

The National Geographic Magazine

AN ILLUSTRATED MONTHLY

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No. 12

THE WELLMAN POLAR EXPEDITION

By WALTER WELLMAN

The Wellman Polar Expedition of 1898-99 had two purposes in view. One of these was to finish the exploration of Franz Josef Land, and the other was to make an approach, by means of what is known as "a dash," near or to the North Pole. Incidentally to both these efforts scientific work of the usual character was to be carried on by a competent corps of observers. The expedition was aided in a financial way by the National Geographic Society, by President Jesup of the American Museum of Natural History, by President McKinley, Secretary of State Hay, J. Pierpont Morgan, W. K. Vanderbilt, William C. Whitney, Richard Olney, and other well-known public men. The cost of the expedition was about \$27,000, of which sum \$12,000 was subscribed by the various contributors.

June 26, 1898, the expedition sailed from Tromsø, Norway, in the ice-steamer *Frithjof*. Aboard were nine members of the expeditionary party—four Americans and five Norwegians. Prof. James H. Gore, of Washington, who had planned to accompany the expedition to Franz Josef Land for a summer's work in geodesy, was unable to go beyond Tromsø on account of the danger that the ship might not get back in time to enable him to meet imperative engagements. Calling at Archangel, Russia, the *Frithjof* took aboard a pack of 83 Siberian dogs which had been brought from the Ob river by Alexander Trontheim, a trustworthy Russian, who has now supplied three Arctic expeditions with draught dogs purchased from the Ostiak tribes. In order to deliver his pack according to contract, Trontheim had to make

a 2,000-mile journey over the Ural mountains, across the plains and tundra, fording swollen rivers and wading deep swamps. Material for house-building was also taken on at Archangel, and the *Frithjof* then steamed northward. The pack-ice was met at about the 77th parallel of latitude July 9, and three days later, the supply of coal running short, it was deemed prudent to run back to Norway for more fuel. July 20 the ship was again at the ice edge, and after a week of ramming through loose floes and searching for open leads found a clear waterway, in which such rapid progress was made that the ice-capped mountains of Franz Josef Land were visible from the crow's-nest July 27.

Next day the *Frithjof* was at Cape Flora, which for three years had been the headquarters of the Jackson-Harnsworth (English) expedition, and where Nansen and Jackson had had their memorable meeting in June, 1896, a chance encounter which doubtless saved the lives of the Norwegian explorer and his comrade. It had been the first plan of our expedition to make Cape Flora our winter quarters, and we had secured from Mr Harnsworth the privilege of making such use as we wished of the house and stores there. It appearing that there was a possibility of pushing our winter quarters farther north and east, we took aboard one of the collapsible houses, which had been used at Cape Flora for storage purposes, and steamed away to the eastward.

At Cape Flora we had hoped to find Andrée and the members of his balloon expedition, which had left Danes island, Spitzbergen, a year before; but finding neither Andrée nor any tidings of him, we were forced to the sad conclusion, which time has since confirmed, that the brave Swede and his comrades lost their lives by a descent of their air-ship into the waters of the Barents sea, east of Spitzbergen and south of Franz Josef Land, probably within 10 or 15 days after their ascension.

After making an unsuccessful effort to push our ship north through the ice-clad British channel, which had been explored by Jackson and down which Nansen had come in his retreat from his winter hut, we moved eastward along the south coast as far as Cape Tegetthoff and Salm island. Off the south shore of this island we steamed in open water over the very spot where the Austro-Hungarian ship *Tegetthoff* had been abandoned, fast in the ice, a quarter of a century before. It may be remembered that for more than a year the *Tegetthoff* had been held in the ice, having become beset off the western shores of Nova Zembla, and that she had drifted helplessly to this spot, where her crew,

through this fortunate accident, were able to discover a hitherto unknown Arctic land. Vainly endeavoring to find water through which to force the *Frithjof* still farther north along the east coast (then unexplored), and finding nothing but ice in every direction, we were compelled to return to Cape Tegetthoff, and there send our stores ashore for the purpose of establishing winter quarters. By August 3 this work was completed, and the ship sailed away for home, leaving us the only human inhabitants of Franz Josef Land, our nearest neighbors being Samoyedes and a few Russians in Nova Zembla, 500 miles to the south. Neither Franz Josef Land nor Spitzbergen is now inhabited by Eskimo or other northern tribes, and, so far as can be learned, never was occupied by any other men than Europeans there for the purposes of exploring and hunting or fishing. Spitzbergen has been known for 250 years, and is visited every summer by a considerable number of craft, but Franz Josef Land has until recently remained almost a *terra incognita*.

The cosmopolitanism of modern scientific exploration is nowhere better illustrated than in this region. Discovered by chance by Austro-Hungarians, it was next visited by Englishmen under the leadership of B. Leigh Smith. It was in 1882 that Mr Smith, on his second voyage to these coasts, lost his ship, the *Eira*, near Cape Flora, and was compelled to pass the long winter in an improvised hut built but a few rods from Mr Jackson's subsequent headquarters. The ruins of that hut, in which 25 men passed the winter in good health, living chiefly



DIAGRAM SHOWING THE ROUTE OF THE FRITHJOF, 1898

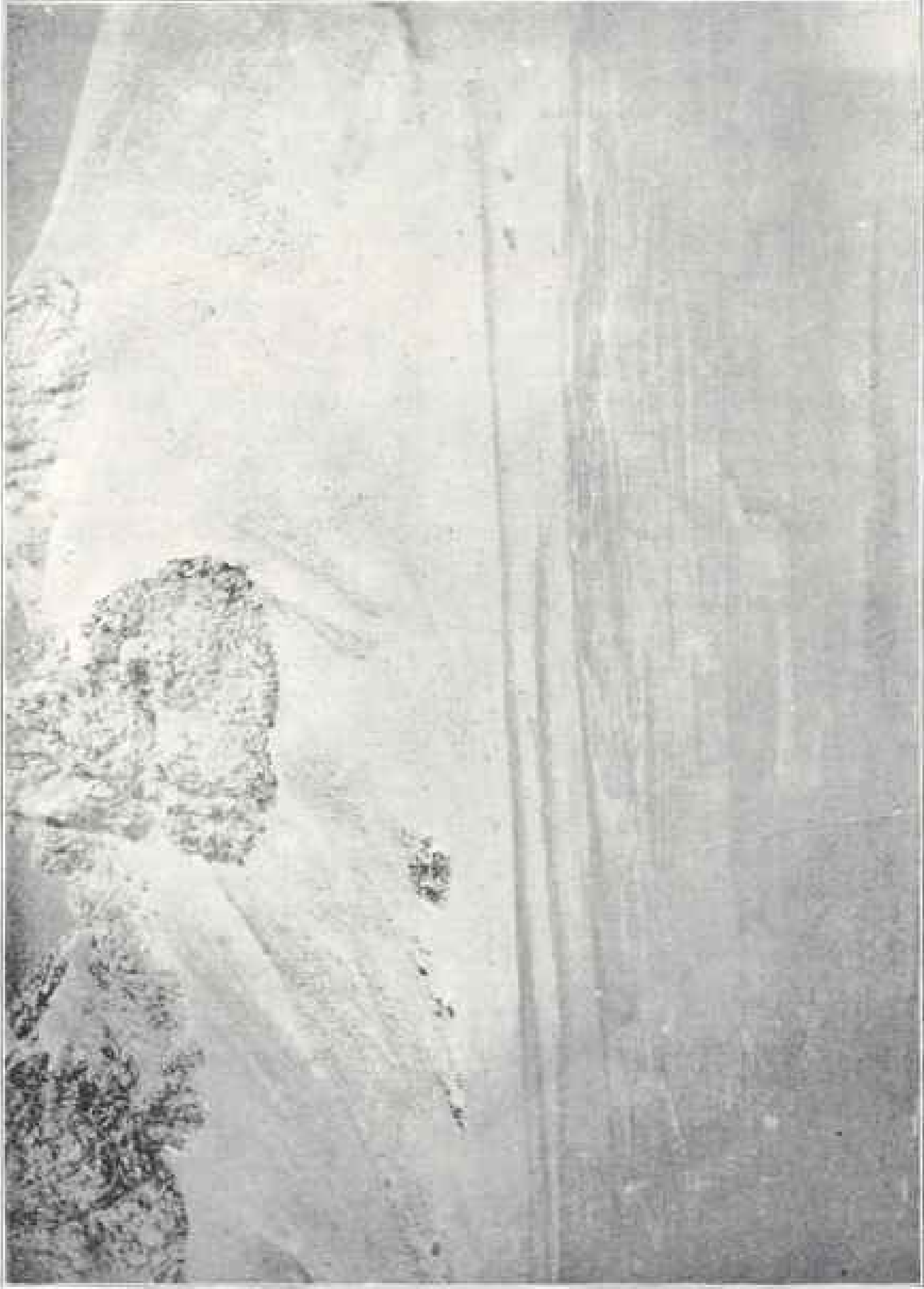
Copyright, 1898, by Walter Wellman

upon bear and walrus meat, still remain, mute witnesses to the fact that Dr Nansen and Lieutenant Johansen were not the first explorers to show that if worst comes to worst the adventurous man, caught out for the long night, may make himself reasonably comfortable with such materials as the country affords, while his rifle keeps him from starvation.

Next came the carefully prepared Jackson-Harmsworth expedition, which explored the western and central parts of the archipelago, but did not succeed in getting farther north than a little beyond the 81st parallel. Mr Jackson, whom I esteem as a painstaking and conscientious explorer, pronounced his judgment that Franz Josef Land was not a good gateway to the Pole, being a mass of small, detached islands, instead of a continental land mass. My own opinion is quite the contrary. It is true the region is one of comparatively small lands and many islands, and in summer the straits and fiords are broken up and filled with drift-ice, which precludes, more or less, active expeditionary work; but at this season of the year not much can be done anywhere in the Arctic, and in the favorable season, to wit, the spring of the year, these fiords and straits afford the best of roadways toward the far north.

The next visitor to these lands was Dr Nansen, and he came down from the north on his return from his memorable sledge journey from the *Fram*, reaching the northeast islands at the end of the summer, and finding it necessary to winter in an improvised hut. Next spring, without knowing where he was, and imagining himself to be nearer Spitzbergen than Franz Josef Land, he renewed his journey, only to meet, by a most rare and happy chance, with the Englishmen at Cape Flora.

After the Norwegians came the Americans, ourselves, with our Norwegian comrades, and as we were coming out this summer we met going in the young Duke of Abruzzi, the Italian prince. This young scion of royalty (he is a son of a former King of Spain, Amadeus) has at great expense outfitted his expedition, and is determined, as he says, to reach the Pole or lose his life in the effort. When we met the Duke his ship, the *Stella Polare*, was in the British channel, in latitude $80^{\circ} 20'$, and with good prospects of pushing 20 or 30 miles farther north before stopping for the winter. Subsequently a pigeon message is reported arriving in Russia with word from the Italian explorer that he is wintering about the 81st parallel of latitude, near the site of the Nansen hut. He has, therefore, an excellent chance for doing good work



BARRETT FORMATION — PLANE-JOINT LAYER

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in the way of a northerly advance next spring. He has 120 dogs, procured for him by Trontheim, and every device that ingenuity could suggest or money buy. The real test for him will come, as it comes to all who attempt the arduous road to the Pole, when he leaves his comfortable winter quarters or his ship and takes to the open field in a sledging trip during the extreme cold. Up to this time it is all comparatively easy, but sledging in February, March, and April tries men's endurance and courage to the utmost.

It is not too much to say that of all the men now in the Arctic regions the young Italian prince has the best chance to reach the Pole or to eclipse Dr Nansen's record. In my opinion, neither Peary nor Sverdrup, both of whom are wintering on the west coast of Greenland, about latitude 79°, has much chance. Their base is too far south. True, Lieutenant Peary has supplies at General Greely's house at Fort Conger upon which he may draw during his sledge journey next spring, but he must travel 150 miles to reach that outpost, and then will be but a little nearer his goal than the Italian is at his base. Besides, Mr Peary was unfortunate enough last winter to suffer the loss of seven toes, and though he is known to be a resolute man, it is questioned by all men of Arctic experience if it be possible for him, thus handicapped, to endure the tortures of a severe sledging campaign. As for Captain Sverdrup, who has so far failed in his scheme to circumnavigate Greenland in the *Fraas*, it is not known precisely what he is to attempt to do.

