in fact, does not resemble that of its modern relative. The *parietals* are narrow and compressed; the *frontals* expand into a broad well-rounded snout. We cannot ascertain from our specimens whether the nasals bore protuberances for the support of horns. It seems probable that they did not.

This animal will be fully described and figured in a later publication. The above is intended merely as a preliminary notice. *Orthocynodon* may be briefly described as an Eocene perissodactyle Ungulate with the premolar-molar dentition of a rhinoceros, and somewhat resembling *Amynodon* in the possession of canines and loss of the median incisors. It has little of the rhinocerotic character in the skull; but the resemblances in the dentition point it out as related to *Amynodon*, with which it belongs, among the group of Eocene progenitors of the Rhinocerotidæ.

Measurements.

	m.
Total length of molar series of the lower jaw.....	·192
Antero-posterior diameter of the first lower molar ..	·038
Transverse diameter of the first lower molar	·022
Vertical diameter of the crown of the canine.....	·040
Transverse diameter of the first upper molar.....	·035
Antero-posterior diameter of the first upper molar ..	·035
Total length of the upper molars, estimated	·165

Amer. Journ. Sci., Sept. 1882, p. 223.

On the Structure of the Head of Archæopteryx. By W. Dames.

In the examination of the *Archæopteryx* in the possession of the Berlin Royal Mineralogical Museum, the results of which will be published in detail with figures, the matrix previously concealing some parts of the skeleton has been removed; and this has given a clear insight into the structure of the head.

When the specimen was obtained for the Museum, two large apertures were seen on the exposed right side of the skull; the hinder one, situated beneath the roof of the skull, was easily recognized as the orbit, especially as it contained a well-preserved bony sclerotic ring, consisting of separate plates lying one over the other, as in so many living birds. The anterior margin of this orbit is formed by a narrow bone, which is turned a little backward and extends down to the base of the skull. This bone (the lacrymal) at the same time forms the posterior boundary of a second, large, rounded triangular aperture, in the middle of which there is a crushed piece of bone separated from its natural connexions with the other parts of the skull. This aperture has been interpreted as the nasal aperture by authors, as by C. Vogt* and O. C. Marsh†. It appears, however, that the anterior part of the skull was still concealed by matrix; and it was only by very careful removal of the latter that the contours of the skull were completely exposed. This gave the important result that in front of the supposed nasal aperture there is a third aperture, placed obliquely to the longitudinal

* Rev. Scient. 2e sér. xvii. 1879, p. 242.

† British Association Report, York Meeting, 1881.

axis of the skull, of an acutely elliptical form and 9 millim. long. Posteriorly it is separated from the middle aperture by a narrow bridge of bone; above and in front it is bounded by a very narrow bone (part of the intermaxillary), and it does not reach the apex of the skull; in front of it there lies an equilaterally triangular piece of bone about 4 millim. long, which forms the tip of the beak. This aperture is to be regarded as the nostril; it is entirely enclosed by the intermaxillary. Its discovery renders the resemblance to existing birds much closer than was previously supposed. As in the bird, there are three apertures on the side of the skull:—a posterior, the orbit; a middle one, enclosed by the lacrymal behind and by the maxillary and intermaxillary in front and below; and an anterior one, the nostril, entirely in the intermaxillary.

This analogy with the skull of existing birds also essentially facilitates the study of the other parts of the skull. Thus the bony piece in the middle aperture will have to be regarded as the inner ascending part of the maxillary, and a long bone running to the base of the skull and partially concealed by the sclerotic ring as part of the vomer. The quadrate bone is also distinctly visible, although its exact form is not recognizable; and close in front of it there is a small bone, not projecting much from the matrix, which from its position may be the pterygoid. Of the roof of the skull scarcely any thing more than fragments of the frontals is preserved; the brain-cavity is filled with calc-spar. The occiput is deficient.

