

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, Cipy 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,
November 12th, 1884.

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

International Committee of Geological Nomenclature, in 1883, a majority voted in favour of the limit between the two divisions being drawn below the Callovian.

The lines of division to which geologists generally attach importance are breaks in the sequence, shown by unconformity or by changes in the sedimentation. Mr. Jukes-Browne very naturally wishes, as most other English geologists have done, to draw a limit where the calcareous deposits of the Middle Jurassics cease in England, and the argillaceous beds of the Upper Jurassics come in. Such a division, however well marked locally, has no general value, the change being confined to but a small portion of the earth's surface.

My reason for classing the Oxford Clay as Middle Jurassic is that, by so doing, the series or primary subdivisions of the system are more nearly equal in value. I take four fairly representative modern classifications, those of Renevier (1873-74), Meyer-Eymar (1881), Geikie (1882), and De Lapparent (1883). Under Renevier's arrangement, if the Oxford Clay (and Callovian) be classed in the higher series, the upper subdivision would contain 3 "*systèmes*" comprising 9 "*étages*," the middle 1 "*système*," and 4 "*étages*." By Meyer-Eymar's arrangement, the upper would contain 4 *étages* consisting of 12 *sous-étages*, (or if the Purbeck, classed by Meyer-Eymar in the Lower Cretaceous series, be added, as it would by most geologists, 5 and 14), the middle 3 *étages*, consisting of 8 *sous-étages*. In Mr. Geikie's classification two divisions would be assigned to the Upper Jurassic, one only to the Middle, whilst in De Lapparent's 4 *étages* with 11 *sous-étages* would belong to the former, and only 2 *étages* with 4 *sous-étages* to the latter. If on the other hand the Oxfordian and Callovian are classed with the Middle Jurassic, the difference in palæontological importance between that and the upper subdivision, under any of the systems of classification quoted, would be small.

I carefully abstained from proposing new names, as so many have already been given to various Jurassic subdivisions. Those proposed by Mr. Jukes-Browne have certainly an advantage, on the score of euphony, over the terms Malm and Dogger, but the latter are widely known.

I must deprecate the use of the term "stage," in the sense in which it is employed by Mr. Jukes-Browne. An English term is urgently required as the equivalent of the French *étage*. This is never used for divisions of the rank of upper, middle or lower Jurassic, but always for smaller terms such as Purbeck, Portland, Kimmeridge, etc. If "stage" is restricted to the same meaning, the term will be far more useful than if employed as loosely as, for instance, "group" and "series" have been.

November 19th, 1884.

W. T. BLANFORD.

WE regret to announce the death of Mr. Searles V. Wood, F.G.S., Treasurer of the Palæontographical Society, on Sunday the 14th December, 1884, at his residence, Beacon Hill House, Martlesham, Woodbridge, after an illness of nine years duration.