PROCEEDINGS OF THE GEOLOGICAL SECTION.

THE geological interest of the meeting at Buffalo naturally centred in the excursion to and discussion of the falls and gorge of Niagara. Dr. Pohlman of Buffalo described the district to be visited on Saturday, and called particular attention to the occurrence of drift-filled antecedent channels on the line selected by the post-glacial overflow of Lake Erie, which would greatly diminish the amount of rock-cutting required in the excavation of the present gorge, and thus reduce the time since the overflow began: indeed, he thought, that, while there may have been rapids in the course of the early Niagara, near the Lewiston margin of the limestone plateau, in which the gorge is cut, the limestone was there so thin, and the shales below it so weak, and branching antecedent channels guided so great a length of the gorge from the plateau margin towards the present falls, that no great cataract was formed until the gorge was cleaned out even as far up as the older suspension-bridge. This would leave but a small amount of deep, hard rock-cutting for the falls to accomplish, and would thus make their beginning much more recent than has generally been supposed.

The geological members of the excursion party therefore gave close attention to these matters, and, as a whole, regarded the heavy drift between the sloping, rocky banks at the whirlpool, and the wide, open valley, with its plentiful drift, at St. David's, as sufficient evidence of an old buried channel connecting these points, and probably heading up above the whirlpool towards the bridges. But there seemed no sufficient reason for any confident belief in a branching old valley from the whirpool towards the Lewiston bluffs: in making this lower part of the gorge there must have been a long period of deep rock-cutting between the first leap of the falls over the bluff and the time of their discovering the old drift channel at the whirlpool. It should be noted that Professor Claypole reported the finding of a ledge of limestone, not seen by the rest of the party, in the drift slope at the whirlpool, which would suggest a less depth for the old valley than was generally accepted. Some antecedent channelling of the rocks was, however, certainly accomplished before the Niagara began its flow, and the washing-out of the drift that filled the old channel was easy work for the river; but by far the greater part of the gorge still seems to be the original work of the falls in solid rock.

The estimate of the age of the falls was presented by Messrs. Woodward and Gilbert of the geological survey, and their remarks greatly interested a large audience that had gathered on the announcement of the discussion. Mr. Woodward had just completed a survey of the Horseshoe Falls, and by comparing his results with those of the state survey in 1842, and of the lake survey in 1875, he found an average recession for the whole face of the fall of about two and four-tenths feet per annum; but, as the central parts of the curve where the water is deepest has retreated from two hundred to two hundred and seventy-five feet in the eleven years since 1875, an average retreat of five feet per annum does not seem at all improbable. Mr. Gilbert then discussed the beginning of the falls as controlled by the drainage of the lakes. When the retreating ice-sheet stood so as to obstruct the St. Lawrence and Mohawk drainage channels to the east, a broad sheet of water, representing a confluent of Erie and Ontario, stood at a high level over the present Niagara limestone plateau, and probably drained south-westward to the Ohio. When further melting opened the Mohawk Channel, the great double lake fell to a lower level, and was separated into its two members, Ontario sinking to the level of its outlet at Rome in central New York, but Erie being held higher by the rim of the Niagara plateau. This was the birth of the river and the falls, and since then they have been at work on the gorge. The age of the falls thus carries us back to a tolerably definite point in the decline of the glacial period.

On the supposition of a uniform rate of recession, the age of the falls equals the length of the gorge divided by the annual recession; but the rate has been undoubtedly varied by changes in a variety of conditions, which must be allowed for. As thus qualified, Mr. Gilbert gave it as his conclusion that the maximum length of time since the birth of the falls by the separation of the lakes is only seven thousand years, and that even this small measure may need significant reduction.