With Peary, Sverdrup, and Abruzzi the conditions are the same in one important respect as they were with us. The effort to make the North Pole must be by a dash, and nothing but a dash. The writer admits that he was the author of the phrase, "a dash for the Pole," but he cannot claim credit as the originator of the idea. As far back as 1827, Parry, the Englishman, attempted a dash for the Pole from the shores of northern Spitzbergen, and established one of the northerly records in that constant advance toward the Pole which restless man has persisted in making. Many other dashes have been made since that time.

Why must it be a dash? Why cannot one take his time to the task, making a gradual approach, year after year? These are questions often asked. The answer is very simple. If we had land extending to or near the Pole the old theory of a gradual advance from depot to depot would hold good. Reaching the Pole would in that case be simply a question of persistent effort,

of stretching out a base of supplies, of a long campaign, or of one organized on a sufficiently large scale to enable the flying column at the front to be well supported from the rear. But the polar explorer, like the mining engineer, the railway constructor, and the colonist, must take conditions as he finds them and adapt his methods to them. There are two main avenues of approach to the Pole—one by North Greenland and the other by Franz Josef Land. These are the two lands reaching nearest to the Pole from lower latitudes, but neither extends, so far as we now know, nearer than within 450 miles of that mathematical point upon which it is the ambition of man to plant his feet.

The aim of every pole-seeker is to get his base or his outpost established as far north as possible upon the land, and to make a dash beyond that point. Thus Mr Peary planned a depot of supplies at the extreme northerly limits of Greenland, but has not as yet been able to establish it. Abruzzi is wintering at 81° , and we made our headquarters a little north of 80° , and established an outpost about 81° . The explorer may use two or three years in establishing his outposts upon the most northerly land he can employ for this purpose, but when he once leaves the land and takes to the frozen surface of the polar sea his journey must be one of short duration—a dash—for these reasons:

1. It is only in the spring of the year that he can travel advantageously over the ice-sheet, and this is so because the winter is too dark, while in the summer the warmth of the sun makes the snow soft and "sticky," fills the pockets with sludge and water, and aids the winds and currents in breaking up the ice. The favorable, practically the only, season for travel over this drifting, shifting field of ice, is confined to March, April, and May, with what little of February one is resolute enough to use amid the darkness, and a part of June in which he may still do something before the snow becomes too soft. Thus the pole-seeker has at his command from 110 to 125 days, according to the earliness of his start, in which to make his northerly journey and his return to the land.

2. Everything he and his dogs eat, as well as the fuel for melting ice into drinking and cooking water, must be carried from the land or the outmost depot, not only for the advance journey, but for the return. Nothing can be had on the way. There is a limit, of course, to the weight of load that may be carried, and if the sledge party started with supplies for a six months' campaign they would be so heavily burdened they could make no



A PAIR OF WALRUS KILLED FOR THE FOOD
Copyright, 1899, by Walter Wellman

progress at all. At the minimum each man must have two pounds of food and each dog one pound per day, and the hauling power of a dog is limited to about 60 pounds and of a man to about 200 pounds. Besides, there is weight of sledges, instruments, bedding, weapons, etc., to be reckoned.

3. It is useless to establish depots upon the sea ice beyond the land, for the sufficient reason that they could never be found again, except by rare good luck. Even in winter the ice-sheet is never at rest. It is constantly drifting to and fro, with a general movement, as was shown by the voyage of the *Fram*, toward the west. If one left a depot upon the ice he could never be sure the ice had not opened there during his absence and destroyed it. On returning from their sledge journey, Nansen and Johansen made no effort to find the *Fram* again, though they were at no time more than 115 miles from the ship, and on their southward march, with a dreadful and doubtful prospect before them, they must have passed within 30 or 35 miles of her at farthest.

Limited in time and limited in weight, the explorer perceives

that the best and practically the only thing for him to do is to take advantage of the favorable season of from 100 to 125 days and make all his plans accordingly. The lighter his loads the shorter time he can remain out; the heavier his loads the slower must be his rate of travel. Between the two extremes he endeavors to find the happy mean and to apply to it the utmost of skill and ingenuity in keeping down weights and in utilizing motive power. Thus we see why it is only by the dash method that any one now seriously proposes to reach the Pole. Dr



MOUNTAINS AND GLACIERS AT CAPE TREKHTHOFF.

Copyright, 1896, by Walter Wellman

Nansen made his dash from the *Fram* after she had drifted far within the ocean, giving him the best start and the best chance to reach the Pole any one has had or is likely to have for some time to come. Peary proposes a dash from north Greenland. Andrée made his dash, bravely but recklessly, by balloon. Abruzzi essays a dash from near Nansen's winter hut and our own outpost.

We tried the dash, too, and might have done very much but for an accident which overtook us. In preparation for this effort

to reach or approach the Pole, and also to aid the work of exploration, which also formed a part of our plans, we established at Cape Heller, near the 81st parallel, an outpost or depot of supplies. This was done immediately after our arrival in Franz Josef Land. Within two days after the *Frithjof* sailed back to Norway a party set out with small boats and sledges for the north. Their instructions were to establish a depot as far north as possible. When they started the ice-sheet upon the bay and the straits was solid and apparently unbroken. But conditions



PREPARING THE HEADQUARTERS HUT FOR WINTER

Copyright, 1909, by Walter Wellman

often change with amazing rapidity in the Arctic, and so it was in this case. Within less than 48 hours the party found themselves involved in the greatest difficulty on account of the sudden breaking up of the ice and its rapid drifting out to sea under the influence of strong offshore winds. Nothing but desperate, even heroic, work enabled them to save their lives and the valuable equipment. Finally managing to reach the land, they struggled northward for a month, sometimes upon the ice-sheet, more often upon the rough shore, occasionally crossing glaciers and now and then advancing some of their heavier weights by boats in com-

paratively ice-free water, and were at length compelled to stop for good on account of drift-ice in the channel and the rapid approach of winter.

At Cape Heller they built a hut of rocks. A few pieces of driftwood served for the ridge-pole. The hides of walrus, killed in the water pools of Austria sound, near by, formed the roof. In this hut were accumulated about a ton of stores for use the following spring—sledges, boats, and other articles needed on sledge journeys. Forty dogs were there also, and for their sustenance during the winter the flesh of fifteen walruses was cut up in small squares and stored in a bin built of snow-blocks. To protect the hut from the winter's storms high walls of snow were built, and these made the premises look so much like an old-fashioned fortification that Mr Baldwin, leader of this party, named the place Fort McKinley. As soon as everything was made snug for the winter Mr Baldwin, pursuant to his instructions, asked for volunteers to remain at the hut through the winter to guard the supplies and care for the dogs. All five of the Norwegian members of the party offered their services, and great was the disappointment of the three who were not chosen. The two men assigned to the task were Paul Bjoervig and Bernt Bentzen, of Tromsø, both sailors, neighbors, and warm friends. Together they had often talked of the pleasure it would be to pass a winter in the Arctic in a little hut well stocked with food and tobacco, and this was to be the realization of their dream.

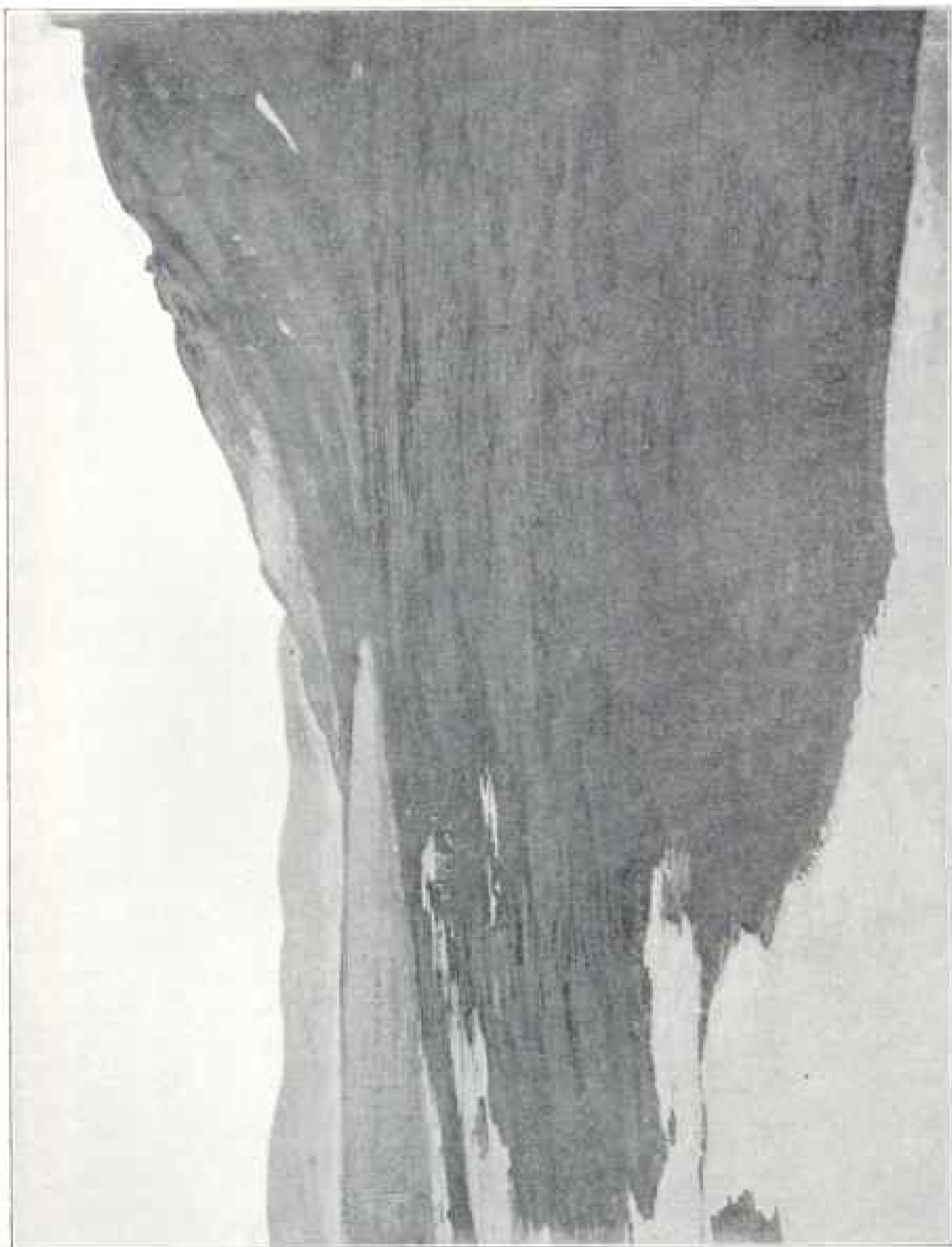
Their enthusiasm was not due to inexperience. Paul Bjoervig was a veteran Arctic sailor and traveler, and had been with the Wellman Expedition of 1894 to the north of Spitzbergen. Bernt Bentzen was a member of Dr Nansen's crew aboard the *Fram* on that famous drift-voyage through the polar seas. Both men were happy and well when their comrades left them and started for our headquarters at Cape Tegetthoff, just at the beginning of winter. It is a coincidence that but a few miles to the westward of this hut is the spot where Nansen and Johansen passed the winter of 1895-'96 in a similar structure, built out of such materials as could be found upon the ground.

