

the heavy Bovidæ were either subjected to greater casualties, by floods or other causes, than the lighter and more fleet Cervidæ; or that they existed in greater numbers and roamed in very much larger herds. It also tends to prove that the Ruminants numerically surpassed the whole of the other Herbivores, the Mammoth alone being comparable in this respect with the Oxen, but surpassing them in size and weight; and compared with which the bones of the Horse and Rhinoceros are but few. This evidence leads to the assumption also that the Rhinoceros was not a common animal in the Pleistocene country whence the bones of the numerous animals deposited at Ilford were derived. For assuming that the habits were similar to those of the existing Rhinoceros, we should expect to meet with its remains generally in places and under conditions better adapted for their preservation, and hence more frequently found than that of other co-existing types of Mammalia.

It is a fact worth noting, that of this assemblage of vertebrate remains, it is seldom that two or more bones of the same animal are found in juxtaposition, showing that they did not find their resting-place where the animals died, but have been floated, probably for long distances from the upper tributaries of the ancient Thames, and subsequently deposited in these fluviatile beds. But wherever the country, and whatever the distance or means by which they have been conveyed here, they have been subjected to no rolling nor water-wearing action; for all the angles and ridges of the bones still retain their original natural sharpness.

III.—ON THE REMAINS OF *RHINOCEROS LEPTORHINUS*, OWEN (*RH. HEMI-TÆCHUS*, FALCONER), IN THE COLLECTION OF SIR ANTONIO BRADY, F.G.S., FROM THE PLEISTOCENE DEPOSITS OF THE VALLEY OF THE THAMES AT ILFORD, ESSEX.

By THE EDITOR.

(PLATE XV.)

IN the late Dr. Falconer's Palæontological Memoirs<sup>1</sup> so ably edited by Dr. Charles Murchison, F.R.S., a masterly and critical examination is given of the European Pliocene and Post-Pliocene species of the genus *Rhinoceros*, from which we venture to extract the subjoined introductory remarks.<sup>2</sup>

“After examining all the collections in England and Italy, and those of Lyons, Montpellier, etc., I have come to the conclusion that there were four distinct Pliocene and Post-Pliocene species of *Rhinoceros*, three of which have long been confounded by Cuvier and other palæontologists under the name of *Rhinoceros leptorhinus*.

