SCIENTIFIC INTELLIGENCE.

I. Miscellaneous Scientific Intelligence.

1. *Natural Science: A monthly review of Scientific Progress.* Each no. 80 pp. 8vo. (Macmillan & Co., London and New York; 14s., post free.)—The first number of this new monthly appeared on the 1st of March. The four numbers thus far issued show that it is to be a Journal of great value to all interested in the progress of natural science. Its contributors are men of high scientific standing. The June number contains papers by P. L. Sclater on the Antelopes of Somali-Land, with figures; R. Lydekker on Recent Researches in Fossil Birds; A. Yaughan Jennings, on the Cave Men of Mentone, giving the results of recent researches and a plate; G. H. Carpenter, Facts and theories in the development of Insects; and others by Prof. Teall, Prof. C. Loyd Morgan, besides various shorter notices of recent discoveries.

2. *Catalogue of Scientific Papers* (1874–1883).—Completed by the Royal Society of London, vol. ix, 1016 pp. London, 1891. —This large volume is the first of the three which will form the third series of the Royal Society's Catalogue of Scientific Papers, embracing titles of papers published or read during the decade, 1874–1883. The titles are arranged under the names of the authors and are given with great thoroughness and accuracy; this first volume contains the names from Abadie to Gissler. The work, like its predecessors, is invaluable to all concerned with the literature of science.

3. *Experiments with alternate currents of high potential and high frequency, by Nikola Tesla.* A Lecture delivered before the Institution of Electrical Engineers, London. With a portrait and biographical sketch of the author. 146 pp. 12mo. New York, 1892 (The W. J. Johnston Company).—Mr. Tesla's lectures delivered, in February last, before the Institution of Electrical Engineers in London have been republished in book form from the pages of the Electrical World. The author's name is already identified with some very important advances in connection with dynamos giving alternating currents. These lectures give the results of his experiments with very rapidly alternating currents of high potential, obtained from an induction coil operated either by the extremely rapid oscillations of a disruptive discharge from a condenser, or, in other cases, by a specially constructed alternator, giving many thousand reversals per second. The luminous phenomena obtained are not only novel and highly interesting, but very suggestive as to a possibly more efficient means of illumination than that now in use. The volume is well illustrated and serves to bring the substance of these remarkable lectures before a much larger audience than that which had the privilege of hearing them delivered.

APPENDIX.

Art. XXIV.—*Notes on Mesozoic Vertebrate Fossils;* by O. C. Marsh. (With Plates II–V.)

The extensive collections of vertebrate fossils from the Laramie now under investigation by the writer contain, besides those already described, many specimens of much interest, and some of these are briefly noticed and figured in the present article. The *Dinosauria* of this formation are of special importance, particularly in their relations to allied forms in the Jurassic, and hence some of the latter, also, are figured for comparison.

Claosaurus, Marsh, 1890.

Next in importance to the *Ceratopsidæ* of the Laramie are the Dinosaurs allied to *Hadrosaurus*, and, as but little is really known of the skeleton in this group, some of the important parts are here described, and figured in Plates II and III. These are mainly from a single specimen which is in remarkable preservation; but the remains of a second individual, likewise in good condition, and in some respects more perfect, have also been used in the investigation. The species is *Claosaurus annectens*, already briefly described by the writer.*

The skull will be described in a later communication. The number of vertebræ between the skull and sacrum is thirty, and all were found in position. There are nine vertebræ in the sacrum, thoroughly coössified with each other. The anterior forty-five vertebræ of the tail were found in position, and in good preservation.

* This Journal, vol. xliii, p. 453, May, 1892.

The fore limbs are unusually small in comparison with the posterior, and the relative size of the two is shown on Plate II. The scapular arch presents many points of interest. The scapula is large, and so much curved that the axis of its shaft is nearly parallel to the articular faces of its lower extremity, (Plate II, figure 1, *s*). On the anterior margin, above the articulation for the coracoid, is a strong protuberance, with a well-defined facet, adapted to the support of the clavicle, if such a bone were present. The coracoid is very small, and is perforated by a large foramen (Plate II, figure 1, *c*). The two peculiar bones now generally regarded as belonging to the sternum were separate, as shown in Plate III, figure 1.

