[A translation of A. Kornhuber, 30 July 1893, "Carsosaurus Marchesettii, ein neuer fossiler Lacertilier aus den Kreideschichten des Karstes bei Komen", *Abhandlungen der k.k.* [*kaiserlich-königlichen*] *geologischen Reichsanstalt, Wien,* 17(3): 1-15, with 2 plates. As befits the time, all Kornhuber's references and ancillary comments are contained in footnotes, which are reproduced here as endnotes; the endnotes are numbered sequentially according to their order of occurrence in this translation, but both original page number and footnote number—in that order—are given in square brackets subsequent to the endnote number to facilitate reference. The rare footnotes in this translation are my own clarifications; all comments enclosed in quotation marks within square brackets are the original text, given in a cases of uncertainty. I thank M.-C. Buchy for the translation of the Cuvier quotes.]

Carsosaurus Marchesettii, a new fossil lacertilian from the Cretaceous formation of Kras near Komen

By

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With one photographic and one lithographic plate (No. I and II)

In the Museo civico di storia naturale of the city of Trieste, wherein is reposited the original slab of the saurian from Komen that was carefully described and figured under the name *Acteosaurus Tommasinii* by Hermann von Meyer in the year 1860[1], there is a significantly larger petrifaction, deriving from the same locality, namely, from the dark bituminous shale of Kras near Komen[2], situated nearly in the middle of a line connecting the towns Monfalcon and Wipbach in the Austrian *Küstenland*[*] north of Trieste. Besides the discovery of *Acteosaurus* the quarries of Komen are also well known for numerous, very well-preserved fishes—we are indebted foremost to J. J. Heckel for the exhaustive communications on and admirable illustrations of these[3]—and further for the appearance of the remains of two other saurians known from unfortunately more poorly preserved material, namely, an animal located in the Museo civico for Milan, 0.48 m in length (as far as it is preserved), discovered by Emil Cornalia and provided with the name *Mesoleptos Zendrini*[4], and a much smaller species in the geological collection of the University of Vienna, of which only the hind half of the body, the hind appendages, and the long tail are preserved and which Prof. H.G. Seeley described and figured as *Adriosaurus Suessi* in the year 1880[5].

The great stone slab of the Trieste Museum furnishes us now with a highly important side piece of the aforementioned petrifaction, which will carefully be depicted in the following.

Already in its significant size the animal surpasses its previously known relatives; the state of preservation of the body remains is also relatively more favorable. Unfortunately the head is missing, as before in all lizards from Komen, and also nearly the entire neck; in contrast, the body and the greater part of both pairs of appendages, as well as the proximal piece of the tail, are visible, for the most part, in relief so beautiful and so distinct against the matrix of stone that a precise study of the animal, and a comparison of the same with similar forms, is greatly facilitated.

The stone in which this reptile is embedded is the well known marly calcareous shale ["Kalkschiefer"] that, according to the investigations of Stache[6], occurs not only in Komen, even if it is only fossiliferous there, but also at other sites—in inner Carnolia[†] and on the Čičarija ["Tschitschenboden," *Gentle Plain*], where it is directly overlain by likewise dark, mostly

[*] *literally* 'Coast-land'*, a former duchy of Austro-Hungary.*
[†] *another former duchy of Austro-Hungary.*

bituminous rock of the Radiolarian zone [“Radiolithenzone”]—and that therefore may be disposed in a deeper level of the Cretaceous formation than the latter, although it is uncertain whether this should be the Cenomanian or the upper Urgonian [*?*][7].

The bed [“Gesteinfuge”] by whose splitting the saurian was uncovered shows a coarsely undulating surface, weakly depressed especially in the region of the left forelimb and at the beginning of the tail. Its color, as a result of long-active oxidation, notably around the fore part of the animal, is fairly light, brownish gray or, through the invasive encrustation [“eingesintertes”] and/or deposition of iron oxide, ocher-like, which coloration the remains of the animal themselves take on. Only on freshly broken surfaces do they show a metallic glint and a steel-gray to blackish color that reminds one of anthracite. The shale itself consists of thin layers or lamellae, 0.0015 to 0.003 m in thickness, very weakly warped (as remarked above), and matte and coal-black at fresh breaks.

The stone slab has a length of 0.96 m[8], nearly matched by the remains of the animal, except for weak bends in the vertebral column that increase the length of the latter by 0.015 m. The width of the bluntly tapering slab, which narrows toward both ends, may be taken as approximately 0.25 m, of which the body of the animal takes up 0.145 m. The thickness of the slab measures on average 0.04 m.

The skeleton is seen lying on its back, that is, with the belly side turned toward the observer, such that the underside of the ribcage and parts of the shoulder girdle are exposed next to and in front of the anterior vertebrae, followed behind by the remaining presacral vertebrae with their ribs. Then follow the two sacral vertebrae and the proximal twelve vertebrae of the tail. Only the three most posterior of the cervical vertebrae are preserved; all others more anterior and, as mentioned, the head itself are missing. The appendages are more or less in their natural position; the proximal and middle segments of all of them, and also in part the distal section of the left forelimb, are preserved, whereas the latter section is only slightly more recognizable in the hind limbs. The pelvic girdle is indistinct, and its organization can only partly be deciphered. The stone slab, moreover, is cloven in two by a fissure that runs nearly down the middle; but the two halves are so well joined together again on the strong plaster underlay in which the entire slab is embedded that this circumstance, since only a little is missing from the breakage, has no influence on the apprehension of the whole.

I move on now to a careful discussion of the fossil itself.

Vertebral column.

If one regards the pelvic girdle, which, as noted, is not entirely distinctly recognizable, the patent overlying of the transverse processes (*tr.*) or parapophyses of two vertebrae by the left ilium (*il.*) serves to establish beyond all doubt the nature of these vertebrae as the two sacral vertebrae (sa_1, sa_2), with which the ossa ilei are in arthrotic connection. Despite the poor preservation of these sacral vertebrae and the difficulty in precisely deciding the boundaries of their centra or vertebral bodies (*c.*), it is clear that their length, 0.02 m each, is significantly diminished in relation to that of the presacrals, especially the anterior ones. In contrast, their centra are broad and compact, with strongly developed transverse processes—nearly 0.02 m long, at the base 0.01 m and at the rounded tip 0.005 m wide—certainly more closely likening the postsacral vertebrae than the presacrals.

A total of 24 of the latter are preserved on the slab. The last two that immediately precede the sacral vertebrae could be termed lumbar vertebrae, for on these ribs could not be discerned well, and lumbar vertebrae also occur in extant lizards (although rarely), like *Chamaeleo* and *Ameiva*. But it is anyhow possible, in fact even more probable, that even these vertebrae bore short ribs, which simply were covered by the blackish encrusting carbonate [“Kalksinterüberzuge”] that obscures this section of the vertebral column[9]. The antepenultimate presacral vertebra definitively bears ribs and on this basis is certainly a dorsal vertebra. 13 further dorsal vertebrae (*do.*) follow this one anteriorly, their ribs gradually increasing in length and robustness. These are not united in any way on the midline and may therefore be termed the so-called (posterior) costae spuriae. Gastralia, as occur in the Rhynchocephalidae and crocodiles and, among lizards, the geckos, Chamaeleontidae, and skinks, are entirely absent in our fossil. The next five vertebrae arrayed anterior to the sacrum (*sa.*), that is, the 17th, 18th, 19th, 20th and 21st counted from back to front, carry long ribs that consist of three segments, which, being in connection with the sternum, constitute the ribcage or thorax and therefore must be termed the real or true ribs. Three more vertebrae follow, whose ribs rapidly and conspicuously decrease in length, and which may be seen as anterior false ribs. It is really irrelevant, here, whether one sees these vertebrae, as certain authors do, as the foremost thoracic vertebrae or whether, as seems more appropriate, given that their ribs are connected neither to the sternum nor to the pectoral girdle, they should count as cervical vertebrae (*ce.*)[10] that, as in numerous related other forms, carry ribs, namely, cervical ribs. If we adhere to the latter view, then our animal would be accorded 21 dorsal vertebrae, or in the case of the above-mentioned possible lumbar vertebrae, 19 dorsal and 2 lumbar vertebrae.

