

king analyses for him. How can an analytical chemist hope to maintain his professional standing when his charges for individual analyses—even when done in quantity—are such that, unless he is to count his own time as without value (and sometimes even under such an assumption), he can not possibly do reliable work without an actual financial loss? I do not wish to draw any unpleasant or unfair inferences as to which horn of such a dilemma the commercial analytical chemists choose; for the most of them are, no doubt, trying to make the best of a difficult situation. Unfortunately, I have no specific remedy to propose, but it is all too evident that these conditions tend to belittle this branch of our science, to result in a large output of inferior work, and to create a distrust which spreads unduly. It behooves us all to at least do what we can to bring home to those who are to place dependence upon work done at these ruinous prices that, in many instances, they are getting just about what they pay for and no more, and that the service is not such as they owe it to themselves to make possible by more adequate remuneration.

Whether we consider present analytical practise from the view of the scientist or as a vocation, we find much that calls for improvement. What the present situation imperatively demands, then, is a courageous and frank admission that the quality of much of the analytical work, practised or published, is inferior to what might reasonably be attained because much of it is one-sided and ill-considered from a scientific standpoint. Let there be a realization that, while no amount of theorizing can take the place of skilful and accurate work, or of a certain amount of empirical experimentation, the analysts should cease pulling on their own boot-straps and avail

themselves more generally of the aids from other portions of our science to help to lift themselves and their art to the worthy position to which both are entitled. Let the chemical analysts realize that they must take greater pride in their work for its own sake, let them demand a recognition of the dignity claimed for it by Dr. Dudley, and let them give to it the best that is in them, in both activity of mind and skill of hand. This is a duty which is owed to our national reputation, to chemical science, pure and applied, and to our own welfare.

H. P. TALBOT

MASSACHUSETTS INSTITUTE
OF TECHNOLOGY

*THE CROCKER LAND EXPEDITION UNDER
THE AUSPICES OF THE AMERICAN
MUSEUM OF NATURAL HISTORY
AND THE AMERICAN GEO-
GRAPHICAL SOCIETY*

THE existence or non-existence of land northwest of Grant Land and the configuration of the polar continental shelf of North America seem to be two of the greatest of the geographical problems still unsolved. There is, in addition, much important geological, geographical, zoological and other scientific work to be done in certain parts of the Arctic regions. Two thoroughly qualified young men have volunteered their services as leaders of an expedition to attack the problems and do the work. Under this combination of circumstances and with the proviso that sufficient funds be provided from outside sources, the American Museum of Natural History and the American Geographical Society have made liberal appropriations in support of the enterprise, and the former institution has taken over its organization and management, feeling that it is well worthy of the backing of the scientific institutions of the country.

The leaders of the expedition are to be George Borup (A.B., Yale, 1907), assistant curator of geology in the American Museum

of Natural History, and Donald B. MacMillan (A.B., 1898; A.M. (Hon.), 1910, Bowdoin). They have become well known to the public, scientific as well as general, through their work under Admiral Peary on his last polar expedition, through Mr. Borup's book, "A Tenderfoot with Peary," and his lectures and through Mr. MacMillan's extensive lecturing throughout the country. They have received Peary's unqualified indorsement for the work in hand. Mr. Borup has been devoting his whole attention during the past two and a half years to studies in the field and at Yale to fit himself thoroughly for scientific geological and geographical exploration. He is a fellow of the Royal Geographical Society (of London) and a member of the New York Academy of Sciences. Mr. MacMillan, since his return from the Peary expedition, has been studying ethnology and practical astronomy at Harvard. In the summer of 1910, he was a member of the Cabot party which was the first to cross central Labrador from the sea to George River, and he spent the summer of 1911 cruising along the coast of Labrador in an eighteen-foot open canoe, studying the Eskimo from Hopedale to Killinek (60° N. Lat.). Mr. MacMillan is a member of the American Geographical Society and the Appalachian Mountain Club.

The object and work of the expedition may, perhaps, be best stated in Mr. Borup's own words:

