

the Triassic system, as proposed by M. Agassiz, on account of the nature of its fishes.

'On the Muschet Band, commonly called the Black-band Ironstone of the Coal-field of Scotland,' by Mr. BALD.—This band of ironstone was discovered, about forty years ago, by Mr. David Muschet, of the Calder Iron-works, near Glasgow. It had been frequently passed through; but was thrown away as rubbish till Mr. Muschet ascertained its value,—when extensive mines were opened for working it. Two bands of this ironstone are found in the great coal-fields of Lanark,—one 14 inches thick; the other, which is 73 fathoms lower, is 16 inches thick. The ironstone of the Muschet band is much more easily reducible than the ordinary dry ironstone,—and requires less fuel. In Scotland it appears to be co-extensive with the coal formation. In South Wales, also, it is found; but there is little of it in England or Ireland. Fifty years ago there were only five iron-works in Scotland, comprising about fifteen blast furnaces, which, together, produced 540 tons of iron per week. There are now 100 blast furnaces in action, which produce 12,000 tons per week, or 624,000 tons in the year,—the value of which, at 3*l.* per ton, is 1,872,000*l.* This great increase Mr. Bald attributed to the discovery of the Muschet ironstone, and to the introduction of the hot-blast. He also mentioned that Mr. Muschet, who is now in his eighty-sixth year, has published a volume on the manufacture of iron, containing an analysis of every ironstone and ore he could obtain; and he trusted his labours would, at least, be recognized in scientific societies, although the pecuniary advantage arising from his discoveries had fallen into other hands.

'On a new species of Hypanthocrinite,' by J. BUCKMAN.—This species differed from the *H. decorus* of Phillips in having its columns flat in front, concave near the apex, and granulated along their whole length. It has also a smaller proboscis, being one-fourth less in the present specimen, which is itself much larger than the usual size of *H. decorus*. Mr. Buckman proposes to call this species *Hypanthocrinites granulatus*;—it was found in the Wenlock shale, in the valley between Hay Head and Walsall, in Staffordshire.

Sir R. I. MURCHISON wished to state, in reference to the Hay Head limestone, that he considered it presumption on the part of Burmeister to question the correctness of the age assigned to it. It might be allowed him to abolish the genus *Bumastus*, characterized by the absence of trilobation, and unite it with *Illæmes*—a genus in which the caudal portion was trilobed; but, as regarded geological sections, he (M. Burmeister) was quite incompetent to give an opinion.

'On Graphic Granite,' by M. JOBERT.—The inspection of several samples of graphic granite has led the author to conclude, 1. That during the cooling of the granite, the crystals of quartz formed first in the midst of the feldspar. 2. That during the consolidation of the feldspar, the quartz crystals remained in a gelatinous state. 3. That the movement of the mineral matter in veins modified the gelatinous crystals of quartz,—flattening them, and sometimes impressing on them the forms of feldspathic crystals. 4. It is to this change in the form of the quartz crystals that the peculiar aspect of graphic granite is due. He also infers that quartz veins and dykes in granitic rocks may be accounted for by supposing the quartz to continue in a gelatinous state after the consolidation of the feldspar.

Prof. OWEN communicated notices of some Fossil Mammalia of South America, which had come under his observation since the publication of his descriptions of the fossil mammalia collected by Mr. Darwin. A new species of the gliriform genus of Pachyderms called *Toxodon*, was founded on an entire lower jaw, with the intermaxillary part of the upper jaw of a specimen equalling the *Toxodon platensis* in size, transmitted from Buenos Ayres. The new species, which Prof. Owen proposed to call *Toxodon angustidens*, is distinguished by the nearly equal size of the upper incisors, the transverse diameter of the inner or median one being two inches; and by the narrower transverse diameter of the inferior molars. Prof. Owen considered the evidence he had induced as evidences of a second species of *Toxodon*; confirming, in every respect his ideas of the affinities of the genus expressed by the title,