The vertebrae are procoelous, as in most lacertilians, that is, they have an anterior concave articular surface with which the posterior condyle of the next anterior vertebra in the sequence articulates. The anterior end of the centrum passes on each side into a strong, short transverse process (*tr.*), to which attach the unicapitate ribs. Thus the vertebrae acquire an anteriorly clearly expanded form without, however, the remaining part of the (vertebral) body suffering an especially conspicuous restriction or narrowing as is so characteristically displayed by another fossil saurian, *Mesoleptos*, from the same locality. The underside of the centra a furrow or groove, bordered on each side by a raised ridge and, according the state of preservation, more or less distinct, whereas the remainder of the surface predominantly evinces fine striations. On the anterior dorsal and remaining three cervical (or neck) vertebrae neither the aforementioned groove nor the striations can be ascertained; rather, their transversely convex surface, anterolaterally somewhat deepened, is evenly and finely rough. In contrast, a spherical prominence or process occurs on the posterior end of the cervical vertebrae, especially the ultimate and antepenultimate ones, and may well be interpreted as hypo- or haemapophyses (*hp.*), as these also are found in living lacertilians, e.g., *Uromastix*. Nothing can be stated about the properties of the neurapophyses (or spinous processes) or zygapophyses (anterior and posterior articular processes), which are present on the dorsal side of the vertebral body.

With regard to the dimensions of the presacral vertebrae, their length varies only slightly, from 0.02 and 0.023 m for the last two to 0.026 m for the antepenultimate, then 0.03 m for the two following anteriorly, and 0.033 for the next six, followed further by a reduction to 0.03 m and to 0.026 m, 0.025 m, and 0.024 m for the first three dorsal vertebrae and to 0.024 m for the three cervicals. The width of the anterior ends of the vertebrae likewise vary from 0.03 m and 0.035 m to 0.04 m for the widest middle and at the same time [“zugleich”] longest dorsal vertebrae. The total length of the presacral section of the vertebral column comes to 0.705 m, of which 0.075 derives from what remains of the cervical vertebrae and 0.63 from the dorsal vertebrae. The sacral section, as is apparent above, is 0.04 m long.

Of the postsacral vertebrae, or the tail section of the vertebral column, which has a total length of 0.23 m, as far as it is given to us, only a very small portion is preserved (as already intimated above). In fact only the first twelve caudal vertebrae (*ca.*) are still present. These are nearly 0.02 m long each and decrease only slowly in length, such that they still come to 0.018 m by the eleventh. Likewise their width decreases only gradually from 0.015 m to 0.01 m. On account of their being encrusted with carbonate little can be said anymore of their sculpturing or the properties of their surface. But one can make out on a few a strong, median groove, marked [“durchzogene”] by a longitudinal ridge, beside which are even weaker, lateral, longitudinal furrows for muscle attachment. Their strongly developed transverse processes (*tr.*), which, because the tail, like the body, also lies on its back, conspicuously emerge on either side and must have served for the insertion of an extensive and powerful musculature, are very clear. These transverse processes are over 0.015 m long on all caudal vertebrae, 0.008 wide at the base but about 0.004 m wide toward the rounded off tips, dorsal–ventrally depressed, flag, at the beginning directed somewhat posteriorly but then perpendicular to the axis of the vertebral column. Lower spinous processes, haem- or hypapophyses (*ha.*), also known as chevrons (*Os chevron, Os en Y*), are present on all vertebrae beginning with the second, i.e., with the exception of the first caudal vertebra, where such was probably also lacking in the living animal, as in extant lacertilians. From what one can make of the properties of the ventral surface of the 3rd, 10th, and 11th caudal vertebrae (ca_3 ca_{10} ca_{11}), the chevrons appear to have been connected via their little articular heads to respective depressions on two especially short processes on the hind end of the vertebra, as in many recent lizards (*Psammosaurus* and the like), and not in the intervertebral space of any two adjacent vertebrae. The two halves of a given chevron are united at their distal end and even ["allda"] elongated into a mighty spine, the haemal spine, which, like the transverse processes, served for the anchoring of powerful musculature, while the triangular space in between the bases, as is known, was provided for the reception of the great blood vessels of the tail. As a result of the pressure of the rock mass above these chevrons were dislocated from their natural position in our fossil, namely, shifted to the left and at the same time more or less posteriorly, but are all rather clearly recognizable. Their length, again decreasing only gradually posteriorly, comes to 0.045 m to 0.035 m.

From the greatly developed size of the caudal vertebrae and their rather inconsiderable diminution in the twelve that are present, one can generally conclude that the tail was extraordinarily long and powerful, and one will not err in estimating the number of caudal vertebrae to be around 100, perhaps even greater, as in today's monitors. With the flexibility of the caudal vertebral column, which, as noted, was provided with an extensive musculature, the tail may have served the amphibious, if predominantly land-dwelling, animal for defense, perhaps also for grasping or capture or for support when rising, for climbing, for propulsion generally; and in emergency in the water as a powerful rudder organ. The presumed length of the tail may have come to at least twice that of the body (which measures 0.67), or about 1.30 to 1.40 m.

Ribs.

The ribs, as previously mentioned, may be divided, according to their union with the breast-bone, or sternum (*st.*), or their separation from it, first into true ribs, or costae verae (*co.*), and then false or asternal ones, or costae spuriae (*co. sp.*), the latter in turn being divisible into anterior—co. sp. anteriores (*co. a.*), the so-called cervical ribs—and posterior—co. sp. posteriores (*co. p.*), or body ribs—sections. The last or hind-most pair of cervical ribs is still of considerable length (0.09), as can clearly be seen on the left side, although only a proximal piece of the corresponding right rib is recognizable. The ribs lying more anteriorly, probably three or four pairs, are less clear, but decrease rather rapidly in size.

The true ribs, in contrast, are quite beautifully preserved. They run from the first through fifth dorsal vertebrae, or counting in an anterior direction from the sacrum, from the 21st to 17th presacral vertebrae, on whose short, wide transverse processes each attaches via the capitulum, extending first outward and posteriorly in an arch-shape, then downward and inward, and finally forward and upward. To these three directions correspond an equal number of segments into which each rib is divisible, namely a proximal segment—the vertebral piece, or *costa vertebralis* (*co. v.*)—, a middle segment—the connecting piece, or *costa intermedia* (*co. i.*)—, and a distal segment—the breast piece, or *c. sternalis* (*co. st.*). The sternal segments of all five ribs articulated anteriorly on each side with the posterior margin, in this case triangular in shape, of the breastplate, or sternum (*st.*), the impression of which is clearly preserved on the stone, left behind by this cartilaginous rather than ossified part of the skeleton. The rib segments mentioned above, in contrast, were all ossified in our animal, even the otherwise frequently cartilaginous middle piece; they are therefore all well preserved and, especially on the left side, quite beautifully developed ["ausgeprägt"]; on the right, especially with the middle segments, partly overlapping the vertebral column, but no less clearly recognizable for that.

The distal end of the sixth rib ($co_6 = p_1$) is greatly thickened, likely provided for a more massive rib cartilage that is no longer connected posteriorly to the sternum, although possibly with the sternal segment of the 5th rib, as traces, particularly on the right side, seem to indicate.

At the end of the sternal triangle noted above, nestled between the bases of the two fifth sternal costae, one sees an additional two bony rods, 0.015 m long and 0.003 m wide, that connect arthrotically with the sternum and correspond to the proximal, ossified parts of the sword-shaped processes, or xiphosternum (*x. st.*), whose distal portion—possibly rather elongate, as in recent lizards—were not preserved on our slab, probably because they were persistently cartilaginous.

No median longitudinal furrow can be discerned in the aforementioned impression of the sternum that would indicate the coming together of two side pieces. One can follow this impression anteriorly and recognize its form as that of a trapezoid of approximately 0.09-m width and about 0.1-m length, to whose two posterior, 0.08-m long edges the five just-mentioned sternal segments of the true ribs attach. At the anterior point ["Spitze"] of this trapezoid the bony episternum (*e. st.*)—which is beautifully bequeathed to us and may once have served the animal as a keel-like reinforcement for muscle attachment similar to the carina sterni in birds—is shifted posteriorly and overlies the cartilage laterally and ventrally. It has the usual form of a T; with the anterior, transverse piece—0.05 m long, from 0.005 m wide in the middle to 0.002 m at the ends—it overlies on our slab the underside of the last cervical vertebra and, with the originally straight but unfortunately somewhat distorted middle piece or handle—0.055 m long, 0.005 m wide at first but then expanding dagger-like to both sides to about 0.008 m posteriorly—, extends to about the second dorsal vertebra, where the point appears overlying the proximal end of the second true rib. Its relationships to the shoulder girdle will be treated shortly. ["Über seine Beziehungen zum Schultergürtel wird bei diesem die Rede sein."]

