only to the novice. It is decidedly a French work, written by a true Frenchman. Neither an instrument nor an accessory is mentioned, unless either invented or manufactured by a Frenchman. The stands of Verick are given great prominence, as are also those of Hartnack. When we consider how beautiful and useful are the instruments of our own country, to say nothing of the fine productions of English houses, we are forced to call the work 'an elementary treatise on the French microscope.' For convenience, elegance of design, and varied adaptability, the French microscope will not compare with those of our own country, while we far excel in the superior quality of our objectives.

The microscopist will be much interested in reading the chapter on the projection microscope. Electricity will soon furnish us with proper illumination.

More information is given under the head of mineralogical research than in any work brought to our notice. Among the accessories mentioned is the camera lucida of Oberhauser. It is a form little used in America, and yet it is one of the most convenient and perfect of its kind.

The new pattern of Malassez's *Compte-globules*, by Verick, is minutely described. The results obtained by this instrument promise to be very accurate: we have practically tested its merits, and can give testimony to its precision. The method for photographing from the microscope is not so simple as that employed here by the use of dry plates; and, if the frontispiece be taken as a sample, it is not more satisfactory. The author shows perfect familiarity with the instruments and accessories, together with their applications as made and used in his own country. C. H. Stowell.

---

## *AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.*

### PROCEEDINGS OF SECTION E. — GEOLOGY AND GEOGRAPHY.

**Reports of committees on geological subjects.**

To the call for a report of the *Committee to memorialize the legislature of New York for a new survey of Niagara Falls*, Prof. James Hall responded, that several surveys had been made, or were in progress, in connection with legislation by the State of New York for preserving the scenery. These would supersede the need of any work of the kind by the association. The committee was discharged.

To the call for a report of the *Committee on state geological surveys*, Prof. N. H. Winchell responded, that the committee had never been called together, and there was no probability of its action. The committee was discharged.

To the call for a report of the *Committee on the international congress of geologists*, Dr. T. Sterry Hunt (by request of the chairman, Professor Hall) responded as follows: —

The committee held a meeting in the month of November last. Two important questions came up, — of geological nomenclature, and topography. It was suggested by Professor Hall, that the only action which could be taken in support of the system of uniform mapping and colors, and signs and symbols, would be to prepare maps of the United States as a whole, and perhaps also maps of portions of the United States, and to color them by different systems; the system adopted being that of Major Powell of the U. S. geological survey, and one or two others. Major Powell has been good enough to say that he would endeavor to prepare such maps, and aid in every way the carrying-out of the scheme. I have no doubt that the matter will be so well managed that the whole question of geological topography will be settled.

As to the question of geological nomenclature, we had much difficulty in getting reports of the previous meetings; and we have named several persons, some of whom have already handed in, or have in process of preparation, their abstracts of geological nomenclature; and I have every reason to hope that in the course of a few weeks we shall have the whole of that matter in shape to transmit to the Berlin congress a full and proper representation of the views of American geologists with regard to our geological nomenclature. There is one thing very much to be regretted, — the possibility that the meeting of the American association and the British association will come in collision with the meeting of the Berlin congress. Nothing definite has been arranged, so far as I can learn by letters. I have met with no response, but I was told that the time of the Berlin congress had not been fixed. In the committee which was held to consider arrangements for the meeting of the British association, it was suggested that we put ourselves in communication with the local authorities of the Berlin congress, and endeavor to get them to fix the time of their meeting so late in September as will allow members of the American and British associations to leave this continent after the meeting of our associations so as to be present at the Berlin congress.

The committee was continued.

The *Committee to confer with the United-States geologist in regard to co-operation between government and state geological surveys* was called on for a report. Prof. James Hall of Albany responded in-

formally: The condition of the state survey is likely to be materially influenced by the law of the general government extending the U. S. geological survey over the states. Proper deference to the head of the U. S. survey required that some action should be taken by which we could confer with Major Powell, to understand our relations to the survey. To prevent any jealousy or uncertainty with regard to what might be the relation of the state survey and the general survey, I suggested the appointment of this committee. I had no intention myself of taking any active part in the matter; and I think there are gentlemen on the committee, much younger than myself, who will do all the work. I believe several members of the committee have had very pleasant interviews with Major Powell, as I have myself, since these meetings commenced; but I had forgotten that I was to make a report. I think it is desirable that there should be very frank intercourse between the gentlemen who are conducting the state surveys and the head of the general government survey, so that we may know what is to be the result of their various surveys which are so very important to geological science. Workers at a distance from each other cannot, without some means of inter-communication, — which, I think, may be established with the head of the general survey, — bring the results of their labors to a fair comparison with those which are done a thousand miles away.

