remark now is, that the fontanel by no means represents an ancestral feature of the Lacertid skull, nor does it figure in the course of ontogenetical development as a recapitulation of some earlier euthygenetical stage, but quite simply arises in consequence of a process dependent on, and histogenetically implied by, the formation itself of the respective parts of the cranial skeleton. There is no bearing upon moments of super- or trans-individual, i. e. phyletic, importance to be deciphered from out this developmental character. The fontanel is not archaic at all, a fact correctly pointed out, already some twenty years ago, by BOULENGER.[7] Only, of course, the way of arguing BOULENGER has followed, did not prove to be, even two decades ago, up to date, for most of the ideas upon which he based his criticisms were of a rather antiquated dash, and did not afford any really convincing and adequately produced evidence to the very credit of his criticism's correctness. I wish to emphasize, in this place and for the first time, that the Lacertid fontanel, occurring on the supraciliary lamina, constitutes an exact parallel to the fronto-parietal fontanel characteristic of any Human babe, and persisting until the limit of incipient puberty. Not more and not less so than in the case of the Human fontanel, the Lacertid fontanel may be said a „primitive" feature. Nobody ever thought of inferring, from the existence of a fontanel in juvenile Men, that the presence of such character is an expression of the Biogenetical Law (established by E. A. R. SERRES), and that, hence, this fontanel might be looked upon as constituting an ancestral peculiarity characteristic of some remote member of the Human chain of descent. Au fond, the fontanel is a subembryonic character, and its prolongated post-embryonic persistance and slow rate of disappearance are merely due to a retardative development of the individual. Precisely that is which obtains in Man, and in such instance we are facing a degenerative, instead of an ancestral, character. And degeneration marks, phylogenetically, a much advanced degree of development on that special line of Evolution which represents the Biohistory of the organismic scale concerned. Through the ingenious research done by L. BOLK, we also learned, some years ago, that many are the typically „human" characteristics that simply consist in a definitive post-embryonic

[7] Ann. Mag. Nat. Hist. Ser. VIII., vol. V., 1910, p. 252.

fixation of (originally) foetal characters. Such special form of Neoteny is certainly a degenerative symptom, marking that much advanced phase of evolutional development which is known, since HAECKEL, as Paracme. In the case of functionally conditioned structures one may sometimes be at a loss with respect to the correct interpretation of features that appear to consist such post-embryonic fixation of foetal characters, for configurational details implied by developmental mechanism in the embryo may be supposed to be simply coincident with such structures in the adult, which are manifest consequences of some long lasted process of functional adaptation having obtained in earlier generations of the respective euthygenetical line. In the case of the fontanel, however, we do not face such complex conditions. We only face a rather plain process of purely embryogenetically conditioned osteogenesis taking place in a connective tissue belonging to the mebraneous kind of the series.

So far as I am informed, the evolutionary importance of post-embryonally fixed foetal characters was, up to now, put forward only in the case of Man. I wish herewith to point at the embodiment of the same developmental principle in a group of Reptiles. For it is clear to me that the *„Archaeolacertae"* DE MÉHELY's (12 and 13) are not ancestral forms, they type being, on the contrary, the at present most developed condition of the family they belong to. The *„Neolacertae"* DE MÉHELY's are, on the other hand, in opposition to DE MÉHELY's opinion, the more protoplasmatic members of the *Lacertidae,* as very correctly suggested by BOULENGER (5, p. 247—256). The species belonging to the latter morphological — not genetico-systematical, as pretended by DE MÉHELY — group have not yet attained that much advanced phase in the process of phylogenetical „desossification", which has been entered by the *„Archaeolacertae"*. In the „osseous" Lizards the fontanel ossifies in due time and only „accidental" cases of a — phylogenetically incipient, ontogenetically more or less durable — persistence of the fontanel occur within their range, whilst in the „membraneous" Lizards the fontanel becomes definitively persistent, being in earlier stages of individual life comparatively larger than in coeval specimens of the „osseous" Lacertids, a fact due to the slower rate of ossification ever gaining in prevalence with the evolutional advancement of the species. There are forms, such as *L. ocellata* subsp. *pater,* in which I found (in a specimen labelled from Tunis) an ossified fontanel (established by pal-

pation), at a very early age already, long before the specimen would have passed that threshold of individual development which separates the young from the halfgrown. In typical specimens of *L. ocellata* (from Portugal), on the other hand, the fontanel appears to subsist much longer, being still comparatively large in young individuals that are about double of the size of the juvenile *pater* just recorded. Of course, we must not forget that the typical *L. ocellata* is of a somewhat larger habit than *pater,* such dimensional difference apparently setting in at a rather early period of post-embryonic development already.

On the strength of such visualization it is evident that DE MÉHELY's *„Archaeolacertae"* are n o t epistatic in the Eimerian, i. e. phylogenetical, sense of the word. They are not lower organized forms persisting on such low grade of evolutional development, a l i a s: they are not arrested at some early stage of epacmic evolution. They are, as stated above, n e o t e n i c to a certain degree, for the histogenetic process of bone-formation is arrested at an earlier stage of individual development, a juvenile (partly embryonic) condition of the skull thus getting fixed in the adult. This sort of Neoteny fixed through many generations means phylogenetical degeneration which is characteristic of paracmic evolution, and such arrest in individual development has nothing to do with phylogenetic arrest, or epistasis, the latter not being preceded, in earlier euthygenetic forerunners, by a more perfect state of full individual development, which evidently obtains in the case of the „Archaeolacertian" ascendence.

L. princeps belongs, in craniological respect, to the Lizards I designated, in this place, as „o s s e o u s". The type of its skull is p y r a m i d o c e p h a l o u s, this character too being, together with the b o n y a r m o u r o f t h e t e m p o r a l r e g i o n, an a r c h a i c one, which statement agrees with the views emitted on the subject by EIMER, BOULENGER and WERNER, being contrary to the inverted phylogenetical interpretation of facts given by DE MÉHELY. It is not without interest to point out, in the case of *L. princeps,* that a more primitive phylogenetical condition of the skull is combined with a much advanced evolutional state of the livery. Cases of a manifest discrepancy obtaining between the degree of evolutional development of skeletal elements on the one hand and livery on the other, are not at all unfrequently to be met with in any group of Vertebrates. In some of the instances it is the skeleton that will prove to be more advanced along the line of its phyletical

development than the livery, whilst in others just the opposite will occur. A weighty record of facts evidences the correctness of the visualization I gave, in 1914, of the question.

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Explanation of Plate I.

Lacerta princeps BLANF. ♂

Persia, 1845. I. 7. Coll. KOTSCHY. — Total length 395 mm.

Fig. 1. Dorsal view.

Fig. 2. Ventral view.

Fig. 3. Lateral view.

Phot. JENNY & VEREBY.