thickness than was formerly supposed. Preglacial stream valleys were also treated.

In the absence of the authors the following papers were read by title:

14. 'Progress of Hydrographic Investigations by the United States Geological Survey,' by F. H. Newell, Washington, D. C.

15. 'Stylolites,' by Professor T. C. Hopkins, State College, Pennsylvania.

Tuesday was given to the Geological Society, and Wednesday afternoon the Section met with Section H, joining in the discussion of the human relics found in the Trenton gravel.

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GEOLOGICAL SOCIETY OF AMERICA.

THE ninth summer meeting of the Society was held at Detroit, August 10th, under the presidency of Professor Edward Orton.

The Secretary announced the election of nine fellows.

The following papers were read:

1. 'The Granite Mountain Area of Burnet County, Texas,' by F. W. Simonds. The area described embraces about fifty square miles, from which the overlying strata have been removed, and the granite reduced to a plain, except at Granite Mountain and Johnson's Rock, which rise about one hundred feet above the general surface. The granite is a biotite granite and is quarried on a considerable scale, affording an excellent building material. After reviewing the opinions of Walcott, Hill and Comstock in regard to the age of the granite, the author concluded that the intrusion accompanied post-Carboniferous disturbances, and may have been as late as Cretaceous.

2. 'Stratigraphy and Structure of the Puget Group, Washington,' by Bailey Willis. The Eocene and Miocene strata adjacent to Seattle and Tacoma are folded and faulted in a manner closely analogous to that of the Appalachian region, but the compressing force acted from the west instead of the east. The fresh-water Eocene is much like the eastern Carboniferous, consisting of arkose sandstones and clay shales containing iron carbonate nodules, with beds of coal or black shale every one hundred, to one hundred and thirty, feet. The total thickness exceeds eight thousand feet. When slightly disturbed, the coal is lignite, but as the amount of disturbance increases there is a passage into steam coal with cubical fracture, and, finally, into coking coals. The coals, being planes of easy slipping, have greatly affected the folding, and have themselves often been crushed to powder.

3. 'The Loess as a Land Deposit,' by J. A. Udden. Observation indicates that the air is not depositing dust in sufficient quantities to build the loess, which spreads over such great areas, at elevations ranging from 300 to 3,000 feet. But the amount deposited varies greatly and may have been much larger in early post-glacial times. The loess closely resembles undoubted wind-blown deposits, while in its uniformity and prevailing lack of bedding plains it is quite different from most aqueous sediments. On the whole, the actual phenomena exhibited by the loess seem to accord better with the hypothesis of Eolian origin than with any other.

4. 'Analogy between Declivities of Land and Submarine Valleys,' by J. W. Spencer. With the aid of diagrams, the author pointed out the close resemblance existing between subaërial and submarine valleys, particularly in the Antillean region. He concluded that such similarity of topography must indicate a common origin, and that the present sea bottom must be a submerged land surface. This shows a sinking of ten to fifteen thousand feet in the Antillean basin, which was probably compensated by an elevation in the region of Mexico.

5. 'Great Changes of Level in Mexico, and the Inter-Oceanic Connections,' by J. W. Spencer. The geological basement of Mexico is a post-Cretaceous base level, out of which rise the higher mountains. A deep-water formation of Mio-Pliocene age rests unconformably upon the Cretaceous. These rocks, by their distribution, point to a Pliocene submergence, with 'canals' or straits connecting the Pacific and Gulf waters. This conclusion is further substantiated by the similarity of the shallow water faunas on the opposite sides of the isthmus, the deeper water forms being quite unlike. This connection was broken by a recent, almost modern, elevation, amounting, in some places, to 8,000 feet.

6. 'The Origin of the Gorge of the Whirlpool Rapids of Niagara,' by F. B. Taylor. From the falls to the cantilever bridge the Niagara gorge is broad. At the latter point it suddenly narrows, and the diminished width continues to within eighty rods of the whirlpool. From here to Lewiston it is wide again. The author ascribed the formation of the broad upper and lower gorges to the action of the great cataract carrying the entire discharge of the upper lakes. The narrow gorge of the whirlpool rapids was referred to a smaller cataract, when the three upper lakes were draining through the Nipissing into the Ottawa. Thus, the latter gorge, being cut by a comparatively small river, must have required for its formation a long time, probably not less than 20,000 to 25,000 years. This considerable period must, therefore, be reckoned with in estimating post-glacial time.

7. 'The Glacial Drainage of the Simcoe Area in Ontario,' by F. B. Taylor. In this paper the author gave reasons for believing that during a period when the Nipissing outlet was closed, a drainage channel was established from Georgian Bay through the River Trent.

8. 'Exposures near Detroit of Helderberg Limestone, and Associated Gypsum Salt, and Sandstone,' by W. H. Sherzer. The highest rocks exposed in southeastern Michigan are Upper Helderberg, nearly or quite equivalent to Corniferous. They are very pure limestones with chert beds, and have a thickness of 100–160 feet. Beneath them is a series equivalent to the Water-lime, chiefly drab dolomites, sometimes oölitic. Some distance below the top of the Water-line is intercalated a bed of white sand, almost pure quartz, many of whose grains show secondary enlargment. Extending to a depth of over 2,000 feet beneath Detroit is a series of beds of gypsum and rock salt, the latter aggregating a thickness of five hundred feet in three beds. Thus, Detroit possesses, in almost unlimited quantities, the pure limestone and salt which are the raw materials of the soda ash and caustic soda industry.

The following papers were read by title:

9. 'Notes on the Geology of the Lower Peninsula of Michigan,' by A. C. Lane.

10. 'The Nomenclature of the Carboniferous Formations,' by R. T. Hill.

11. 'Ice-transported Boulders in Coal Seams,' by E. Orton.

12. 'Clay Veins Vertically Intersecting Coal Measures,' by W. S. Gresley.

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REGENERATION IN OLIGOCHAETE WORMS.

Professor T. H. Morgan, of Bryn Mawr, has made the following summary of recent studies upon regeneration in worms:*

1. Pieces of the anterior end of Allolobophora fœtida containing less than thirteen segments rarely, if ever, regenerate posteriorly, yet such pieces can regenerate very quickly anterior segments if these are cut off. The result shows that the lack of power of the anterior pieces to regenerate

* Archiv für Entwickelungsmechanik, V. Band, 3 Heft.