The humerus is comparatively short, and has a prominent radial crest. The radius and ulna are much elongated, the latter being longer than the humerus, and the radius about the same length. The ulna has a prominent olecranon process, and is a stouter bone than the radius. The carpal bones were quite short, and appear to have been only imperfectly ossified. The fore foot, or manus, was very long, and contained three functional digits only. The first digit was rudimentary, the second and third were nearly equal in length, the fourth was shorter and less developed, and the fifth entirely wanting, as shown in Plate II, figure 1.

In the functional digits (II, III, IV), the phalanges are elongate, thus materially lengthening the fore foot. The terminal phalanges of these digits are broad and flat, showing that they were covered with hoofs, and not with claws. The limb as a whole was thus adapted to locomotion or support, and not at all for prehension, although this might have been expected from its small size and position.

The elongation of the fore-arm and manus is a peculiar feature, especially when taken in connection with the ungulate phalanges. It may, perhaps, be explained by supposing that the animal gradually assumed a more erect position until it became essentially a biped, while the fore limbs retained in a measure their primitive function, and did not become prehensile, which was the case in some allied forms.

The pelvis is shown in Plate II, figures 2 and 3, and has already been described by the writer. Its most notable features are seen in the pubis and ischium, the former having a very large expanded prepubis, with the postpubis rudimentary, while the shaft of the ischium is greatly elongated.

The femur is long, and the shaft nearly straight. The great trochanter is well developed, while the third trochanter is large and near the middle of the shaft, as shown in Plate II, figure 2. The external condyle of the distal end is projected well backward, indicating great freedom of motion at the knee.

The tibia is shorter than the femur, and has a prominent cnemial crest. The distal end is much flattened, and the astragalus is closely adapted to it. The fibula is very straight, with its lower end flattened and closely applied to the front of the tibia. The calcaneum is large, with its concave upper surface closely fitted to the end of the fibula. Of the second row of tarsals, only a single one appears to be ossified, and that is very small and thin, and placed between the calcaneum and the fourth metatarsal, nearly or quite out of sight.

The hind foot, or pes, had but three digits, the second, third, and fourth, all well developed and massive. The terminal phalanges were covered with broad hoofs. The first and fifth digits were entirely wanting.

A comparison of the limbs and feet of *Claosaurus*, as here described and figured, with those of three allied forms from the Jurassic, *Stegosaurus*, *Laosaurus*, and *Camptosaurus*, as shown on Plates IV and V, is especially instructive. These three genera have already been quite fully described and figured by the writer, but new points of interest have been made out by the recent investigation of more perfect material. The present figures will show more accurately some of the mutual relations of these early herbivorous Dinosaurs to each other, as well as to their successors in Cretaceous time. The gradual changes that can be traced from one to the other will be discussed in a later communication.

Palæoscincus, Leidy, 1856.

A new reptilian genus and species, *Palæoscincus costatus*, was proposed by Dr. Leidy in 1856 for a single tooth found by Dr. Hayden in the Judith Basin. This tooth was more fully described and figured by Leidy in 1859.* The specimen showed well-marked characters, and many similar teeth have since been found, both in the Judith Basin and in various other localities of the Laramie.

A smaller species, apparently of the same genus, is not uncommon in the Ceratops beds of Wyoming, and a characteristic tooth is shown on Plate III, figure 3. This may be taken as the type specimen, and the species it represents may be called *Palæoscincus latus*. The crown of the tooth in this species is broader and the apex more pointed than in the first species described, and this is clearly shown in comparing the present figures on Plate III with those given by Leidy.

* Proc. Acad. Nat. Sci. Philadelphia, p. 72, 1856; and Trans. Amer. Phil. Soc., p. 146, pl. ix, figs. 49–52, 1859.

The tooth from the Laramie described by Cope in 1882 as a mammalian premolar and as the type of the generic name *Meniscoëssus* evidently belongs to the above or an allied genus, and all three are unquestionably the teeth of Dinosaurian reptiles pertaining to the order *Stegosauria*. On Plate IV, figure 1, a very small but typical tooth of *Stegosaurus* from the Jurassic is represented. The allied genus *Diracodon*, also Jurassic, has similar teeth.

Aublysodon, Leidy, 1868.

