they would be better classed with the latter than the former. As previously stated, I went to find a Lower Red Sandstone of Permian age, and was disappointed in meeting with what I, with all my bias, am convinced is Millstone-grit or "Rough Rock." The sections, on examination by any geologist, will speak for themselves much better than any description by me. I give my humble opinion, and the grounds on which I form it, with the greatest possible respect to the worthy Professors, and trust that the Geological Survey, when the gentlemen connected with it survey and map the district, will decide whether I am right or wrong in my conclusions.

In my examination of the district I had the advantage of being accompanied by my friend, Mr. J. W. Kirkby, of Sunderland, a gentleman well known for his thorough knowledge of the Permian beds of the north-east of England; and I have his consent to state that he entirely coincides with me in my opinion of the age of the Bramham Moor, Plumpton, Knaresborough, and Fountains Abbey Sandstones.

II.—ON A GENUS AND SPECIES OF SAUROID FISH (*THLATTODUS SUCHOIDES*,¹ OW.) FROM THE KIMMERIDGE CLAY OF NORFOLK.

BY PROF. OWEN, F.R.S., F.G.S., ETC.

(PLATE III.)

BUT little evidence has, hitherto, been had of the existence of large Sauroid fishes in the Kimmeridge Clay: indications by detached teeth had only, until now, reached me. The very useful "Systematic and Stratigraphical Catalogue of the Fossil Fish in the cabinets of Lord Cole" (now Earl of Enniskillen) "and Sir Philip de M. Grey Egerton," 4to., did not include any species from that formation at the time of its publication (1837).

To C. B. ROSE, Esq., F.G.S., we are indebted for the evidence of the fine addition to the Sauroid family of Ganoid fishes figured in in Plate III.

The portion of skull, including the main part of the upper and lower jaws, with their dentition, in that gentleman's instructive collection at Yarmouth, was obtained from the Kimmeridge Clay at Downham, near King's Lynn, Norfolk.²

The portion of upper jaw (Plate III.), nearly 7 inches in length, contains twelve teeth, or their recesses of attachment: of which six are in the maxillary⁽²¹⁾ and as many in the premaxillary⁽²²⁾. The teeth are strong cones, with a sharp apex and large subquadrate base, narrower in the fore-and-aft direction of the jaw: less convex transversely on the outer than on the inner side of the crown: straight or slightly convex, lengthwise, on the outer side; concave, lengthwise, on the inner side, the crown being slightly bent inwards as it descends vertically from the alveolar part of the upper jaw. The most conspicuous characteristic of the teeth in both jaws is the

¹ θλαΐω, to bruise; οδους, tooth; συχος, name of an Egyptian Crocodile.

² See "Geological Map of Norfolk," in the "Outline of the Geology of Norfolk," by SAMUEL WOODWARD, 8vo. Norwich, 1833.

longitudinal dent or notch, as if from the effect of a bruise, at the middle of the outer side of the base: and this is more marked, or is longer, in the lower than in the upper laniaries. It occurs in that part of the dentine which was covered by cement, and is, I believe, made more conspicuous in the specimen (Plate III.) through the loss of part of that outer coating. Not more than one-half of the crown is coated with enamel. This apical half gives a more circular transverse section than the cement-covered basal half. The enamel is marked by fine longitudinal striæ, with a few similar ridges. The teeth in which this part is preserved attain almost the length of an inch, with a basal breadth of half an inch; but the dimensions of all the parts are shown in the figure, accurately drawn of the natural size. The margin of the hollow base of the cement-covered part was ankylosed by that bone-like tissue to the border of the alveolar depression. The maxillary teeth are rather larger than the premaxillary ones.

