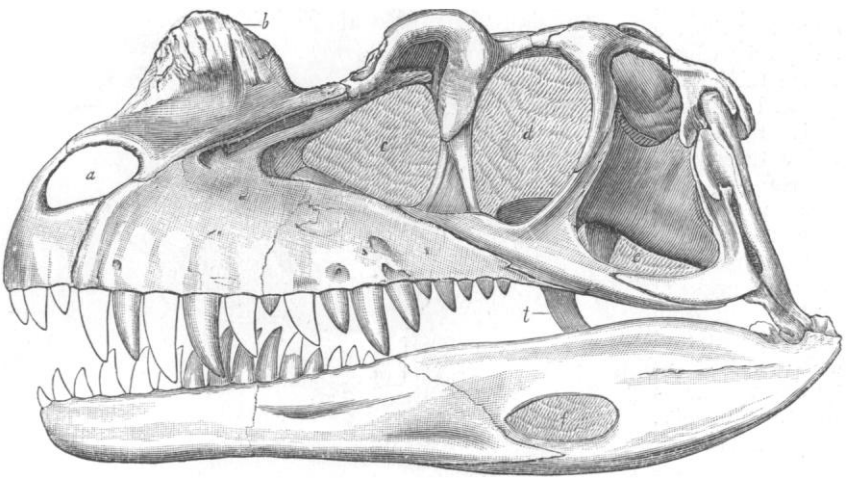
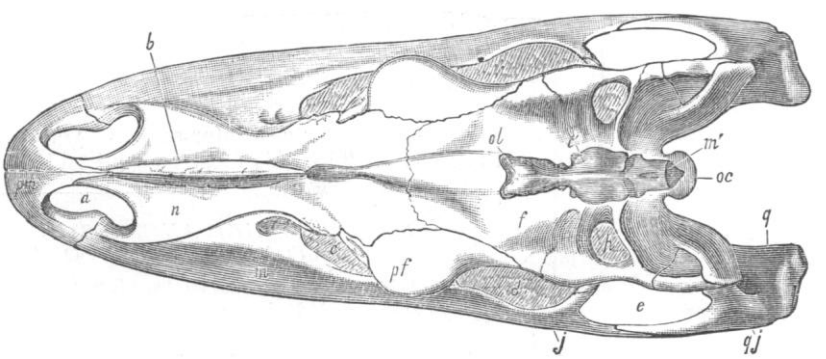
The skull was broken in the exhumation, but is nearly perfect; and, when found, a large flint chip was found resting against the top of the head, as shown in fig. 1, and two others resting like epaulets against the shoulders. The length of the skull, from the back of the head to the forehead, was eighteen centimetres, and from the back of the head to the projecting eyebrows, nineteen centimetres and a half: the breadth was fourteen centimetres. One femur was saved from loss, and measured forty-nine centimetres in length.



Skull of Ceratosaurus nasicornis Marsh; side view.



Skull of Ceratosaurus nasicornis Marsh; top view. *a*, nasal opening; *b*, horn-core; *c*, antorbital opening; *c'* cerebral hemispheres; *d*, orbit; *e*, lower temporal fossa; *f*, frontal bone; *h*, supra-temporal fossa; *j*, jugal bone; *m*, maxillary bone; *m'*, medulla; *n*, nasal bone; *oc*, occipital condyle; *ol*, olfactory lobes; *pf*, pre-frontal bone; *pm*, pre-maxillary bone; *q*, quadrate bone; *qj*, quadrato-jugal bone.

NEW JURASSIC DINOSAURS.

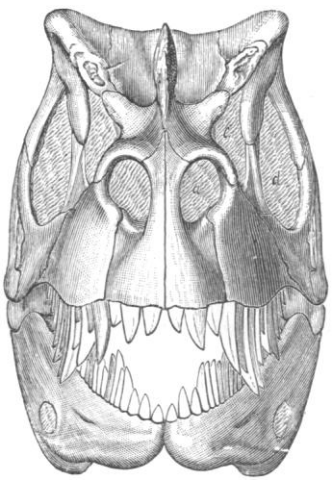
IN the *American journal of science* for April, Professor Marsh has given the principal characters of the Theropoda, a carnivorous order of dinosaurs, illustrated by numerous figures, several of which are here repeated.

Although much has been written about these reptiles since Buckland described Megalosaurus, in 1824, but little has been made out in regard to the structure of the skull, and many portions of the skeleton still remained to be determined.