In the same publications above cited, Dr. Leidy also described and figured, under the name *Deinodon*, a number of teeth which he regarded as pertaining to carnivorous Dinosaurs, but later, in 1868, he made a new genus, *Aublysodon*, for some of these teeth which differed materially in form from those known to belong to such Dinosaurs.* The teeth regarded by Leidy as characteristic of *Aublysodon* are represented in figures 35–45, Plate IX, of the Transactions above quoted, and the best preserved tooth of this series, which Leidy suspected to be an incisor, is shown in figures 41–45. The latter figures are carefully reproduced on Plate III, figure 4, of the present article, and two other similar teeth are represented on the same plate. They all have the same characteristic chisel-shaped crowns, covered with a thin coat of enamel, and show indications of wear.

The teeth referred by Leidy to the genus *Aublysodon* and many others of the same general character since discovered may be divided into the four following groups, all the specimens of which appear to be somewhat curved either to the right or left:

(1) Large teeth (Leidy's figures 37–40) having both edges crenulated, and the posterior ridge between them broad. The wear of the apex is apparently posterior.

(2) Somewhat smaller teeth, but still large, one of which is represented in Plate III, figure 5. Faint crenulations may be detected on the edges. The wear of the apex is on front and back, and also on the side, probably the outside. The posterior central ridge is narrow. This tooth represents a distinct species which may be called *Aublysodon amplus*.

(3) Smaller teeth with no crenulations, and the posterior ridge with a groove (Leidy's figures 41–45). The wear of the apex is in front. These may be regarded as typical of *Aublysodon mirandus*, Leidy.

(4) The most abundant teeth are much smaller, with no crenulations, and the posterior ridge sharp and not grooved.

* Proc. Acad. Nat. Sci. Philadelphia, p. 198, 1868.

The wear is in front of the apex, and on one side, sometimes on both sides, as in figure 6, Plate III. This tooth may be taken as the type of a new species, *Aublysodon cristatus*.

The fact that these peculiar teeth are apparently in pairs, and are in themselves more like the teeth of mammals than of reptiles, has long been considered by the writer an argument for the mammalian character of the smaller forms at least. The large crenulated teeth described by Leidy strongly resemble those of carnivorous Dinosaurs, as he considered them, but no Dinosaur teeth of this form have been found in position in the jaws. The next smaller size, with very faint crenulations, one of which is figured in Plate III, figure 5, is too large for any mammal yet known from the Laramie, and this is true, also, of those figured by Leidy.

Many of the smaller teeth of this type, if considered apart from the others, would naturally be regarded as mammalian incisors, especially from the lower jaw, and the wear of the summits would in itself tend to strengthen this reference, if some of these teeth alone were considered. A number have been found, however, that show wear not only on the summit and on one side near the summit, but also on the other edge. This would imply, if these teeth are really lower incisors, either that the rami of the lower jaw were so loosely united at the symphysis that motion between them was possible, so that the incisors could thus rub against each other, or that these teeth were separated so as to admit the upper opposing teeth between them.

That some of these teeth are mammalian incisors there can be but little doubt, and this doubt can only be removed entirely by the fortunate discovery of a tooth in position in the jaw.

Cimolopteryx, Marsh, 1889.

The only bird hitherto known from the Laramie deposits is *Cimolopteryx rarus*, the type specimen of which is represented on Plate III, figure 2. Another species, about twice the size of the first, is indicated by various remains, among them the coracoid. This bone lacks the strong inner process near the pit for the scapula, which is characteristic of the smaller form. The present species, which may be called *Cimolopteryx retusus*, is also from Wyoming.

The new Laramie fossils here described and figured were collected by Mr. J. B. Hatcher and party, in the Ceratops beds of Montana and Wyoming. They will all be discussed more fully in another communication.

New Haven, Conn., July 18, 1892.

Explanation of Plates.

Plate II.

Figure 1.—Left fore leg of *Claosaurus annectens*, Marsh; outside view. *c*, coracoid; *h*, humerus; *r*, radius; *s*, scapula; *u*, ulna; I. first digit; IV. fourth digit.

Figure 2.—Left hind leg of the same individual; outside view. *a*, astragalus; *c*, calcaneum; *f*, femur; *f'*, fibula; *il*, ilium; *is*, ischium; *p*, pubis; *p'*, postpubis; *t*, tibia. Figures 1 and 2 are one-twentieth natural size.

Figure 3.—Pelvis of the same individual; seen from the left. One-sixteenth natural size. *a*, acetabulum; other letters as in figure 2.

Plate III.