Meanwhile those of us who had remained at Cape Tegetthoff were busy preparing our own house for the long winter. As first erected, the hut was a mere shell, two thicknesses of thin boards with an air-space between, and a roof of two layers of canvas. The house was ten-sided, one of the sections containing a door and two others little windows. With planks converg-

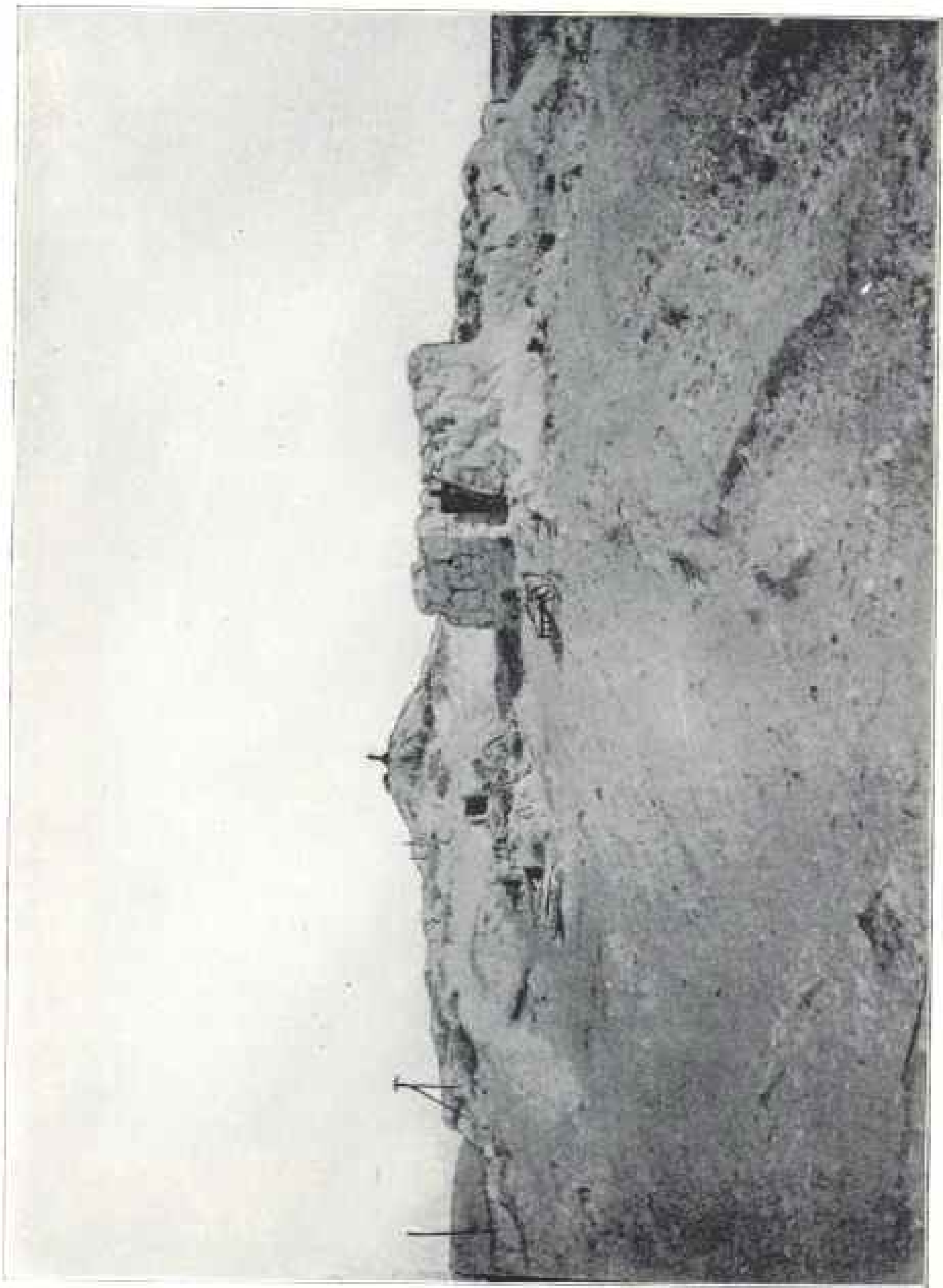
ing at the apex of the roof we built another shell around the whole; walled it up with blocks of snow and stretched a third roof over it in the shape of an old discarded mainsail from the *Windward* which we had picked up at Cape Flora. When the winter came on in earnest the snow drifted over the house, fairly burying it, as well as the store-shed which we had built at one side of Russian timber. The little windows were buried under walls of snow six or eight feet in thickness, and about this house there were in the Arctic darkness just two signs that it was actually used as a human habitation—the little stovepipe at the apex of the roof, pouring forth its cherry sparks, and a small, black hole at the entrance to the shed, through which we crawled in making ingress or egress.

We built an observatory of snow-blocks, too, for protecting the meteorological and magnetic instruments from the fury of storms, and within this enclosure (it had no roof) Mr Baldwin, the meteorologist from the U. S. Weather Bureau, and Mr Harlan, the physicist, carried on a series of observations throughout the dark season. Mr Baldwin secured continuous thermograph, barograph, and anemometer records during our entire sojourn in the Arctic, and also made a most painstaking study of the *aurora borealis*, comparing the manifestations here with a similar study which he had made in Greenland some years before. His observations and conclusions in this important field of scientific inquiry, when elaborated and published, as I understand they are to be by the government, will, in my opinion, form a valuable contribution to the literature of that topic. Mr Harlan also studied the aurora, particularly from the point of view of its effect upon the magnetic needle, and his report thereon, as well as his general study of the physical conditions of Franz Josef Land, I intend to publish in proper form and place as soon as possible. Dr Edward Hofma, medical officer and naturalist of the expedition, has a most interesting report concerning the fauna and flora of that region.

Within our hut we passed a very comfortable winter. It is true that at times the thermometer, hanging upon the wall 10 feet from the diminutive stove, had hard work keeping its head above the zero mark, and where we sat upon our packing boxes, each in his own "corner," hoar-frost was constantly hanging upon the wall; but all this was reckoned as nothing; nor did we suffer from the effects of the long night. If there was any melancholia its victim managed to keep his sufferings pretty well concealed.



CLIFFS AT CAPE COURTNEY SHOWING HORIZONTAL ROCKS, THE WILSON EXPEDITION DISCOVERED
Cape Court, 1898, by Walter Burdeau



THE HEADQUARTERS HOUSE — FROM A PHOTOGRAPH TAKEN BY MCKENNA DURING THE WESTER TRIP

Copyright, 1899, by Walter H. H. H.

All three of my American comrades, unfortunately, were ill for short periods during the winter, and this made it impossible for any of them to accompany me upon the sledge journey to the north, for which we were all winter busily preparing. But these ills might have shown themselves at home, and were in no way due to the climate or the surroundings. We had good beds, good food, including plenty of fresh bear meat, and American oatmeal, bacon, and flapjacks were not forgotten.

To the most of us the winter seemed short and not much of a test of patience. True, the absence of the sun for 127 days and nights was somewhat of a deprivation, leading us to the conclusion that if we were going to pass the remainder of our days in those regions sun-worship is the religion which would most strongly appeal to us; but we had work to do, bears to kill, scientific observations to carry on, books to read, exercise in the open air to take when the winds did not blow too severely, and the night was none too long. Almost every day we were out for a walk or a run upon snowshoes, and glorious it was to get about in the crisp air and the bright moonlight. But for the moon this far-northern world would be the very depth of gloom during the winter; but when the skies were clear and the moon was full the Arctic night was almost as bright as a winter day in temperate zones, and some of our best photographs were taken under these conditions.

Bathing was not neglected by any member of our party, even in the coldest weather. A tub of water was taken into the storehouse, one man at a time, and though the temperature there was usually from 5 to 15 below zero, we stripped and bathed in tolerable comfort, and without taking colds. In fact, such a thing as a cold the writer has never suffered from in the Arctic regions, though he has bathed in the open sea, diving from icebergs, and refreshed himself by a naked plunge in a natural tub formed of ice, floor and walls. Wool is now admitted to be better than furs for extreme cold, though some travelers cling to fur garments. In the Arctics one does not suffer from the direct effects of cold, but from its indirect effects in the formation of frost and damp within the clothing due to congelation of the exhalations from the body. It is for this reason that wool possesses superiority to skins, as the former permit the moisture to pass through the fabric; the frost forming outside, while furs retain it within. Upon the sledge journey, in temperatures ranging from 10 to 48 below zero, the writer wore no furs, save a pair of reindeer-skin

moccasins upon his feet. Within these moccasins were from three to five pairs of thick woolen stockings, these being surrounded by loose dry grass to absorb the moisture. He never once suffered from cold feet, and even after he had met with an accident and the circulation in one of his legs below the knee was almost wholly stopped, he suffered no frostbites. Upon the hands wool is better than skin. We usually wore two pairs of ordinary woolen mittens. The inner pair was dry and warm, while the outer pair was filled with frost, which could be shaken out at intervals.

February and March were our coldest months, and these were the months of the sledge journey. The lowest temperatures observed by us were a little under 50° Fahrenheit, not as great a degree of cold as is observed every winter in Siberia and in the interior of Alaska; but it must be remembered that all of our observations were taken at the sea-level, where the relative humidity of the atmosphere is greater than upon the elevated table-lands of Siberia or in the mountains of Alaska. Franz Josef Land we found to be a region of storms, due probably to its proximity to the comparatively warm Barents sea to the south, where the influence of the Gulf Stream is quite marked, and to the fact that it lies directly within the track of what might properly be called the Arctic trade winds.

This Arctic trade wind, result of the same causes as the trade winds so well known to navigation in the southern hemisphere, blows from northeast to southwest, as the trades of the region below the equator blow from southeast to northwest. In both cases the chief causes are the rotary motion of the globe and the flow of cooled air toward warmer zones along the surface of the earth. It is this trade wind which produces the set or current of the Arctic seas from the northern coasts of Siberia to the great outlet of the ocean between Greenland and Spitzbergen—the same movement of waters that Dr Nansen relied upon to bring the *Fram* through in safety. In Franz Josef Land we had opportunity to observe not only the effects of this current, pouring down through all the sounds and straits summer and winter, either under the ice or breaking the ice-sheet and carrying the débris with it, but also the meeting of two opposing forces, namely, the Arctic trades and the Gulf Stream. The mighty ocean river that debouches from the Gulf of Mexico, traverses the coast of North America, and crosses the Atlantic to the shores of Great Britain, divides there into two branches.

One flows southward toward the equator, while the other impinges against the coast of Norway, keeping ice-free all winter the fiords and harbors of that picturesque country even farther north than the latitude of Point Barrow, in Alaska, and then flowing on into the Barents sea against the western coast of Nova Zembla and, thus turned northwestward, continuing its course in a westerly direction along the southern coasts of Franz Josef Land. There our investigations and observations enabled us carefully to note the mingling of the two currents. Just as the Gulf Stream is the product of the piling up of masses of water within the Gulf of Mexico by the trade winds of the southern hemisphere, so the Arctic current which brings the icy waters down into the Atlantic from the polar sea is the product of the northern trade winds. We were thus at a most advantageous point for study of this vast circulatory system of the sea. We were at the meeting of the waters from the two Poles of our earth.

Of great importance to explorers is this constant movement of the liquid masses which impinge upon Arctic lands. It frees the coast of Franz Josef Land of ice through the summer months, making navigation all along its shores comparatively easy at that season, even though there may be a thick belt of almost impenetrable pack-ice farther to the south. It brings to Arctic shores, too, from the headwaters of Siberian rivers, masses of driftwood for fuel and building purposes. It seemed to us a remarkable beneficence of nature that we should find timber from the interior of Asia to put into our little hut and to burn with blubber for our fires a thousand miles above the tree limit and within six hundred miles of the North Pole itself.

While wintering at Cape Tegetthoff we burned considerable quantities of this driftwood, and at times we thought it not such a bad country, after all. Perfectly fresh water came pouring down from the glaciers in the summer months and formed limpid pools at our very doors. Building materials we sawed out of frozen snowdrifts, blocks as true and almost as firm as marble. Bears had a comfortable habit of walking into our front yard to be shot, and right nice steaks and stews we contrived to make of them. The surf threw firewood upon the beach right in front of our dwelling, and never at any time did we have need of the iceman.

The sunless winter was long, but not tedious. Best of all, good fellowship abode with us. It is an Arctic axiom that ex-

ploring parties should be of but one nationality. It is a pleasure to record that though we were Americans and Norwegians living in one little room, night and day, for five months, not a word of discord between Yankees and Norsemen marred the novel experience. No better or more faithful men ever served under the banner of Norway than those young men who lived with me under the Stars and Stripes at Cape Tegetthoff that winter, in the most northerly inhabited house in the world, and who subsequently accompanied me upon the sledge journey.



"HEADS WALKED UP TO OUR DOORS TO BE SHOT."