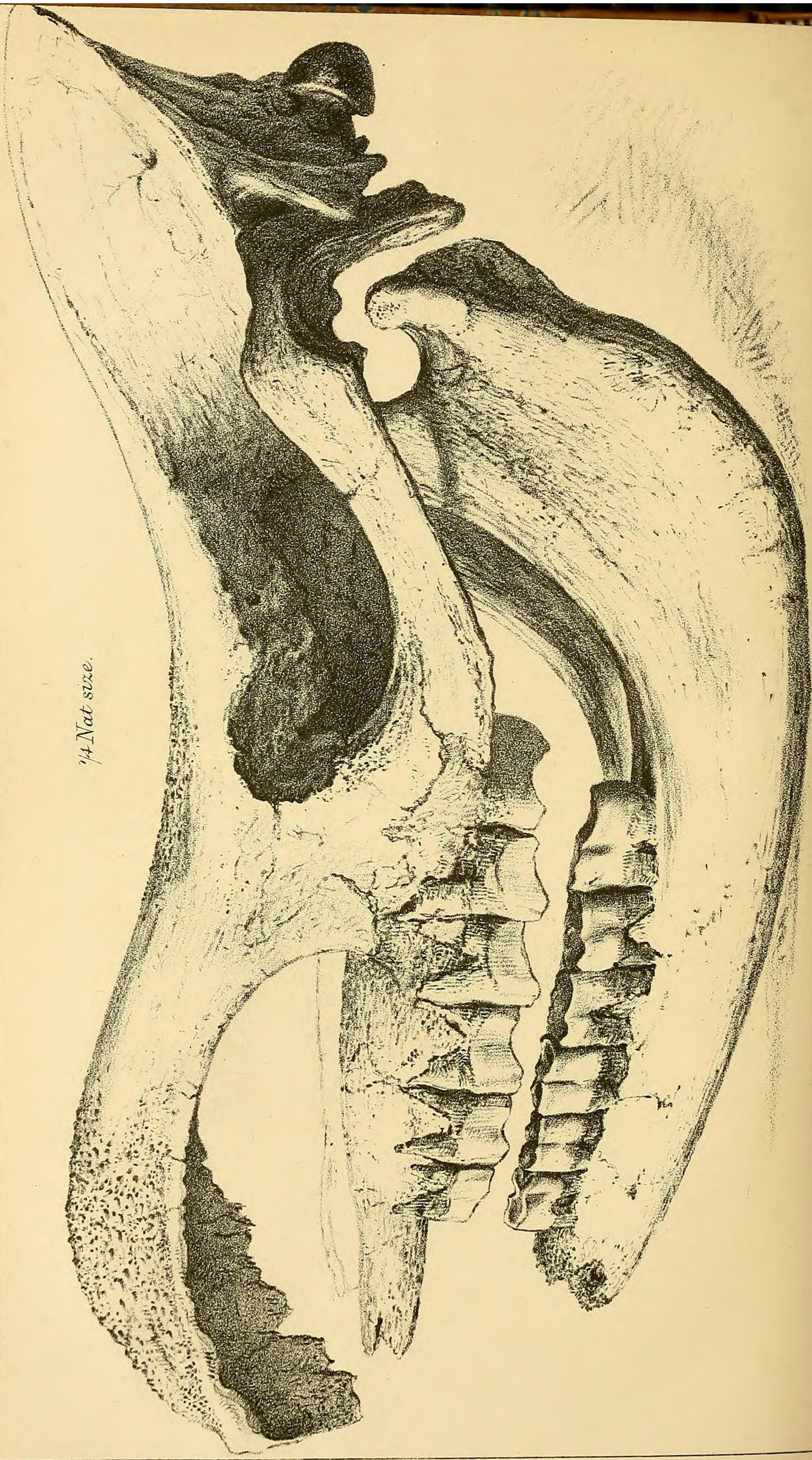
“I have carefully examined at Stuttgart the materials on which Kaup's and Jäger's *Rhinoceros Merckii* is founded. It is not a distinct species, but is identical with the Grays Thurrocks species, or *Rhinoceros leptorhinus (mihi)*. The *R. Lunellensis* of Gervais is founded on a young jaw with milk-dentition, which is not to be de-

<sup>1</sup> 8vo. London, 1868, vol. ii. p. 309.

<sup>2</sup> Compiled by Dr. Murchison from two letters addressed by Dr. Falconer in 1862 to Mons. Lartet, of Paris, and Col. Wood, of Stouthall, Swansea, and from his note books.



*1/4 Nat size.*



pended on for determining distinctions. So, also, the *R. elatus* of Croizet, and the *R. mesotropus* of Aymard, found in Auvergne, are not distinct species. I have examined the chief collections in Auvergne. The specimens in M. Pichot's collection and in the Museum of Le Puy are mainly *R. Etruscus*, while the *R. mesotropus* of Aymard comprises both *R. leptorhinus* and *R. antiquitatis*.

The four species may be classified as follows:—

PLIOCENE. I. No bony nasal septum.  
1. *Rhinoceros leptorhinus* (Cuvier, *pro parte*).  
Syn. *R. megarhinus* of Christol.

II. Partial bony septum.  
2. *Rhinoceros Etruscus*, Falconer.  
Syn. *R. leptorhinus* (Cuvier, *pro parte*).  
3. *Rhinoceros hemitæchus*, Falconer.  
Syn. *R. leptorhinus* (Owen, *pro parte*).

POST-PLIOCENE. III. Complete bony septum.  
4. *Rhinoceros antiquitatis*, Blumenbach.  
Syn. *R. tichorhinus*, Fischer and Cuvier.

“1. *Rhinoceros leptorhinus*.—This is the original and typical *Rhinoceros leptorhinus* of Cuvier, founded on Cortesi's Monte Zago cranium. It is the species described by Christol as *R. megarhinus*, and is the only Pliocene or Post-Pliocene European species that had not a nasal septum.

“To this belongs the celebrated Cortesi cranium in the Museum at Milan, which I have carefully examined. With this species also I have identified the *Rhinoceros* remains found in the Sub-Apennine beds of Piacenza, in the Val d'Arno upper beds, at Montpellier and Lyons, and at Grays Thurrocks, in Essex. The *Rhinoceros*, however, found in the Elephant-bed of the Norfolk coast is different.

