of a recent trip to the West Indies for the purpose of studying the economic fruits of the tropics.

D. T. MacDougal,
Secretary pro tem.

DISCUSSION AND CORRESPONDENCE.

BIBLIOGRAPHY OF GEODESY.

To the Editor of Science: In the Report of the United States Coast and Geodetic Survey for 1887 there was published a Bibliography of Geodesy. Since the date named so many important contributions have been made to the literature of this subject that during the last meeting of the International Geodetic Association a resolution was passed requesting the undersigned to prepare a new edition of the Bibliography.

This work is now well under way, and every possible effort will be made towards making it complete. This desirable end can be attained only with the assistance of those authors who are good enough to send as soon as possible titles of their publications to the address given below.

As in the first edition, it is proposed to include all papers, books and reviews, pertaining to geodesy, least squares, figure of the earth, density of the earth and gravity determinations, including theoretical discussions of the pendulum.

In complying with this request, authors should give:

1. Full name.
2. Complete title.

a. If book, give size, number of pages in preface and in body of book, number of plates and illustrations, date and place of publication.

b. If in a serial publication, give name of publication, volume, and year and pages occupied by the contribution.

c. If a review, state the title of work reviewed.

In case the work has been reviewed, give name of reviewer and where the review may be found.

If preferred, in order to insure harmony in the form of making out the titles, publications may be sent to the undersigned. The International Exchange Service of the Smithsonian Institution has graciously consented to transmit such works as may be forwarded with the object named in view. They should be sent in my name to the Smithsonian Institution, Washington, D. C.

By giving this their early attention, author will confer a favor upon the compiler and upon those who may find it necessary to consult the work when published.

J. H. Gore.

Columbian University,
Washington, D. C.

SHORTER ARTICLES.

NOTE ON THE WESTERN TERTIARY.

The recently published discussion on 'The Freshwater Tertiary Formations of the Rocky Mountain Region,' * by Professor W. M. Davis, in which he indicates published evidence to prove those supposed lacustrine deposits not to have deposited in large lakes, but rather in regions of lakes and rivers, explains well the Eocene deposits which I have seen in northwestern Wyoming in the Bighorn basin. This region was visited by a party from the University of Minnesota in the summer of 1899.

The Eocene badlands there show an extent of horizontal strata which, when viewed as it is exposed for miles around one, does suggest at once a large filled lake basin. But there is a rapid alternation of clay and sand strata, and the several diverse kinds observed recur so unequally, and yet often so monotonously that the theory of a large permanent lake does not suffice to explain the phenomena. In fact while exploring for fossils I had the impression that we were not beyond the supposed lake's marginal zone, even when 40 miles or more from the formational boundary, and came finally to believe that this freshwater Tertiary might be different from others of the West. Professor Davis's argument now convinces me that it is not.

In order to find fossils rapidly one had to search out what we called rivers and bogs. The former are shallow trough-shaped beds of sand occurring either as intercalated masses or as thickened parts of a regular stratum. The bogs occurred here and there, more or less

* *Proceedings Am. Acad. Arts and Sci.*, Vol. XXXV., p. 345.

clearly indicated by color and by small rough clay-iron residuum when weathered. Fossils occurred most frequently in those deposits and one became aware of their discontinuity when trying to follow them in search of their contents. The sand troughs or rivers yielded the whole bones, *i. e.*, vertebræ with processes and even rarely whole skeletons. The bogs yielded fragmentary bones. These were found to have been gnawed, as a rule, and the gnawing had been done also where they now lie in the strata. Legs were found bitten off at the knees, as if the animal had mired and its buried parts thus escaped being devoured. Also numerous fragments of, evidently, a single animal would occur scattered about, the ends and thin parts of bones being gnawed off. For example, more than once a Coryphodon's large tooth was found with the surface, including the enamel, chiseled off by some corrugated tooth, probably that of some Tillodont mammal. Plates of turtles' plastron had likewise been nibbled all around their margins. In fact, worthless fragments composed the greater part of the fossils.

When one had become skilled in detecting the differences between those pieces fractured before, and those after, fossilization, many strange things began to be evident, such as fragments taken from the same stratum at some distance apart, proving to be those of one bone; and again fragments representing the same parts of several animals occurring in one spot, the other parts of all being absent. A lot of molar teeth and an odontoid process seem often to represent a head and neck. This all appeared to be incidental to the feasting that had preceded fossilization.

That crocodiles and turtles may have done the gnawing in part was suggested by their fossil remains, but that the chiseling process was theirs could not be maintained. In some cases, maceration had left the bones shapeless or thickly encrusted with iron. And this maceration as well as the chiseling might well argue the subaerial deposition of the bones.

I may mention also two geologically significant phenomena which require close observation to distinguish them. Original stratigraphic inequalities, amounting sometimes to local unconformability, might be passed unnoticed among the numerous similar looking inequalities due to unequal induration of the rock, the latter being intimately associated as to its cause with the physiographic changes now developing. And the color banding may be both original stratigraphic and secondarily modified. I remember one fine example of a large trough filled with a series of clay and sand strata, seen at a distance on the left of the trail ascending Tatman's butte to the Buffalo basin. But not having had time to examine it minutely, I scarcely dare assert that it might not be secondary cross-coloring. Close at hand one would not have noticed it, because the whole could not have been seen, and the slow thinning out of individual strata would be nothing unusual. Expeditions into badlands for the purpose of collecting fossils can not well take time in one season to gather and verify occurrences sufficient to prove the exact geologic nature of the deposit of part, much less the whole, of a basin, which, however, expeditions for that express purpose might do.

FREDERICK W. SARDESON.

UNIVERSITY OF MINNESOTA,
April 6, 1901.

AN UNUSUAL TYPE OF AURIFEROUS DEPOSIT.

ONE of the most unique deposits of gold-bearing material which the writer has ever seen has been worked during the past three or four years at the King Solomon mine. It is situated near the summit of Cañon mountain, in the basin of the South Fork of Salmon river, in the southwestern part of Siskiyou county, California.

The ore consisted of a body of semi-decomposed country-rock, including micaceous schist, slate and greenstone, heavily stained with the oxides of iron and manganese and containing fine particles of free gold disseminated through it. The deposit had a length of about 500 feet, an average width of 60 feet and mainly a workable depth of 50 feet, although a much narrower body of ore continues to greater depth. Mining operations have been conducted in several large open pits, beneath the floors of which have been excavated tunnels. The ore is shoveled from the loose crumbling slopes of the pits into