Copyright, 1898, by Walter Wellman

It was on February 18 that we set out upon this trip to the north. The sun had not risen, and the days were short and dark. But well we knew that if we were to make the Pole, or approach nearer to it than any of our predecessors, we should have to start very early in the Arctic morning. We stumbled along in the gloom, through deep snows and rough ice, encountering storms and great cold, sometimes making but two or three miles a day, and at last arrived at our outpost at Fort McKinley. This was near the end of February. Here we found that a remarkable tragedy—one of the most remarkable tragedies known

to the history of Arctic exploration—had occurred during the winter. Bentzen had been taken ill in November, shortly after our men had left the two there together, and had never recovered. Lingered till January 2, carefully nursed by Bjoervig, death had then come to Bentzen's relief. All this Bjoervig told me, when, at the head of our little procession, I met him standing in front of the tunnel which led down into the now snow-buried hut. Then we crawled in, and Bjoervig poked up the blubber fire and started to make me some coffee, as I sat looking about at the strange little cave, its walls coated with hoarfrost even within two feet of the brilliant flames.

"Where did you bury Bentzen, Paul?" I asked.

"I have not buried him, sir," was the reply. "He lies in there."

I lit a little lamp—a bicycle lamp; it had been here in Washington—and walked into the darkened portion of the hut, partly partitioned from the remainder of the apartment, to which Paul had pointed. As soon as my eyes had become accustomed to the peculiar light which the frosted walls and roof reflected from the dim lamp, I saw at my feet a one-man sleeping bag, bearing evidences that it had been occupied by a living man the night before. By its side, within arm's reach, lay another bag. This one was occupied, and had been for several months. Bag and contents were now frozen as solid as a rock. For two months Bjoervig had slept by the body of his dead comrade—two months of solitude amid the Arctic darkness when night was not to be distinguished from day—two months alone with the dead in this Arctic tomb.

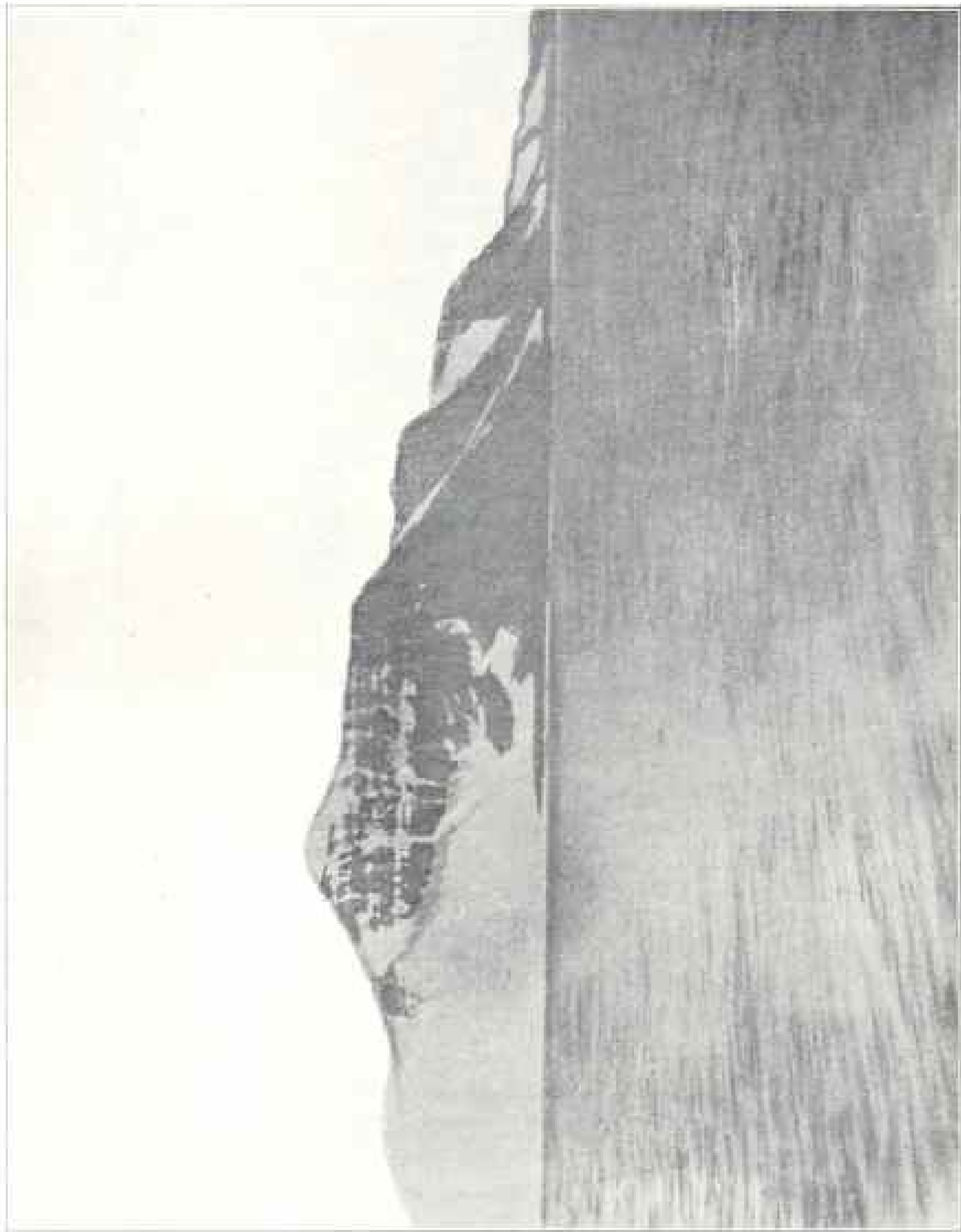
Bjoervig had not buried Bentzen because he had promised him he would not, and he had promised because of the sick man's fear that if buried in the cold and darkness it would be in such manner that the bears and foxes might get at his remains.

Notwithstanding this dreadful ordeal through which he had passed, Bjoervig was sane, cheerful, almost normal. He was a little nervous, and had difficulty in getting sleep; but next day he helped us drag out the body and carefully bury it in a hole which the wind had hollowed out. It was a bitter day, 45 below zero, and a fierce blast blowing down from the glaciers. But the most industrious man of us all, after the little funeral ceremony was over, was Paul. For hours he was busy chinking up all the openings in the walls around the rude tomb. "I promised him the bears and foxes shouldn't get him," he explained.

We took Bjoervig with us, contrary to our original plan, and continued our journey to the north. Though the weather was still gloomy, the snow deep in places, storms too frequent, the ice rough, and the loads heavy, we made satisfactory progress. By March 20 we were off the east coast of Rudolf Land, near the 82d parallel of latitude. Our prospects were bright. We had traveled one-fifth of the way to the Pole, and had yet at our command for northerly advance six or seven weeks of the most favorable season. We had passed through the worst of the darkness and cold, and had just reached that period when, in those latitudes, we were to have the sun all the time in the heavens. All our men and equipment were in good condition, and we were scenting the victory that lay before us when a seemingly trivial accident occurred to one of our number. All pride goeth before a fall, and this man, glorying in his strength and endurance, slipped while working his sledge through heavy ice with his team of dogs and fell in a little crevice in the path. The hurt which he received would not have been serious had he stopped for ten days or a fortnight for rest; but in that work, with the farthest north, and perhaps even the Pole itself, beckoning him on, one does not stop. He always thinks he will be better the next day and quite well the day after. So he keeps going, dragging himself along, till he drops in the snow and can go no farther.

Then came the bitter retreat. The injured man had to ride upon a sledge and be dragged by his faithful companions and his dogs. He suffered, of course, but quite as much in his pride as in his body, for it is inglorious to be hauled off the field of battle. His Norwegian comrades were as brave as lions and as tender as women. They nursed him and cared for him, unmindful of themselves. They made the ambulance, bounding along over the rough ice, as comfortable as they could; the tent they converted into a hospital, and bandaged the injured limb with hot water in temperatures of 40° below zero. Fearing their broken leader might die upon their hands, they made a gallant race for a man's life back to headquarters at Cape Tegetthoff, arriving there April 9.

If the man riding southward upon the sledge in those first days of April looked longingly to the eastward, where the glint of ice-capped and wholly unexplored lands was seen under the rays of the sun, and planned that in a couple of weeks he would take his sturdy Norwegians out there to explore and



Cape Verde—FRANK JONES LASH
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← Track of Steamer "Capella," 1899, which brought back the Expedition.
 ← Track of Sledge Journeys of the Wellman Expedition, 1898-'99.
 ★ The Northernmost Point Reached by the Expedition. (565 Miles from the Pole)

MAP OF FRANZ JOSEF LAND ARCHIPELAGO, SHOWING THE NEW LANDS DISCOVERED AND EXPLORED BY THE WELLMAN EXPEDITION

Copyright, 1899, by Walter Wellman

- | | |
|--------------------------|---------------------|
| A. Royal Society Island | v. Cape Elkins |
| B. Pritchett Island | d. Cape Vilus |
| C. Brice Island | e. Cape Baska |
| D. Bliss Island | f. Cape Foraker |
| E. Alger Island | g. Cape Fairbanks |
| F. Jackson Island | h. Cape Gorman |
| G. Brady Island | i. Cape Tyrol |
| H. August Island | k. Cape Copeland |
| I. Simon Newcomb Islands | l. Cape Robert Hill |
| K. Willis Moore Islands | m. Cape Frick |
| L. McGee Island | |
| M. Payor Island | |
| N. Lyman Gage Island | |

map, that was but another evidence that in Arctic exploration it is a good thing to have plenty of optimism, served in daily rations and carried in imperishable packages.

This journey was subsequently made, however, by a party led by Meteorologist Baldwin, and the result of it was that, whereas when the Wellman expedition arrived in Franz Josef Land the eastern limits of that land were unknown and formed a topic of discussion among geographers, they are now carefully marked out upon the map. By means of these two sledge journeys and a voyage in the unexplored parts of Markham sound subsequently made in the steamer *Capella*, which was sent after the expedition at the expense of my brother, Arthur Wellman, some 20 new lands or islands were added to the map of that archipelago. Upon these new lands, their capes and straits, we had the pleasure of placing the names of well-known American scientific and public men who had befriended the expedition, including that of the President of the National Geographic Society.

We bear testimony to the surprising accuracy of the survey of a part of Franz Josef Land which had been made by Payer, the discoverer of that region, 25 years before. His one great error, the location of an enormous glacier, capping a land of continental dimensions, extending northward from Wilczek Land, had been in part demolished by Dr Nansen, who had landed at the Freeden islands and crossed in his journey over the sea ice the spot where Payer had placed his Dove glacier. We completely finished the destruction of that geographic error. The Dove glacier does not exist, nor has Wilczek Land the form or dimensions ascribed to it by the Austro-Hungarian explorer.

Four times did we cross the path of Dr Nansen—twice on our sledge journey to the far north, where we saw, but did not reach, three islands which he had passed without seeing, as they lay a considerable distance to the westward of his course, and twice in our steamers in the British channel and along the coast of Northbrook island at Cape Flora. We regret, of course, the accident which deprived us of our chance to wrest from the gallant Norwegian the honor of the farthest north; but if we have in a modest way been able to contribute something to the world's knowledge of the world, we feel amply repaid for all the hardships and all the sacrifices.