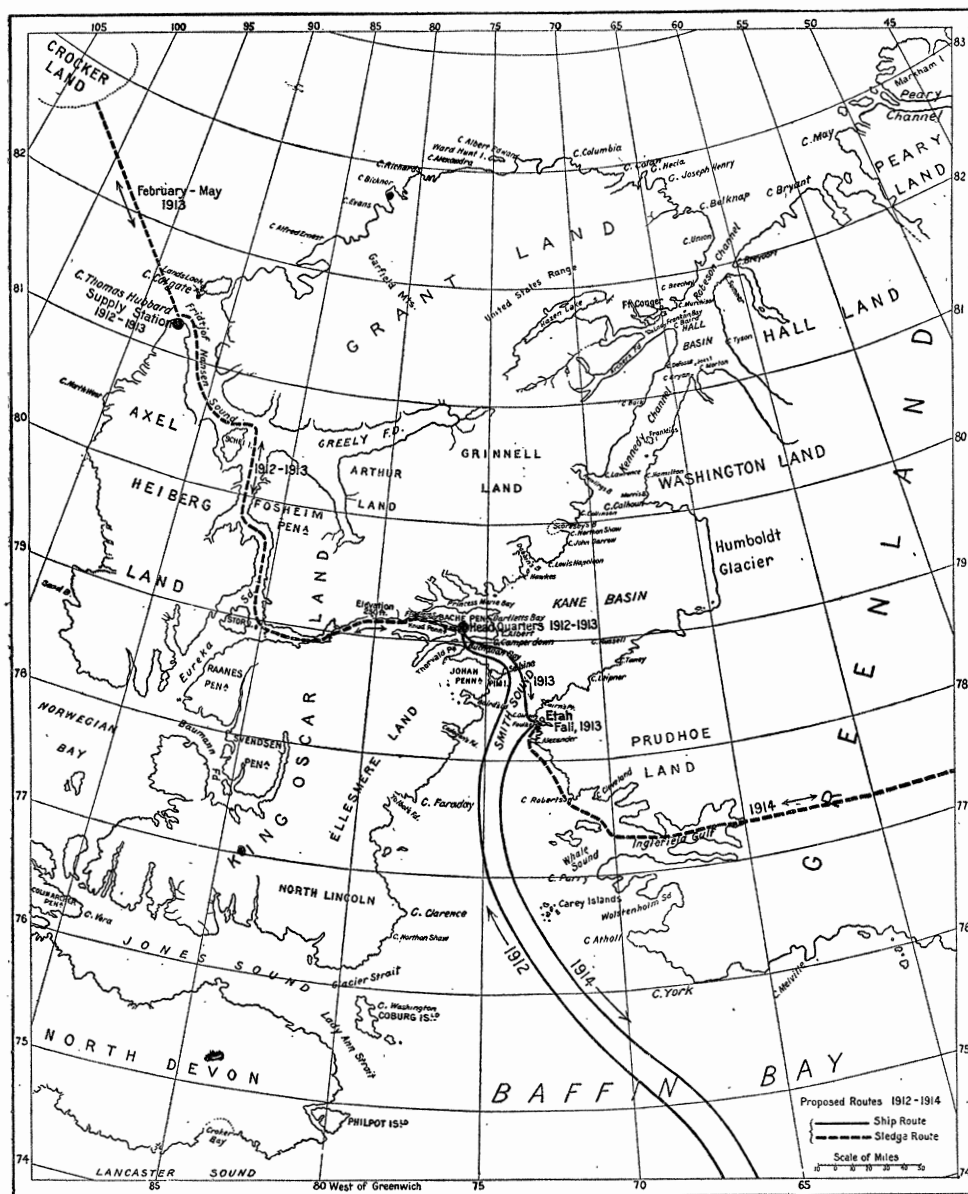
Belief in the existence of a land mass northwest of Grant Land rests on deductions made by Harris and observations made by Peary. Admiral Peary in his book "Nearest the Pole" reports having seen the "faint white summits of a distant land" on 24 June, 1906, from 2,000 feet above sea level on Cape Colgate and again six days later from 1,600 feet altitude on Cape Thomas Hubbard. It was calculated that this land lay about 130 miles out in the polar sea and in 100° W. Long. and 83° N. Lat. To it Peary gave the name Crocker Land. Dr. R. A. Harris in his monograph on "Arctic Tides" (1911) gave his reasons for concluding from a plotting of the cotidal lines of the Arctic regions that a great tract of land, an archipelago or an area of shallow water, trapezoidal in outline and half a million square

(statute) miles in area lies north of eastern Siberia and northern America. He places one corner of his trapezoid northwest of Grant Land and identifies Peary's Crocker Land with it.

The new expedition proposes to make soundings along the line from Cape Thomas Hubbard to Crocker Land, to determine the situation of the continental shelf, to collect samples of the ocean floor and to take temperature observations of the water at various depths and by attaching a small net to the sounding wire, to obtain specimens of oceanic life. These soundings, taken in connection with those made by Admiral Peary between Cape Columbia and the Pole, and by Nansen on the drift of the Fram starting in latitude $78^{\circ} 50'$ north, longitude $133^{\circ} 37'$ east, north of Siberia, to $85^{\circ} 57'$ and thence down the west coast of Spitzbergen, will give a fair idea of the configuration of the floor of the Arctic seas. Tidal observations will be made at Cape Thomas Hubbard and at such points on Crocker Land as are found to be practicable. Such observations are highly desirable as supplementary to the records already secured on the north coast of Greenland and Grant Land by Marvin, MacMillan and Borup in connection with the last Peary expedition. On Crocker Land itself it is proposed to make a topographic map of the coast line and of parts of the interior, and if feasible to map geologically such parts as are visited; but in any case, to note the stage of physiographic development, the formations represented, and to collect specimens of rocks, of fossils and of living plants and animals.

