

BIBLIOGRAPHICAL NOTICES.

The Zoology of the Voyage of H.M.S. Beagle, under command of Capt. Fitzroy, during the years 1832 to 1836. (Published with the approval of the Lords Commissioners of Her Majesty's Treasury.) Edited and superintended by Charles Darwin, Esq., M.A., F.G.S. Part I. No. I. *Fossil Mammalia.* By Richard Owen, Esq. 4to. London, Smith, Elder, and Co., 1838.

It has been long the practice on the continent for the government to defray a part or the whole of the expense of publishing and illustrating the accounts of the various voyages and expeditions undertaken for discovery or other purposes connected with science. In Britain, we believe, that until the publication of the Northern Zoology by Richardson and Swainson, little encouragement was thus given to works of a similar kind, and in consequence, an enormous price was set on them, which limited their circulation nearly to the public libraries or to those of the most wealthy followers of science and literature. But we are happy now to perceive that this same plan of encouragement has been still further pursued, and in the instance of two expeditions, one undertaken publicly, the other by a private individual, the Lords of the Treasury have come forward to assist in defraying the expense of the illustrations; this we are sure will be attended with the best results for science, and we would only strongly insist that proper precautions should always be used to secure the excellency of the work and the cheapness of it to the public. In regard to that now before us, we are well satisfied in one respect; but although the first number is certainly cheap, in proportion to the run of prices of modern books, yet it will depend on that of the future numbers whether as a whole it will be available to the general reader. Having thus shortly noted our opinion on the plan now adopted for the promotion and assistance of science, we shall endeavour to give an analysis of the part which has at this time appeared.

In July 1831, H.M. ship Beagle was commissioned for the purpose of surveying the southern parts of America, and afterwards circumnavigating the world, and Mr. Darwin was appointed naturalist to the expedition. On returning to Britain the collections procured during the voyage proved to be valuable and interesting, and many of them entirely new to science; and "the object of the present work is to give descriptions and figures of undescribed or imperfectly known animals, both fossil and recent, together with some account, in the one case of their geological position, and in the other

of their habits and ranges." And it is at the same time modestly added, "As I do not possess the knowledge requisite for such an undertaking, several gentlemen have most kindly undertaken different portions of the work." To Mr. Owen has been deputed the description of the fossil mammalia; to Mr. Waterhouse those of the recent mammalia; to Mr. Gould the birds; Mr. Bell the reptiles; and the fishes to the Rev. L. Jenyns. The first part, as our title indicates, is devoted to the fossil mammalia, described by Mr. Owen, to which work and the admirable illustrations the Wollaston Medal was awarded in February last by the Geological Society. This is prefaced by a Geological introduction by Mr. Darwin, detailing the localities where the remains afterwards noticed were discovered.

All the remains were found between latitudes 31° and 50° on the eastern side of South America; in the provinces bordering the Plata; Bahia Blanca, situated near the confines of Northern Patagonia, and Southern Patagonia. The principal deposit is contained in the almost boundless estuary of the Plata, forming a flat or pampa of reddish argillaceous earth, varying little in elevation and stretching over a surface of some hundred miles in extent, where the traveller may wander "without meeting a single pebble or discovering any change in the nature of the soil." This is intersected by streams, which lay open the immense deposits of animal remains which are there buried, and exhibit to the traveller those wonderful relics which are commenced to be described in the work before us. Mr. Owen, considering the information communicated by Mr. Darwin, is of opinion that this deposit cannot be of very ancient date, and the facts he states seem to bear him out. The change of level which has taken place is by no means considerable, and the numerous accompanying remains of shells belong mostly to recent species, and to many which are at this moment existing in the vicinity. He concludes that a great bay formerly occupied what are now called the Pampas, and the lower parts of Banda Oriental, and that into this the rivers which are now united in the one great stream of the Plata must formerly have carried down the carcasses of the animals inhabiting the surrounding country, and "where the skeletons would thus be entombed in the estuary of mud which was then tranquilly accumulating." The second district where quadrupeds were found is in Bahia Blanca, about 250 miles south of the Plata; it is a large bay nearly surrounded by very low land, on which successive lines of sand dunes mark in many parts the retreat of the waters; and it is supposed, from the bones being found imbedded in their proper relative positions, that the carcasses of the animals when they perished

were probably drifted to this spot in an entire state. One of the skeletons thus placed was encrusted with serpulæ and corallines, which would indicate that it had been for some time before its entombment in the deposit, remaining in the waters which then covered the bay. Among the shells which were found with these remains, twelve species are absolutely identical with existing species; four more are perhaps so, the doubt arising from the imperfect condition of the specimens; and of the remaining seven, four are very minute and one extremely imperfect. The conclusion arrived at regarding this deposit is nearly similar to that relating to the first. The streams, inferior to the Plata, acting together with the currents of a large bay, drifted the remains of the animals towards a point where sand and shingle were accumulating; "the whole area has since been elevated; the estuary and mud of the former ruins have been converted into wide and level plains; and the shoals of the ancient Bahia Blanca now form low headlands on the present coast."