The dimensions of the rib cage, as represented on our slab, come to 0.20 m in length and 0.145 m in width. The rib segments increase in respective length from anterior to posterior and at the *n*th rib come nearly to:

n:	I	II	III	IV	V
	meters	meters	meters	meters	meters
Sternal segment	0.08	0.10	0.12	0.14	0.16
Connecting piece	0.02	0.03	0.04	0.045	0.045
Vertebral piece	0.12	0.125	0.13	0.132	0.14
Altogether	0.22	0.255	0.29	0.317	0.345

The free or posterior false ribs that follow are of significant length up to and including the 14th dorsal vertebra but then decrease rapidly in length on the last seven presacral vertebrae, if the last two vertebrae bore ribs at all, which can no longer be determined on the slab but, as mentioned above, is not improbable. Each rib has at its proximal (vertebral) end a simple, longitudinally round capitulum, anterolaterally somewhat compressed, that articulated via a shallowly depressed oval arthrotic surface, probably vertically oriented as in recent lizards, to the correspondingly raised lateral arthrotic surface of the short transverse process of the vertebra, as indeed can still be recognized on the eleventh dorsal vertebra (do_{11}). The arch of the posterior false ribs of the left side are flat and expanded, their inner surface concave or deepened like a groove, with the hollow becoming ever shallower toward the distal end and disappearing by the last quarter. A rather narrow, sharp anterior edge and a broader, blunter posterior edge border this concavity. The distal end of the rib is blunt, as if truncated, and doubtlessly served for the attachment of cartilaginous extension pieces, the so-called rib cartilages, which fell to decomposition. On the right side the ribs are pressed more onto the vertebral column, with their proximal ends clearly exposed (especially on the anterior vertebrae) but with their distal ends lying atop and crossing over one another, whereby their external convex surface and their upper edge become visible. The length of the ribs, which varies only insignificantly from the sixth to fourteenth and comes on average to 0.17, diminish rapidly, as noted, from the fifteenth (0.085) on, such that the nineteenth, still clearly discernible rib on the right side measures a mere 0.045. The anterior longer ribs are additionally more strongly curved at their distal end and more posteriorly directed, whereas this is only in the tiniest measure the case with the posterior, shorter ones.

Pectoral girdle and appendage

There are a few clues to the characterization of the shoulder girdle on the left side of our animal. Indeed, in the region of the last cervical and the first thoracic vertebrae—external to them—broad flat plates of bone, mostly free of encrustation ["Übersinterung"] and having a blackish, striated appearance, can be discerned. They are divisible into two sections, a lateral and a medial one, on the basis of a clear, somewhat irregularly broken or toothed borderline or suture, or *sutura* (*sut.*). On both one recognizes greatly thickened areas laterally and posteriorly that, although now disrupted, once constituted the articular socket, or *fossa glenoidea* (*f. gl.*), for the reception of the head of the humerus. The lateral division of the bony plates runs anteriorly from the socket and ends in two flat, trapezoidal processes, rounded at the end, which are separated by a narrow, longish cutout. This division represents the shoulder blade, scapula (*sc.*), and the more external of the processes has been termed the mesoscapula (*m. sc.*), the inner the true scapula. The inwardly located, broader section of the bony plate, connected with the scapula by the aforementioned suture, likewise flattens anteriorly and medially and ends, like the shoulder blade, at an anterior, arch-like edge, where again an embayment ["buchtförmiger"], only somewhat wider, can still be seen. The medial boundary with the sternum is indistinct, for it was greatly affected by the pressure of the stout ribs, of the last cervical and first true vertebrae, lying beneath. This plate of bone represents the "crow-bone", or coracoid (*cr.*), which as a result of the cutout mentioned above is divided into prae- and mesocoracoid (*p. cr.* and *m. cr.*), whereas the true coracoid was provided for the connection with the anterolateral edge of the sternum. Less clear are the vestiges of the shoulder girdle on the right side, which are cut off shortly by the edge of the stone slab. They are, like the right forelimb generally, shifted more closely to the vertebral column, and one can still easily distinguish the proximal end of the humerus (*hu.*), the coracoid (*cr.*) and mesocoracoid (*m. cr.*), and their division at the articular socket (*f. gl.*). On their surface one sees, as on the left side, fine, even striations that diverge toward the anterior and medial edge. Soft, weakly bowed rods of bone, which abut on the lateral rami of the episternum and which on the left side one clearly sees extending along the anterior edge of the mesoscapula, can be taken as the collarbones, or clavicula (*cl.*), which are partly dislocated from their natural position but once, attaching to the anterior ends of the scapula, the praecoracoid, and the aforementioned episternum, in part indirectly, in part directly via bone, served as a linchpin for the consolidation of the shoulder girdle. No entirely certain data on the dimensions of the individual parts of the shoulder girdle can be extracted. The scapula may have been about 0.03 m long and 0.02 m wide, the coracoid 0.025 m long and 0.038 m wide.

Of the pectoral appendage the upper arm, the forearm, and in large part the hand bones, on the left side, are bequeathed to us; on the right, but the first two. Here the state is such that the limbs, which were probably spasmotically outstretched in death, each turning its anterior, inner or ventral side toward the observer, wherein the elbow bone, or ulna (*u.*), immediately recognizable for its predominating stoutness, lies closer to, the "arm-spindle", or radius (*r.*) more distant from the same ["von demselben"]. The upper or proximal end of the upper arm bone, or humerus (*hu.*), was greatly expanded; its (convex) articular ball lies a little outside the articular socket (*f. gl.*) built by the scapula and coracoid, and next to the ball one can discern the trochanters, or *trochanteres* (*tr.*), of which the ventrolateral one (*tr. l.*) is especially clearly exposed on the left side. Toward the middle the humerus narrows, evinces a spot somewhat deepened with respect to the length, and expands again downward, or distally, toward the knot of the elbow joint ["zeigt eine der Länge nach etwas vertiefte Fläche und erweitert sich nach unten, oder distal, wider zu den Ellbogengelenksknorren"]. Its length comes to 0.08 m; its width is nearly the same above and below, namely, 0.02 m, but is reduced nearly by half in the middle and measures a little over 0.01 m. The convex distal end articulates with a correspondingly concave arthrotic surface consisting of the proximal (upper) ends of the two bones of the forearm. Also present was a large sesamoid bone for the extensor muscle of the forearm, a so-called *patella ulnaris* (*pa. ul.*), which again is more distinct on the left side, where it is nestled between the medial *Knorren* on the distal end of the humerus and the proximal end of the ulna. The ulna is 0.013 m wide at its dorsal epiphysis but narrows gradually moving into the body [*diaphysis*], where, nearly in the middle of its length, it measures 0.007 m, to attain again ventrally a width of 0.01 m. At the aforementioned places the radius shows dimensions of 0.009 m, then 0.004 m and 0.006 m, where, like with the ulna, the measuring was undertaken partly on the right forearm, partly on the left, according to the side on which the respective place is more clearly exposed. This, because on the left side a lamella of the carbonate encrustation [“Kalksinterlamelle”] again partly covers the bone itself, which is true of the third section or end-piece of the left arm, that is, the hand, to a still greater degree. The forearm bones are quite similar in length and come to 0.05 m each. This figure compares with that of the upper arm by a ratio of nearly 5 : 8. All these arm-bones show weak longitudinal striations, the radius moreover shows deeper furrows and bony ridges in between them that likely were provided for the attachment of muscles. On the hand, which, as mentioned above, somewhat encrusted, the position and boundary of the “root of the hand”, or carpus (*cp.*), and the middle hand bones, or metacarpus (*m. cp.*), may in part be apprehended by raised lines, even if more precise statements on their connection with the forearm bones as well as with one another are not really possible. The largest carpal bone abuts upon the ulna (*u. c.*), like a smaller one the radius (*ra. c.*); of the distal row of carpals the fifth, fourth, third, and second can be recognized. These carpal bones are removed from their natural position by pressure: separated further longitudinally and laterally from one another as well as shoved outwardly from the radius and even more so from the ulna, with which they previously were in contact. The latter is also the case in the right forearm, though to a lesser degree. On our slab, therefore, the distance between the distal ends of the ulna and radius comes to 0.0016 m on the left side and 0.0012 m on the right. The length of the carpus can be taken as up to 0.008 m. Measurement of the width is uncertain on account of the aforementioned displacement by pressure.

The middle hand bones, with the exception of the broken-off distal end of that of the first finger, are present and more or less clearly visible; from the fifth finger there are additionally the three phalanges, if encrusted, and from the fourth finger the proximal piece of the first phalanx. The length of the fifth metacarpal is 0.015 m, that of the first and third over 0.02, that of the phalanges of the fifth finger 0.03 together; thus, considering the longest and missing fingers, which doubtlessly, as in today’s lacertilians, are the adjacent fourth and third, divisible into five and four segments, respectively, one could well estimate the length of the entire distal segment of the forelimb, the hand, at 0.075 m, which is almost the same length as would be given for the upper arm. From the last or distal phalanx on the fifth finger, 0.008 m in length, one may infer a moderately curved and, in relationship to the significant body size of the animal, comparatively small claw.

