

The country explored stretches from the N.E. corner to the S.W. Every locality in which lignite had been met with was visited. The most northerly of these, at Húsavik, presents a coast-section showing 200 feet of tuffs with bands of lignite, 200 feet of the same with marine shells, and an immense series of overlying tuffs, which are unfossiliferous, and were followed, ten miles further north, to Tjórnes, almost within the Arctic Circle. The shells, a series of which were exhibited, indicate a warmer sea, and, in the author's opinion, are of an age a little anterior to the Crag. It is hoped that Dr. Gwyn Jeffreys, who has several times examined them, may pronounce a definite opinion in regard to this. A number of sections towards the interior were visited, one of the finest being in a cañon near Hof, where the sides are upwards of 1000 feet high, and nearly vertical, exhibiting an alternation of semicolumnar basalts, ash-beds, and laterites, capped by rhyolites. These rhyolites are very beautiful, and cap the basalts over a wide area, being themselves overlain by other and more irregular streams of basalt and tuffs. The country has been subjected to immense denudation, and is cut up into rolling flat-topped hills such as characterize basaltic regions elsewhere. The horizon from which most, if not all, the fossil plants from Iceland have been obtained, is that of the rhyolites—a more recent series than any represented in the British Isles or even in the Faroes. Their age may have been correctly assigned to the Miocene.

CORRESPONDENCE.

RELATIVE AGES OF AMERICAN AND ENGLISH NEOZOIC SERIES.

SIR,—Mr. J. Starkie Gardner, in his memoir "On the Relative Ages of the American and the English Cretaceous and Eocene Series" (*GEOLOGICAL MAGAZINE*, November, 1884, p. 504), says, "Professor Marcou wrote that he considered all the supposed Cretaceous rocks of California to be Tertiary, but without going so far as that, there can be no question about the Tejon Group, at least, being of that age." This statement is erroneous.

In my "Note sur la Géologie de la Californie" (*Bulletin Soc. géol. France*, tome xi. p. 407, 1883), which I suppose is the paper referred to, I have described the Cretaceous rocks of the vicinity of Shasta-city as being the only region of California, so far as explorations have yet been made, where the Cretaceous rocks truly exist. It is what Mr. Starkie Gardner calls "the Shasta group," "held to be of the antiquity of the Gault." On that age nothing yet definite can be said; and I believe it is prudent to reserve expressing a decided opinion until more material has been collected and described.

As to the "Chico group" quoted as the "supposed equivalent to the Chalk formation of Europe," I have shown the palæontological reasons why it should be considered as representing the lower part of the Eocene. At Chico creek, where it was first discovered, only two or three degenerate Cephalopoda have been found, amid a magnificent and very numerous fauna of Gasteropoda and Acephala, characteristic of true Lower Tertiary in America as well as in Europe.

The "Martinez group," also quoted as Cretaceous, is only a subdivision, composed of a few passage-beds without real value, and ought to be dropped.

Then comes the "Tejon Group," which Mr. Starkie Gardner admits as being Tertiary without question.

The Cretaceous series of North America are far more complete than represented in Mr. Gardner's paper; for he has overlooked entirely the Cretaceous rocks of Texas and the Lower Mississippi basin. The expression of "Lower Cretaceous" of America, as used by him, is misleading, for it means only the lower parts of the Cretaceous rocks of the basin of the Upper Missouri, where neither the Lower Cretaceous or even the Middle Cretaceous of Europe are found. It is even very doubtful if there is a representative of the Marly Chalk (*craie tuffeau de Touraine*) or "Turonian."

The "Dakota and Fort Benton groups" represent with their fossils, such as *Ptychodus* and other fishes, *Inoceramus*, etc., the White Chalk of Sens or "Senonian"; and certainly are not older than the lower part of the Upper Cretaceous rocks of England and France. All the upper divisions, called "Fort Pierre and Fox hills groups," are the representatives of the most upper part of the European Cretaceous rocks called "Danian," and which exist at Mäestricht, Aix-la-Chapelle, Cibly near Mons, Faxö in Denmark, in Provence, and the Pyrenees.

The "Laramie group" represents the lower part of the European Eocene from the Pisolitic limestone of Paris, the Meudon clay, the Rilly limestone, the Paris Plastic clay, the Puddingstone of Nemours, the Soissonais sands, the beds of the Isle of Thanet, as far up as the Middle Eocene of Sir Charles Lyell. It represents and corresponds to the "Chico group" of California.

And because *Mosaurus* exists in the Laramie, that does not make it Cretaceous, any more than the existence of the degenerated *Ammonites* and *Baculites Chicoensis* at Chico Creek makes the "Chico group" Cretaceous. But it only shows that *Mosaurus*, *Ammonites*, and *Baculites* existed in America at the beginning of the Tertiary period, when they had already finished their existence in Europe.

CAMBRIDGE, MASSACHUSETTS, UNITED STATES,
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JULES MARCOU.

THE CLASSIFICATION OF THE JURASSIC SYSTEM.

SIR,—I am indebted to Mr. A. J. Jukes-Browne's letter in the GEOLOGICAL MAGAZINE for last November, for an opportunity of explaining my reason for proposing, in my note on the Classification of Sedimentary Strata, to draw the line of division between Upper and Middle Jurassic above the Oxford Clay.

I mentioned in my note that this was a doubtful question, and the weight of authority is in favour of Mr. Jukes-Browne's view, that is, of classing the Oxford Clay as Upper Jurassic, though many continental geologists consider the Kelloway Rock (Callovian) as pertaining to the Middle series, owing to the German equivalent belonging to the Dogger or Brown Jura. At the Zurich meeting of the