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OF

GEOLOGICAL MEMOIRS.

On FOSSIL RHINOCEROS REMAINS. By C. GIEBEL.

[*Jahresb. naturw. Vereines in Halle.* 1851, pp. 2-9.]

FROM the great abundance in which fossil bones of the Rhinoceros occur throughout Europe, there is no doubt that for a long time, fossil remains not having yet met with scientific consideration, they were abundantly collected and, mixed with other remains, were sold as the *unicorn fonsile*. In my own family for a century past has the sale of the fossil Unicorn, from the gypsum-quarries of the Seveckenberg*, near Quedlinberg, been carried on with foreign travellers; and the descriptions of the bones, as handed down from father to son, tend to prove that the majority belonged to Rhinoceros. Their true explanation, however, could not have been given at this early period, as nothing had yet been known of the teeth and skeleton of the living Rhinoceros. This knowledge was supplied by Worm, who thereby afforded Grew, in 1681, the means of asserting the existence of the Rhinoceros in a fossil state. In 1668 a fragment of an upper jaw had been exhumed at Chatham near Canterbury; in this the form and position of the orbits were evident, which enabled Grew to refute Somner's assertion † that this fragment of skull had belonged to the Hippopotamus‡.

The next determination of fossil Rhinoceros bones we meet with is half a century later. Numerous bones had been found near Herzberg, in the Hartz, which, from their great size, had been taken for those of the Elephant. Hollman compared them with the skeletons of the Elephant and Hippopotamus, and conjectured, on account of their striking dissimilarity to both, that they belonged to the Rhinoceros. To confirm his conjecture he transmitted a tooth to Meckel, who, during his stay in Paris, compared it with the Rhinoceros, afterwards described by Buffon and Daubenton, and recognized its perfect identity§. A mass of material, far richer than had yet been collected in England and Germany, was found by Pallas in the Peters-

* [For an account of these quarries by M. Giebel, see *Jahresb. loc. cit.* p. 15 et seq.—TRANSL.]

† *Philos. Transact.* 1701.

‡ [See also Owen's *Brit. Foss. Mam.* p. 331.—TRANSL.]

§ *Akten Götting. Gesellschaft*, vol. ii. 1752.

burg Museum, which had been brought together from the most distant parts of the Russian empire. He undertook the management of this Museum in 1758, and his attention was immediately directed to four Rhinoceros skulls, the most perfect of which he described in 1761*. Pallas soon afterwards visited Siberia, and there found that remarkable relic, the carcase of a Rhinoceros, on the banks of the Willuji, an affluent of the Lena. This was in December 1771, and two years afterwards† he gave a description and figure of some of its parts, together with that of a perfect skull discovered at the Baikal Sea. To the latter he also devoted a second memoir in the 'Acta' for 1777, and, in the 'Neuen Nordischen Beiträgen' of 1779, he noticed other Rhinoceros bones discovered in Kasan. During this time, in Germany also, some notice had been taken of the fossil Rhinoceros. Zückert illustrated with some fine drawings‡ the bones that had been exhumed from the Seveckenberg in 1728 by former members of my family and preserved in the collection of Privy Counsellor Müller at Berlin. Soon afterwards, 1782-84-86, Merk's important letters appeared; the first of which contains a description of a skull and several parts of a skeleton from the banks of the Rhine, in the Darmstadt district. In the second letter was mentioned the discovery of another skull near Worms, on which Collini also wrote a memoir§,—another skull from near Cumbach,—two teeth from Weissenau, and a third from Strasburg. The last letter refers also to the bones dug up near Cologne and at other places in Germany. Although not conversant with osteology, yet, from a careful comparison of the fossil remains with which he was acquainted, Merk recognized two specifically distinct Rhinoceroses as having once existed in Germany, both of which also were decidedly distinct from the two living species which were then known to naturalists. Still earlier, Camper|| had pointed out the difference between the species with, and the species without incisor-teeth, and had entered into a discussion with Pallas on the presence of incisors in a Siberian skull; the examination subsequently (in England) of a Sumatran skull with incisors convinced him of this specific difference.

These were the materials on which Cuvier worked, and on which his faculty of classification was brought to bear. In 1795 and 1797 he gave his views on the peculiar species with lengthened skull and two horns. In the beginning of this century he read an elaborate memoir on both the fossil and the living species of Rhinoceros, of which he distinguished four or five. But notwithstanding Cuvier's satisfactory exposition of the difference of the species, Faujas St. Fond, in his 'Essai de Géologie,' 1801, asserted that the greater length of the skull and the ossification of the nasal septum in the Siberian Rhinoceros were conditions characteristic merely of age, and that the animal differed not from the species now living in Central Africa. No refutation of this view appeared, and it was forgotten. In the

* Act. Petersb. Acad. vol. ii.

† Act. Petersb. Acad. vol. xvii.