Pelvic girdle and appendage

Of the pelvis only the iliac bone, or ileum (*il.*), is utterly clearly preserved on both sides, where, as was previously mentioned in the treatment of the vertebral column, it is still seen in connection with the transverse processes (*tr.*□), or parapophyses, on the left side; this connection on the right side appearing severed and the ileum itself shifted laterally and to the right. From the acetabulum, in whose construction it, together with the pubic bone and ischium, participates, the ileum is bent like a hook posteriorly and extends as a straight, nearly 0.04 m long, 0.008 m wide process, which then narrows to 0.005 m and bluntly tapers to 0.003 m, to the parapophyses to which it articulates. The position and boundaries of the “sitting bone”, or ischium (*is.*), which has comes to lie on the first sacral vertebra, as well as that of the more anteriorly located pubic bone, *os pubis* (*pb.*), on the last dorsal vertebra, and their union with the bones of the same name on the other side[11] appear well indicated on our slab, and it is possible, starting with the acetabulum on the left side, to trace these relationships; but a truly clear picture of this girdle, as one could well expect from the favorable position of the animal, is unfortunately confounded by the dark calcareous encrustation ["durch den dunklen Kalksinterüberzug"]. We have therefore only indicated it with dotted lines on our outline drawing, the second plate.

The left pelvic appendage entirely corresponds to the natural position in the life of the animal, except for the likewise spasmodic condition in which all three sections are bequeathed to us, as was already noted for the pectoral appendage. The upper leg bone, or femur (*fe.*), is, like the humerus, pulled out from the articular socket, next to which its oblong, convex articular head, which inserted there, can be seen. Under the latter, specifically medial and somewhat ventral to it, the sharply projecting trochanter is seen, from which obliquely running crests of bone extend, diverging toward the distal end. The upper leg bone is 0.085 m long and very straight; at the ends is it almost equally (0.02 m) wide but in the middle measures 0.014 m. Of the lower leg bones the calf bone, or fibula (*fi.*) lies to the inside and the shin bone, or tibia (*ti.*) to the outside, both with their proximally depressed ends connected to the respectively raised distal end of the femur at the knee joint. The "knee-disk", or patella (*pa.*), is well enough preserved that one is capable of recognizing its position on the tibia, if no longer especially well its form. The lower leg bones have been pulled apart from one another, especially at their distal end, by the pressure of the overlying rock (that is, the distance between them is greater than normal), and the proximal end of the fibula is additionally somewhat shoved up onto the femur. The tibia is straight, 0.014 m wide above and 0.01 m below; the fibula, somewhat bowed in the middle, is 0.006 m wide above and 0.008 m below. The length of the two is about the same and comes to around 0.05 m[12]; the ratio between upper and lower leg length is therefore 10 : 17.

On the right side the pelvis is disjointed and the ileum, like the entire limb, or at least the proximal and middle segments that are bequeathed to us, shoved laterally, such that the back side of the limb is turned to the observer and the position of the lower leg bones appears reversed, that is, with the fibula to the outside and the tibia to the inside. The distal ends of the two lower leg bones lie atop the fifth caudal vertebra and its symphysis with the preceding fourth.

None at all of the bones of the foot is recognizable on the right side; on the left, only a few traces of indistinct, mostly dispersed, and also encrusted bones of the "root of the foot", or tarsus (*ta.*), fragments of the middle foot bones, or metatarsals (*mta.*), and quite a few phalanges (*ph.*), including an ungual, are preserved.

Integument.

An only rarely preserved part of the body is fortunately bequeathed to us on our slab of stone, namely, distinct impressions of the epidermal covering of the skin, which occurs in several places: on the right side outside the arches of the ribs in the region of the 12th through 14th and 16th through 18th dorsal vertebrae, on the left—especially beautifully and distinctly—in a rather large patch laterally from the distal end of the sixth posterior false rib and inward from it to around the arch of the seventh rib. One also finds on the left less distinct traces, lateral to the ends of the 4th, 9th, and 11th false ribs. True bony scales—constructed by ossification of the dermis ["Lederhaut"]—were not present, as are known in some extant lizards like Pseudopus and Ophisaurus and, among the fossils, in the lower Miocene species of the Rott lignite and the freshwater carbonates of Puy de Dome; rather, [the impressions] corresponded to thickenings of the uppermost layers of the cutis, and rough, horny scales of the similarly thickened epidermis overlay them ["Es waren keine ächten Knochenschuppen vorhanden, …, sondern den Verdickungen der obersten Schichten der Cutis entsprachen, und es waren ihnen dicht aufgelagert, derbe, hornige Schuppen der gleichfalls verdickten Oberhaut"]. These show a rhombus-like shape; the pattern is imbricate—the margins of the scales rather strongly thickened, especially at the acute angles of the rhombus—but they do not cover one another like shingles and are arranged in oblique rows, so that they form, rather like the scales of a pine cone, spiral rows going in two directions. The surface of the little plates take on irregular raised areas, small bumps or crests, or stripes, which are most especially common in the middle [of the scales], according the whole the appearance of shagreen. Scales of this form covered the belly and the breast of the animal, as one may conclude from their spatial relation to the ribs, and the epidermis of the back had the same character, as identical parts of the skin covering, to be found on the right side of the animal lying extremely close the back, make plain.

Of great interest, however, is a large number of small animal remains that are heaped up next to and atop one another in pied disarray [“im buntesten Gewirre”] left of the vertebral column in the region of the abdominal cavity of the animal, from about the eighth dorsal vertebra and the third posterior false rib belonging to it back to the pelvis. One finds the most sundry skeletal parts of small saurians and, as it appears, also fishes. Small, very delicate ribs or fine fish-bones, found in clumps dispersed here and there at the distal ends of the eighth through fourteenth ribs, and also the amphicoelous character of small vertebral columns with a persistent *chorda dorsalis*, as one can see running posteriorly parallel to the curve of the ninth rib, may be referable to small fishes and also possibly to tailed amphibians. Nearby definitive remains of small saurians are also encountered: small lacertilians, etc., whose vertebral columns often still lie attached to the ribs, bones of the appendages and the like; in one place even a portion of a lizard skull lies obliquely over the seventh rib 0.03 m to the left of the 12th dorsal vertebra, its underside turned to the observer. It measures 0.04 m in terms of length and is 0.01 m wide at the posterior end, and 0.005 m anteriorly, where the two halves of the jaw have been separated by pressure and lie somewhat distanced from one another. Unfortunately here a thin, brownish black encrustation [“Sinterüberzug”] permits little more than the hard palate, with the two anterior holes (*foramina praemaxillaria* or *incisiva*), and the pointed teeth (especially on the left maxilla), which appear acrodont and rather separated from one another, to be recognized. Also between the seventh and eighth ribs, 0.02 m left of the twelfth vertebra, the bony remains of the hind part of a reptile skull—with the two upper supratemporal fossae, or perhaps the orbits—may be indicated. Because of the smallness of these remains and their poor state of preservation, it is not possible to remark on the affinities with particular species. In respect of its size, in any event, the first-mentioned skull would certainly match *Acteosaurus*, described by H. v. Meyer from this formational level, or perhaps Seeley’s *Adriosaurus*, although the skulls of these forms are unfortunately unknown. One can count twelve rather long, more or less associated segments of vertebral column like those mentioned above, manifoldly bent and overlying the ribs and even the ventral surface of the vertebral column, as seen on the 15th vertebra and others, or distributed in the space between the ribs, which, except for the aforementioned fish or amphibian remains, may derive from lizards. The circumstance that the body cavity is entirely free from remains of this kind anteriorly, and moreover that, outside the boundaries of the animal, such remains occur neither on the right side, nor on the left, nor in the region in the tail and furthermore overlie the bony components of the inner wall of the abdominal cavity, namely the ribs and the ventral surface of the vertebrae, may well justify the supposition that we are dealing here with the indigestible remains (which escaped decay following the locking of the animal into its matrix of stone) of the nourishment of an extraordinarily voracious carnivore that, according to the saurian way, devoured its living prey whole. We see before our very eyes an incarnation of the maxim “eat or be eaten”, which, like even today, has asserted itself inexorably in the dark days of every distant previous world.

