Rush Medical College. He has taught at Northwestern University and at the University of Illinois, where he is now an associate professor of surgery.

AFTER a service of forty-five years as professor of chemistry and head of the department of chemistry at Colgate University, Dr. Joseph Frank McGregory has resigned and has been appointed professor emeritus of chemistry. Dr. R. Chester Roberts, who has been acting head of the department during the past year, has been appointed head of the department. Dr. Raymond J. Hemphill has resigned as assistant professor of chemistry and has accepted a research appointment at the Pittsfield plant of the General Electric Company. Dr. Kenneth H. Goode, research chemist for the Sylvania Products Company, of Emporium, Pennsylvania, has been appointed assistant professor of chemistry and Dr. Paul B. Gleason assistant professor of physics.

AT the school of medicine, Western Reserve University, the following promotions and new appointments have been made in the preclinical departments: Dr. George B. Ray has been promoted to be associate professor of physiology; Drs. O. W. Barlow and W. F. von Oettingen to be assistant professors of pharmacology; Dr. Alan Moritz to be assistant professor of pathology, and Dr. Edward Muntwyler to be senior instructor in biochemistry. New appointments have been made as follows: Dr. David Seecof, assistant professor of pathology; Dr. La Verne Barnes, senior instructor in bacteriology and hygiene; Drs. J. P. Quigley and F. D. McCrea, senior instructors in physiology; Dr. Richard Bolt, associate in hygiene and preventative medicine, and Mr. F. C. Bing, instructor in biochemistry. Dr. Howard T. Karsner, professor of pathology since 1914, has been given the added title of director of the institute of pathology. The department of pathology recently moved from the school of medicine to the institute building, which has just been completed. Dr. Victor C. Myers has been elected secretary of the faculty.

DR. RALPH B. SEEM, of the Billings Memorial Hospital of the University of Chicago, has been appointed physician superintendent of hospitals and professor of hospital administration in the medical school of Stanford University, in place of the late Dr. R. G. Brodrick.

PROFESSOR F. WOOD JONES, Rockefeller professor of physical anthropology in the University of Hawaii, has accepted a professorship of anatomy at the University of Melbourne to succeed Dr. R. J. A. Berry, who recently resigned.

RICHARD VYNNE SOUTHWELL, F.R.S., fellow of Trinity College, Cambridge, has been elected professor of engineering science in the University of Oxford, in succession to Professor C. F. Jenkin.

DISCUSSION

COLUMNAR STRUCTURE IN LIMESTONE*

THE occurrence of columnar structure in limestone is rare. As a result, its origin and characteristics have not been adequately recorded in geologic literature.

The late Dr. Salisbury mentions columnar structure[1] in subaqueous clay in the vicinity of Menomonie, Dunn County, Wisconsin. He found distinct concentric lines on the cross-section surfaces of the columns and ascribed their origin to concretionary action. Other columnar structures in Devonian waterlime have been reported[2] from the vicinity of Stroudsburg, northeastern Pennsylvania, but no detailed account of the nature of their origin is available. They are known to be very similar to columnar structure in basalt and have ball-and-socket joints.

In limestone only one example of this structure has ever been recorded. This occurs in the lower two thirds of a bed in Silurian limestone at the base of Mt. Wissick on the shore of Temiscouata Lake, opposite Cabano, Quebec. Dr. E. M. Kindle in an excellent article, "Columnar Structure in Limestone,"[3] describes the stratigraphy of the locality and shows that the limestone was formed under littoral conditions. He assigns its development into columns to mud-cracks which extended to a depth of from ten to twenty-four inches and which were filled up by sediments having a somewhat more argillaceous composition than the limy beds cut by the mud-cracks.

In the summer of 1927, the writer, while a member of the Rawson-MacMillan Expedition for Field Museum, had the opportunity to observe at Silliman's Fossil Mount, Frobisher Bay, Baffin Land, another example of limestone breaking into irregular

* Since this article has gone to the press a paper by Branson and Tarr on "New Types of Columnar and Buttress Structures," believed to have originated through differential solution and pressure acting in a manner similar to that which produces stylolitic structures, has appeared in the December, 1928, number of the *Bulletin of the Geological Society of America.*

[1] R. D. Salisbury, "Columnar Structure in Subaqueous Clay," SCIENCE, new ser., 5: 287, 1885.

[2] W. O. Crosby, "Dynamical and Structural Geology," Bost. Soc. Nat. Hist., 1892, p. 268.