Figure 1.—Sternal bone of *Claosaurus annectens*. One-eighth natural size. *a*, seen from above; *b*, seen from below.

Figure 2.—Left coracoid of *Cimolopteryx rarus*, Marsh. Natural size. *a*, front view; *b*, inner view; *c*, back view; *d*, lower end.

Figure 3.—Tooth of *Palæoscincus latus*, Marsh. *a*, natural size; *b*, *c*, *d*, twice natural size.

Figure 4.—Tooth of *Aublysodon mirandus*, Leidy. Natural size. *a*, front view, with sections; *b*, side view. (After Leidy.)

Figure 5.—Tooth of *Aublysodon amplus*, Marsh. Natural size. *a*, side view; *b*, back view; *c*, front view.

Figure 6.—Tooth of *Aublysodon cristatus*, Marsh. Twice natural size. *a*, side view; *b*, back view; *c*, front view.

Plate IV.

Figure 1.—Tooth of *Stegosaurus ungulatus*, Marsh. *a*, natural size; *b*, *c*, *d*, twice natural size.

Figure 2.—Left fore leg of the same species.

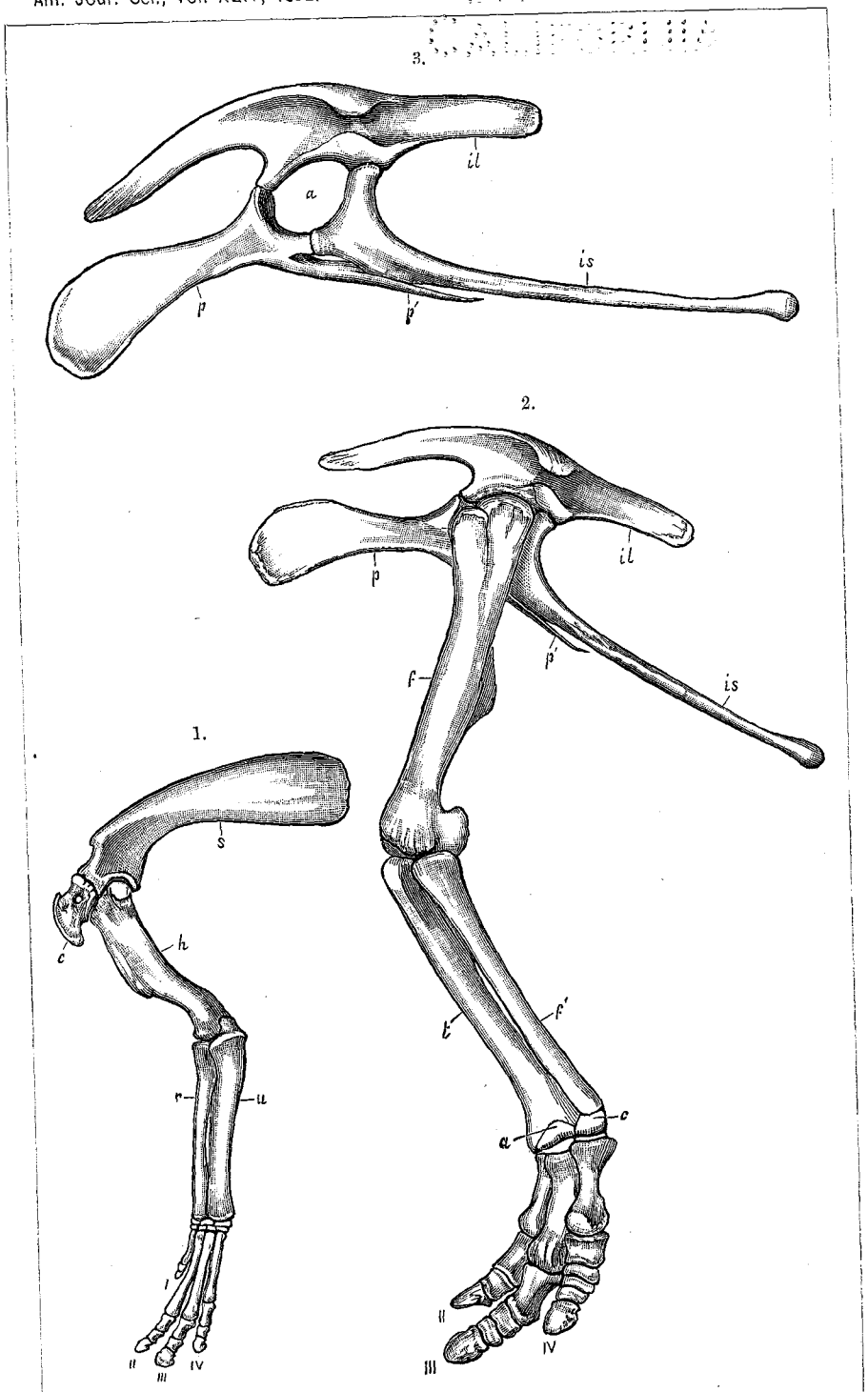
Figure 3.—Left hind leg of the same species. Figures 2 and 3 are one-sixteenth natural size. Letters as in Plate II.