As we have already concluded, when we stress the chief characteristics of the animal described above, it may be disposed among the scaled lizards [“Schuppenechsen”] or *lepidosaurs* on the basis of the procoelous character of the vertebrae, the sacrum consisting of two vertebrae, the unicapitate ribs and want of lumbar ribs, and the skin covered with horny, platy scales, and more precisely among the true lizards [“Eidechsen”]‡ or *lacertilians* on the basis of the elongate body, the long tail, the derived shoulder girdle provided with a sternum, and the five-toed limbs that do not liken fins.

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‡ Some authors have tried to restrict the German word *Eidechse* to the Common Wall Lizard, *Podarcis muralis*, and perhaps close relatives, using the word *Echse* for lizards in general. This practice has not always been followed; in this case Kornhuber is clearly referring to members of the old Order Sauria or Lacertilia; later, he seems to restrict the meaning of the same word to the Family Lacertidae.

The question now arises, to which family or genus among the lacertilians our fossil is to be assigned, if not to a previously described species.

Foremost in our thoughts may now be *Acteosaurus Tommasinii* Herrmann von Meyer (*op. cit.*), which, as was already once mentioned, derives from the same black shales of Komen. It is therefore necessary to subject the two fossils to a careful comparison. Neither the skull of the one nor the other is bequeathed to us; thus, we must confine ourselves to the axial and appendicular skeleton. In respect above all of size, when we first compare only the well-preserved dorsal sections with one another, 0.63 m long in our fossil but little more than 0.13 m in *Acteosaurus*, our fossil surpasses the latter nearly fivefold in length. Since the latter, as H. v. Meyer (*op. cit.*, p. 229) expressly emphasized and as I convinced myself by observation of the original slab, was a fully grown animal ["ein völlig entwickeltes Thier"], such an identification is for this reason alone out of the question. But there is additionally the number of dorsal vertebrae, which comes to 27 in *Acteosaurus* and 21 in our animal, and the properties of the first sacral vertebra, which in *Acteosaurus* maintains the form and size of the anterior dorsal vertebrae themselves but in our fossil is shorter, likening the caudal vertebrae. The caudal vertebrae of *Acteosaurus*, with the exception of the anterior 1–4?, also seem not to have borne transverse processes, which in our animal, in contrast, were considerable on all caudal vertebrae bequeathed to us and doubtlessly were developed on the missing ones as well. The properties of the ribs are also quite different. In *Acteosaurus* they all show nearly the same length, viz., 0.022; only the middle ones are significantly longer. Its *Gestalt* [*form*] thereby generally approaches that of snakes and justifies the assumption that, beyond the eight preserved cervical vertebrae, a rather large number of more anterior ones would have been present, as is completely consistent with the macrotracheal ["makrotrachelen"] nature of dolichosaurs, where *Acteosaurus* certainly belongs. Nicely concordant with this is also the ratio of the pectoral and pelvic appendages. The former are here conspicuously shorter and as a whole more delicate, the humerus, only 0.007 m long, having only half the length of the 0.014-m long femur. In our fossil, in contrast, the ribs are conspicuously different in length, comeing to 0.17 m on average for the anterior ones then decrease rapidly to 0.085 m and even further to 0.045 m, that is, to about a quarter of their anterior length. The pectoral and pelvic appendages of our animal, finally, show no particular differences, neither in length nor in stoutness, and liken one another to a great extent, the humerus (0.080 m) and femur (0.085 m) exhibiting practically the same length. The same applies to the second or middle segments of the appendages, where the forearm and lower leg have the same length of 0.05 m, such that ratio of the middle segment to the proximal one is about 5 : 8, while this ratio in *Acteosaurus* turns out to be 5 : 7 for the forelimb and 4 : 7 for the hind limb. It is therefore not even remotely possible that our fossil belongs to *Acteosaurus*. In fact they are so distinguished from one another by the features I have adduced that the animal described here does not even fit in the family Dolichosauridae but rather more closely approaches the Varanidae, as will be demonstrated later.

The saurian remains first known from the Cretaceous series of Komen were, as already mentioned, *Mesoleptos Zendrini* Cornalia (*op. cit.*). The skeleton includes most of the trunk vertebrae, the pelvis, part of the tail, and the proximal and distal sections of the right hind limb. In respect of body size—the trunk was namely over 0.36 m long—this skeleton is much closer to our fossil[13]. Although the remains of *Mesoleptos* are very incomplete, there can be no confusion between it and our fossil on account of the highly characteristic form of the vertebral centra of the latter, which of course was cause for the erection of the generic name. The centra, as described and figured by Cornalia, were namely anteriorly significantly wider and posteriorly too strongly narrowed, or constricted, such that individual anterior vertebrae, in which the posterior apophysis is broken off, have a triangular form wherein the base of the triangle is located anteriorly and the apex directed posteriorly. In our animal the form of the vertebrae as well as their dimensions show the significantly different conditions described above.

Finally, Professor H. G. Seeley (*op. cit.*) has presented a new genus and species, *Adriosaurus Suessi*, from the shales of Komen. The incomplete fragment of the skeleton includes the hind part of the trunk, the pelvis, the pelvic appendages, and the long tail. Seeley has in particular exhaustively compared it with *Hydrosaurus lesinensis*, described by me[14], and recognized it as entirely different from the latter, a view to which I fully assent. Just like *Acteosaurus*, *Adriosaurus* is a fully developed animal and little different from it in size. Thus, for this reason alone its identification with our animal is out of the question. Additionally its vertebral centra are distinct from those of both our animal and *Acteosaurus*; they are namely shorter, more compact, the dorsals somewhat less than 0.005 m long, 0.006 m wide anteriorly, their longitudinally convex sides converging posteriorly to a width of only 0.003 m. Furthermore, the ribs are relatively much thicker—namely, 0.002 m thick at the proximal end—, stouter, and moderately curved, although not much different from one another in length: characteristics that are consistent with the snakelike body form of the dolichosaurs but, as mentioned multiple times, do not occur in our fossil.

With regard to our animal, now, there may still be several foreign Cretaceous lizards to consider. Thus, *Dolichosaurus longicollis* from the lower Cretaceous of Kent, which Owen[15] describes and figures. It is not entirely easy to obtain a good conception of this animal, if one follows Owen, for he combined a fossil that he first linked to the adjacent, simultaneously figured jaw pieces and teeth[16] as *Rhaphiosaurus subulidens* in the year 1841[15] with another petrifaction under the name *Dolichosaurus*[17], upon notice from Dixon that the two pieces were found in the same quarry near Burham and at the same time, yea, as one could quite reasonably assume, in the same limestone block. The quarrymen had probably distributed the pieces to different persons; thus they had landed in two different collections (Smith's and Egerton's). It is exceedingly difficult, given the different form of the admirably illustrated vertebrae (*op. cit.*), to convince oneself that the pieces should have belonged to one and the same animal. Hermann v. Meyer also disputed this[18], and for good reason, for the one piece (*Dolichosaurus*), considered an anterior portion, presents itself strongly curved, the other (*Raphiosaurus* Owen 1841), following posteriorly, stretched out straight, and it "is difficult to resolve how, in so slender and flexible an animal, the one half of the vertebral column should have been bent so strongly without simultaneously inducing a curvature in the other". Whatever the case, our fossil is to be identified with neither of these two pieces, for the characteristics of the snakelike body form—the scarcely or weakly differentiated length of the ribs, the anterior ones like those more posterior, as is so clearly displayed in the two Burham pieces—, emphasized above in the comparison with *Acteosaurus*, are not at all to be found in our animal, which moreover was much larger. Entirely invalid would be such a view if one were to assent to Owen's recent interpretation, according to which *Dolichosaurus* would have to have had 17 cervical and 40 dorsal vertebrae (the lumbar number being approximate), that is, a total of 57 presacrals, an enormous number for an animal provided with well-developed limbs, while only 21 dorsals are present in our animal.

From the middle Cretaceous of Clayton in Sussex yet another mandibular fragment and dorsal fragment of a saurian vertebral column, contained in the same chunk of rock, were combined by Owen[19] as *Coniasaurus crassidens*. Only nine procoelous dorsal vertebrae are preserved, which are reminiscent of *Dolichosaurus*, but one can conclude from the mandibular fragment that the head was rather larger than in the latter. The poor state of preservation complicates *indess ungemein* the systematic disposition of the animal, which on the one hand appears to be near the dolichosaurs, on the other, on account of the properties of the teeth, the Iguanidae. For these reasons it can likewise not be identified with our fossil.

