one Rhomb-marked Snake (*Psammophis rhombeatus*), four Crossed Snakes (*Psammophis crucifer*), one Hygian Snake (*Elaps hygiæ*), two —— Snakes (*Dasypeltis scabra*) from South Africa, presented by Messrs. Herbert Melville and Claude Beddington; one Smooth Snake (*Coronella lævis*), two Common Snakes (*Tropidonotus natrix*) from Oxfordshire, presented by Mr. A. W. S. Fisher; one Otter (*Lutra vulgaris*) from South Wales, received in exchange; two White-tailed Sea Eagles (*Haliaëtus albicillay's*) from Norway, three Indian Python (*Python molurus*) from India, deposited; one Macaque Monkey (*Macacus cynomolgus*) from India, one Pardine Genet (*Genetta pardina*) from West Africa, purchased; one Vinaceous Turtle Dove (*Turtur vinaceus*), bred in the Menagerie.

OUR ASTRONOMICAL COLUMN.

LIGHTNING SPECTRA.—Mr. W. E. Wood, of Washington, has continued his observations of lightning spectra for the purpose of determining the origin of some of the lines previously recorded by him (NATURE, vol. xlii. p. 377). The result is that he is now able to say, in the *Sidereal Messenger* for August:—"Lightning spectra present but the characteristic lines of oxygen, hydrogen, nitrogen, and carbonic acid, and—what was puzzling to me—the line of the vapour of sodium. The absorption bands which I find in lightning spectra I think might be produced by the moisture in the air, a large quantity being present during thunderstorms." It is suggested that the sodium line owes its presence to the existence of meteoritic *débris* in the atmosphere.

A NEW ASTEROID.—The 315th asteroid was discovered by Charlois on September 1.

THE INTERNATIONAL GEOLOGICAL CONGRESS: WASHINGTON MEETING.

THE fifth meeting of the International Geological Congress, being the first ever held in America, was held at the Columbian University, Washington, from August 26 to September 1, with an attendance of sixty or seventy foreigners, from Austria-Hungary, Canada, Chili, France, Germany, Great Britain, Mexico, Peru, Roumania, Russia, Sweden, and Switzerland, and about two hundred members from the United States. The papers and discussions were generally in English, though French and German were to some extent spoken. French has been the language of all the previous Congresses.

Profs. James Hall and James D. Dana were elected Honorary Presidents, and J. S. Newbery Acting President. Owing to the absence of the latter, the chair was filled in turn by several of the Vice-Presidents.

FIRST DAY.—After the election of officers, as nominated by the bureau, Prof. Joseph Le Conte, as senior Vice-President, took the chair, and delivered the opening address, in which he said that the idea of an International Congress was born in America in 1876. Previous meetings have been held at Paris in 1878, Bologna in 1881, Berlin in 1885, and London in 1888. He briefly stated the purposes of this Congress, which were afterwards carried out—namely, to discuss classification of the Pleistocene rocks, of correlation, and of map notation. He compared the maps of Europe and America, showing the complexity of the former and the simplicity of the latter. He then considered some points in American geology:—(1) The general continuity of the record. (2) The prevalence of extensive faults, ranging from 100 to 2000 feet, and extending over great distances. (3) Peculiarities of mountain structure. Prof. Gilbert has discovered a new type of mountains formed by uptilted strata. The Sierra Nevada is an illustration. (4) Extensive lava floods, covering areas from 10,000 to 100,000 square miles in extent, and from 2000 to 4000 feet deep. No such floods are found elsewhere. Those of India are the nearest approximation; but in Europe the lava beds are small and much cut up. (5) The great continental movement, commencing in the later Tertiary, and terminating in the beginning of the Quaternary, which has caused changes of level amounting to 2500 or 3000 feet on both sides of the continent. (6) The ice-sheet of the glacial epoch was first and most completely demonstrated in America.

Other addresses were delivered by Mr. Hubbard, Chairman of the Local Committee; Mr. Noble, Secretary of the Interior, who has official control and supervision of the Geological Survey of the United States; Prof. Hughes of England, Prof. Gaudry of France, and Major Powell, Chief of the Geological Survey.

SECOND DAY.—The entire day was occupied by a discussion on classification of the glacial Pleistocene deposits. Prof. T. C. Chamberlin opened the discussion by stating that classification might be made on three grounds: (1) structural; (2) chronological; (3) genetic. The first was very easy, being an obvious division into assorted and unassorted drift. The second was extremely difficult, and could not be accurately made till after a full determination of the third. He accordingly proposed the following general classes: (1) formations produced by the direct action of Pleistocene glaciers; (2) formations produced by the combined action of Pleistocene glaciers and accompanying glacial drainage; (3) formations produced by glacial waters after their issuance from Pleistocene glaciers; (4) formations produced by floating ice derived from Pleistocene glaciers; (5) formations produced by shore ice and ice floes due to low Pleistocene temperature, but independent of glacier action; (6) formations produced by winds acting on Pleistocene glacial and glacio-fluvial deposits under the peculiar conditions of glaciation.

This paper was discussed very thoroughly. Prof. T. McK. Hughes pointed out that the classification suggested by Prof. Chamberlin was purely genetic. He then explained the abundance of striated boulders in one part of the glacial deposits and their absence in another. If the supply of material (that is, of rock bosses above the ice) ceases at any point, then all the boulders will gradually sink through the ice and become glaciated at the bottom. Prof. Hughes also thought that two distinct types of ridges formed of glacial material were confused under the names—kames, osars, and eskar. He also explained the "pitted plains" as due to an unusual interruption between the hills or ridges of eskar character. He expressed his opinion that the glacial period was a continuous one, in England at least, except for slight changes due to unimportant oscillations.

Mr. McGee mentioned the importance of land forms in interpreting geological processes. Any primary geological classification must be genetic. He discussed in detail the following scheme of classification of Pleistocene deposits:—

Classification of Pleistocene Formations and Land Forms.

A. Aqueous:
  1. Below base level.
    a. Marine.
    b. Estuarine.
    c. Lacustral.
  2. At base level.
    a. Littoral.
    b. Marsh.
    c. Alluvial (certain terraces, &c.).
  3. Above base level.
    a. Torrential.
    b. Talus (including playas).

B. Glacial:
  1. Direct (Chamberlin's Class I.).
  2. Indirect (Chamberlin's Classes II. to V., in part).

C. Aqueo-Glacial (Chamberlin's Classes II. to V., in part).

D. Eolic (Chamberlin's Class (?) VI.).

E. Volcanic:
  1. Direct.
    a. Lava sheets.
    b. Cinder cones.
    c. Tuffs, lapilli sheets, &c.
  2. Indirect.
    a. Ash beds.
    b. Lapilli sheets.

Prof. Chamberlin, in closing the discussion, said that there was great difficulty in applying a chronological classification, and that such a classification might even act as a barrier to observation and to the recognition of the truth. Chronological classification is the ultimate goal of glacial studies, but it is something for which we are not as yet prepared. Red, oxidized sub-soils are not developed in northern latitudes. Organic deposits between glacial layers are abundant in the West, but do not belong to a single horizon. Many facts of erosion and

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