Major Powell expressed the hope that the committee would be continued. Several members of the committee had conferred with him with reference to the surveys, but they had not conferred as a committee. Practical relations have been established between the general survey of the United States and several of the state surveys. He thought it was probable that such arrangements could be established as would make it satisfactory to all.

The committee was continued.

## PAPERS READ BEFORE SECTION E.

### (*PAPERS ON GLACIAL PHENOMENA.*)

### The life history of the Niagara river.

BY JULIUS POHLMAN OF BUFFALO, N.Y.

A SERIES of observations whose points were given in detail had convinced the author that the formation of the gorge of Niagara had been a matter of tens of thousands, rather than of hundreds of thousands, of years. The beginning of the history might be stated as in the pre-glacial epoch. A lake then occupied the valley of the Tonawanda; its outlet was the line of the ancient Niagara River from the falls to the whirlpool; thence, by way of the St. Davids valley, into the Ontario valley. All these valleys were closed during the glacial period. The subsidence of Lakes Erie and Ontario was that of one body or region, until they were separated by the Lewiston escarpment; after that the drainage of Lake Erie found its path through drift deposits and old existing valleys to Lake Ontario. The latter lake subsided slowly, and no waterfall was formed at its entrance. The river excavated its gorge to the whirlpool, not by means of a retreating fall, but as a rapid in an old shallow valley. At the third pool, this path met the ancient river-valley: it was along that valley only, that the falls receded to their present site. The retreat of the fall was not the means of excavation, for at least seven miles usually ascribed to it; the portion which would offer the most resistance, between the falls and the whirlpool, being already excavated.

From that point to Lewiston, the progress was very rapid in cutting the gorge; a shallow valley had partly removed the hard limestone, and the softer underlying shale rock was a barrier much more easily penetrated. We have no exact data of the retrocession of the falls within periods of modern observation. A comparison of Professor Hall's map of the falls in 1841, and that of the United-States lake survey in 1875, shows wide discrepancies. After all reasonable allowance for inaccuracies, we must admit that parts of the Horse-shoe fall have receded in thirty-four years at least one hundred feet, and on the American side the recession is from twenty to forty feet. These facts all tend toward a shortening of the history of the present river.

In the discussion that followed, Professor Hall expressed a doubt as to the dependence that could be placed on differences between surveys made by different persons, using differing methods. That there had been retrocession within the period of our observation, he did not doubt; but it could scarcely be so rapid as was indicated by the estimates of Dr. Pohlman. Other speakers discussed the paper, which was of special interest, because it fired the first gun of the glacialists in the geological section, and it roused their opponents.

### Glacial cañons.

BY W. J. McGEE OF SALT LAKE CITY, UTAH.

THIS paper was read, in the absence of its author, by Mr. Warren Upham. It considered the action of a glacier as being, to a certain extent, capable of representation by mathematical formulae. It was admitted, however, that some of the quantities in the equations must remain very indefinite. The paper was almost wholly theoretical, and arrived at the following conclusions: The temporary occupancy of a typical water-cut cañon by glacier-ice will, 1°. increase its width; 2°. change the V to a U cross profile; 3°. cut off the terminal portions of tributary cañons, and thus relatively elevate their embouchures; 4°. intensify certain irregularities of gradient in the cañon bottom; 5°. excavate rock basins; 6°. develop cirques; and, in general, transform each cañon into an equally typical glacial cañon. It follows that these features do not necessarily imply extensive glacial excavation, or indicate that glaciers are superlatively energetic engines of erosion.

Owing to the custom of abstaining from discussion on a paper in the absence of its author, the dissentient opinion of many who were present was not