FOSSIL-HUNTING IN WYOMING.

EDITOR OF SCIENCE: An article on 'Fossil-hunting in Wyoming,' published in the January issue of *The Cosmopolitan*, contains some inaccuracies which ought to be corrected. The present writer feels called upon to make these corrections. As many of the illustrations used in the *Cosmopolitan* article were from photographs of the Field Columbian Museum quarries, the erroneous impression has gone out in certain quarters that members of this institution were responsible for some of the misstatements, especially one which has been interpreted as a reflection upon a man to whom the science of paleontology owes much. I wish, therefore, to give a brief history of the discovery and collection of Dinosaurs in America, which I have sought to make as accurate as possible. The data regarding their discovery and early collection have been furnished me by Dr. Williston, whose association with Professor Marsh during his early work upon the Dinosaurs places him in position to speak authoritatively.

The first Jurassic fossil discovered in America was described in 1870 by Leidy under the name *Antrodemus* (*Labrasaurus*, Marsh, *fide* Lucas). Professor Arthur Lakes of Golden, Colorado, was, however, the first to recognize and appreciate the value of the deposits. In March, 1877, he located the horizon near Morrison, Colorado, and immediately sent specimens to Professor Marsh. Almost contemporaneously but a little later, fossils were discovered at Cañon City, Colorado, by O. Lucas, a teacher, and in Wyoming by W. H. Reed, a section foreman on the Union Pacific railroad. Reed, however, did not make known his discoveries until the following autumn and so forfeited any claim to priority.

In December of the same year Dr. Williston, who had been collecting for Marsh at Cañon City and later at Morrison, was sent to investigate the discovery reported by Reed at Como, Wyoming. Under his directions and assisted by Reed, quarry 1. of the Como series was at once opened and the work continued until late in the winter. During the succeeding years collecting was actively carried on in the Como region and as many as thirteen quarries in all were opened by the various men who had charge of the work. Collecting was carried on exclusively by Marsh for two or three years, at the end of which time Cope sent men into the immediate vicinity. After the Como quarries were abandoned, no collecting was done in the Jurassic beds for a number of years and the impression went out that the locality was exhausted. Interest in the beds was, however, revived by Professor W. C. Knight of the University of Wyoming, and W. H. Reed, who as early as the summer of '94 located and opened a new quarry at Mexican Mines, Wyoming. In the following summer Dr. Williston with a party from Kansas University was invited to share with them their new prospect. In '96 collecting was continued by the University of Wyoming in the Jurassic beds south of Laramie. In the spring of '97 the American Museum of New York sent men into the old Como locality to reopen Marsh's mammal quarry; but finding more promising material in the Dinosaur beds, their attention was turned to them. About the same time Knight's men opened quarries in the Freeze-out Hills. During the following year collecting was actively carried on by these two parties in their respective localities, and valuable quarries opened by both.

In '99 unusual attention was attracted to the Dinosaur beds of Wyoming by various press reports more sensational than accurate. In addition to the two institutions which had been carrying on active work, parties were sent out by the University of Kansas and by the Carnegie and Field Columbian museums. The Union Pacific railway also organized an excursion to the fossil fields, which brought not only paleontologists and geologists, but men interested in almost every branch of natural science to look at this new Eldorado. Among the new quarries opened during the year, those of the Carnegie Museum and Kansas University proved especially productive.

The valuable deposit worked out by the Field Columbian Museum party had not previously been passed over by 'a Kansas University professor,' as stated by the author of the *Cosmopolitan* article. On the contrary the quarry had been located and worked for some time by the Kansas University men. After they had taken out a large quantity of unusually good material

and returned home, the Field Museum party made a new stripping beside the old and obtained from it large additions to its summer's collection. Photographs of the fossils exposed in the various stages of the work of this party formed the subjects of many of the illustrations used in the *Cosmopolitan* article.

Elmer S. Riggs.

Field Columbian Museum.

January, 23, 1900.

CURRENT NOTES ON PHYSIOGRAPHY.

PHYSIOGRAPHY OF JAMAICA.

In connection with his studies of coral reefs, Mr. Alexander Agassiz has had surveys made of several West Indian islands by R. T. Hill, whose latest report is on the 'Geology and Physical Geography of Jamaica' (Bull. Museum Comp. Zool., Harvard College, xxxiv, 1899, 256 p., xli pl., including a topographical and a geological map). The island contains an interior mountainous area (the Blue mountains, 7360 feet), of greatly deformed rocks and of well subdued and elaborately carved form, occupying about one-sixth of the total area, chiefly in the east. A limestone plateau, whose gently arched strata were deposited unconformably upon the denuded older rocks during a period of submergence, rims around the eastern mountains and covers the central and western parts of the island to heights of 3000 feet; it is terminated toward the coast by strong bluffs, often terraced, 1200 feet high on the north. Below the bluffs, low plains descend gently to the sea. Solution has exerted great control over the drainage of the plateau, as may be seen in the interesting series of depressions, from incipient hollows of small size, to deep 'cock-pits' or sink-holes, and great basins, walled in by strong cliffs. Some of the basins still have underground drainage; others discharge their waters through canyons that have been formed by the retrogressive erosion of exterior rivers; while still others have lost their outer wall by the greater advance of erosion, subaërial or marine, and now form amphitheaters open to the coast. Inliers of older rocks sometimes rise in mountain form from the floor of the larger basin, as in Clarendon valley in the center of the island. The strata of the coastal plains lie on denuded benches of limestone or older rocks; their surface is diversified by coral reefs and transverse valleys, the first deposited, the second eroded during the time of elevation. The largest plain is that of Liguanea, upon which Kingston is situated.

The geological structure and history of the island, and its relation to the surrounding regions are fully discussed.

NICARAGUA CANAL ROUTE.

No article recently published gives better illustration of the practical value of the explanatory or genetic method in geographical description than that by Hayes on the 'Physiography of the Nicaragua Canal route' (*Nat. Geogr. Mag.*, x, 1899, 233–246; see also Science, x, 1899, 97–104). One feels on reading it that the author has critically observed the salient facts and that his account of them fully expresses the results of his observations. The region described may be divided into three parts: The upland traversed by the San Juan river from Lake Nicaragua eastward to the Carribbean, the basin of the lake, and the upland or continental divide that separates the lake from the Pacific. The eastern upland is part of an uplifted and dissected peneplain, 100–200 feet above sea level, and bordered by hills and mountains on the north and south. Its revived streams still run nearly at the upland level in their upper courses; then they descend rapidly in young valleys that they are still deepening to aggraded alluvial floors, which suggest a recent depression after the time of first valley cutting. The lake now stands where a bay once opened northwest to the Pacific; the eastern upland was then the continental divide. The bay seems to have been formed by warping or faulting a western portion of the peneplain above referred to. Numerous volcanic cones grew on the bay floor and converted its head into the lake, whose level rose until an eastern overflow formed the San Juan river, now cutting a trench across the eastern upland. The southwestern barrier of the lake seems to be another part of the peneplain, warped so as to give a steep descent to the Pacific and a gentler descent to the lake. On account of the unequal slopes thus determined,