Should one want to draw comparisons between our fossil and the largely beautifully preserved saurians from the lithographic shales of the upper Jurassic near Cerin in the Departement Ain and near Sohlenhofen, Eichstätt and other towns in Bavaria, or of Ahlem in Hannover, then the larger species from these localities—from 0.70 to 1.50 m long, which in superficial view show a few similarities to the former when one does not conceive other peculiarities—are entirely distinct in their more or less strongly developed abdominal ribs (acrosaurs H. v. Meyer and other sphenodontids that are close to the extant Australian genus *Hatteria* [Sphenodon]) and in the amphicoelous nature of the vertebrae, or, when the abdominal ribs are lacking, as in the small, short-snouted, crocodile-like apatosaurs, in the latter characteristic alone. They all belong to older forms ["Typen"], as is also indicated by their geologic appearance. Our fossil with procoelous vertebrae, in contrast, is, according to the previously depicted features, a true lacertilian, as already mentioned.

Lastly one can think of *Hydrosaurus* [=Pontosaurus] *lesinensis*, described by me[20], which also belongs to the Lacertilia and which represents the type ["Typ"] of the monitor lizards in a most excellent fashion. Although the contemporaneity of this animal with the fossil from Komen discussed here is completely beyond doubt, even these two remains cannot fully be reconciled when their characteristics are closely compared[21]. The poor development of the pectoral appendages in the saurian from Lesina, nearly only half the length as the pelvic appendages (0.045 : 0.086), compared to nearly equal development in the animal from Komen—as determined from their proximal (*hu.* 0.08 : *fe.* 0.085) and middle segments (0.05 : 0.05)—, speaks above all against their identity. Furthermore, the saurian from Lesina has 30 dorsal vertebrae, whereas the one from Komen only has 21 of these; or, if one follows the aforementioned alternative interpretation in which the more cranially located vertebrae that bear false ribs are seen as dorsal vertebrae, then, with the position of the shoulder girdle, clearly recognizable on our slab,
24 of these result in our fossil, whereas in the former, according to such a definition, there would be 33 thoracic vertebrae [sic]: a difference that forecloses at last the union of the two.

Now the determination of the relationships and systematic position of the new animal from Komen, as is so often true of paleontological questions of the kind, is not without considerable difficulty, for of course it is the characteristics of the soft parts, especially the peculiarities of the tongue, on which the more recent systematics of the living lizards rests. In our case we can also unfortunately glean no hints from the characteristics of the skull parts and especially from the highly systematically informative kind of dentition, for the head was not bequeathed to us. Fortunately we are in a position to approach the resolution of this question by differential diagnosis of the characteristics of the integument, which is nicely bequeathed to us, in addition to those of the skeleton. Above all the amphicoelous Ascalabota [*note that the conception of this taxon precedes Camp's (1923) revision*] and the grasping-footed ["greiffüssigen"] Chamaeleontidae, quite apart from their small body size, are out of the question. The animal from Komen, with its evenly rounded ["gleichmässig gerundeten"], highly elongate, relatively slender body, its uniform tabular scales, its the phalanges, which are very short-clawed for its considerable size, can also not be related to the laterally compressed, or dorsoventrally flattened, moderately elongate, mostly ungraceful agamas and iguanas, covered with differently ["verschiedenartig"] keeled, shingled, or spiny scales and for the most part conspicuously strongly clawed. The Anguidae and scincoids, either of a snake-like habit, wherein the limbs are dwarfed or entirely lacking, or, where these are more developed, of slight body size and mostly covered with keeled or shingled scales, likewise depart from our animal from Komen. That it also cannot be attributed to the Dolichosauridae we have established above by specifying the differences of *Acteosaurus*. Our fossil appears in manifold respects to be much close to the true "wall lizards" ["Eidechsen"], both of the Old World (*Lacertidae*) and of the New (*Ameividae*); in these alone are the back and belly clad in different scales: smaller, often granular, and of different form on the back, and, in contrast, invariably developed into much larger, four- or six-sided or perhaps roundish plates that are arrayed in transverse rows on the belly.

The body of our animal from Komen, as shown by the description of the form of the remaining integument given above, was covered in obliquely arrayed, tabular scales that are equally large on the belly and on the back and also of similar form, a feature that in part characterizes the extant Varanidae, which our fossil also closely approaches in its body size and in its general proportions, i.e., the highly elongate body, the broad back, the complete and equally developed appendages, and the long tail.

But still here there are differences of such significance that even an identification with the genus is out of the question. Namely, prescinding from the vertebral count, especially of the dorsal vertebrae, which, although it can be given with certainty for the animal from Komen, varies among the different species of the genus *Monitor* Cuv[ier] (*Varanus* Merr[em]) itself[22], there is a generically most significant difference in the construction of the rib cage. To wit, in *Monitor*[23] only three rib pairs participate in its construction: in the species from the Nile (*Varanus niloticus D. B.*) these are the tenth, eleventh, and twelfth ribs, which attach to the posterior margin of the sternal cartilage with their sternal ends. All subsequent ribs, in this case 27 pairs, are no longer united with the sternum and exist as so-called posterior false ribs. According to Cuvier's table[24], 19 such false ribs occur each in the *Monitor* of Java [Varanus bengalensis?], to which the text[25] appears to refer, and the New Holland species [?]; 18, in the *Monitor* with small white spots ["Monitor piqueté de blanc"; V. gouldii?]; and finally 17 of these in an undetermined species. But our fossil from Komen clearly has five true pairs of ribs, which all articulate with the posterior margin of the sternal cartilage, and unquestionably following that 14 or, if one supposes two more to be present on the posterior-most presacral vertebrae—Cuvier[26] of course takes these to be lumbar vertebrae in the monitor lizards—, 16 false ribs, a number that occurs in no monitor species. In iguanas fully five pairs of sternal ribs insert on the posterior margin of the sternum, but in these yet another rib participates in the construction of the rib-cage, attaching far anteriorly to the sternal end of the preceding fifth rib[27].

A further, not insignificant difference, finally, can be seen in the configuration of the integument. In the monitor lizards, namely, the horny tabular scales are arrayed in transverse rows that girdle the body in zonal succession, whereas in the animal from Komen they are obliquely arranged. The "tablets" themselves are in the former oval or oblong, humpy, convex, and surrounded by a fringe or ring consisting of small scales or "little warts", while those of the belly, scarcely different in size, are quadrangular, mostly flat and smooth. In the fossil from Komen they have the same, rhomboidal form everywhere and, on their surface, the manifold raised areas described earlier.

These peculiarities decidedly separate our fossil from the genus *Varanus* and its subgenera and necessitate the erection of a new genus of the Varanidae. For this beautiful and memorable lizard of the Kras I would like to suggest the name *Carsosaurus*[28]. I take the liberty of naming the species *Carsosaurus Marchesettii* in honor of the director of the Museo civico di Storia naturale of the city of Trieste, Dr. Carlo de Marchesetti, highly esteemed for his scientific research on the natural history of the Austrian *Küstenland*, and expressing to him my most obliging gratitude for the friendly willingness with which he facilitated the study and investigation of this animal by having the benevolence to commit to me in good faith the precious slab for so long.

Summary compilation

of the

proportions of individual skeletal parts of Carsosaurus Marchesettii and their dimensions

Total length of the skeleton as preserved		0.975
Length of the neck, as far as it is present		0.075
" " dorsum		0.63
" " sacrum		0.04
" " trunk, accordingly		0.67
" " tail, as far as it is present		0.23
Width of the skeleton at the trunk		0.145
Number of cervical vertebrae present	3	
Presumed number of cervical vertebrae	7–9	
Number of dorsal vertebrae	21	
" " lumbar vertebrae	0	
" " sacral vertebrae	2	
" " caudal vertebrae present	12	
Presumed number of caudal vertebrae	over 100	
Anterior pairs of false ribs, probably	3–4	