‡ Beschäft. Naturforsch. Freunde in Berlin, vol. ii. 1776.

§ Abhandl. Mannheim. Akad. vol. v.

|| Act. Petersb. Acad. 1780.

‘ Mémoires du Muséum’ (vol. vii. 1806), Cuvier gave a full account of the osteology of the species of Rhinoceros then known to him; and here the Siberian Rhinoceros was recognized by distinct and important characters, as a peculiar species. Hitherto this had been known as the “Siberian Rhinoceros.” In his ‘Archæologia,’ and a year later in his ‘Natural History,’ Blumenbach gave it the specific name of *Rh. antiquitatis*, and Fischer, in his ‘Zoognosia,’ 1814, changed it to *Rh. tichorhinus*, which latter has been accepted by Cuvier and all later writers.

Cuvier’s extensive researches facilitated the specific determination of fossil remains of the Rhinoceros, and these were everywhere more carefully studied. The next important discovery took place in 1811, in the Vale of the Arno, a report of which was given in a letter from Philip Nesti to Targioni Tozetti. Cortesi also described*, in 1819, a nearly perfect skeleton which he found in the Subapennine Hills, in the Placentin. In that Part of Cuvier’s ‘Ossemens Fossiles’ published in 1822, this species received the name of *Rh. leptorhinus*, and together with it also the incisor-teeth figured by Merk, besides a similar tooth from Avaray, were determined as belonging to *Rh. incisivus*; and a *Rh. minutus*, from Moissac, was, from its smaller size, less positively determined. The fine skull from Montpellier, to which Marcel Serres, in the ‘Journal de Physique,’ 1819, had given the specific appellation of *Rh. monspessulanus*, was referred by Cuvier to *Rh. tichorhinus*. Whilst the last volume of the ‘Ossemens Fossiles’ was in the press, 1825, Cuvier received, through Schleiermacher, drawings of the skull and jaw discovered near Eppelsheim, by which he was confirmed in his opinion of the near alliance of the *Rh. incisivus* to the living Sumatran species. After the publication of Cuvier’s osteological researches, the number of the species increased so much in a few years, that when Pander and D’Alton, in their beautiful work on the Skeletons of the Mammalia, endeavoured to reduce the number, they were far from meeting with general approbation. Henceforth scarcely a year passed without the announcement of new localities for fossil Rhinoceros bones being discovered. Then came that unfortunate æra of uncriticised Palæontology, 1830–43, which produced a whole host of new Rhinoceroses.

Immediately after the publication of the ‘Ossemens Fossiles,’ 1825, Baker and Durant noticed the discovery of fossil Rhinoceros remains in the tertiary beds of the Sub-Himalayas, which, ten years later, they ascribe to *Rh. unicornis fossilis*. In 1828 Clift and Buckland mention this species, from the Irawady, and subsequently Cautley and Falconer, from the Sub-Himalayas, under the name *Rh. angustirostris* or *sivalensis*. Croizet and Jobert in 1828 pointed out one of the fossil bones from Auvergne as having belonged to a slender and long-legged species, *Rh. elatus*. On some unworn teeth of *Rh. tichorhinus*, from the Loës of the valley of the Rhine, Bronn made his genus *Cælodonta* †, which after a short existence again disappeared. In the same year Harlan ‡ instituted his *Rhinoceroides Alleghanensis*, from a

* *Saggi Geologici.*

† *Jahrb. f. Min. u. s. w.* 1831.