Plate V.

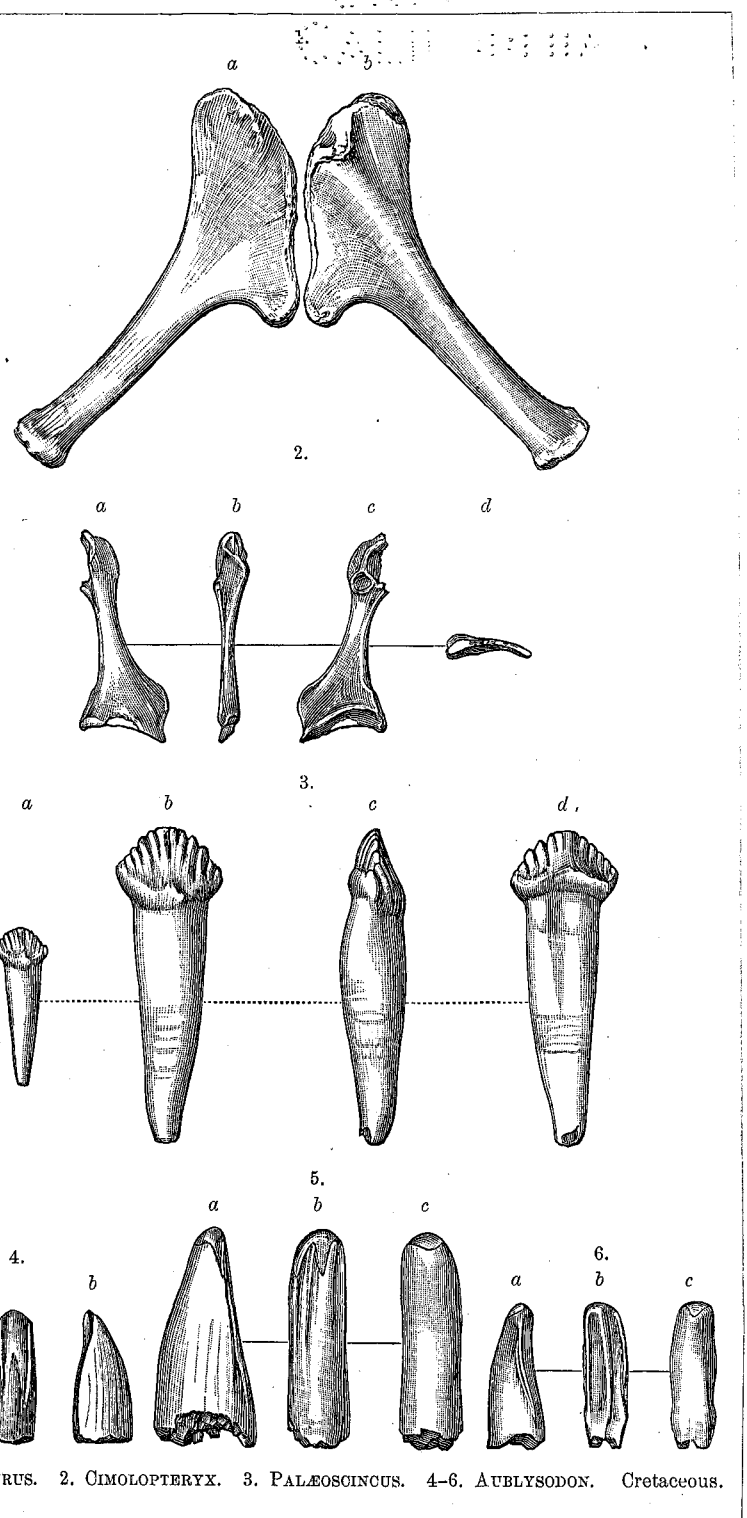
Figure 1.—Left hind leg of *Laosaurus altus*, Marsh; outside view. One-eighth natural size.