[3] Canada Geological Survey, Museum Bull., No. 2, Geological ser., No. 14, 1914, pp. 35–39.

columns. Silliman's Fossil Mount is in 63° 43′ north latitude and 69° .02′ west longitude. It stands at the head of the bay, about 300 feet from high tide and two and one half miles south of Jordan River. It is a hill of horizontally bedded limestone which lies unconformably on the hills of Meta Incognita. It is about three fourths of a mile long and 320 feet high (by aneroid) and runs in a general northwest and southeast direction. The entire mount, so far as its stratigraphy[4] is known, is of Middle Ordovician age. It is significant to note that the mount is the only sedimentary deposit in place that has been found in the entire region of the bay, which is nearly 150 miles long and about fifty miles wide at its entrance from the Davis Strait. The existence of such an isolated hill of Ordovician age is at once interesting and problematic. It has been suggested by previous explorers[5] that the mount is an accumulation of glacial drift. The fact, however, that the limestone is horizontally bedded is evidence enough that it must have been a deposit in place. The chronology of the geologic history of Frobisher Bay will be discussed in a later paper. For the present, it suffices to say that Silliman's Fossil Mount is either a remnant of erosion of the deposits laid down by the Ordovician and later seas on the irregularly eroded Archean surface or it is the result of erosion of sediments from graben developed during post Ordovician-Devonian faulting.

The columns observed by the writer are few in number and occur only in the uppermost beds at the southeast end of the mount. They vary in width and in the number of faces. The columns stand approximately perpendicular to the bedding plane, although some lie at an inclination of several degrees. Disintegration of the columns appears to be very rapid. In fact, talus has reached within fifteen feet of the summit. The limestone composing the column is of buff color, slightly brownish when freshly fractured. It is fine-grained and compact, and when dissolved in acid leaves a small amount (10 per cent.) of argillaceous residue. Although fossiliferous, it seldom yields small fossils. Large cephalopods and gastropods are its principal fauna.

[4] Charles Schuchert, "On the Lower Silurian (Trenton) Fauna of Baffin Land," *Proc. U. S. Nat. Mus.*, Vol. XXII, Washington, 1900. The writer has made an extensive collection of fossils at Frobisher Bay, conclusions as to the stratigraphical significance of which will be published at a later date.

[5] Since Sir Martin Frobisher discovered the bay in 1576, Silliman's Fossil Mount has been visited by four parties: Charles F. Hall (who discovered and named the mount) in 1861; five members of the Seventh Peary Arctic Expedition in 1897; eight members headed by Russell W. Porter in 1898, and three members of the Rawson-MacMillan Expedition for Field Museum in 1927.

These columns can not be ascribed to concretionary action. There is no evidence of concentric lines on their cross-section surfaces. Neither can they be ascribed to mud-cracks, since no filling material adheres to their adjacent faces. Again, as a rule, the fissures between columns resulting from mud-cracks diminish downward and terminate abruptly upward. In cross-section, mud-cracks are wedge-shaped (unless the walls of the cracks are parallel) and columns originating from them are likely to correspond with the walls and be wedge-shaped.

In the view of the writer the irregular columns in the limestone at Silliman's Mount are the result of a joint system developed from tensional forces acting during the uplift of the area. Joints producing cubical blocks in stratified rocks have two directions, vertical and at right angles. In this case there is an additional diagonal direction which does not lie in the line of intersecting points of the vertical and right-angled joint planes. In such a joint system there will be a series of columns having from three to six faces. Ordinarily the three-sided columns (being thinner and more angular) will disintegrate first separating the other columns and somewhat increasing the columnar effect of the strata.

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FORESTS AND PRECIPITATION

THE relation of forests to precipitation has given rise to much discussion but has called forth relatively few facts. The following observation seems therefore worth presenting because it is definite.

On July 4, 1929, the writer was motoring through north central France, between Paris and Tonnerre, a region intensively cultivated but containing patches of forest of varying size. Most of the forests are of oak and beech, managed under the system known as coppice under standards. The trees are not tall, the standards not over thirty to forty feet in height and the coppice less. The day was one of local showers, bright sun one moment, then a shower, then sun again. Not infrequently it would rain while the sun was shining. Most of the showers were rather light, but in the middle of the afternoon the rain fell very heavily for about ten minutes and then stopped abruptly. Further on, somewhere beyond the city of Sens, we noticed with surprise that the road was dry and that no rain had fallen, at least for a number of hours. In this dry area the road passed through the outer edge of two small forests, and in both cases *the road through the forest was wet from recent rain, and dry outside the forests.* The line of demarcation was very distinct, and showed that *the precipitation had fallen*