“2. *Rhinoceros Etruscus*.—This species, like the following, had an incomplete bony nasal septum, but it had a comparatively slight and slender form. It is met with along with *Elephas (Loxodon) meridionalis* and *Mastodon Arvernensis*, in the lower beds of the Val d'Arno, and in the 'Submarine Forest Bed,' or superimposed blue clays of the Norfolk Coast, immediately underlying the Boulder-clay; but as yet it has been found in none of the ossiferous caves of Britain. With this species, also, I have identified the remains of a *Rhinoceros* submitted to me by Professor Ansted, which were found a few miles from Malaga, in white marl overlying Pliocene blue clay abounding with shells.

“3. *Rhinoceros hemitæchus*.—This species has been described by Professor Owen as *R. leptorhinus*. It has the nasal septum incomplete in the centre, and it differs from *R. antiquitatis* (*R. tichorhinus*) in other cranial characters, as well as in those of the teeth. I am satisfied on this point, after examining the entire dentition of both young and old animals. *Rhinoceros hemitæchus* accompanies *Elephas antiquus* in most of the oldest British bone-caves, such as Cefn, Durdham Down, Minchin Hole, and other Gower Caverns. It is also found at Clacton in Essex, and in certain beds in Northamptonshire. It is also met with in Italy.

“From some of these localities entire skulls and a great portion of the skeleton have been obtained.

“4. *Rhinoceros antiquitatis* (*R. tichorhinus*). This species had a complete bony nasal septum. It is found in the newer Pliocene deposits of Kent, Surrey, and Essex, and associated with *Elephas primigenius* in caverns of the same date.

“*Elephas antiquus* with *Rhinoceros hemitæchus*, and *Elephas primigenius* with *Rhinoceros antiquitatis*, though respectively characterizing the earlier and later portions of our period, were probably contemporary animals; and they certainly were companions of the cave-bears, cave-lions, and cave-hyænas, and of some at least of the existing mammalia.

“There can be no reasonable objection to the name *Rhinoceros antiquitatis*. South of the Rhine, that is, in Geneva, France, and Italy, all modern palæontologists call the species *R. tichorhinus*; but, north of the Rhine, in Germany, Holland, Scandinavia, and Russia, the most eminent authorities designate it *Rhinoceros antiquitatis*.

“A name in science ought not to be a disputed point of mere geographical predilection.

“Blumenbach named it first *Rhinoceros antiquitatis*. Fischer de Waldheim, a palæontologist of no great authority, changed the name into *Rhinoceros tichorhinus*, and Cuvier adopted Fischer's name without acknowledgment. Desmarest called it *Rhinoceros Pallasii*. Blumenbach's names of *Elephas primigenius* and *Mastodon Ohioticus* are now accepted by every one; and there is no reason why his *Rhinoceros antiquitatis* should be rejected for a more modern name.

“Living neither north nor south of the Rhine, I have no geographical predilections, and as an impartial foreigner I accept the earliest name, viz. Blumenbach's; besides, the name *Rhinoceros tichorhinus* is faulty, inasmuch as three species had a nasal septum.”

We make no apology for the length of the foregoing quotation, as it contains most valuable information as to the division and distribution of the fossil species of *Rhinoceros* in Europe, and has never appeared in any other of Falconer's works, save in his Memoirs, for which we are so greatly indebted to Dr. Murchison.

No better introduction could possibly have been found for the purpose of calling attention to the remarkably fine skull and lower jaw<sup>1</sup> of *Rhinoceros leptorhinus*, Owen (*Rhinoceros hemitæchus*, Falconer), obtained from the Uphall Brickpit in the vicinity of Ilford,<sup>2</sup> and probably the most perfect of this species which has hitherto been found in England (see Plate XV.).

It forms a part of the magnificent collection of Pleistocene Mammalian remains from this particular locality in the ancient Valley of the Thames, collected with so much care by Sir Antonio Brady, F.G.S., and for the preservation of which he and the public<sup>3</sup> are so largely indebted to the indomitable perseverance, energy,

<sup>1</sup> Found disassociated, but clearly referable to the same species, though possibly not to the same individual.

