

probably specimens of *Siphonotreta micula* which occur in these graptolitic shales. His description and figures, as far as they go, correspond with M'Coy's fossil, which I have found at Garple and elsewhere in Dumfriesshire.

NOTICES OF MEMOIRS.

I.—THE FOSSIL FISH OF MOUNT LEBANON.¹

THE fossil fishes of Mount Lebanon appear to have been first noticed in the time of the Crusaders, and subsequently by the travellers Korte, Lebrun, Volney, and mentioned by Scheuchzer, in 1708. They were first scientifically described by Blainville, who noticed two species, and afterwards by Agassiz, Sir Philip Egerton, Heckel, and Pictet. New researches on these fishes by MM. Humbert and Pictet have been published at Geneva, illustrated by 19 plates. By these authors the fishes are considered to belong to the Cretaceous period, from the great number of Teleostean fish and the absence of Ganoids,—from a certain number of genera or groups which exclusively characterize the Cretaceous period—from the great number of extinct genera which give a special physiognomy to these faunas, such as at Hakel, the *Pseudoberyx*, *Petalopteryx*, *Coccodus*, *Aspidopleurus*, and *Cyclobatis*, and at Sahel Alma, the *Pycnosterinx*, *Cheirothrix*, *Rhinellus*, and *Spaniodon*, and lastly, from the fact that the genera which have living representatives are the most abundant at Lebanon, such as the types of the *Beryx*, the *Clupea*, and *Chirocentrites*, which are more or less eminently Cretaceous, or have their commencement in that period.

From a general comparison of the fish fauna of Hakel with that of Comen in Istria,—of the fauna of Sahel Alma with that of the Westphalian Chalk, and both of them with the Cretaceous fauna of England, the authors consider that the fishes of Lebanon belong to the Middle Cretaceous period.

In reviewing this fauna palæontologically, or in relation to the previous Jurassic and subsequent Tertiary periods, some interesting facts appear. Taking the classification of fishes by J. Muller, but three of his sub-classes have fossil representatives, the Elasmobranchs, Ganoids, and Teleosteans. The latter being generally considered to have first appeared in the Cretaceous period, but the genera *Tharsis*, *Leptolepis*, etc., are now recognised as Teleosteans, and related to the *Halecoides*,—fishes which possess in a high degree the normal characters of the class, and of which they represent somewhat the archetype. The Elasmobranchs are not abundant at Lebanon, the principal forms belong to sharks and rays. The Ganoids are not represented in this fauna, for the Hoplopleurides are not true Ganoids. The third sub-class, the Teleosteans, are the most important, and constitute nearly the whole of this fauna. Of this sub-class, the *Halecoides* contain nineteen out of fifty-one species;

¹ Nouvelles recherches sur les Poissons fossiles de Mont Liban, par MM. F. J. Pictet et A. Humbert, Geneva, 1866.

next in importance are the Ctenoids. The fish with pectinated scales present four types respectively, represented by the group of the *Beryx*, the *Pseudoberyx*, the *Pycnosterinx*, and *Platax*. These four types, very distinct at the present day, are found at their first appearance to have some characters in common, which become diminished or effaced in succeeding periods, so that they represent the base of four divergent rays, between which are intercalated all the families which have not existed before the Cretaceous epoch. Other Teleosteans, but much more rare, are also found at Lebanon, such as one or two *Sparoides*, one or two *Gobioides*, and a curious genus, *Petalopteryx*; and lastly, the *Hoplopleurides*, characterized by a series of scales arranged in longitudinal rows, form a group which at present are special to the Cretaceous period. Thus the fauna of Lebanon, like other Cretaceous faunas, presents relations to succeeding and scarcely any to preceding ones; the general character being the great diminution of Ganoid, and their replacement by many Teleostean fishes.—J. M.

II.—COAL DISCOVERIES, AND PRIMORDIAL FOSSILS, IN NOVA SCOTIA, AND NEW BRUNSWICK.

[Extract of a letter from Principal Dawson, F.R.S., etc.]

WHILE your attention in England is much occupied with questions as to the character of your coal-fields, ours in British America is excited by the constantly recurring discoveries of new and greater deposits, almost beyond our present power to utilise them. The great coal-seam of Pictou, thirty-eight feet in thickness, and accompanied by three other workable beds, having an aggregate thickness of nearly as much more, has long been known; but, until recently, its horizontal extent had been proved only over a very limited area. Within the past three years, an extension of these great beds, with only slightly diminished thickness, has been proved over five other properties, which must contain an aggregate workable quantity of at least one hundred and fifty millions of tons of good bituminous coal, and there are the best reasons for believing that a much greater extension of these beds will yet be found. The capabilities of our other coal-fields in Nova Scotia and Cape Breton, are also almost daily receiving new illustrations, by the opening up of additional coal areas. Some of the new mines are being worked by companies in Nova Scotia or in Canada, but the greater part by companies in the United States. It seems strange that these deposits, near the coast, within ten days of England, and in a country where the means of subsistence are cheap, should not attract, to a greater extent, the attention of English capitalists, with the view of making them a means of extending British mining and manufacturing industry.

