

tropical surface currents setting southward are largely turned away from the antarctic regions, so only a scanty portion of the water from such currents reach the frigid latitudes. And through this cause the antarctic lands have become heavily glaciated, and the glaciers are constantly flowing into the sea. This process chills the waters surrounding the antarctic shores and causes them to sink and find their way to the temperate and tropical latitudes in under currents. In this way all of the under-waters of the oceans have acquired a low temperature, and there is much to show that their coldness is being slowly increased, and in consequence a cold epoch is being brought about. There is nothing hypothetical concerning the vast operations of nature which give support to this view of the subject. For it is well known to the navigators of the southern oceans that the belt of strong westerly winds which sweeps the southern seas causes a cold drift current to move around the Antarctic Continent. And it is also well known to science that the chilly waters of the antarctic seas find their way to the temperate and tropical latitudes in cold under-currents.

C. A. M. TABER.

THE SMITHSONIAN TABLE AT THE NAPLES STATION.

IN view of the necessary delay in connection with several applications which have recently been made for the use of the Smithsonian Table at the Naples Station, it may be well to call the attention of zoologists and botanists to the 'Report on the Memorial presented to the Smithsonian Institution regarding an American Table at the Naples Zoological Station,' printed in *SCIENCE*, XXI., No. 641, June 16, 1893, pp. 328-329.

Candidates will avoid delay in the consideration of their applications if they will bear in mind the following suggestions:

1. Applications should be addressed to Professor S. P. Langley, Secretary of the Smithsonian Institution, Washington, D. C., and *not* to the Secretary of the Advisory Committee.

2. The candidate should state his entire educational history, give a list of the papers he has pub-

lished, and if possible send reprints of the same to accompany his application.

3. He should apply for a definite period of time, not exceeding six months, and state the time of year which will be most convenient for him to occupy the table.

4. He should give some definite statement as to the general line of investigation he wishes to pursue while at Naples.

5. If a recent graduate and a person not thoroughly known as an author, he should request his former instructors to write in his behalf to the Secretary of the Smithsonian Institution.

If the professors of zoology and botany in the various universities will bear these suggestions in mind they will greatly lessen the correspondence and delay in connection with the consideration of the applications from their students and will at the same time forward the interests of the applicants.

CH. WARDELL STILES,
Secretary Advisory Committee.

SCIENTIFIC LITERATURE.

An Introduction to Geology. By WILLIAM B. SCOTT. The Macmillan Co. 1897.

The author of this class-book has attempted, and we think successfully, to provide a brief but complete and sufficiently detailed treatment of geology for the ordinary college student.

He has used as a basis the fuller standard treatises on Geology, has taken as his model Sir Archibald Geikie's 'Class-book,' has written it for American students, selecting examples from American geology; has illustrated the work with reproduced scenes taken by American geologists, and has had help and suggestions from other workers in special fields. The result is, in general, a satisfactory book to put in the hands of a class of students, and particularly well adapted, as it seems to the writer, to supplement a course of lectures in a general college curriculum.

The arrangement of the chapters is not altogether such as a teacher would naturally use, and that some license is given to readjust the chapters is suggested by the remark in the preface: "The order in which the different sections of the book are taken up should depend somewhat upon the season of the year in

which the study is begun." The chapters themselves, however, treat of the subjects with precision and sufficient detail for the production of definite notions on the points discussed.

The treatment of Historical Geology is on the lines of Dana's Manual, but without the details. This method in an exhaustive manual is valuable, but it may be doubted whether the use of so many scientific names of animals and plants as is necessary in such a treatment conveys any definite information to readers who are unfamiliar with zoology and botany; and even to zoologists, unless very well acquainted with the paleontological side of their science. The fact is that a really satisfactory mode of treatment of this fascinating subject of the biological problems of historical geology has not yet come to light.

The illustrations are, in the main, excellent and new and, as has been said, richly American. But some of them are so imperfectly reproduced from the original photographs as to lose much of their value.

The publishers' part of the work is well done, though the user of the book will often be caused to lament that it is found necessary to put so much weight into a book one is expected to hold in a single hand.

H. S. WILLIAMS.

YALE UNIVERSITY.

The Glaciers of North America. By ISRAEL C. RUSSELL, Professor of Geology in the University of Michigan. Boston, Ginn & Co. Pp. x+210.

When the glaciers of Switzerland had been well explored those in this country were scarcely known, and now Professor Russell tells us that North America is the best region in the world for the study of glaciers; that all types occur here, of all sizes and in great variety; and he makes good his assertion by the descriptions of the glaciers of North America, so far as they are now known, which fill the greater part of the volume before us.

Professor Russell attacks his subject as a geographer; his aim is to report the present condition of knowledge concerning the glaciers of this country and to 'stimulate a thirst for

fresh explorations and renewed study along an almost untrodden path.'

To carry out this object the book must necessarily be largely a compilation, but the material for an important part is furnished by the original papers of the author himself. Of these we mention especially the account of the Mt. St. Elias region, which Professor Russell explored in the course of two remarkably plucky attempts to ascend Mt. St. Elias.

He opens with a chapter giving a clear account of the characteristics of glaciers and their work, in the course of which he is confronted with the question: 'What is a glacier?'

A concise definition of a class of natural objects is always difficult; and certainly none has yet been given which includes all the phenomena of glaciers. Mr. Russell recognizes this and gives provisionally the following definition: A glacier is an ice body originating from the condensation of snow in regions where secular accumulation exceeds melting and evaporation, *i. e.*, above the snow line, and flowing to regions where waste exceeds supply, *i. e.*, below the snow line.

The majority of geologists and physicists would accept this as fairly representing the essential characteristics of a glacier; but the small number who believe that the force urging a glacier down its bed is not due to gravity alone, but to a large extent to the increase of the volume of the ice on account of the growth of the ice grains, must utterly reject it; for, according to their hypothesis, the source of supply is not snow that falls in the *névé*-fields, but the water that freezes throughout the body of the glacier.

The glaciers of North America are confined to the Cordilleran mountain series and to the Greenland region. Professor Russell says that "the Cordilleran glaciers form an irregular curve, broadest and reaching the sea line in the Mt. St. Elias region, and narrowing and becoming more and more elevated at both its western and southern extremities," and then he successively describes in greater detail the glaciers of the Sierra Nevada; of the Cascade range, the higher peaks of which are volcanic cones and carry glaciers radiating from their summits; of Canada, and of Alaska. The