<sup>2</sup> See the accompanying sketch of the geology of the neighbourhood of Ilford, antè p. 390.

<sup>3</sup> This fine collection of Tertiary Mammalian Remains has since become the property of the Nation.

and scientific skill of Mr. William Davies, of the Geological Department of the British Museum, who rescued with his own hands this and many other equally unique and priceless remains from inevitable destruction, owing to the exceedingly friable nature of the fossils imbedded in this deposit of permeable and moist Brick-earth.

This species was heretofore only known in this country from exceedingly fragmentary remains, as, for example, the upper part of a skull and parts of lower jaws from Clacton and Walton, in Essex, (figured in Owen's *British Fossil Mammals*, pp. 356-381, figs. 131-141), and the basal portions of two crania and eleven rami of the lower jaw from the Gower Caves and Northampton (figured in Falconer's *Palæontological Memoirs*, vol. ii., plates 19-21 and 23-25).

Concerning the specimen from Ilford (Plate XV.), Mr. William Davies writes as follows:—

“The skull is nearly entire, and evidently that of an aged animal; for the molars, of which there are six on each side, are all very much worn. The skull has not been crushed, and therefore shows well the normal form and proportions. The occiput is partly restored. The condyles and foramen magnum are entire, the basi-occipital is wanting. The parietal, frontals, and nasal bones are perfect. The last have a very rugose surface for the attachment of the nasal horn. The inter-orbital space is also slightly rugose, and probably supported a short frontal horn or boss. The zygomatic arches and styloid processes are perfect; the orbital rims are imperfect. The maxillaries are greatly mutilated, and the incisive bones are also imperfect, wanting the anterior ends by which they were united to the lower border of the nasal septum. The palate is nearly entire. Appended to the nasals is the anterior portion of the bony septum of the nares, perfect in front, but broken behind.

“The dimensions of skull are as follows:—Length of molar series 10·7 inch. Length of true molars 6·3 in. Length of pre-molars 4·4. Extreme length of skull from occipital crest to tip of nasals, measured along the curve, 33 in. Length from occipital crest to end of nasals in a straight line 31 in. Greatest constriction of skull between the zygomatic arches 5·1 in. Width of inter-orbital space 11 in. Width of nasals about the middle of the anterior rugosity 5·5 in. Extreme length of nasal opening, right side, 10·6 in. Width of zygomatic arches posterior to last molar 13 in. Width of zygomatic arches across glenoids 14 in. Width of occipital crest 4·6 in. Height of occipital crest from lower border of the foramen magnum 7·6 in. Width of condyles, including foramen magnum, 6·3 in.”

Concerning the *cloison*, or bony septum dividing the nostrils, upon which Dr. Falconer in his classification (already quoted) lays so much stress, Mr. Davies contributes the following most important information:—

“In clearing the skull from its matrix of sandy gravel, I found the anterior border of the septum joined and apparently consolidated

<sup>1</sup> Catalogue of Pleistocene Vertebrata in the Collection of Sir Antonio Brady, F.G.S., by William Davies, of the British Museum (p. 29). Printed for private circulation.

to the end of the nasals; but the greater part of that portion of the septum which is preserved, I found detached from these bones, *but not broken*; and this detached portion showed upon its superior margin a hollow smooth surface, which perfectly fitted a rounded longitudinal smooth ridge upon the inferior surface of the nasals, to which it was originally joined by an unanchylosed sutural attachment. Moreover, I traced the septum beyond the middle of the inter-orbital platform to which it was also attached, and served as a support. At this point, the bony septum was thick, but of a very coarse cancellated structure, and so exceedingly friable as to render it impossible to detach and preserve any fragment of this part of the bone. The septum became gradually thinner toward the front of the nasals, the structure becoming less coarse, to about the middle of the nasal apertures, where the bone is thinnest, but its substance more compact. It again thickens a little forwards and downwards, where it forms a broad inferior border to join the intermaxillary bones.

“During the process of restoring the skull, which was in a somewhat dilapidated condition, it was unfortunately necessary, in order to form a support for the palate and teeth, to cover the posterior portion of the septal sutural ridge with plaster, and thus destroy the evidence of its existence; but subsequently another skull of the same species was secured for the collection, in which this upper ridge is preserved and distinctly shown. There was also a central longitudinal ridge, but with a broken edge, upon the inner floor of the palate, to which bones I believe the septum was also attached; but owing to the broken condition of the palatal bones, and the displacement of the fragments, the fact of their being conjoined was not sufficiently noted by me at the time, so as to enable me to speak upon this point with absolute certainty.”