Little notice appears to have been taken in England of the very remarkable discovery, by Messrs. Matthew and Hartt, referred to in Prof. Bailey's Report, on Southern New Brunswick, and also in a paper by Mr. Matthew, in the Journal of the Geological Society, of

a primordial fauna, equivalent to Barrande's "Etage C.," and to the English *Lingula* flags, in the slates of the vicinity of St. John, New Brunswick. Mr. Billings has recently examined a suite of these fossils, and perfectly agrees with Mr. Hartt, as to their age, which in his opinion will place them below the Potsdam Sandstone, and on the horizon of Salter's Menevian, and will bring for the first time into their true geological position the older slate series of Nova Scotia, Newfoundland, and New England. Mr. Hartt hopes soon to publish descriptions of these fossils, including no less than five species of *Paradoxides*, and seven of *Conococephalites*,

These and other important new facts, I shall endeavour to apply to the elucidation of the geology of the Eastern part of British America, in the new edition of my "Acadian Geology," now preparing for the press.

III.—COAL OF PICTOU, NOVA SCOTIA.

THE coal-field above alluded to, now proposed to be worked, is called the Bear Creek Mine, and is considered by Dr. Dawson and Mr. Robb to be a continuation of the same coal seams as those opened out in the adjacent district, and known as the Albion and Acadian mines. The Pictou coal-field presents peculiar and exceptional characters, as well as local complexities of structure, which Mr. Robb considers to be due, first, "to the existence of folds or flexures in the older rocks previous to the deposition of the Coal-measures; causing irregularities of surface, which by determining the direction and intensity of currents, would produce a great diversity in the thickness and quality of the beds. And secondly, to the continuance of the same elevatory forces which have originated the folds, subsequently to the filling up of the troughs; and producing in the Coal-measures themselves a series of anticlinal and synclinal folds, with dips varying in direction according to the original trend of the rocks; and in amount according to the sharpness of the folds."

The Bear Creek mine comprises about 1080 acres, and has been found to contain four coal seams, the thickest being 19 feet, these beds, according to Mr. Robb, being identical with the Deep, Main, and McGregor seams of the Albion mines. The lowest seam or Frazer oil coal of those mines, yielding on distillation 200 gallons of crude oil per ton, has not yet been discovered at Bear Creek, but there is scarcely any doubt that it exists there. The aggregate amount of coal contained in the four seams discovered is estimated at 24 million tons, allowing for every deduction.

IV.—ON THE DISCOVERY OF FOSSIL HUMAN REMAINS IN THE LEHM OF THE VALLEY OF THE RHINE AT EGUISEHEIM, NEAR COLMAR. By M. FAUDEL.

THE Lehm in which these human bones were found occupies the same stratigraphical position as the Lehm of Alsace, forming the upper part of the "Diluvial Beds." It is a marly deposit, of a

yellowish-grey colour, composed of a mixture of clay, fine sand, and carbonate of lime. It contains in abundance those calcareous concretions called "Kupstein," or "Puppelestein" ("pierres en forme de petites poupées"), and has yielded also three characteristic shells: *Helix hispida*, Linn.; *Pupa muscorum*, Drap.; and *Succinea oblonga*, Drap.

Bones of a large stag (species undetermined), including an almost entire frontal bone measuring 18 centimetres transversely between the horns, were exhumed.

A fine molar tooth of *Elephas primigenius*, and a metatarsal bone of *Bos priscus* were found at the base of the deposit.

All the bones have completely lost their organic matter; their texture is chalky, they are of a white colour, and very fragile.

The human bones consist of a frontal and a right parietal bone, almost entire. They belong to the same skull, and of an adult individual of middle stature. They were found together embedded in the Lehm, and present the same white colour as the other bones, and must have undergone identical alterations in texture and composition.

The author's chief conclusions are that man lived in the valley of the Rhine contemporaneous with the fossil stag, bison, and mammoth, and that the appearance of man in the country would have been *previous* to certain movements of the earth, which took place after the deposition of the "diluvium," and which have given the ground its present physical configuration.—COMPTES RENDUS.

REVIEWS.

I.—QUARTERLY JOURNAL OF SCIENCE. No. 13, January, 1867.

SEVERAL articles of general interest are contained in this Journal. The first, entitled, "*Sir Charles Lyell, and Modern Geology*," accompanied with a lithographic portrait, sets forth the claims of that philosopher to be considered as the "founder of Modern Geology," in the sense of his being the man who first clearly defined the principles of geological investigation, and is a review of his more popular works. The article is written in a clear, sound, and philosophical manner, and forms an essay on the progress of Geology, as well as an autobiographical sketch of its modern historian.

A second paper is on "*the Ignigenous Rocks, near Montbrison*," by Dr. Daubeny, a supplement to his previous paper (see *GEOL. MAG.* Vol. III. p. 216) on the Antiquity of the Volcanos of Auvergne. The only igneous rocks observed in the neighbourhood of Montbrison consist of a compact basalt, with nests of olivine, a material which could only have been elaborated by the aid of great pressure, and under a different configuration of the surface from that now existing, and the author concludes that a vast antiquity must be assigned to these basalts.

Mr. A. R. Wallace contributes an article on "*Ice-marks in North Wales*," a review of Glacial Theories and Controversies; and Mr.