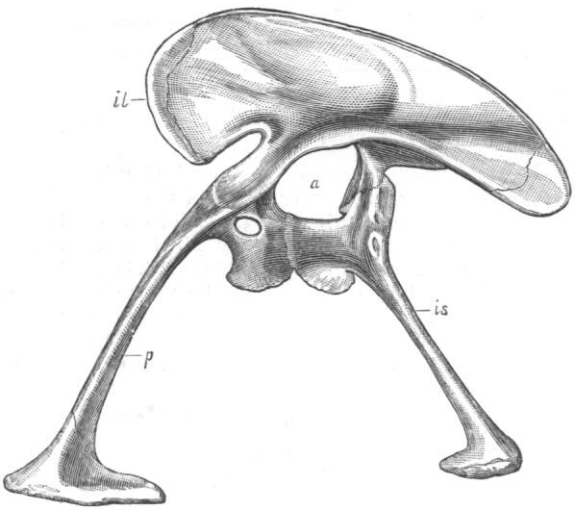
Of the carnivorous dinosaurs from the American Jurassic, there are apparently four distinct families, one of which is represented by Ceratosaurus, a new form here described. The nearly perfect skeleton of Ceratosaurus presents several characters not hitherto seen in the Dinosauria. One of them is a large horn on the skull; another is a new type of vertebra; and a third is seen in the pelvis, which has the bones all co-ossified, as in all known birds except Archaeopteryx. Another feature, not before known in carnivorous dinosaurs, is the presence of osseous dermal plates, extending from the skull over the vertebrae. This skeleton is over seventeen feet in length.

The skull of Ceratosaurus is very large in proportion to the rest of the skeleton. The posterior region is elevated, and moderately expanded transversely.

The facial portion is elongate, tapering gradually to the muzzle. Seen from above, the skull in outline is like that of a crocodile; seen from the side, it appears lacertilian in type, the general structure being light and open. The nasal bones support a large, compressed, elevated horn-core on the median line. It evidently supported a high trenchant horn, which must have formed a powerful weapon for offence and defence. The maxillary bones are large and massive, as are also the lower jaws. They are each provided with numerous teeth, which are large, powerful, and trenchant, indicating clearly the ferocious character of the animal when alive. There are, moreover, large protuberances partially overlying the orbits, which they doubtless served to protect. The brain was of medium size, but comparatively much larger than in the herbivorous dinosaurs: it was quite elongate, and situated obliquely in the skull. The foramen magnum is small. The cerebellum was of moderate size. The optic lobes were well developed, and proportionally larger than the hemispheres. The olfactory lobes were large and expanded. The pituitary body appears to have been large.



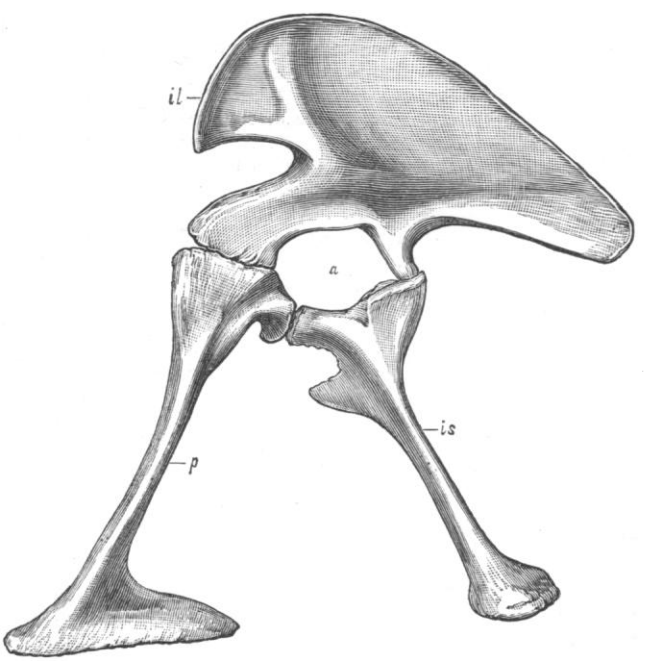
Skull of Ceratosaurus nasicornis Marsh; front view.



Pelvis of Ceratosaurus nasicornis Marsh; side view, seen from the left. *a*, acetabulum; *il*, ilium; *is*, ischium; *p*, pubis. One-twelfth natural size.

The cervical vertebrae differ in type from those of any other known reptiles, being deeply concave behind, but flattened in front, leaving only a narrow margin for articulation.

The bones of the pelvis, except the sacrum, are all thoroughly co-ossified. The pelvis is extremely narrow, being in striking contrast to the width in this region in the herbivorous forms found with them. Some facts seem to indicate that they were viviparous. The pubes were long, and firmly united for the greater part of their length, terminating below in a large, massive, foot-like body, which probably served to support the animal when sitting down.



Pelvis of Allosaurus fragilis Marsh; side view, seen from the left. *a*, acetabulum; *il*, ilium; *is*, ischium; *p*, pubis.