Above all, we are glad to subscribe to that cosmopolitan spirit which knows no frontier lines in the pursuit of knowledge. We

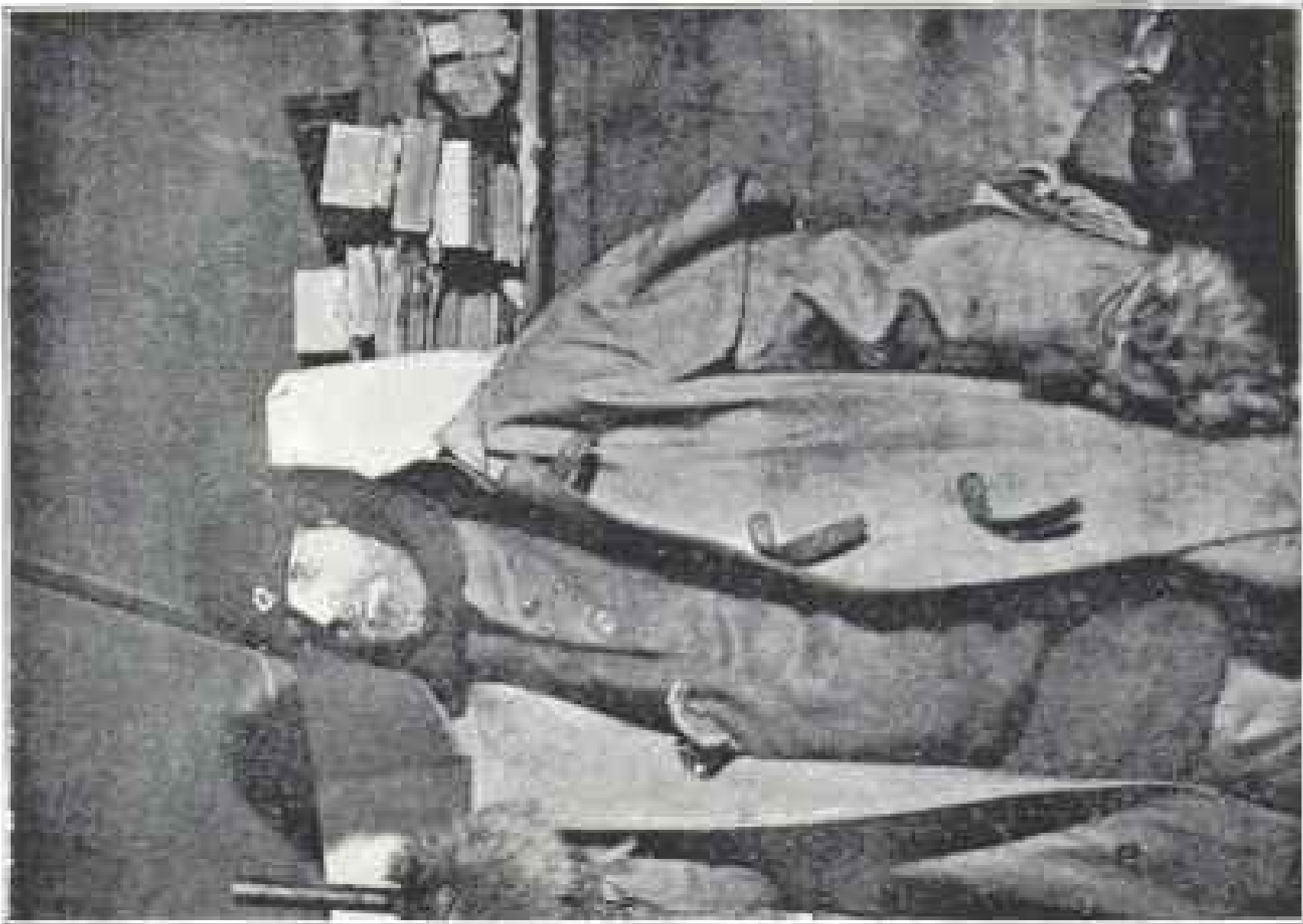
honor the Norwegian for what he did, and we expect great things of the young Italian prince, the Duke of Abruzzi. Upon meeting him in Franz Josef Land we went aboard his ship and welcomed him to the region of ice and snow and wished him good luck in a fashion which I feel sure was hearty and sincerely American.

We may have differences of opinion as to the value of reaching the Pole. If we apply the utilitarian test, it is of small moment; but so is a poem. And what is polar exploration but an epic of endeavor, in which all sordidness is left behind, and in which a man, knowing the risks and the chances of failure, ventures his life and his all in a combat against the forces of ignorance? For I deem it beneath the dignity of man, having once set out to reach that mathematical point which marks the northern termination of the axis of our earth, which stands as a sign of his failure to dominate those millions of square miles of unknown country, to give it up because the night is dark and the road is long. He will not give it up. The polar explorer typifies that outdoor spirit of the race which has led conquering man across all seas and through all lands, of that thirst for knowing all that is to be known which has led him to the depths of the ocean, to the tops of mountains, to dig in musty caves, to analyze the rays of light from distant worlds, to delve in the geologic records of past times. It will carry him to the North Pole, too, and that before many years shall have passed. Any one who supposes anything else of man doesn't know man. His acquaintance with human nature—with the nature of the adventurous races of our zone and times—is limited.

The eyes of the scientific world are turning with more and more eagerness to the Antarctic regions. Little now remains—beyond the Pole itself—in the Arctics; but in the far south there is great work to be done in every field of scientific exploration and investigation. I have here the suggestion to make to the National Geographic Society, and I make it after a careful study of the situation in all its bearings. It is that this Society institute a movement whose object shall be to gain from Congress an appropriation for an American Antarctic Expedition, to work in harmony with the expeditions which are to go into that field from England and Germany. The modest sum of \$150,000 would equip a creditable expedition bearing our flag, and it is my belief that even in this utilitarian age the American Congress can be induced to devote such a small sum to such a great purpose.



HIS WILDMAN IN AUSTRIA, 1900
Copyright, 1900, by Walter H. Preece



HIS WILDMAN READY TO START ON THE SLIPPER JOURNEY — FRANKFURT, 1900
Copyright, 1900, by Walter H. Preece

THE HARRIMAN ALASKA EXPEDITION

By HENRY GANNETT,

Chief Geographer, U. S. Geological Survey

This expedition, notices of whose movements have appeared in earlier numbers of THE NATIONAL GEOGRAPHIC MAGAZINE, reached Seattle on its return July 31. It left the same port for the north June 1, and in the intervening 60 days the *George W. Elder*, bearing the expedition, steamed 9,000 miles and visited points along the entire northwest coast from Seattle to Bering strait. Not less than 50 different landings were made. The *Elder's* route is represented in a general way on the accompanying sketch map of Alaska.

The party was composed of Mr Harriman's family and a few of his personal friends, with some 30 scientific men, making a total party of 50. This comprised zoölogists, botanists, geologists, and geographers. Every possible facility for the prosecution of scientific work was made, including outfits for inland travel and accommodations for the preparation of specimens, etc. Indeed, the whole expedition, although projected primarily as a pleasure trip for Mr Harriman's family, was subordinated in all ways to the needs of the scientific party. Even the movements of the ship were arranged day by day by a committee on board in the interest of the scientific work.

The general plan pursued was to follow the coast, making brief stops at numerous points for the purpose of making observations and collections. The steamer followed the inside passages as far as Glacier bay, making numerous stops on the way, but none of much duration until Glacier bay was reached. At this point, which is notable for the immense glaciers which reach the sea-level and discharge icebergs, the ship remained for several days, which were improved by the geologists in mapping the glaciers, paying special attention to the positions of their discharging fronts, for purposes of comparison with earlier measurements and for comparison by future students. A similar stop was made in Yakutat bay, where the steamer was taken not only to the head of Yakutat bay proper, but traversed its extension to its head. From Yakutat bay the expedition went to Prince William sound and spent a week in this interesting and almost unknown region.

Upon its shores are many glaciers, few of which are of record, which extend down to tide and drop bergs into the sea. In this region Mr Gilbert explored and mapped one of the finest glaciers of Alaska, situated upon the north shore, just west of Port Valdez, to which the name of Columbia glacier was given, the fiord into which it enters being called Columbia fiord. Port Wells, an extensive fiord on the northwest coast of Prince William sound, was also explored, and a sketch map of the upper part of this inlet is presented on page 511.

From Prince William sound the boat visited Homer, in Kachemak bay, and thence proceeded to Kodiak island, where parties were landed for hunting and for scientific work. Thence the boat coasted the Alaska peninsula, passing among the Shumagin islands, and thence on to Unalaska, stopping at numerous points on the route. Leaving Unalaska, a short pause was made at Bogoslof, a group of two volcanic islets, one of them a century old and the other but fourteen years of age; thence the course was north to St Paul island, where a short stop was made to visit the fur-seals, and thence to Plover bay, in northeastern Siberia, where the Inuit people were first encountered. The ship then crossed to Port Clarence, passing just south of Bering strait, within sight of the Diomedé islands. At Port Clarence was found a fleet of arctic steam whalers which were waiting there for the ice to retreat from the vicinity of the straits. From Port Clarence the boat visited various islands in Bering sea—St Lawrence, St Matthew, and Hall islands—and thence steered a straight course for Unalaska. From that point she returned to Seattle, following much the same course as on the way up and stopping at comparatively few points.

Throughout, the expedition was greatly favored by the weather. It is a common saying that nothing can be certain about Alaskan weather except that it will be unfavorable. Still, during the two months that the expedition was in Alaskan waters there was but one rainstorm, and there were many clear, bright, sunny days. Although fogs and cloudy weather were frequent, they commonly occurred when there was little to see or do, and the work of the expedition was but slightly delayed or hampered by it.

The entire south coast of Alaska, from Portland canal to the Aleutian islands, is composed of a succession of glacial fiords, which continue inland as branching glacial gorges, reaching far up into the coast mountains. Many, if not most, of the gorges are still filled with glaciers near their heads, and in scores of

cases these glaciers still extend so far downward as to protrude their fronts into the deep water of the fiords.

A few thousand years ago, perhaps at the time the Egyptian pyramids were rising, the fiords which form the inland passages now traversed by the tourist were filled with great rivers of ice from the sea bottom nearly to the mountain summits. Indeed, the ice was spread in great sheets, covering all but the highest mountains. The retreat of the ice, though apparently slow, has yet been at so rapid a rate that the oldest land, which first emerged, has suffered little from subsequent aqueous erosion. The glacial carving is still strongly in evidence, and this in a region of excessive rainfall and steep slopes, where aqueous erosion is at a maximum. From these oldest regions, densely forest-clad, with the remains of older forests under foot, we may pass, going up the fiords to land continuously younger. As we approach the glacier the older, dead forests disappear. There is now but a single generation of trees, and these become younger and smaller. Soon they are succeeded by alder and willow bushes; then by grasses and annual plants, by mosses, and other low forms of vegetation, and, finally, by bare rock ridges, polished and scoured by ice and by bare glacial gravel a few miles only from the ice-front.

The glaciers are still retreating. The next generation will find few of them with their fronts still in the sea, discharging bergs. The thunder of the glacier, as it breaks off into the sea, will soon be no more heard in the land. A century ago, when Malaspina explored these shores, the ice extended much farther down the fiords than now. They found fiords closed which now are open, and their charts show that the inlets then extended far less deeply into the land. Malaspina sailed up Yakutat bay, passed Haencke island, and for the moment believed that to him it had been given to discover the long-sought northwest passage, but he was soon confronted by a blank wall of ice, which, extending from side to side, barred further passage. Sadly he named this upper portion of Yakutat bay Disenchantment bay, for his dream was over. Now the ice barrier, the front of Hubbard glacier, has retreated, and ships may pass 25 miles farther, away to the head of Russell fiord, as the southward extension of Yakutat bay has been named, in honor of Prof. I. C. Russell, who first explored it. When this fiord was dammed by the ice-front of Hubbard glacier it became a lake, with its level some 200 feet above sea, as shown by lake benches along its walls. Then it overflowed