Figure 2.—Left hind leg of *Camptosaurus dispar*, Marsh; outside view. One-twelfth natural size.

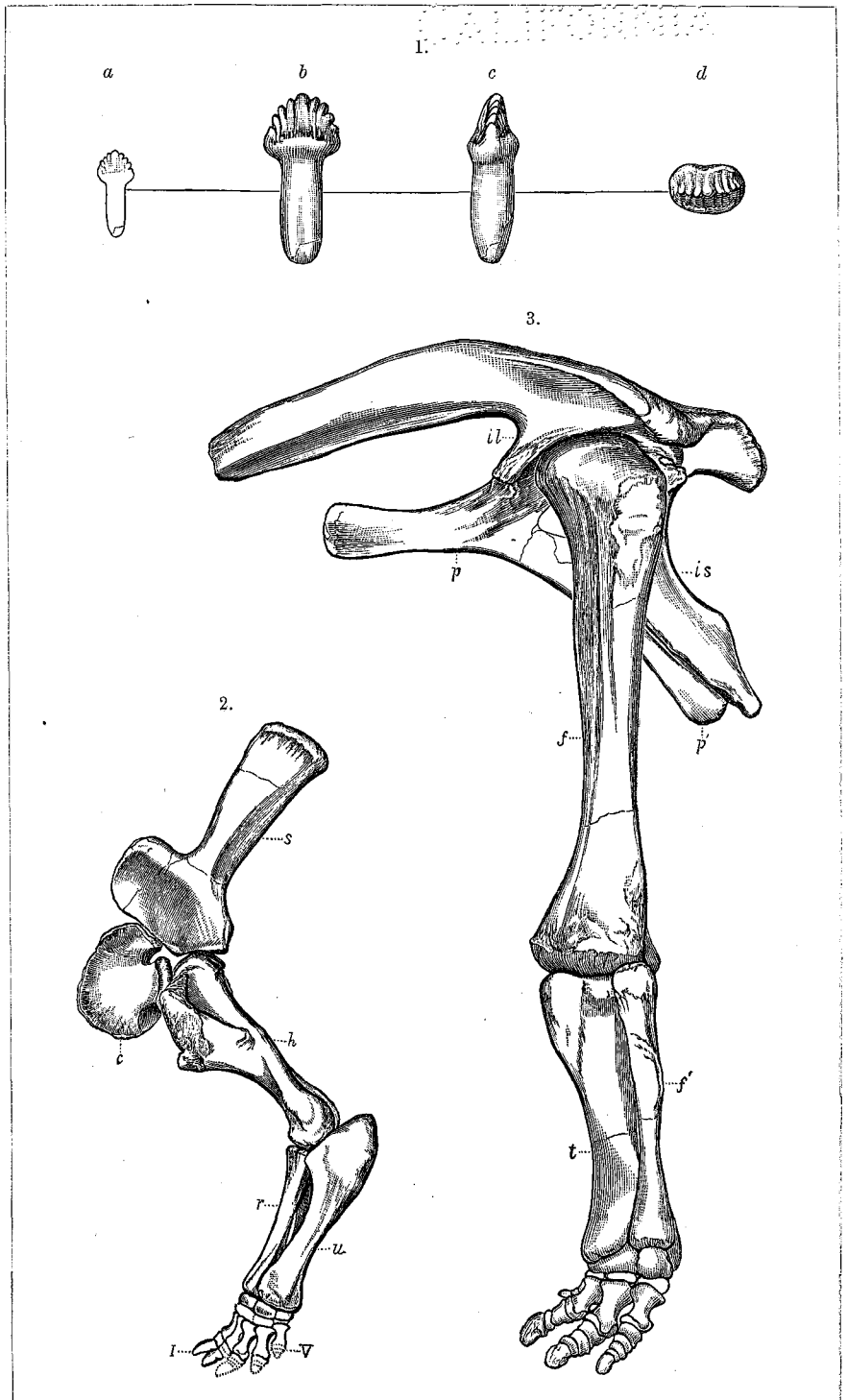
Figure 3.—Pelvis of the same individual; seen from the left. One-twelfth natural size. Letters as in the preceding plates.