In order to increase the scientific value of this expedition and in order that it may yield definite scientific results in the event of failure to reach Crocker Land, it is proposed to explore and to make detailed scientific observations in Ellesmere Land, Grant Land and Greenland. A part of the north coast of Grant Land will be studied and during one summer or late spring it is proposed to make a trip from Whale Sound (Inglefield Gulf) directly east into the interior of Greenland. By taking this course, the height of the ice cap may be ascertained and observations made of this great ice sheet supplementary to those of Peary, Nansen and Nordenskiöld. Nansen's studies were slightly south of the Arctic circle where the land is not very wide. The two journeys of Peary from Whale Sound to Independence Bay were made relatively near the shore.

After consultation with various scientists as to what classes of work will yield the greatest return, it is proposed to make the following studies:



THE PROPOSED ROUTE OF THE CROCKER LAND EXPEDITION

(a) *Geography*.—The coast lines and interiors will be mapped by plane table, barometer, continuous tracing of valleys, etc.

(b) *General Geology*.—Observations on the geology of Ellesmere Land and Grant Land have been made by the Norwegians under Sverdrup and the English Expedition of 1875-6, but their work was

necessarily of such a preliminary character that very little concerning the age of the formations and the relative abundance and character of the igneous and sedimentary rocks was learned; and nothing concerning the physiographic conditions of these areas was determined. It is proposed therefore to make detailed areal studies of the geology

of these regions and to make rather complete collections wherever possible.

The scattered paleontological data in this region which now are of small value could be made of much greater significance by studies such as are proposed. Along physiographic lines practically nothing has been done and the broad question of cycles of erosion involving possible climatic changes furnishes a fascinating subject of study of far-reaching scientific importance. The structure of these areas as indicating the character and extent of the larger earth movements in the Arctic regions and the original structures of the larger land masses could be determined by such studies as we propose.

(c) *Glaciation*.—It is proposed to make a thorough study of glaciers, glacial motion and the process of erosion by glacial ice caps. The geological importance of ice in molding land forms has been studied in existing glaciers, but the process of land molding under a continuous moving ice cap is not understood and there is here an opportunity for making observations which are significant not only for the present geological era, but also for Permian and Cambrian eras. It is proposed to make a special study of the so-called "glacial fringe" on the shores of the polar sea which to a limited extent resembles the great Ross Barrier of the Antarctic. The land and sea ice meet on the north coast of Grant Land, about five miles off shore. The land ice or "glacial fringe" is not a true glacier, but a combination of glaciers from the land and the heavy ice of the fiords which merge into a sort of piedmont glacier. There are no crevices in the ice surface aside from "tidal cracks," but it is thrown into great swells or waves 30-40 feet high and from a few hundred yards to a mile in length, which run generally normal to the shore. From this fringe come the floe-bergs and many heavy ice floes of the polar seas. This "glacial fringe" forms a unique and interesting feature of glaciation, and a study of its character and effects is of the highest importance to glacialists. In this connection attention has been called to an interesting feature by Colonel Feilden, the naturalist to the English Arctic Expedition of 1875-6, who says: "There is a lot of drift wood knocking about. I got it from off the floes up to 1,000 feet elevation—the interesting question is whether it comes from the Mackenzie or from Siberia? I do hope they will make a most careful investigation of the raised beaches and their contents. Also the birthplace of those mysterious boulders which are strewn along the

shores and to high altitudes in Grand Land and North Greenland."

(d) *Meteorology*.—It is proposed to make continuous barometric and thermometric observations at all points visited and an endeavor will be made by use of box kites to secure data as to temperature and direction of the upper air currents. No work of this sort has been previously done in such high latitudes, and it is probable that interesting data regarding atmospheric circulation will be obtained.

(e) *Tidal Observations*.—As stated before, observations will be made at Cape Thomas Hubbard and at points on Crocker Land. Mr. O. H. Tittman, superintendent of the Coast and Geodetic Survey, in a letter says, "Tidal observations, if carefully made for even a few days at a place, will be appreciated at this office. The localities in which such information appears to be most desired are: Axel Heiberg Island, Greeley Fiord, northwest coast of Grant Land, any undiscovered land to the northwest of Grant Land, the north coast of Greenland at points between Cape Bryant and Cape Morris Jesup. Any soundings which may be taken to the north of known land will be of interest to this office and to geographers generally."