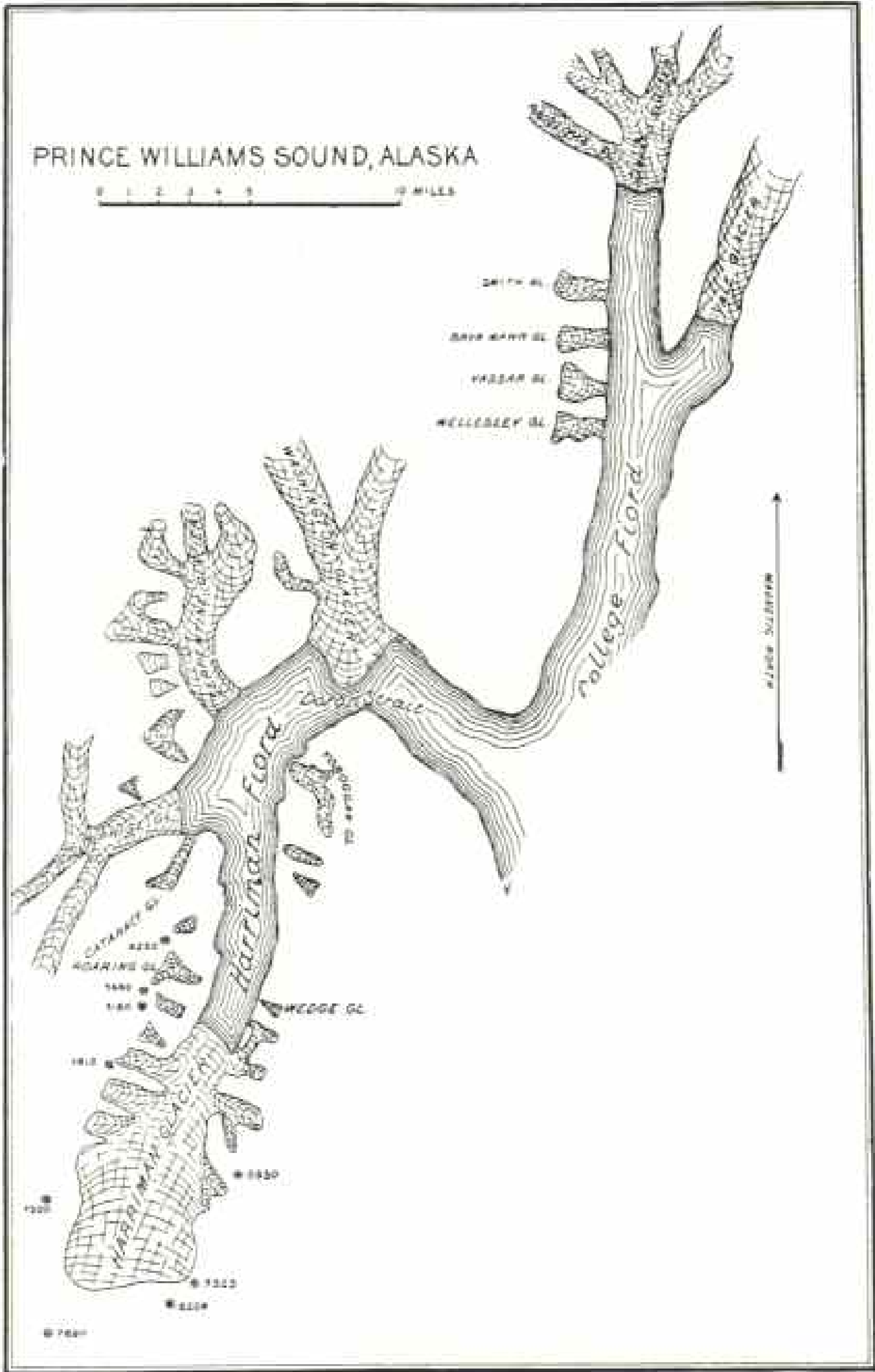
to the south, directly to the Pacific, or westward to the lower part of Yakutat bay. Here, therefore, is a fiord 25 miles in length, opened up within a century.

Port Wells, in Prince William sound (see map, page 511), is a fine example of the retreat of the ice and the opening of navigable waters. The old charts show this fiord to be only some 30 miles in length, whereas the explorations of the Harriman expedition in 1899 show that it now runs northward into the land not less than 40 miles. It terminates at the upper end in two branches, each occupied by a great glacier, Yale and Harvard, whose fronts are in the water, while along the west side of the fiord are four smaller glaciers, tumbling down in ice cascades from "hanging valleys" into the water. These terminal glaciers have retreated 9 miles in a century.

But the finest of the recent accessions to the navigable fiords of Alaska is the Harriman fiord, discovered and mapped by the expedition. This is a western branch of Port Wells and is not indicated on any chart. Five miles above its mouth it turns abruptly from a northwesterly to a southerly direction and runs in this course some 15 miles. At the bend it is nearly closed by the ice-front of Washington glacier. Indeed, although this glacier has been known for some time to the people who navigate these waters, it was supposed that it extended entirely across the fiord, closing it. It was therefore a great surprise, even to the local pilot of the *Elder*, when a close approach to the front of Washington glacier disclosed a passage through and an open fiord, lined with magnificent glaciers and mountains, beyond.

Under the circumstances it required great nerve to take a 1,700-ton steamer through waters so utterly unknown as these. There was no danger from shoals in the open fiord, but a projecting rock which might in earlier days have been a nunatak might have been encountered at any moment; but the ship was run safely to the head of the fiord, unfolding at every bend a wonderful scene of rock and ice.

From all indications, it is certain that within the century the four great glaciers which now drop bergs into the waters of Harriman fiord were united in one, which occupied the fiord from its present head to its mouth. Moreover, but few years have elapsed since Washington glacier bridged or dammed the fiord at its bend, closing it to all access except by land journey. From these, amid thousands of similar instances which might be cited, it is clear that Alaska is "Our Youngest Possession." The coast, at



THE UPPER PART OF FORT WEDG, PRINCE WILLIAMS SOUND, ALASKA

least, has but recently emerged—so far as it has emerged as yet—from its mantle of ice. But there are enormous areas still buried beneath ice coverings thousands of feet in thickness. The Muir glacier alone covers an area probably as large as the state of Rhode Island, and there are scores of others comparable with it in magnitude. The region north of Prince William sound is covered in greater part by glacial ice. There is more ice there than dry land.

One broad fact or conclusion, long ago pointed out by Mr John Muir, but persistently overlooked by geologists, is forced daily upon the attention of the traveler on the Alaskan coast. This is that the existence of glacial fiords is no evidence of a subsidence of the coast. The Alaskan fiords were cut and are being cut today by glaciers below sea-level. It may be that the coast is subsiding, but its fiord character is no evidence of this. Glaciers are now protruding their fronts into water a hundred fathoms deep and many miles from where the shoreline would be were the ice removed.

Of the results accomplished by this expedition little can be said at present, since little will be known until the specialists of the expedition have had time and opportunity to investigate the material collected. The movements of the party were arranged in such wise as to be especially favorable to the work of the biologists. The frequent stops made in many different localities afforded them an opportunity for a thorough study of the distribution of plant and animal life throughout a vast stretch of the coast. The comparatively longer stops made in the vicinity of the most important glacier regions enabled them to make quite exhaustive studies of the extension of plant and animal life over newly made land, recently freed from the ice covering, and in this branch of study it may well be that interesting and important results will be obtained.

THE METEOROLOGICAL OBSERVATIONS OF THE SECOND WELLMAN EXPEDITION

By EVELYN B. BALDWIN,

U. S. Weather Bureau

In the following article I purpose to give merely an outline of the scope and character of the meteorological work of the second Wellman Expedition. The observations that were secured,

together with some account of the meteorology of the year spent in the Arctic regions, will form the subject of a separate paper. Through the courtesy of the Chief of the Weather Bureau, the instrumental equipment of the expedition was made as complete as possible within the short time available. It consisted of standard wet and dry thermometers, self-registering maximum and minimum thermometers, aneroid barometers, a barograph, a thermograph, an anemometer, and a water thermometer.

The observations may be divided into three series, *viz.*, those made on shipboard, in camp, and in the field.

The observations on shipboard began June 27, 1898, the day following our departure from Tromsø. They were made thrice daily, as nearly as possible at 7 a. m., 2 p. m., and 9 p. m., local time, the ship's position being duly noted. Each observation consisted of readings of the dry and wet bulb thermometers, water thermometer, salinometer, aneroid barometers Nos. 1134 and 1135, giving the atmospheric pressure in inches, and of the ship's barometer, indicating the pressure in millimeters, wind velocity, as indicated by an anemometer erected on the ship's bulwark, allowance being made for the speed of the ship, which, however, was very slow. In addition to the foregoing, observations were made as to the direction of the wind, the amount of cloudiness, and the kind and direction of clouds. This series of observations extended in a line from near North Cape to Vardø, Norway, thence to Archangel, which point was reached July 4; thence northward to about latitude $77^{\circ} 54'$ N., longitude $44^{\circ} 58'$ E., at which point the ship turned southward on July 11, returning to Vardø, and from Vardø northward again, July 17, reaching Cape Flora, Franz Josef Land, latitude $77^{\circ} 56' 27''$ N., longitude $45^{\circ} 42' 18''$ E., on July 28, and then, finally, eastward to Cape Tegetthoff, latitude $80^{\circ} 6'$ N., longitude $57^{\circ} 54'$ E., reaching the latter point on August 3, on which date the expedition ship began her return voyage to Norway.

During this voyage the southernmost occurrence of ice was noted in the course of the night of June 28, latitude $63^{\circ} 20'$ N., longitude $35^{\circ} 00'$ E. It consisted, however, of but small pieces. The highest temperature was recorded at Archangel, *viz.*, 77° F., July 4. But, in general, the temperature recorded in the southern part of Barents sea varied from 53° to 43° F., gradually sinking to from 37° to 32° F. along the southern coast of Franz Josef Land. The salinometer indicated the salinity of the sea to vary but little from 27 per cent, while in the White sea it

gradually diminished to zero at a point six miles below Archangel, in the Dwina river. The temperature of the sea varied from about 45° F. in the southern part to 30° F. at Cape Tegethoff. Generally cloudy weather, with much fog at times, prevailed during the voyage.

With the departure of the ship, regular meteorological observations were taken on shore for two days, or until 7 a. m., August 5. Thereafter, till the night of October 30, a period of eighty-six days, during which time I was in the field in charge of the expeditionary advance party, the work embraced nearly continuous records of temperature and pressure by means of the barograph and thermograph, checked by means of standard thermometers and two excellent aneroid barometers, besides nearly continuous measurements of the wind movement and velocity by Robinson anemometers, and frequent eye observations of the clouds, general weather conditions, movements of the ice, etc.

The self-registering instruments were carried in a large basket, through which the air circulated freely. The basket rested upon an inflated rubber pillow. The anemometer was mounted on a hickory pole seven feet in length. Whether on the sledge or in the boat, these instruments gave entire satisfaction. Owing to the very slow progress made in advancing the equipment from day to day, the value of these field observations was not materially impaired by change of station, the largest radius of which did not exceed fifty miles in a straight line between Cape Tegethoff and Fort McKinley.

From August 22 to September 19 a station was maintained at Storm bay, Wilczek Land, 35 miles northeast of Cape Tegethoff, and we were thus afforded an exceptional opportunity of studying the meteorology of that storm-swept region. Strong southerly winds blew almost incessantly, accompanied at times by fog, snow, rain, and sleet, and on one occasion by hail.

On September 19 we made a forced march across Quereau glacier, Storm bay, to a low point of land near Cape Heller, where we built an outpost and named the same Fort McKinley. During this journey the self-registering instruments continued to record in a most excellent manner, the barograph indicating the height above sea-level (1,100 feet) and the inequalities of the surface wherever ice valleys were crossed.

As illustrating the weather on this journey, I quote from my journal as follows:

September 18: Weather clearer, but the wind from 2 p. m. (17th) to 10 a. m. (18th) averaged 19 miles per hour from the southeast; 5

o'clock p. m., moved the camp to the north side of Storm bay, on the edge of Quereau glacier, to an elevation of 100 feet; very thick snowfall and wind strong from the southeast; 9 p. m., blinding snowfall continues before southeast wind; 10 p. m., wind gentle, but accompanied by a shower of sleet and dense fog; 11 p. m., light fall of hail for three minutes. September 19: 11 a. m., weather cleared; temperature 28.9° ; wind gentle, from the west; 3 p. m., station at an elevation of 1,100 feet above sea-level, on Quereau glacier, north from the previous camp; average wind velocity since 11 a. m., 20 miles per hour from the west; considerable fog at times; 8:30 p. m., station advancing northward, the elevation now being 1,130 feet; dense fog generally prevalent, being either "blown up" or formed upon the glacier by the west wind coming from Markham and Austria sounds; frequent glimpses of a golden glow upon the clouds from the fog hidden sun in the northwest assisted in keeping the course with the compass; 11 p. m., wind continuing strong from the northwest and darkness upon the moving station, but by noting the lines of snowdrift, we continued to advance. September 20: Quereau glacier, 1 a. m., crossing a series of inequalities or broad and gently sloping valleys leading toward the west face of the glacier; 2 a. m., the surface beginning to slope northward as well as westward; 4 a. m., first view of the summit of Cape Schurarda; 6 a. m., "station" at the foot of Quereau glacier, two miles east of Fort McKinley, and at 7:30 a. m. at Fort McKinley.

The closing days of September were spent in completing the fort and in cutting up walrus meat for dog food. During the night of September 30 and October 1, young ice formed on the surface of the sea, and it became impossible to use the boats save in open spaces. The temperature of the air had now sunk to 12° F.