The second cranium is not so perfect as that figured in our Plate XV. “Inasmuch as the molars, the premaxillæ, and the whole of the palatal portion of the skull are wanting. This fine fragment comprises the entire upper portion of the cranium. The occiput and condyles, the right zygomatic arch with the articulating surface, and the right orbit, with its anterior tuberosity, are also quite perfect. The two auditory foramina are present and entire. The styloid processes are broken, and the basi-occipital and sphenoid are mutilated, as are also the maxillaries, left zygoma, and orbit. The fragment, moreover, shows the anterior and posterior portions of the bony septum of the nares. The anterior portion is broken posteriorly, and is attached to a medial ridge, which ridge does not terminate at a short distance from the anterior border of the nasals, as in the typical Clacton specimen, figured by Prof. Owen in his ‘British Fossil Mammals,’ and which is now preserved in the British Museum, but is continuous along the under surface of these bones and of the inter-orbital platform, and unites with the posterior fragment of the septum, which is preserved and conjoined with the sphenoid.”

Mr. Davies remarks:—“The presence of these front and hind portions of the septal partition, with their broken inner margins,

the coarsely cancellated bone found in the preceding specimen, and the continuous ridge, lead to the inference that" (contrary to the opinion of Dr. Falconer as already quoted) "the nares of this species were separated by an osseous division, the coarse structure of the greater part of which contributed to its speedy decomposition; the anterior portions, being of more compact texture, are found generally well preserved. Moreover, the inner edges of the portion of the septum which remain in this and the preceding specimen are jagged and broken, showing no trace of a true natural margin.

"The surfaces of the inter-orbital platform and of the posterior portions of the nasals are so slightly rugose in this specimen, that they may be described as nearly smooth, and as affording but small support for the basal attachment of either a nasal or a frontal horn; and as the cranial sutures are all consolidated, this comparative smoothness is not due to immaturity. The skull is of somewhat smaller dimensions than the preceding, and may probably be that of a female."

Concerning the jaw of *Rhinoceros leptorhinus* (figured with the skull on Pl. XV.), Mr. Davies observes:—"This is an exceedingly fine and nearly entire lower jaw, consisting of both rami, and containing the entire series of permanent teeth *in situ*, with the exception of the second premolar of the left side, of which the alveolus only is preserved. The anterior end of the symphysis is mutilated; otherwise each ramus, with its condyle and coronoid, is perfect. They are firmly connected at the symphysial suture, which is thoroughly consolidated. That the jaw pertained to an aged adult, is shown by the condition of the teeth, for they have all, even the last molars, been well worn. There are two mentary foramina in each jaw."

The dimensions are given as follows:—"Length of jaw 19 in. Height of ascending ramus to condyle 11 in. Height of ascending ramus to coronoid 12.5 in. Transverse length of condyles 4.5 in. Length of molar series 9.5 in."

We have to thank Mr. Davies most heartily for clearing up this obscure and difficult point, involving as it does the fundamental character upon which Falconer's species of *Rhinoceros hemitæchus* rests.

In the future Falconer's name (*R. hemitæchus*) must give way before Prof. Owen's *R. leptorhinus*,<sup>1</sup> not only as the older name, but also because Falconer's specific appellation "is faulty" (to quote Dr. Falconer's own words as to the abolition of *R. tichorhinus*, see *antè*, p. 400), "inasmuch as this species had a completely ossified nasal septum." From the observations of Mr. Davies it seems probable that the greater or less development of the bony nasal septum (upon which Dr. Falconer laid so much stress) cannot be relied upon as a basis of specific distinction between *R. Etruscus*; *R. leptorhinus*, Owen (*R. hemitæchus*, Falc.); and *R. antiquitatis*, Blum. (*vel R. tichorhinus*, Cuv.), although it may assist us, when preserved in fossil crania, to decide whether it was a horned, or hornless, Rhinoceros.

<sup>1</sup> See Owen's History of British Fossil Mammals and Birds, London, 1846. 8vo., p. 356.