Pairs of true ribs	5
Posterior pairs of false ribs, 14 distinct, 2 probable	16
Length of cervical vertebrae	0.024
Width “ “ at anterior end	0.03–0.032
Width “ “ at posterior end	0.02
Length of dorsal vertebrae	0.04 0.03 0.02
Width “ “ at anterior end	0.04–0.03
Width “ “ at posterior end, nearly	0.02
Length of sacral vertebrae	0.02
Width “ “	0.015
Length of transverse processes of cervical vertebrae	0.02
Width “ “ “ “	0.01–0.005
Length of caudal vertebrae	0.02 0.018 ?
Width “ “	0.015 0.01 ?
Length of transverse processes of caudal vertebrae, over	0.015
Width “ “ “ “ , at base 0.008, at tip	0.004
Anterior false rib, ultimate, on third cervical vertebrae, length	0.09
First through fifth true ribs, length	0.22 0.25 0.29 0.31 0.34
Posterior false ribs, length of the posterior ones 0.045, of the middle ones, 0.085, of the anterior ones	0.17
Rib-cage, width 0.145, length	0.2
Sternum, posterior margins each	0.08
“ , greatest width 0.09, length about	0.10
Episternum, length of the transverse piece	0.05
“ “ “ handle (middle piece)	0.055
Xiphosternum, ossified part, width 0.003, length	0.015
Scapula, length approximately 0.03, width	0.02
Coracoid, length approximately 0.025, width	0.038
Length of the humerus	0.08
Width “ “ at the ends 0.02, in the middle	0.01
Width of the ulna at the upper end 0.013, in the middle 0.007, at the lower end	0.01
Width of the radius at the upper end 0.009, in the middle 0.004, at the lower end	0.006
Ratio of forearm to upper arm length	5 : 8
Carpus, length (width uncertain)	0.008
Metacarpals, length from 0.015 to	0.02
Fifth (anterior) “toe”	0.03
Ungual	0.008
Length of the hand, probably	0.075
“ “ pectoral appendage, probably	0.205
Length of the ilium	0.045
Greatest width of the ilium	0.008
Length of the femur	0.085
Width of the “ at proximal end	0.02
“ “ “ at distal end	0.02
“ “ “ in the middle	0.014
Length of tibia and of fibula, each	0.05
Width of the proximal end of the tibia	0.014
“ “ “ “ “ fibula	0.006
“ “ distal “ “ tibia	0.01
“ “ “ “ “ fibula	0.008
Ratio of lower leg to upper leg length	10 : 17 or 5 : 8
“ of upper arm to upper leg length	0.08 : 0.085
“ of forearm to lower leg length	0.05 : 0.05, *i.e.*, 1 : 1
“ of the length of the proximal and middle segments of the pectoral appendage to the proximal and middle segments of the pelvic	

appendage ....0.13 : 0.135, *i.e.*, nearly 1 : 1
Probable length of the pelvic appendage 0.21
“ “ “ foot or distal segment of the pelvic appendage 0.075
Presumed length of the head, estimated by comparison with related saurians, about.... 0.22
“ “ “ neck, approximately 0.16
“ “ “ tail 1.30 to 1.40
Adding the length of the trunk provided above 0.67
gives a probable length of the entire animal of.. 2.45

Length of the stone slab, above 0.96, below 1.00
Width “ “ “.. 0.25
Thickness “ “ “ 0.04
Thickness of the calcareous shale lamellae 0.0015 to.. 0.003

Plate I.

Dr. A. Kornhuber: *Carsosaurus Marchesettii*, a new fossil lacertilian from the Cretaceous formation of Kras near Komen

Overview of the stone slab with the animal remains at nearly half natural size.

Plate I.

This plate, executed photographically in the *Wiener k.k.* [*kaiserlich-königlichen*] *Lehr- und Versuchsanstalt für Photographie und Reproductionsverfahren*, under the direction of Professor Dr. Johann Maria Eder, furnishes a completely true-to-nature representation of the new fossil from Komen at nearly (*i.e.*, somewhat less than) half the natural size, namely at a ratio of 44:96 or 11:24, thus $1:2^{2}/_{11}$. The animal is presented lying on its back, that is, with the right side turned upward in the picture, the left downward, such that what remains of the neck follows to the right of, and of the tail, to the left of, the massive trunk that takes up the middle. The stone slab is obliquely broken in two nearly in the middle. The edges of the fracture, along which, with the exception of the lower third, where only a little of the animal resided, only insignificant parts are missing, were fit together, and the whole is embedded in a strong plaster sheet. A thick, blackened [“geschwärztes”] board, to which the halves of the slab are well fastened, the one with three strong iron *Reiber*, the other with two, serves as an underlay to protect the stone slab, crossed as it is by the aforementioned fissure; all of which is mentioned because the *Reiber* could not be removed from the plate during the taking of the photographs.

Plate II.

Dr. A. Kornhuber: *Carsosaurus Marchesettii*, a new fossil lacertilian from the Cretaceous formation of Kras near Komen

Outline of the skeleton, its individual parts labeled and numbered.

Plate II.

For the purpose of facilitating the apprehension and understanding of the anatomical details of the fossil represented in the photographic plate, an outline of the bony framework has been drafted at the same ratio as Pl. I, namely, at nearly half natural size, supplemented in certain places where this was undoubtedly possible, *e.g.*, on the tail and other places, and its parts were labeled with the initial letters of the Latin terms used in the text for the parts of the skeleton and with numerals corresponding to their position in the sequence. These are compiled here as follows:

ce_{n-2} … ce_{n}. Vertebrae cervicals, antepenultimate to ultimate cervical vertebrae.
co. a. Costae spuriae anteriores, anterior false or cervical ribs.
hp. Hypapophyses of the cervical vertebrae.
do_{1} … do_{21}. Vertebrae dorsales, dorsal or trunk vertebrae; the subscript provides the reference number of each individual vertebra.
c. Centrum or corpus vertebrae, vertebral body
tr. Processus transversi, transverse processes of the dorsal vertebrae.
sa_{1} and sa_{2}. First and second sacral vertebrae.
$tr□_{1}$ … $tr□_{2}$. Their transverse processes.
ca_{1} … ca_{12}. First through twelfth caudal or tail vertebrae.
ha_{2-11}. Haemapophyses or hypapophyses, chevrons of the second through eleventh caudal vertebrae.
$tr□□_{1-12}$. Proc. transversi, transverse processes of the first through twelfth caudal vertebrae.
co_{1} … co_{5}. Costae verae, true or thoracic ribs.
co. v. Costa vertebralis, vertebral piece or segment of the thoracic ribs.
co. i. Costa intermedia, middle piece or segment of the thoracic ribs.
co. st. Costa sternalis, breast piece or segment of the thoracic ribs.
$co_{6-21} = p_{1-16}$. Costae spuriae posteriores, posterior false ribs, first through sixteenth.
st. Sternum, breast cartilage, *s* its left posterior margin, *d* its right.
e. st. Episternum, also called the interclavicula or T-shaped bone.
x. st. Xiphosternum, sword-like process of the sternum.
cl. Clavicula, left clavicle.
sc. Scapula, shoulder-blade, *m. sc.* mesoscapula, *sut.* sutura, suture between *sc* and *cr.*
cr. Coracoid, *p. cr.* praecoracoid. *m. cr.* mesocoracoid, *cr□*, *mcr□* the bones of the same name on the right side.
f. gl. Fossa glenoidea, articular socket for the humerus, *f. gl□* that of the right side.
hu. Humerus, upper arm bone of the left side, *hu□* of the right.
tr. l. Trochanter lateralis inferior, ventrolateral trochanter on the humerus, *tr. l.□* of the right side.
ra. Radius of the left side, *ra□* of the right.
pa. ul. Patella ulnaris, sesamoid bone of the forearm extensor muscle.
cp. Carpus.
mcp. Metacarpus, middle hand.
ph. Phalanges, “toe”-bones.
ph. u. Ungual or distal phalanx.
il. ileum, left; *il□*, right.
pb. Position of the pubis (os pubis); *pb□* of the right side.
is. Position of the ischium (os ischii); *is□* of the right side.
fe. Femur, upper leg bone of the left side, *fe□* of the right.
ti. Tibia, shin bone of the left side, *ti□* of the right.
fi. Fibula, calf bone of the left side, *fi□* of the right.
pat. Patella, knee-cap of the left side.

ta.	Tarsus of the left side.
mta.	Metatarsus, metatarsals of the left side.
ph□.	Posterior phalanges or "toe"-bones of the left side.
sq. int.	Squammae integumenti, tabular scales of the skin.

[*The next five represent*] remains of the fodder, the content of the abdominal cavity:

W.	One of many vertebral columns.
Sch.	Remains of a skull.
R.	Example of numerous ribs and fragments thereof.
Fl.	Example of numerous fin-rays
Gl.	Example of limb bones.

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[1] [1,1] H. v. Meyer: *Palaeontographica*, Vol. 7, issue 4: December 1860, p. 223-231, pl. 24, figs. 1–4.

[2] [1,2] In the orthography of the place-name I follow the map of Austria by Scheda, and in its enunciation the pronunciation of the inhabitants of the area, who say "Kómen," whereas "Comén" is very often also found in the literature.

[3] [1,3] J.J. Heckel: *Beiträge zur Kenntniss der fossilen Fische Oesterreichs*. Abhandlung 1, with atlas. Vienna, 1849.

[4] [1,4] Cenni geologici sull' Istria nel: *Giornale dell' I. R. Istituto Lombardo* etc. Vol. 3, p. 35, pl. II. Milan, 1851.