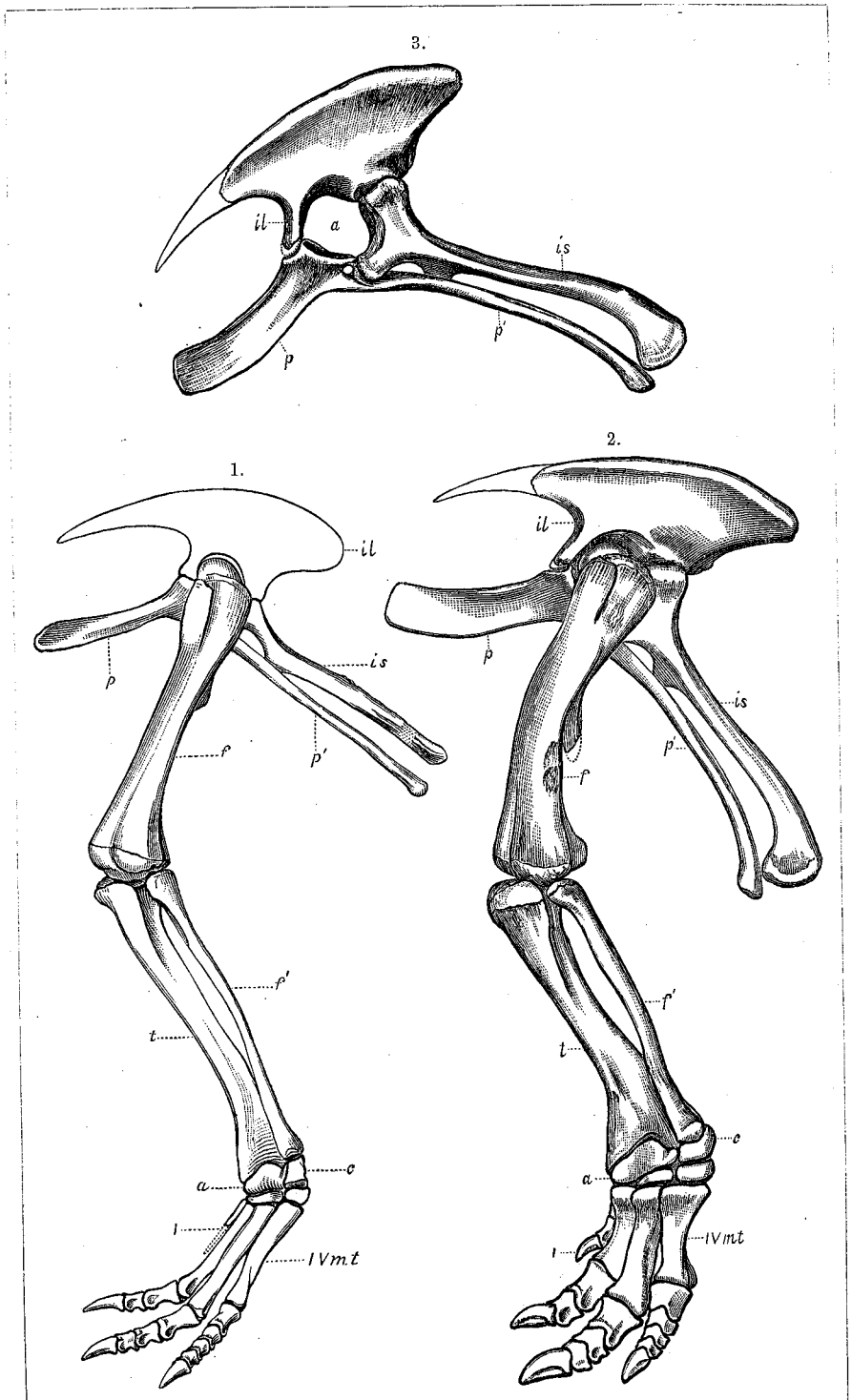
Claosaurus annectens, Marsh. Cretaceous.



1. Claosaurus. 2. Cimolopteryx. 3. Palæoscincus. 4–6. Aublysodon. Cretaceous.



STEGOSAURUS UNGULATUS, Marsh. Jurassic.



1. LAOSAURUS. 2 and 3. CAMPTOSAURUS. Jurassic.