Six days later I determined to make an effort to communicate with Mr Wellman, at Cape Tegetthoff, and to ask to be permitted to continue the meteorological work at Fort McKinley in person, and for this reason, as well as to determine the condition of travel southward, I dispatched, on October 8, three of our Norwegian supporters by boat to make the attempt to reach Cape Tegetthoff. They, however, returned in a short time, on the same day, and reported it to be an utter impossibility to force the boat through the "mushy" surface of the sea, and there remained now no other course to pursue except to wait patiently for the forming ice to harden, and then, agreeably to instructions, to return to headquarters, at Cape Tegetthoff. For the first time this season (October 11) the temperature dropped below zero, a half degree Fahrenheit, and on the 13th to 10° below. On the 14th, although the young ice was strong enough to support the weight of a large bear, it was still too unsafe to admit of

sledge travel. On the 16th, although the temperature of the sea water at the surface was 28° F., that of the air rose to 23° F.; fell again to —9° F. by the 20th; the young ice measured from seven to nine inches in thickness, and on the 22d we set out for Cape Tegetthoff, arriving there on the night of October 30. The lowest temperature experienced on this journey was 17° F., on the 27th, and much thick weather prevailed. The young ice was frequently not over two inches thick; it had apparently been broken up a few days prior to our journey, and in the subsequent freezing the surface had become much broken, thus making travel in the gathering darkness of the long Arctic night exceedingly difficult.

On reaching the base station regular observations were made until the arrival of the relief steamer *Capella*, July 27, 1899.

During my absence in the field, as above described, and a second time for a period of 35 days—April 26 to May 30, 1899—in the eastern part of Franz Josef Land, observations were zealously made by Dr Hofma and Mr Harlan. In addition to the data already noted, the occurrence of sunshine, miscellaneous phenomena, and auroral displays were duly recorded and described. Of the last-mentioned, there were obtained at least 140 entries or descriptions of displays occurring on 83 different dates. During my second absence in the field, a series of observations of temperatures, atmospheric pressure, clouds, and estimated wind velocities were obtained for comparison with the regular observations at headquarters.

PORTO RICO OR PUERTO RICO ?

The editorial foot-note to my article on Porto Rico (p. 112) seems to render it desirable for me to state my reasons for spelling the name of the island in accordance with "the form commonly in use in England and the United States." They are as follows:

1. The U. S. Board on Geographic Names is not necessarily a final authority on the orthography of geographic names; its membership does not embrace lexicographers or linguists, and its chief duty is merely to simplify and unify custom in geographic nomenclature for administrative convenience.

2. The decision of the Board in favor of the spelling "Puerto Rico" was made several years ago, when the island was foreign territory, and when the name was not in frequent use in the official records and literature of the United States, and whatever may have been the merits of the decision at that time, it is now obsolete, as shown by official usage. The

usage includes (a) that of the President of the United States (creator of the Board on Geographic Names), who employs the form Porto Rico in all his messages and documents; (b) that of the local official government, which, since the American occupation, has been designated "The Military Department of Porto Rico;" (c) that of the Treaty of Peace, executed at Paris last year, in which the name of the island is given as Porto Rico; (d) that of the Post-Office Department, through which all post offices of the island are officially located in the "island of Porto Rico," and (e) the prevailing custom of the U. S. Department of Agriculture, the U. S. Geological Survey, and other governmental departments and bureaus (from which the membership of the Board on Geographic Names is made up), all of which use the form Porto Rico in their official publications.

3. The name Porto Rico is established by 300 years of world-wide usage, as I have shown in detail elsewhere. This form has been adopted by all the best English writers, and by all the world-famous cartographers of England, France, Holland, and Germany almost since modern geography had its beginning in the discovery of America.

4. The term Porto is easily pronounced and is written phonetically, while the word Puerto is practically unpronounceable in English, and hence involves non-phonetic writing; accordingly, the former is so fully in accord with the laws of linguistic evolution, which cannot here be fully set forth, that it could not possibly be supplanted by the latter.

5. If it is the principle of the Board to adopt "for other countries the names by which they are known to their own inhabitants," they have undertaken a needless and impossible task. In my opinion, it will be a long time before the English people will use such names as Kraljeorna Srbija, España, Deutschland, etc., for Servia, Spain, and Germany, or before we can make the Germans, French, and Spaniards call our own country by any other names than the Vereingten Staaten, Les Etats Unis, and Los Estados Unidos, respectively. In endeavoring to enforce such a revolution upon a world-wide custom of language the Board is transgressing its powers and diminishing its field of usefulness.

R. T. HILL.

Washington, D. C.

THE NATIONAL GEOGRAPHIC MAGAZINE AND THE U. S. BOARD ON GEOGRAPHIC NAMES

On September 4, 1890, the President of the United States issued the following order:

As it is desirable that uniform usage in regard to geographic nomenclature and orthography obtain throughout the Executive Departments of the Government, and particularly upon the maps and charts issued by the various Departments and Bureaus, I hereby constitute a Board on Geographic Names, and designate the following persons, who have heretofore cooperated for a similar purpose under the authority of the several Departments, Bureaus, and Institutions with which they are connected, as members of said Board:

(Here follow names.)

To this Board shall be referred all unsettled questions concerning geographic names which arise in the Departments, and the decisions of the Board are to be accepted by these Departments as the standard authority in such matters.

Department officers are instructed to afford such assistance as may be proper to carry on the work of this Board.

The members of this Board shall serve without additional compensation, and its organization shall entail no expense on the Government.

BENJAMIN HARRISON.

EXECUTIVE MESSAGES, September 4, 1890.

The policy of the Board was fully set forth in its first report, pages 6-10, published in 1892; it also formed the subject of an article by Mr Henry Gannett, chairman of the Board, which appeared in THE NATIONAL GEOGRAPHIC MAGAZINE for July, 1896, and dealt at some length, and in an exceedingly interesting manner, with the various difficulties encountered by the Board in the performance of the important duty intrusted to it.

As originally organized, the Board consisted of representatives, ten in number, of the Geological Survey, the Coast and Geodetic Survey, the Hydrographic Office, the Corps of Engineers, U. S. A., the Light-House Board, the Department of State, the Post-Office Department, and the Smithsonian Institution. Nearly all its original members were engaged in geographic work of one sort or another, and their high professional standing undoubtedly lent great weight to their decisions. The rulings of the Board have with unimportant exceptions been fully sustained by public opinion, and the only criticism that has been heard has been called forth by that strict regard for consistency which has characterized the Board in all its decisions. In the various Executive Departments its rulings have had all the force of law.

Among the earliest of its decisions was the one determining the spelling of Puerto Rico, in which the Board adhered to its policy of adopting the orthographic form in local use. For the following six years *Puerto Rico* was the only form recognized in any of the Executive Departments. It was a report from the United States Consul at San Juan, *Puerto Rico*, that was published by the Department of State only a few days before the blowing up of the *Maine*; it was to *Puerto Rico* that United States mails were dispatched up to the breaking out of the war with Spain; it was a map of *Puerto Rico* that was subsequently issued by the Military Information Division of the War Department; it was a bulletin on the Trade of *Puerto Rico* that was published by the Department of Agriculture less than six weeks prior to the acceptance by Spain of the President's terms of peace.

With the outbreak of the war, however, American newspapers, with few exceptions, began to accustom the public to the form *Porto Rico*, and it was only a short time before this spelling made its appearance in the correspondence and publications of two of the departments. When the final Treaty of Peace was made public it was found that, either through ignorance of the fact that the Board on Geographic Names had made a ruling on the subject or by one of those inadvertences on the part of an engrossing clerk that have been known to invalidate entire acts of Congress, the form *Porto Rico* was the one used in that copy of the treaty,

and that only, which was retained by the representatives of the United States. How far the use of this form in so important a connection, whether by accident or by design, has affected the usage of the Executive Departments, it is impossible to say, but that in several of them the form *Porto Rico* is now in use is undeniable. Such use, however, is not nearly so general as Mr Hill would have us believe. In the three great geographic bureaus, the Coast and Geodetic Survey, the Hydrographic Office, where the charts used in the U. S. Navy are prepared, and the Geological Survey, the form *Puerto Rico*, said by Mr Hill to be obsolete, is the only one used, except that in the last mentioned bureau the use of *Porto Rico* has been permitted in papers of which Mr Hill is, himself, the author, and in which he has insisted upon this form being used. For Mr Hill to quote Mr Hill may be amusing, but it is hardly convincing. The only notable instance of the use of the form *Porto Rico* in the Department of Agriculture is, similarly, in a recent publication of which Mr Hill is joint author. It is in general use, however, in the Post-Office Department and the Weather Bureau, but in neither of these is its adoption understood to have been the outcome of any very careful consideration, and certainly in the case of the Weather Bureau it can hardly possess much significance, seeing that equally conspicuous with *Porto Rico* in its maps of the West Indies is *Puerto Principe*.

The adoption or non-adoption of the Board's decisions by the Departments is, however, a matter concerning only such Departments and the Board. The object of this article is not so much to justify the Board's decisions as to justify THE NATIONAL GEOGRAPHIC MAGAZINE in regarding the Board as the one and only standard of authority on geographic nomenclature, so far as the government and people of the United States are concerned. If the need of such authority has been felt in the Executive Departments to the extent of calling for presidential action, how much more has it been felt by the editors of a Magazine the object of which is the extension of geographic knowledge, in whose pages appear, from time to time, articles dealing with those less-known regions of the world whose geographic nomenclature is still in its formative stage, and that desires accuracy and consistency in every statement that it contains. The editor's labors have been enormously lightened by the work of the Board on Geographic Names, and there is not the slightest disposition on the part of the present management to aid in the restoration of that condition of confusion and inconsistency wherein every man was a law unto himself by ignoring so much as a single one of the Board's decisions.

J. H.

PLACE NAMES IN CANADA

The first annual report of the Geographic Board of Canada, printed at Ottawa, in 1899, by order of Parliament, has come to hand. This is the first report of the Canadian Board on Geographic Names—a board authorized December 18, 1897, and organized May 11 of the following year. The report gives the origin and history of the board, its by-laws, the rules adopted for governing its decisions, and a list of some 200 de-

cisions. These relate almost entirely to the northwestern part of Canada, in the Yukon region. It appears that as long ago as March, 1888, the question of the establishment of such a board was agitated, and again in 1897, but for some reason the matter was not followed up. The present board, constituted by an order in council approved by the Governor-General, is composed of two representatives of the Department of Marine and Fisheries, and one each of the Department of Railways and Canals, Postoffice Department, and the Geological Survey, and the Queen's Printer.

The by-laws of the board governing its organization and methods of procedure are very similar to those of the United States board. The rules of nomenclature which have been adopted are also quite similar, but we note the absence, except by inference, of the most important of all such principles—i. e., that local usage should prevail. On the other hand, great stress is laid upon priority of publication of names. The first of these rules is as follows: "When the priority of a name has been established by publication, particularly when such publication has occurred in any standard or authoritative work or works, that name should, if possible, be retained."

We do not think that our Canadian neighbors appreciate what the result of the application of this principle will be on their nomenclature. It is safe to say that the majority of Canadian place names, as now used, are not identical with those first applied. From our limited knowledge of the history of the place names of Canada, we could cite scores or hundreds of names which, as now used, are different from those originally applied in maps and books. In biology it may be possible to carry out this principle of priority, although it must be said that its application in this branch of science involves a vast deal of labor and confusion, but in geographic names it is simply impossible.

The organization of the Canadian board will relieve our United States board from the necessity of making decisions on names in Canada, and doubtless our board will accept, without question, all decisions made by the Canadian board.

H. G.

THE ANTARCTIC CLIMATE

Henry Arctowski, the meteorologist of the recent Belgian Antarctic expedition, in *The Geographical Journal* for October gives a preliminary account of the meteorological observations conducted by him during the expedition. Because of their relatively small distance from the open sea and great distance from the pole, the positions ranging from 81° to 85° west longitude and 69° 50' to 71° 30' south latitude, two distinct types of climate were experienced, according to the direction of the wind—a continental and an oceanic. July was the coldest month, its mean temperature being -23.5° C. (-10.3° F.), and the lowest temperature observed during the month, -37.1° C. (-34.8° F.).

The warmest month was February, with a mean temperature of -1.0° C. (30.2° F.), and a minimum for the month, -9.6° C. (14.7° F.). If we regard June, July, and August as the antarctic winter months, and De-

ember, January, and February as summer, we may take it that the mean winter temperature is -16.8°C . (1.8°F .), and the mean for summer -1.5°C . (29.3°F .).

From his observations, Mr Arctowski concludes that between the seventieth and seventy-first parallels of the southern hemisphere and amid the ice of the Antarctic ocean—first, the mean temperature is lower than that of the northern coast of Spitzbergen (Mossel bay, 1872-'73, -8.9°C . (16.0°F .)); second, the minimum temperature is quite as low as the minima observed on the east side of Greenland (Sabine island and Scoresby sound); and, third, the mean temperature of the three summer months is lower than the corresponding mean in the ice of the Arctic ocean. If we consider that a considerable fraction of the seventieth parallel of south latitude is land, we can suppose that it may have a mean temperature as low as the 70°N ., and include a pole of cold with lower temperature as the Asiatic or North American poles of cold.