Mr. A. A. Julien, in a paper on 'Methods of testing building-stones for absorption, freezing, and fire,' gave what he considered the proper conditions for such testing, and maintained that the tested stone should be continued under pressure at least a month. He stated that frost was found to be more active in removing particles that had been loosened by chemical weathering than in direct mechanical breaking of unweathered rock. Mr. J. C. Branner reported that he had found glacial striations over the summits of some mountains examined by the Pennsylvania geological survey, so that no direct measure of the maximum thickness of the ice can be determined from this region. It is interesting to note in this connection

that Professor Branner and others following him, in a discussion of the scheme of map colors adopted by the International conference of geologists, took occasion to severely criticise the scheme proposed as being too rigid, and wanting in adaptability to new regions. Among the other papers of note, we would call attention to the following: 'The geological features of a district in south-western Colorado,' by Dr. J. B. Comstock; 'The outcrop and thickness of the Tully limestone in the neighborhood of the finger lakes of western New York,' by S. G. Williams; 'The molluscan fauna of the New Jersey marls,' by R. P. Whitfield; 'A revision of the Cayuga Lake (New York) section of the Devonian,' by H. S. Williams; 'A process of mechanical deformation for the Connecticut valley triassic formation,' by W. M. Davis; 'Work in Nebraska,' by L. E. Hicks; 'Our cretaceous flora' and 'Our Devonian and carboniferous fishes,' by Professor Newberry; 'Fossil wood from Ohio,' by Professor Claypole; 'Geography and topography of the head of Chesapeake Bay,' by W. H. McGee; 'Holyoke trap range,' by B. K. Emerson; 'Some dynamic effects of the ice-sheet,' by F. J. H. Merrill.

PROCEEDINGS OF THE SECTION OF CHEMISTRY.

PROFESSOR WILEY prefaced his vice-presidential address by announcing the much-to-be-regretted death of William Ripley Nichols, his predecessor as chairman of the section.

W. H. Seaman, who, with A. C. Peale and C. H. White, forms a committee of the chemical society of Washington for the purpose of bringing about uniformity in the methods of stating water analyses, read a report upon this subject, and desired the approval of the section for the method recommended. After much debate, the matter was referred to a committee of the section, consisting of Professors Caldwell, Langeley, Myers, Mason, and Warder, who are to report another year what action is desirable.

Miss Helen C. De S. Abbott read a paper upon the proximate composition of a bark from Honduras, known as 'chichipati,' which contains a new camphor and a yellow coloring-matter, chichipatin, apparently of value as a dye and substitute for fustic. The same author also presented some considerations of the relations of the chemical constituents of plants to their morphology and evolution, believing that the chemical constituents follow parallel lines with the evolutionary course of plant forms, the one being intimately connected with the other, and the height of the scale of progression being indicated by these constituents, which are therefore appropriate for a basis of botanical classification.

H. C. Bolton, of the committee on indexing chemical literature, after presenting their report showing the large amount of valuable work which was being done, read a paper on the confusion which exists in the abbreviations employed in chemical bibliography, and the desirability of uniformity in designations of scientific periodicals.

C. F. Mabery's paper on the products of the Cowles electric furnace was of particular interest, and attracted much attention. He stated that the past year had been devoted more especially to the development of an increased commercial efficiency of the furnace, so that now three hundred horse-power could, by means of a large dynamo, be applied with greater economy in the results; and by coating the charcoal employed in the furnace with lime, by soaking it in lime-water, the production of graphite was largely avoided and a marked improvement in the working of the furnace introduced. The results — although, as compared to what would eventually be accomplished by electric smelting, they may seem crude — have reached a stage where their commercial success can be demonstrated.

It was also found that when the electrodes entered the mixture in a slanting position the product was increased. They are now also moved in and out with advantage, being gradually withdrawn as the resistance falls. Professor Mabery replied to the criticisms of Hehner of Berlin, Siemens, and others, that no new principle was involved, showing that the Cowles furnace is quite different from all hitherto constructed, and the only one of practical application by which a dynamo of three hundred horse-power could be used, as by means of a resistance-box and the arrangement of the furnace the sudden breaking of the current is prevented from burning out the dynamo. The presence of copper for the reduction of aluminium was shown to be unnecessary; and, by complete exclusion of air from the furnace, buttons of the metal were easily obtained. A product which has attracted considerable attention during the past year is obtained by reducing aluminium in presence of iron. A cast iron is formed containing sometimes as much as ten per cent of aluminium, and this product is used to facilitate the working of crude iron and to introduce into the various grades a small percentage of aluminium. In the reduction of aluminium in the presence of copper, a yellow product is frequently taken from the furnace which is composed of metallic aluminium to the extent of one-half or three-fourths, the balance being silicon and copper. It is also formed in the absence of