Results relating to the dentition were also obtained by the removal of the matrix. Two small denticles, situated under the middle opening, were previously visible. Afterwards ten teeth became distinctly recognizable, standing in the margin of the jaw. The foremost of these is at about 2 millim. from the tip of the beak; but there are indications that one or two teeth existed in front of this, so that the dentition reached quite to the apex. The teeth are about 1 millim. long, sugarloaf-shaped, very acute, and apparently smooth and shining, without any vertical furrows or striæ. The individual teeth are separated by intervals of scarcely 1 millim. Marsh (*loc. cit.*) assumed that the teeth were only in the intermaxillary, as the last one was still below the nostril; but now that it is proved that the aperture hitherto regarded as the nostril is really the middle one of three apertures in the side of the skull, it seems rather that the dentition was not confined to the intermaxillary, but extended to the maxillary, at least its anterior part. Marsh has also expressed the opinion that the teeth stood in a groove; from the recent examination it would rather appear that each tooth stands in a separate alveolus.

The lower jaw is retained in its natural position, *i. e.* articulated with the quadrate bone, and with its upper margin closely applied to the skull. It shows a postarticular process directed backward, such as occurs, for example, in the genus *Anser*. From the position of the lower jaw it cannot be seen whether it contains any teeth; but this appears probable. Below the lower jaw there is a part of an acicular hyoid bone, similar to those of existing birds.

The clearing of the shoulder-girdle, which is not yet completed,

shows nevertheless that the part interpreted by Vogt (*l. c.* p. 242, fig. 18) as a coracoid is really a portion of the matrix, so that the structure of the shoulder-girdle, so far as it is preserved, can only be ascertained after this has been removed. All the inferences drawn from this part as to the relations of *Archæopteryx* to Birds and Reptiles therefore fall to the ground.—*Sitzungsb. Akad. Wiss. Berlin*, July 27, 1882, p. 817.

On the Innervation of the Mantle of some Lamellibranchiate Mollusca. By M. L. Vialleton.

The author has investigated the distribution and termination of the nerves in the part of the mantle lining the interior of the shell within the pallial line and the adductor muscles in the genera *Unio* and *Anodonta*. The process adopted was as follows :—The mantle, detached from its adherences in the living animal, was placed for fifteen minutes in lemon-juice, then in a 1-per-cent. solution of chloride of gold, where it was left for at least twenty minutes. It was then put into water acidulated with acetic acid (one drop to 20 gr.), when the reduction is effected in from twenty-four to thirty-six hours. Fragments of the mantle carefully torn can then be examined; or transverse sections can be made of it after hardening.

The portion of the mantle within the pallial line is formed by a lamina of connective tissue, rich in vessels and nerves, and covered on both surfaces with an epithelium of one layer of cells. Transverse sections show that the nerves are not equally distributed in the connective lamina, but more especially in two planes near its two surfaces; some are even placed immediately below the line of implantation of the epithelial cells. In a fragment containing one of these planes examined flat, the fibres are seen sometimes to fork or anastomose in the form of the letter Y, sometimes to cross at the same point, and their elementary fibrillæ form a tangle in which more or less complicated chiasmata are distinguished.

The fibres thus constitute an irregular network, with nodal points of very variable form. The arrangement occurs on both surfaces of the mantle; but the two planes communicate by fibres situated in the thickness of the connective lamina, and really form only a single plexus.

Each superficial plexus gives off finer fibres, which either originate directly from the large nerves of the plexus or, after the exhaustion of the latter, by repeated ramifications. These fibres finally divide into unifibrillar elements, which unite and anastomose in a thousand ways to form a plexus with very close meshes. It is *subepithelial*, for it persists when the epithelium is removed, but is more superficial than the one from which it originates.

Thus in the mantle of *Unio* and *Anodonta* the nerves form a plexus perfectly analogous to that seated in the connective tissue of the cornea beneath Bowman's lamina. It forms a very delicate nervous apparatus, which, being closely applied to the interior of the shell, may receive any shocks communicated to the latter, and transmit the impression of them to the animal. This arrangement is probably general among the Lamellibranchiata.—*Comptes Rendus*, September 4, 1882, p. 461.