Restorations of the fore and hind legs of Allosaurus are given. They are remarkable for the great disparity in size. A new classification of the order Theropoda is also proposed, including the European as well as the American forms.

THE ASTRONOMICAL LABORS OF MR. COMMON.

In his address before the Royal astronomical society in February last, on the presentation of the gold medal to Mr. Common for his photographs of celestial bodies, the president of the society, Mr. Stone, remarked that the council, in making the award, had been less influenced by originality in the methods adopted than by the great practical success which has attended his efforts in this field of astronomical research. It will be of interest to note a few points, relating to the labors of Mr. Common, which have contributed more or less directly to the importance of his results.

He began celestial photography about ten years ago, with a small refractor of five and a half inches aperture. In 1877 he supplied himself with an eighteen-inch mirror by Calver, the mounting for which was designed by himself, and executed under his direct personal superintendence. In a paper presented to the Royal astronomical society in 1879, he laid down certain assumedly proper conditions to be fulfilled in the mounting of large reflectors, according to which he was proceeding with the construction of an exceedingly powerful telescope, and among which were the following:—

1°. No tube properly so-called. 2°. No mass of metal either below or at the side of the line joining the large and small mirrors. 3°. An equatorial mounting capable of direction to any part of the visible heavens, and of continued observation past the meridian without reversal. 4°. An efficient means of supporting the mirror without flexure. 5°. Driving-clock, circles to find or identify an object, and motions taken to eye-end. 6°. A collimator for the ready adjustment of the mirrors. 7°. Such a construction of mounting as to give the greatest amount of steadiness with the least amount of friction. 8°. An efficient means of resilvering the mirrors and of protecting them from dew. 9°. A safe, steady, and easily adjusted platform for the observer, allowing about two hours continuous observation without the necessity of any motion except that from the observer's place, and of easy access.

In designing a mounting to satisfy these conditions, Mr. Common made such departures from the old form of mounting and platform, that an account of it was deemed worthy of a place in the Memoirs of the Royal astronomical society, where may be found (vol. xlvi. p. 173) a description of his instrument, together with fully detailed drawings suited not only for his, but also for a much larger telescope. In the actual construction of the thirty-six inch reflector, the cost was kept down as much as possible without sacrificing any essential points, all elaborate mechanical arrangements coming under the head of mere luxuries being avoided. Both the telescope and its house were so contrived as to be completely under the management of one person.

The difficulties which Mr. Common surmounted in the construction of his telescope were of the most discouraging nature, — in fact, unique. Just as the great speculum — a lump of glass of about thirty-eight inches diameter, and seven inches thickness — was ready to receive its final figure in the hands of the optician, it burst into a thousand pieces with a terrific explosion. Within a few hours time, Mr. Common had telegraphed to the glass-makers in Paris for two more disks of like dimensions, the extra one to be brought into service in case of another explosion. The second disk, however, was successfully ground, polished, and mounted ready for work, about the middle of 1879, and it is with this instrument that Mr. Common has carried on his unequalled researches. In some respects it is proper to call it the most powerful telescope in existence, although the great refractor of thirty inches aperture, now being mounted near St. Petersburg, may be expected to surpass it.

A description of Mr. Common's novel plan for silvering large mirrors may be found in vol. xlii. of the *Monthly notices* of the Royal astronomical society, at p. 79.

Of the mounting of Mr. Common's reflector, Mr. Stone remarks, that it shows in every direction great engineering-skill, guided by the experience, gained in the use of the smaller instruments, of the actual requirements for successful astronomical work. The method of relieving the friction of the polar or main axis of the instrument deserves especial attention, and is fully dealt with in his memoir. Mr. Common alluded, in this publication, to the fact that this principle is equally applicable to other astronomical instruments of large dimensions; and at the meeting of the Royal astronomical society, March, 1884, he presented plans for a large transit circle in which mercury-troughs are used to sustain the weight of the tube when in certain positions. By these means he believes that flexure may be practically eliminated.

Early in 1880 Mr. Common attempted to photograph the great nebula of Orion; the result being a failure, as the stars appeared on the plate as lines, and the nebula had impressed itself only as a faint stain. But such failures only suggested the necessity of improved clock-driving, and the use of more sensitive plates. In June, 1881, Mr. Common obtained a successful photograph of comet (*b*) of that year; and, in March of the year following, a photograph of the nebula of Orion, which excited the admiration of all the astronomers who had an opportunity of inspecting it. He continued, however, to push the refinements of his photographic and instrumental equipment to a farther limit, and obtained on the 30th of January, 1883, a photograph of the nebula, with an exposure of thirty-seven minutes, a carbon enlargement from the negative of which was presented to the Royal astronomical society in the March following. This photograph showed a marked advance on