'Description of the cranium of the *Toxodon platensis*, a gigantic extinct mammiferous animal, referable to the order *Pachydermata*, but with affinities to the *Rodentia*, *Edentata*, and herbivorous *Cetacea*,' under which his original memoir was published in 1838. M. Quatrefages, in his 'Considérations sur les Caractères Zoologiques des Rongeurs,' 4to. 1840, had corrected what he assumed to have been Prof. Owen's allocation of the *Toxodon* to the Rodent order. M. Quatrefages thought the so-called incisors of the *Toxodon* to be canines, affirming that their roots extended to the maxillary bones above the first molars; and he regards the *Toxodon* as having a nearer affinity to the Morse (*Trichecus*). Prof. Owen referred to his 'Odontography,' p. 411, for a refutation of Geoffroy St.-Hilaire's ideas that the scalpriform incisors of Rodents were canines: and alluded to the enamelled complex molars of the *Toxodon* in refutation of M. Quatrefages' idea of its relationship to *Trichecus*.—An almost entire skull of the *Mastodon Andium* had been transmitted to the British Museum from the post-pleiocene beds of the Pampas of Buenos Ayres; its molar dentition was described, and a distinctive character of its tusks, in a strip of enamel two inches broad along their outer sides, was pointed out.—*Macrauchenia*. To this genus of tridactyle Pachyderms, which is nearly allied to the Palæotherium by the structure of the feet, and the Llamas (*Auchenia*) in the structure of the neck, Prof. Owen had referred a molar tooth of the lower jaw, on account of its crown being composed of two upright half cylinders of equal height, as in the Palæotherium. A left ramus of the lower jaw, from tertiary deposits of Buenos Ayres, has been received, containing six molar teeth, three true and three false, the last four showing the same form or pattern as the single fossil tooth from Patagonia, demonstrating the resemblance with the lower molar teeth of the Palæotherium, except in this difference, viz. the absence of the third lobe in the last molar, by which the generic distinction of the South American Pachyderm was established; and an approach made to the rhinoceros. The *Macrauchenia*, to which Prof. Owen provisionally referred the fossil in question differed, however, like the Palæotherium, from the rhinoceros, in the greater exterior convexity and the equal height of the two demi-cylindrical lobes of which the last premolar and the three true molars were composed, and it further differed from both Palæotherium and rhinoceros in the more simple form of the second and third premolars; the enamel is smooth and the dentine compact, and the coronal cement forms a thin layer. The longitudinal extent of six molar teeth was nine inches.—*Nesodon*, n.g. A genus allied to the preceding, but resembling the Anoplotherium, in the absence of any vacant interspace in the entire dental series, and in the equal height of canines and incisors, was established on the anterior part of the lower jaw and on two molar teeth of the upper jaw, discovered by Capt. Sullivan in an arenaceous tertiary deposit on the coast of Patagonia. The incisors, canines, and premolars of the lower jaw are not only in contact, but overlap each other like scales or tiles, and the molar teeth of both upper and lower jaw are characterized by islands of enamel, whence the generic name proposed. The incisors are six in number. The characters described by Prof. Owen are resemblances to *Toxodon*, in which, also, the large procumbent incisors overlap each other: the interval between *Toxodon* and *Macrauchenia* is evidently partly filled by the present remarkable genus. The extent of the sloping symphysis, the breadth of the lower jaw behind the symphysis, and the depth of the ramus at the beginning of the first true molar, were severally two inches. The quadruped to which these fossils belonged must have been about the size of the llama. Prof. Owen proposed to call the species *Nesodon imbricatus*, in allusion to the tile-like, overlapping arrangement of the anterior teeth.—A second larger species of *Nesodon* was indicated by four or five detached teeth of the lower jaw from the same deposits. This species, of the size of the zebra, it was proposed to call *Nesodon Sullivani*.—As a check to the undue increase of so many large herbivorous species of the Megatherioid and Pachydermal orders, the great *Machairodus*, discovered in the caves of Brazil, by Dr. Lund, who first supposed it a hyena, was well adapted. An almost entire