The third locality is in lat. $49^{\circ} 15'$, on the coast of Southern Patagonia, Port St. Julian. The tertiary plains of that country are modelled into a succession of broad and level terraces, which abut one above the other. The whole surface is thickly covered by a bed of gravel composed of various kinds of porphyries. The lower part consists of several varieties of sandstone, and contains many fossil shells, the greater number of which are not found in a living state. The south side of Fort St. Julian is formed by a strip of narrow land nearly a hundred feet in height, and on its surface existing species of littoral shells are abundantly scattered. The gravel is there covered by a thin but irregular bed of sandy or loamy soil, which likewise fills up hollows or channels worn through it. In the longest of these channels the remains of the single fossil quadruped (*Macrauchenia patachonica*) was found imbedded. And Mr. Darwin suggests, that as the Guanaco, the only large animal now inhabiting the plains of Patagonia, often wanders over the extensive flats which are left dry at the head of the harbour during ebb tide, we may imagine that the fossil animal, whilst in like manner crossing the ancient bay, fell into one of the muddy creeks and was there buried. In summing up the whole information collected regarding these deposits, it is considered that there is strong evidence against admitting the theory of a period of overwhelming violence by which these remains were brought to their present state.

The first number, besides the interesting introductory remarks by Mr. Darwin, is nearly entirely occupied with the description of a single gigantic quadruped, of which the cranium was discovered in

the Sarondis, a small stream entering the Rio Negro, about 120 miles N.W. of Monte Video, while an under jaw was procured at Bahia Blanca. In this description there are some very able remarks on the various affinities presented between the remains and the quadrupeds belonging to the Pachydermata, the Rodentia, Edentata and Herbivorous Cetacea, to the first of which it is however more particularly referable. The name of *Toxodon platensis* has been applied to this singular animal, the first or generic term relating to the curved form of its teeth, the latter indicating the locality of its discovery. The skull, which is figured of the natural size, on a large folio folding plate, is in length two feet four inches, in breadth one foot four inches. The subordinate dimensions and a description of every part is minutely given, and the following deductions are made. The teeth consist of molars and incisors, separated by a long diastema or toothless space; in the upper jaw the former are fourteen in number, seven on each side; the incisors four, one very large and one small in each maxillary bone; but although the dentary system is decidedly rodent, yet the number of the molar teeth, and their diminution of size as they advance towards the anterior part of the jaw, indicate an approach to the Pachydermata; at the same time it is observed, the *Capybara*, in the increased size of the posterior grinders and other particularities, presents a somewhat similar alliance to the same tribe. The depth of the zygoma bespeaks the size of the masticatory muscles; and the temporal muscles being also large, it is presumed that the great incisors at the extremity of the jaws were used like the canines of the hippopotamus to divide or tear up the roots of aquatic plants. The osseous parts pertaining to the senses of sight and hearing resemble those of the aquatic Rodentia and Pachydermata. The aspect of the nostrils is placed upwards, as in the herbivorous Cetacea; but in the bony structure they materially differ, by having narrow canals of intercommunication between the nasal passages and the frontal sinus. The articulating condyles of the cranium indicate, that when the body of the *Toxodon* was submerged, the head could be raised so as to form an angle with the neck, and bring the snout to the surface of the water, without the necessity of any corresponding inflexion of the spine. There is no evidence to determine the character of the extremities, whether they were ungulate or unguiculate, while the structure of the nostrils will suggest that the habits of the animal were not so strictly aquatic, as to warrant the supposition that the under extremities were altogether wanting. Altogether the discovery of these remains is one of the most important which has been made for a long period; and in the

concluding words of Mr. Owen's most valuable observations, "It is highly interesting to find that the continent to which this existing aberrant form of rodent is peculiar (the *Hydrochærus*), should be found to contain the remains of an extinct genus, characterized by a dentition which closely resembles the rodent type, but manifesting it on a gigantic scale, and tending to complete the chain of affinities which links the pachydermatous with the rodent and cetaceous orders."

The description of the remains of another large animal scarcely less interesting is commenced in the concluding pages of the number, but we shall not notice this until we receive its completion. Suffice it to say now, that from the portions of the skeleton which have been discovered containing no parts of the skull or teeth, the animal is considered referable to the order Pachydermata, but with affinities to the Ruminantia, and especially to the Camelidæ. It has been named *Macrauchenia patachonica*.

The number is illustrated by seven well-executed lithographic plates.