‡ *American Monthly Journal of Geology.*

fragment of upper jaw, found in Pennsylvania, which bears not the slightest resemblance to that of the Rhinoceros, and indeed may well be a work of art. Other specific names were produced by Kaup for the Eppelsheim remains, together with Short Notices, in the 'Isis,' 1832, in Von Meyer's 'Palaeontologica,' 1832, and in the 'Jahrbuch,' 1833. Amongst these was *Rh. pachyrhinus*, soon after re-named *Rh. Schleiermacheri*, founded on two perfect skulls, jaws, and other parts, and, according to Cuvier, belonging to *Rh. incisirus*. *Rh. hypsilorhinus* was again transferred to the last-named species, and *Rh. Goldfussi* was suppressed. The single incisor of *Rh. leptodon*, from Wiesbaden, appeared to belong to *Rh. Schleiermacheri*, and the four-toed, hornless *Rh. incisirus* served as the type of the new genus *Aceratherium*. In 1834 the Third Part of Kaup's 'Descript. Oss. Foss.' appeared with a full description of the genus *Rhinoceros*. *Rh. Schleiermacheri*, *Rh. leptodon*, *Rh. minutus*, and, under *Aceratherium*, *Rh. incisirus* and *Rh. Goldfussi*, were referred to as individual species. The same year was further distinguished by De Christol's Memoir on the History of Rhinoceroses. With the aid of new materials this writer undertook a critical examination of Cuvier's species. *Rh. tichorhinus* retains incisors in the under, and probably in the upper jaw; *Rh. leptorhinus* is dissolved, its skull being given to *Rh. tichorhinus*, the bones of its extremities to *Rh. incisirus*. The peculiar characters which Cuvier could not recognise as satisfactory in the remains of the *Rh. incisirus* he had at his command, are pointed out in the Montpellier skull by De Christol, who thought that on account of these newly found evidences of specific character it should bear the new name *Rh. megarhinus*. In the same year also Cortesi discovered a second skeleton in the Placentin; and, mistaking the humerus and femur, and the form of the tip of the jaw and of the last upper molar, found in it new generic characters, the naming of which, however, by the advice of Blainville, was postponed. On the other hand, the well-known deposit of Sansan afforded numerous bones which Lartel, also in 1834, distributed under the names of *Rh. brevimaxillaris*, *Rh. longimaxillaris*, and *Rh. quadridigitatus* or *inermis*. The description of these did not appear until 1836 *, and then with some alterations of names—the species with four-toed fore-feet and three-sided incisors appearing as *Rh. tetradactylus longimaxillaris*, the smaller one, with slender legs and shorter jaws, as *Rh. tetradactylus brevimaxillaris*; with a third, unnamed species.

In Germany, in 1835-39, G. F. Jäger was, like Kaup, busily engaged in multiplying the specific names in his 'History of the Fossil Vertebrates of Würtemburg.' The species he there gives are—*Rh. Kirchbergensis*, established on two upper and one lower molar,—acknowledged by Kaup, and by him changed to *Rh. Merkii*, identified by Owen as *Rh. leptorhinus*, and by Blainville placed with *Rh. incisirus*,—*Rh. cherocephalus*, identified with *Rh. incisirus* by Jäger himself, who appears to have chosen this probably only as a provisional name,—*Rh. molassicus*, which, according to the notice of Jäger's work in

* Bulletin Soc. Géol. de France, vol. vii.

the 'Jahrbuch,' 1837, rests only upon the fragment of an upper molar,—*Rh. Steinheimensis*—according to Blainville this agrees somewhat with *Rh. minutus*, and he refers its teeth to those of the Palæotheres and Lophiodons. Lastly, we must mention the *Tapiroporus*, which Jäger established on the milk-teeth of the Rhinoceros.

In the last ten years criticism has been as busy as species-making. Owen's excellent work on the Fossil Mammalia of England threw great light on *Rh. tichorhinus* and *Rh. leptorhinus* by his comprehensive description of these species. The Monography of the Rhinoceros, in Blainville's great work on Mammalia, also appeared about the same time. The result of three years' labour, with the help too of a prodigious mass of material, does not satisfy this critical observer. He points out the existence of two living species in Africa and of three in Asia. Of the fossil species he regards as well established the *Rh. tichorhinus*, *Rh. leptorhinus*, *Rh. unicornis fossilis*, and *Rh. incisivus*, the males of which last species have been described, according to the different conditions of age, as *Rh. Goldfussi*, *Rh. Schleiermacheri*, *Rh. Merki*, *Rh. minutus*, and *Rh. elatus*; and the females of which have no horn.

To the new species have been added in the course of the last ten years *Rh. tapirinus*, by Pomel *, from the tertiary beds of the Puy de Dôme, and by Raulin, 1848, from the same place, *Rh. brachypus*, and *Rh. tetradactylus* from Sansan.

The discovery of a very young lower jaw with the sockets of incisor-teeth misled me into establishing a genus—*Hysterotherium*, which I withdrew on obtaining a more perfect jaw, that enabled me to recognize it as belonging to a young *Rh. tichorhinus*. The exhumation of nearly all the parts of a skeleton of the *Rh. tichorhinus*, numerous specimens of various bones, as well as the skeleton from Nordhausen, now in the Museum of this place, has enabled me to examine this species more particularly than had been hitherto done. But Brandt's Memoir on the *Rhinoceros tichorhinus*, just commenced, in the 'Memoirs of the Petersburg Academy,' which will contain not merely a richer mass of material, but indeed valuable information on the soft parts, renders a more detailed account of my researches unnecessary.

[T. R. J.]

On Borings in Search of Rock-salt, in SWITZERLAND.
By P. MERIAN.

[Bericht Verhandl. Naturf. Gesellsch. Basel, 1851, ix. pp. 41-44.]

M. KÖHLY, Engineer, of Biel, who has been perseveringly engaged for many years in the search for Rock-salt in the interior of the Jura, has commenced boring at the village of Wysen, Canton Soleure, near the Lower Hauenstein.

Wysen stands on the great development of Muschelkalk which composes the northern Jura, and which extends uninterruptedly from

* Bulletin Soc. Géol. 1844.