(f) *Ichthyology*.—Hitherto practically no fish have been caught in these waters by any of the previous expeditions except a variety of salmon trout found in fresh water lakes. The fish do not seem to rise to bait.

In Smith Sound and Kane Basin there are great numbers of fish, however, as proved by the innumerable seals found there. Their chief diet is fish. Numerous good-size fish bones were also found in the stomachs of narwhals killed by Peary's last expedition.

By taking nets, trawls, etc., along, fish new to science may be caught and in all events we can prove what kind of fish inhabit these waters.

(g) *Ethnology*.—The Eskimos will be studied, their mode of life, traditions and language. It is planned to take a phonograph and make records of their language, songs, etc.

It is also intended to use the new adaptation of color photography to moving pictures in depicting various phases of animal life. This has never been done in the Arctic. Many very interesting and valuable moving pictures of the life in the north remain to be taken, such as camp life, building igloos, driving dogs, hunting and especially a good walrus fight.

(h) *Ornithology*.—Complete collections of eggs and birds will be made. Photographs of the nest-

ing places and the young will be taken; moving pictures showing the marvellous abundance of bird life, etc., will be secured.

(i) *Mammalogy*.—Specimens of all kinds of animal life will be secured, including bear, foxes, deer, mush oxen, hare, lemmings, walrus, and several kinds of seals. Measurements of narwhals and white seals will be made to supplement those taken by Mr. Roy C. Andrews in the Pacific.

The plan of campaign as laid down by Messrs. Borup and MacMillan is as follows:

Leave Sydney, N. S., by special steamer about 20 July, 1912. Collect whale and walrus meat and dogs on the way northward. Land on the south side of Bache Peninsula (Flagler Bay), Lat. $79^{\circ} 10' N.$, and establish winter quarters. Send the ship home. About the middle of September, begin sledging supplies to Cape Thomas Hubbard, and carry the work on throughout the winter during the moonlight periods. Leave Cape Thomas Hubbard with the return of dawn in February, 1913, and push across the ice to Crocker Land. Leave Crocker Land about 1 May, and return to Cape Thomas Hubbard. Send a messenger to North Star Bay with news of the expedition, to be forwarded by Danish steamer to civilization. Carry on scientific work in Grant Land and along return route to winter quarters on Flagler Bay, arriving there in July, 1913. During the summer, transfer supplies and collections to Etah. In the spring and summer of 1914, make an expedition from Whale Sound (Inglefield Gulf) directly eastward to the summit of the ice-cap of Greenland, at the widest part of that island. Return to New York in the autumn of 1914 by special ship.

The following are some of the principal items of the outfit to be provided: three years' provisions for four or five white men, their helpers and their dogs, much of which, particularly the pemmican, has to be specially prepared and packed; clothing; instruments for all kinds of observations and records; photographic cameras, including those for moving pictures; a power boat for use in Flagler Bay and in crossing to Etah with supplies and collections after the return from

Crocker Land; salary of physician and wages of cook and helpers; a steamship to take the party to Flagler Bay in 1912 and another to go up for it in 1914.

A physician and a zoologist are needed to accompany the party throughout the whole expedition.

It is estimated that not less than fifty thousand dollars (\$50,000) must be provided for the absolute needs of the expedition, in order to enable it to accomplish the valuable results that have been outlined above, in spite of the fact that Messrs. Borup and MacMillan generously serve the expedition without salary during the period of its absence from New York. Subscriptions to the fund are invited. Checks should be made payable to and all correspondence should be addressed to the American Museum of Natural History.

In addition to the support of the institutions already named, subscriptions have already been made or promised by Yale University, Bowdoin College, New York Academy of Sciences, Groton School, Theodore Roosevelt, R. E. Peary, Thomas H. Hubbard, Zenas Crane, Mrs. C. B. Alexander, John E. Thayer and others. There remains to be raised about thirty thousand dollars, and the museum has opened an account, known as the "Crocker Land Expedition Fund," for the purpose of receiving and caring for all subscriptions made to the expedition. Checks to further its purposes should be drawn payable to the American Museum of Natural History and forwarded to that institution. A list of subscribers will be published later and will be included in the final report.

The honorary committee on the Crocker Land Expedition consists of Henry Fairfield Osborn, president, American Museum of Natural History; Chandler Robbins, chairman of the council, American Geographical Society; Thomas H. Hubbard, president, Peary Arctic Club.

The committee in charge comprises E. O. Hovey, American Museum of Natural History; H. L. Bridgman, Peary Arctic Club.

All correspondence regarding the expedition should be addressed to Dr. Hovey.