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but during a temporary halt and slight re-advance of the slowly retreating ice-sheet which formed the drift without its limits.

Incidentally the observations herein recorded indicate (1) from the essentially homogeneous and unquestionably unipartite character of the drift-sheet above the löss, especially in section 6, that the Torrellian hypothesis of the deposit of a *ground-moraine* and a *superficial moraine* by each glacier is invalid; (2) from the disappearance of the blue coloration downward in sections 6, 8 and 10, that this blue color is not normal and changed to brown or yellow by oxidation from above, as urged by Hawes,* Julien,† Von den Bruch,‡ Shaler,§ and others, but is in some way acquired.

May 31, 1882.

ART. XXIV.—*Orthocynodon, an animal related to the Rhinoceros, from the Bridger Eocene;*‖ by WM. B. SCOTT and HENRY F. OSBORN.

ORTHOCYNODON is the name given to designate a new genus of the Rhinoceros line from the Bridger Beds of Wyoming. It was discovered by the Princeton Expedition of 1878, in the Bad Lands of Bitter Creek. It carries the Rhinoceros line farther back than it has been supposed to exist. The oldest representative of this line known hitherto is *Amynodon*, a genus found by Professor Marsh¶ in the Uintah beds which overlie the Bridger. Orthocynodon was at first referred to the latter genus, until important differences in the molar dentition were discovered.

Generic characters.—The lower canines are erect and functional, giving the name to the genus. The lower incisors are two on each side and semi-procumbent. The lower premolars, with the exception of the first, are somewhat simpler than the molars, but have the Rhinoceros pattern of two inward-opening crescents directed forwards. The upper premolars have distinct posterior crescents and small postero-internal cusps. The post-glenoid and post-tympanic processes apparently do not unite to surround the external auditory meatus. There is a sagittal crest separating the temporal fossæ.

This genus differs from *Amynodon* in the erect canines, in

* Geology of New Hampshire. 1878, iii, p. 333.

† Proc. A. A. A. S., 1879, xxviii, p. 352.

‡ Mémoire sur les Phénomènes d'Altération des Dépots superficiels par l'infiltration des eaux Météoriques, 1881, pp. 147–168.

§ Glaciers, 1881, p. 165.

‖ Description from specimens in the E. M. Museum of Geology, Princeton, N. J.

¶ This Journal, III, vol. xiv, p. 251.

the possession of a posterior crest, and distinct though small postero-internal cusp on the second and third upper premolars; finally, in the fact that the premolar pattern in both jaws is like that of the molars. In *Amynodon* the canines are nearly procumbent and the premolars are all unlike the molars. It is singular that this genus, belonging to a more recent geological formation than *Achaenodon*, should have less of the typical Rhinoceros structure in its molars.

Orthocynodon antiquus, gen. et sp. nov.,

$$\text{Dental formula, } i\,\frac{2\text{–}2?}{2\text{–}2},\ c\,\frac{1\text{–}1}{1\text{–}1},\ pm\,\frac{3\text{–}3?}{4\text{–}4},\ m\,\frac{3\text{–}3}{3\text{–}3}$$

The specimens consist of the skull and lower jaw of one individual, and a portion of the skull containing the molar series of another. In each the upper canines and incisors are wanting. The lower incisors are close to the canines; they are semi-erect in position and placed in a quarter circle. They have slight fangs and sharp crowns, with low cingula posteriorly. The canines are almost trihedral in section and curve upwards and slightly backwards, worn at the back of their pointed tips by the upper teeth. A diastema of two inches separates them from the premolars. The lower premolar-molar series differs only in size and minor details from that of a young specimen of *Rhinoceros Indicus*. The first premolar has a simple crown rising to a single point and supported on two fangs. The inner face is irregularly concave, as in the Rhinoceros. Each of the remaining teeth presents two forward opening crescents of similar pattern. The third and fourth upper premolars are preserved in our specimens, and the upper molars are complete. The premolars present an external longitudinal ridge; from it arise a broad anterior and a narrow and somewhat low posterior crescent, opening backward; the postero-internal cusps are small. The molars are like those of the Rhinoceros in the proportion and disposition of their crescents.

The *Skull* is about fourteen inches long and five inches deep. The occipital condyle resembles that of the Indian Rhinoceros. There is a recurved *paroccipital* process having a long forward union with the post-tympanic. The *post-tympanic* and *post-glenoid processes* do not unite as in the modern Rhinoceros. In common with all the Eocene Ungulates there is quite a high thin sagittal crest, and somewhat deep temporal fossa, quite unlike the Indian Rhinoceros. The skull 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 points 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

SCIENTIFIC INTELLIGENCE.

I. CHEMISTRY AND PHYSICS.

1. *On the Atomic Weight of Carbon.*—ROSCOE has re-determined the atomic weight of carbon by the method employed by Dumas and Stas, which consists in the direct combustion of the diamond. For this purpose diamonds from the Kimberley mines, South Africa, were used, those burned by the French chemists having come from Brazil. The method employed was the same, carefully purified oxygen being conducted over the diamonds contained in a tarred platinum boat placed in a glazed tube of Berlin porcelain, which was heated in a charcoal fire. The products of combustion were absorbed (1) by a weighed U-tube containing pumice moistened with sulphuric acid, (2) by two series of Geissler-Liebig potash bulbs, containing potash solution; (3) by three U-tubes containing pumice wet with a solution of caustic potash, and (4) two small U-tubes containing pumice and sulphuric acid. Six separate experiments were made. In the first, six small transparent stones of a pale yellow color were used; in the second eight small dark stones; in the third one large dark stone; in the fourth four dark stones; in the fifth four colorless stones, and in the sixth a piece of the black diamond known as carbonado. Assuming Stas's atomic weight for oxygen 15·96, the values obtained for carbon in the six experiments were as follows: 11·970, 11·978, 11·970, 11·976, 11·966, 11·995; mean, 11·9757. The mean value obtained by Dumas and Stas in 1840 is 11·9708. With the exception of the sixth experiment, in which the black variety of carbon was used, the hydrogen obtained