[5] [1,5] On Remains of a small Lizard from the Neocomian Rocks of Comén etc. in: *The Quarterly Journal of the Geological Society of London*. Vol. 37. London, 1881, p. 52, pl. 4.

[6] [1,6] *Jahrbuch der k. k.* [*kaiserlich-königlichen*] *geologischen Reichsanstalt*, Vol. 10, 1859, Verhandlungen p. 11.

[7] [2,1] Cf. Guido Stache: Die liburnische Stufe und deren Grenz-Horizonte. Part I [„I. Abth."] Vienna 1889. *Abhandlungen der k. k.* [*kaiserlich-königlichen*] *geologischen Reichsanstalt*, Vol. 13, p. 41, 42 — On account of being overlain by the radiolarian Chalk, as mentioned in the text, the shales of Komen were mostly counted as Neocomian, even if it has not yet been possible observe their resting on *Caprotinen* Chalk. The comparative results that Bassani has published on the fish fauna of Lesinia also speak for the recent opinion of Stache *op. cit.* mentioned in the text.

[8] [2,2] This measurement refers to the upper surface of the slab, which bears the fossil. The stone slab as a whole measures 1 m. The reduction of this admeasurement in the accompanying figure, as carried out by photography, is 0.44 m, that is, at a ratio of 11:24, or somewhat less than half natural size.

[9] [3,1] The constitution of the Recent lacertilians disposes one more to the latter conclusion for, as Brühl also noted in his treatise on *Uromastix* [Uromastyx] (*Zootom. Atlas Lief*[*erung*] 14. Vienna, 1880), the last rib in all properly prepared lizard skeletons is located immediately in front of the first sacral vertebra. It may also be for this reason ["Daher mag es auch kommen"] that Cuvier ascribes no lumbar vertebrae to the monitor of Java or to the Draco in his *Ossemens fossiles*, Vol. V.2, p. 288 of the year 1825, although in contrast he ascribes to them two such vertebrae each in his *Leçons d'Anatomie comparée*, 2nd edition, 1835, Vol. I, p. 221, for which possibly the editor of the latter, namely Duméril, is accountable.

[10] [3,2] This distinguishing feature is also accepted by Cuvier (*Recherches sur les Ossemens fossiles*, 3rd edition. Paris, 1825. Vol. V Part II, p. 284: "les cinq premieres (vertèbres) ne vont pas s'unir an sternum par des cartilages, et c'est même cette circonstance que nous prenons pour caractériser les vertèbres cervicales" [*the first five (vertebrae) are not connected to the sternum by means of cartilage, and it is this very condition that we take to characterize the cervical vertebrae*]), whereas R. Owen (in Dixon's *Geology and Fossils of the Tert*[*iary*] *and Cret*[*aceous*] *formations*, 1850, p. 386 ff.) believes those vertebrae lying between the head and shoulder girdle ought to be termed cervical vertebrae and, in contrast thereto, those covered or *umfasst* (embraced) by the shoulder girdle still count as dorsal vertebrae. Because the shoulder girdle is only connected with these vertebrae via soft parts (musculature, etc.) and not directly with the skeleton—that is, because [Owen's] demarcation is not a so definite and certain one, unlike the criterion of Cuvier—it seems more appropriate to apply the latter's criterion also to lizards, even if the terminology first arose from the osteology of man and the mammals and, contrary to the opinion of Owen, could not be asserted more generally.

[11] [7,1] The aforementioned pelvic bones are interpreted here in the sense of Cuvier and later anatomists, whereas Reichert and Gorsky (*Ueber das Becken der Saurier*. Dorpat 1852) and also Fürbringer (*Die Knochen und Muskeln der Extremitäten bei den schlangenähnlichen Sauriern*. Leipzig 1870) have promulgated another interpretation. Cf. the footnote on page 85 of my paper on *Hydrosaurus lesinensis* (*Abhandlungen der geol. Reichsanstalt*. 1873. Vol. 5, No. 4, p. 85).

[12] [8,1] The measurements here have once again been taken in part from the left appendage, in part from the right, according to whether the bones were more clearly exposed on the one side or the other. Thus, for example, the left tibia is significantly encrusted, whereas on the right side this is not the case.
[13] [10,1] In the year 1874 I had the opportunity to appreciate carefully the original slab of Mesoleptos, which the then-living director of the Museo civico di Milano, Prof. E. Cornalia, very willingly made available to me.
[14] [10,2] *Abhandlungen der k.k.* [*kaiserlich-königlichen*] *geologischen Reichsanstalt,* 1873, Vol. V, Number 4, p. 75-90, Pl. XXI and XXII. At this point I may be permitted rejoin a comment made by Prof. Seeley (*op. cit.*, p. 52) on the 1st of December, 1880, and which reads:

"Prof. Kornhuber does not appear to have been quite certain as to the position of the Lesina rocks in the Cretaceous series; but while I was in Vienna, Professor Pisani mentioned to me that he had identified thirteen species of fish with Upper Neocomian species, and as fish constitute the chief fossils of the deposit, this must be held conclusive evidence of the geological age of these lizards". Indeed I was not entirely certain as to its geological age in my first notice on the saurian from Lesina at the meeting of the *geologischen Reichsanstalt* [Geological Institute] on the 17th of January, 1871, and, on account of its characteristics, so conspicuously reminiscent of recent forms, was inclined to see it as Eocene. The true and thorough expert on the geological relations of the Austrian *Küstenländer* [*coast-lands*], Dr. G. Stache, already questioned this in the aforementioned meeting, and further contemplation also led me to the conviction, exhaustively grounded in my paper of January, 1873, p. 78 (see there note 5), cited above, that the fossil from Lesina "belongs to the Secondary age, and namely must have lived in the Cretaceous period during the time of deposition of the shales of Komen", that, in other words, "the light, yellowish brown chalks of the Dalmatian islands" "belong to the Cretaceous formation and probably further must be disposed in the lower Cretaceous, the upper Neocomian."
[15] [11,1] Transactions of the Geological Society of London. Second Series. Volume VI. Part the first. London 1841, p. 412, Pl. 39, fig. 4.
[16] [11,2] These were previously demonstrated as belonging to a fish of the genus *Pachyrhizodus* Ag[gasiz].
[17] [11,3] In: *The Geology and Fossils of the Tertiary and Cretaceous Formations of Sussex* by Frederick Dixon Esq. etc. London 1850, p. 388, Pl. XXXVIII and XXXIX; also in: The Palaeontographical Society, London 1851: *Monograph of the fossil Reptilia of the Cretaceous Formations* by Prof. Owen &c., p. 22, Pl. X.
[18] [11,4] *Op. cit.*, p. 299 and 230.
[19] [11,5] Dixon's *Geology and Fossils* (see note 17 [i.e., 11,3]) 1850, p. 386, Pl. XXXVII. Figs. 18, 19, 19a and 20, and Pal. Soc. London 1851 (likewise see note 17 [i.e., 11,3]), p. 21, Pl. IX, Figs. 13, 14 and 15.
[20] [12,1] *Op. cit.*
[21] [12,2] See additionally the compilation in the appendix of the most essential dimensions of the skeleton of the new saurian from Komen. The significant relative differences are most especially conspicuous when one compares them to the dimensions of *Hydrosaurus lesinensis*, *op. cit.*. p. 87.
[22] [12,3] Cf. Cuvier. *Recherches sur les Ossemens fossiles*. Third edition. Volume V, Part II. Paris 1825, p. 288, and *Leçons d'Anatomie comparée* of Georges Cuvier, published by Duméril. 2nd edition. Volume I. Paris, 1835, p. 221.
[23] [12,4] *Op. cit.* (*Oss. foss.*) p. 291, Pl. XVII, Fig. 33.
[24] [13,1] *Ossemens foss.* p. 288 and *Leçons d'Anatomie comparée* p. 221.
[25] [13,2] *Op. cit.* (*Ossemens foss.*) p. 284, where instead of "dix-sept sont de fausses côtes" it is probably supposed to read dix-neuf.
[26] [13,3] *Op. cit.* (*Oss. foss.*) p. 288 and 284: "The complete absence of lumbar vertebrae appears to me a general rule in this family of lizards." Cf., in contrast, *Leçons* p. 221, to which I earlier called attention in the treatment of the vertebral column in note 1 on page 3 [i.e., *endnote 9*] of this paper.
[27] [13,4] *Op. cit.* p. 293. Pl. XVII Fig. 34.
[28] To the ancients Kras went by the name *Carusavius*, which was transformed in Italian into the shorter expression *Carso*. For the naming, as executed in the text, euphony and succinctness were controlling factors and are to be found in the term *Carsosaurus*, compared with *Carusaviosaurus*.