skull had been, thence, transmitted to Paris, and had been referred by M. de Blainville to the genus *Felis*, who had published a figure of it. A specimen of the same, or a closely allied, species, displaying some characters not preserved in the Parisian specimen, had been transmitted from the tertiary deposits of Buenos Ayres. Prof. Owen pointed out several differences establishing the, at least, subgeneric distinction of this remarkable carnivora, which equalled the Bengal tiger in size, and had upper canine teeth of thrice the length. As Prof. Owen could not determine any specific distinction in the present fossil from the *Hyena neogea* or "*Smilodon*" of Dr. Lund, he proposed to call the species "*Machairodus neogæus*." This, happily extinct, most formidable and destructive of the carnivorous genera, had anciently an extensive geographical range through a great extent of South America, in India, and throughout Europe: fossil remains of different species having been found in old pleiocene deposits in Germany and France, in the newer pleiocene of the Val d'Arno, and in the bone caves of England. Our own ancient *Machairodus latidens* of Devonshire, added to the other species, adds to the propriety of keeping the genus distinct from the typical *Felis*. Of the gigantic extinct armadilloes, Prof. Owen added to the former species, which he had called *Glyptodon clavipes*, the following; viz., *Glyptodon reticulatus*, *Glyptodon ornatus*, *Glyptodon tuberculatus*, and *Glyptodon clavicaudatus*. An enormous tail of the latter, now in the British Museum, showed several of the ossicles of the dermo-skeletal sheath produced into huge tubercles, the whole resembling the club of the giant Gog or Magog. Prof. Owen thought that the present knowledge of the co-existence with those large herbivorous armadilloes of a gigantic carnivorous species like *Machairodus*, gave some insight into their need of a complete and strong defence of all the exposed parts of the body and the tail, since they had not the powerful claws with which the Megatherioid quadrupeds might have waged war with the *Machairodus*. With regard to the *Megatherium*, the remains recently transmitted confirmed Prof. Owen's ideas of its closer affinity to the sloths than to the ant-eaters or armadilloes; and had enabled him completely to reconstruct both the fore and hind extremities, and correct all the errors in Cuvier's descriptions.

Mr. EDWARDS communicated a list of the fossils of Brackstone Bay, Sussex. Of the classes Conchifera, Brachiopoda, and Gasteropoda, there are 161 described species, and 79 undescribed;—74 of which are also found at Barton.

SECTION D.—ZOOLOGY AND BOTANY.

'On the Cultivation of Silk in England.'—A letter was received from Mrs. Whitby, of Newlands, near Lymington, Hants, wherein she gave the Association the result of her experiments, begun ten years ago, on her own estate; and exhibited specimens of raw and manufactured silk, with full details. Mrs. Whitby began by planting various sorts of mulberry trees; and finds the Dwarf Philippine by far the best,—as producing more leaf,—and, from the facility with which its cuttings are struck, being more easily propagated than any other. She finds that, by procuring the eggs of the large Italian sort or four changes, she obtains as great a proportion, and as good a quality of silk, as they do in Italy or France. The testimony of several eminent manufacturers in London, Manchester, and Coventry, attest this. Mrs. Whitby has presented to the Queen twenty yards of rich and brilliant damask, manufactured from silk raised at Newlands. After making allowance for occasional unfavourable seasons, and labour, machinery, outlay of money, &c., it will be found that land laid out for furnishing food for this valuable caterpillar will afford a large profit.

Mr. OGILBY thought this a subject of national importance. The producing silk in this country had hitherto been only pursued as an amusement. Mrs. Whitby had demonstrated the possibility of obtaining a sufficient quantity of food at the right time,—which had hitherto been the great difficulty of growing silk in this country. He hoped the production of silk would be adopted in Ireland. The value of the silk brought to this country was above 2,000,000*l.* annually. Mrs. Whitby's silk was worth as much in the market as the best foreign silks.—Mr. MONCK-