The outline of the alveolar part of the upper jaw was undulated as in the stronger-jawed species of Crocodile, that of the premaxillary⁽²⁾ and maxillary⁽¹⁾ describing a convex curve where the strongest teeth are fixed, with an intervening concavity. On both sides of the mouth two of these teeth are close together at the middle of the maxillary convexity⁽¹⁾; the same disposition marks the three larger teeth at the alveolar convexity of the premaxillary. Other laniaries are separated by intervals equalling the basal breadth of the tooth, or exceeding it, as where the contiguous teeth of the maxillary and premaxillary descend into dental interspaces of the lower jaw. The density of the bone increases as it recedes from the alveolar part. The upper convex border of the maxillary is smooth and polished, like ivory; the outer surface of the adjacent bone is roughened by raised striæ, running mostly in an oblique direction downward and forward. All the outer surface of the dentary element (Pl. III. ³²) of the lower jaw is finely striated, save at the irregularly thickened part of the lower border of the bone. The right dentary (ib. ³²) being slightly dislocated downward, exposes the flat inner surface, which shows the coarser longitudinal fibres of the osseous texture there. I cannot detect any evidence of an inner series of teeth, added to the outer row of large laniaries in the lower jaw of *Thlattodus*: there may have been a few small scattered ones, if these have not fallen from the palate.

A single detached tooth of the genus may be distinguished from any of those similarly-sized Sauroid Fishes which have come under my notice; as, e.g., by the squarer form of the basal half, and rounder shape of the apical half, of the crown, from the tooth of the Cretaceous *Saurodon*,¹ *Saurocephalus*,² and *Saurichthys*,³ from the tooth of the Liassic and Lower Oolitic *Eugnathus*,⁴ from that of the Carboniferous *Megalichthys*, etc. The above-described shape and strong outer notch co-exist, indeed, so far as I know, only in the Upper Oolitic

¹ Dixon's "Geology and Fossils of Sussex," 4to. 1850. Pl. xxxii.

² Ibid., Pl. xxxv., fig. 5.

³ Agassiz, "Recherches sur les Poissons Fossiles," Tab. 55a.

⁴ Ib., Tab. 57a.

(Kimmeridgian) genus of Saurian fishes, for which the term *Thattodus* is here proposed, the present species being designated *suehoides*, from the crocodilian resemblance above noted. The references in the figure of Pl. III. are explained in the text.

III.—ON THE STRUCTURE OF THE THAMES VALLEY AND OF ITS CONTAINED DEPOSITS.

By SEARLES V. WOOD, jun., F.G.S.

THE great Valley of the Thames has long been known to contain deposits of gravel intermixed with freshwater beds; but the true Geological age both of the valley and of its deposits was long in doubt. Latterly the view expressed by Mr. Prestwich (in which he was of accord both with Professor Morris and Mr. Trimmer), that the whole was newer than the Boulder-clay, has met with acquiescence. The general structure of the deposits in this valley, although they form the most extensive of the Post-Glacial series in England, has not however yet been shown in any comprehensive manner.

Mr. Prestwich, speaking of the gravel which forms the principal member of the deposits, says¹ that it stretches "in a continuous and uninterrupted sheet from the sea to Maidenhead." In his paper "On the Loess of the Valleys of the South of England and of the Somme and Seine,"² he identifies the brickearth of the Thames Valley with the Loess of the Belgian plateau and with the brickearth of the Valleys of the Seine and Somme; but of the Thames Valley he says, the structure is complicated by the existence, in addition to the high and low-level valley-gravels, of a wide-spread set of marine hill-gravels covering large tracts of country, but that, after eliminating the foreign element, "there remains a set of valley and terrace-gravels which, though not so marked or well characterized as in the Seine Valley, are nevertheless of nearly similar order and age."³ He adds that the Loess "is intimately associated with all the valley-gravels and is contemporaneous with, and dependent upon, them from the beginning to the end of the series," and he conceives it to be "the result of river-floods commencing at the period of the highest valley-gravels and continued down to the end of that of the lowest valley-gravel."⁴

Although the age of the Thames Valley and its deposits, relatively to the Boulder-clay, has never been shown (Mr. Prestwich considering that the exact relation of the deposits is nowhere clearly seen, and that the question of relative age depends on a variety of collateral evidence⁵), yet the proof is readily afforded by drawing a line from the Hog-Market, Finchley, upon which hill exists an outlier of the Boulder-clay or Upper-drift (underlaid by a thin bed of the Middle-drift gravel), to the summit of Havering Hill, in Essex, upon which is another outlier of the Boulder-clay; this line will form a perfect

¹ Quart. Journ. Geol. Soc., vol. xii., p. 131. See also map in paper in Phil. Trans., 1864, Part II.

² Phil. Trans., 1864, Part II.

⁴ Ibid., pp. 273-4.

³ Ibid., p. 255.

⁵ Quart. Journ. Geol. Soc., vol. xii., p. 133.