During the drift in the pack-ice hourly observations were made with a marine barometer and with an aneroid. While Mr Arctowski has not yet been able to apply exact corrections to these observations, the uncorrected values are near enough for present purposes. The lowest pressure observed during the winter was 711.74 mm. (28.022 inches), and the highest 772.14 (30.400 inches). The mean value of the monthly variations of the barometer, amounting to 34.30 mm. (1.350 inches), shows very clearly that the cyclonic belt extends beyond the polar circle. The three months of almost continuous daylight (November, December, and January) are characterized by a very small variation of pressure—only 23.95 mm. (.945 inch). The three corresponding months of winter have also a mean less than those for the intermediate or equinoctial months. The differences between the annual and monthly means show that February, March, and April form a negative group, in which pressure is relatively low; the three months of polar night form another group of maximum barometric pressure; then follow August, September, and October—months of decreasing pressure—a group which, although not exactly negative, forms a distinct secondary minimum; and, lastly, three months of polar day forming a secondary maximum of pressure. The existence of a direct, simple relation between the barometric pressure and the progress of the sun is at once obvious.

The winds blew from northerly and southerly points with almost equal frequency, but easterly winds predominated over westerly. The sky was usually overcast, most frequently with a thick layer of stratus which formed a uniform gray covering and often persisted for days or even weeks together, with only short breaks. The number of days during which the air did not remain saturated—i. e., on which the hygrometer indicated a humidity of less than 90 per cent—was October, 12; November, 18; December, 22; January, 15, and February, 11. If ice deposits from fog and similar precipitation are included, snowfall is recorded on 257 days and rain on 14 days of the year. Speaking generally, it may be said that the weather was extremely cloudy; that fogs were frequent; that snow fell on many days, and that the air was saturated nearly the whole time.

GEOGRAPHIC LITERATURE

Puerto Rico: Its Conditions and Possibilities. By William Dinwiddie. With Illustrations from Photographs by the Author. Pp. 295. New York and London: Harper & Brothers. 1899. \$3.00.

Mr Dinwiddie's book excels as a minute description of the industrial conditions and commercial possibilities of the island and in the excellence of the illustrations made from views from his own camera. Those who are merely interested in the utilitarian side of Porto Rico will find this an excellent book of reference. The scientific statement is a little halting, however. For instance, an illustration of one of the white limestone hills between Utuado and Lares is entitled "coral formation," when in fact it is one of the finest examples of the truly sedimentary tropical oceanic white limestones we have ever seen. Mr Dinwiddie is excusable, however, for many geologists have persisted in terming all the tropical white limestones "coral formations." In the long chapter entitled "The Great Caves" the author commits the common but provoking blunder of treating technical scientific publication as no publication. In order to increase the reader's anticipation of his own glowing discoveries which are supposedly to follow, he begins this chapter with the remark that "it is astonishing how little is known about the geology of the island." A few lines further on he says that the owner of the caves "told us that several years ago an Englishman, a member of some British scientific society, had paid a short visit to the caves, . . . and it is quite likely that a report of its wonders has been published in the scientific journals of Great Britain." Perhaps if the "scientific journals" had been examined, in them would have been found at least an intelligible description of the caves, which, so far as Mr Dinwiddie's researches are concerned, only resulted in about 3,500 words of "padding," leaving the reader in as profound a darkness concerning the nature and origin of the caverns as that which must exist in these wonderful depths—at least, he in no manner adds to that knowledge of the geology of the island which he assumes to be so deficient. It is also regrettable that Harper & Brothers permitted the use of the spelling "Puerto Rico," which is no longer excusable, since the island has been officially designated Porto Rico by the United States government. The work is well indexed and on the whole is a credit to its author and publishers.

ROMER T. HILL.

Japan in Transition: A comparative study of the progress, policy, and methods of the Japanese since their war with China. By Stafford Ransome. 8vo, pp. xvi + 261, with 55 illustrations and 4 maps. Harper & Bros.: New York and London. 1899.

This book, written by a journalist trained in the study of foreign peoples, aims to present a picture of the present life, customs, industries, and politics of the Japanese, especially in their relations to the rest of the

world. The author describes the accommodations for travel, the hotels and railways, the attitude of the natives toward foreigners, the condition of education, of Christianity, the Japanese moral standards and business integrity, international relations and politics, the condition of Japan's industries, etc. All these subjects are treated with freedom and fullness and by the pen of a master. Mr Ransome finds theoretical education well advanced among the Japanese, but practical education, the power to apply knowledge in doing things, he finds far behind. He judges the work of Christian missionaries to be largely a failure. In morals his verdict is that the Japanese are not behind the Anglo-Saxon, but different. This is a charitable way of characterizing a moral code which sanctions polygamy and prostitution. In business integrity the Japanese are behind the Anglo-Saxon, as would very naturally be expected from their want of experience. In modern manufacturing these people are making a good beginning, but have a long road to travel before becoming serious competitors of the great nations.

H. G.

Through Unexplored Asia. By William Jameson Reid. Illustrated by L. J. Bridgman. 8vo, pp. 499, with 3 maps and 52 cuts. Boston: Dana, Estes & Co.

This is a narrative of a portion of a notable journey through western China, eastern Tibet, and southern Mongolia during the year 1894 by the author in company with the late George Burton. The extreme western point reached was in approximate longitude 95° east, latitude 34° north, and the extreme northern point was just above the 40th parallel. The present volume, which is published independently, carries the narrative forward to the shores of Charing Nor. It is the intention of the publishers to present the remainder of the narrative in a second distinct work. The book is written in the form of a journal, through which is scattered, amid the narrative of adventure, much information regarding the geography of the country traversed and the habits and customs of the people encountered.

H. G.

Alaska and the Klondike. By Angelo Heilprin. 8vo, pp. 315, with 35 illustrations and 3 maps. New York: D. Appleton & Co. 1899.

This is a narrative of adventure and observations made by the author during a trip to Dawson via Lynn canal and the upper Yukon in the summer of 1898. It is a bright, readable book, and is of value in portraying in vivid colors the life and social conditions in this unique mining camp when in the heyday of its prosperity, as well as the life on the trail and river. The illustrations are strikingly illustrative and are well reproduced.

H. G.

The Empire of the South, its Resources, Industries, and Resorts. By Frank Preshrey. 4to, pp. 181. Published by the Southern Railway Company. 1899.

This book is an illustration of the highest art in advertising. The dedication of the book reads as follows: "This volume is dedicated to the people of the South by the Southern Railway Company, whose interests are identical with those of the states traversed by its lines." The economic truth here uttered is the key-note of the book. It is a descrip-

tion of the southland, the "territory" of the Southern railway, its scenery, its soil, its people, its products, presented in so charming a way that it reads like a novel, and profusely illustrated with the finest of modern work. Considered simply as a piece of book-making, it is, in paper, print, and illustration, one of the finest specimens that the century has brought forth.

H. G.

Hawaii and Its People. The Land of Rainbow and Palm. By A. S. Twombly. Boston: Silver, Burdett & Company. 1899.

This book, an historical reader for young people, is a very readable account of the Hawaiian people, their legends, beliefs, and characteristics. It is divided into three parts, which deal, first, with the myths and folklore of ancient Hawaii; second, with the transition period, beginning with Captain Cook's discovery of it; and, third, with modern Hawaii. Into it also is woven much of the descriptive and economic geography of the country, and the book has a number of good and attractive illustrations. It is one of a series of supplementary readers published by the same firm, of which are *Australia and the Islands of the Sea* and *Our American Neighbors*.

C. L. G.

The Yosemite, Alaska, and the Yellowstone. By William H. Wiley and Sara King Wiley. 4to, pp. xix + 230, with 157 illustrations. London and New York: John Wiley & Sons.

This book is an interesting narrative, somewhat in the form of a journal, of the trip made by the American Society of Mechanical Engineers to the San Francisco convention, in the spring of 1892.

GEOGRAPHIC MISCELLANEA

VESSELS drawing 25 feet of water can now enter Galveston harbor, and the foreign commerce of the port is rapidly increasing.

Work on the Simplon tunnel is being prosecuted with great energy, but its completion is not looked for before the summer of 1904.

PROFESSOR WILHELM JOEST, who died some time ago during an expedition among the South Sea islands, is reported to have left \$75,000 to the Ethnological Museum in Berlin. The interest of the bequest is to be used for purchasing new collections and assisting scientific expeditions.

Dr F. A. Cook, surgeon and ethnologist of the Belgian Antarctic expedition, in an article contributed to *McClure's Magazine* for November, entitled "Two Thousand Miles in the Antarctic Ice," gives an interesting account of the experiences of the party during their winter in the South Polar regions.

THE Dismal Swamp canal was officially opened to traffic on October 14. The new waterway, which is 22 miles long, connects Chesapeake bay with Albemarle sound and enables light-draft shipping to avoid the much-dreaded Diamond shoals. It also opens up to improvement thousands of acres of fertile land and a considerable area of good hardwood and pine timber.

The area under wheat in Argentina for 1898-'99, from which the crop was recently gathered, has been officially estimated at 6,150,319 acres. No official estimate of production has been received, but its aggregate amount has been put at 70,000,000 bushels.

Plans are being made for the construction of a tunnel under the Hooghly river at Calcutta. The river at this point is about 30 feet deep, and according to one of the plans the tunnel will pass 12 feet beneath the bed of the river. The length of the tunnel proper will be 6,875 feet.

The construction of the Nicaragua canal would reduce by about two-thirds the distance by water from New York to San Francisco. By the Cape Horn route the distance is 14,870 miles, by the Nicaragua route 4,946 miles; hence there would be a saving of 9,924 miles - about 26 days time.

The construction of the trans-Alaskan military road, with which Capt. W. B. Abercrombie, commanding the Copper River exploring expedition, has been so prominently connected, is now completed through the Coast range of mountains into the Copper River valley. It is entirely free from glaciers, and is believed to be as cheap a piece of work as was ever undertaken by the War Department in opening up a new country.

A RUSSIAN author, according to *The Independent*, appears to have proved in a book recently published that Bering strait was not first discovered by Bering, who found the passage in 1728, but by Semen Deschnef, a Cosack, who was in Siberia from 1638 to 1659, and on his return to Moscow reported the existence of the strait, which he had discovered while exploring the country adjoining it on the west.

THE Tide Tables for 1900, issued by the U. S. Coast and Geodetic Survey, contain, for the first time, as a part of the annual tables, the predicted tides for St. Michaels, Alaska, during the season of navigation. The times of slack current for each day of the year at Sergius narrows, Peril strait, Alaska, are also given. This is the first time full predictions of slack currents have been made and published for the localities.

An interesting article on the subject of Liverpool and its docks appears in a recent number of the *Windsor Magazine*. The docks, the most extensive in the world, occupy the north shore of the Mersey for nearly eight miles. Their total water area is 385 acres, affording over 25 miles of wharfage. The largest dock, the Alexandra, covers upward of 33 acres. The principal graving dock is 950 feet long and is the largest in the world.

THE reports circulated in several western newspapers during the past month of the breaking up of a tornado at Hennessey, Okl., by the discharge of a cannon, has recalled to attention a "tornado breaker" patented by W. S. Blunt, C. E., several years ago. The principle of this machine rested upon the theory that an explosive discharged into the midst of an approaching tornado would immediately dissipate the cloud. The Chief of the Weather Bureau emphatically states, however, that the discharge of the most powerful cannon would be utterly inappreciable in its effect upon a tornado cloud, and that it is impossible for such clouds to be dissipated by any explosive that man may invent.

THE Coast Pilot party of the U. S. Coast and Geodetic Survey is now engaged on a revision of the Atlantic Coast Pilot, part IV, Point Judith to New York. The field work, which included all of Long Island sound, was executed in August of this year. It is hoped to have the published volume ready for distribution within two months. There was also prepared and published during the past month a supplement to the last edition of part II, which was published in 1893.

FOR the excellent map of the scene of the military operations in South Africa, which accompanies the current number, THE NATIONAL GEOGRAPHIC MAGAZINE is indebted to Major W. A. Simpson, U. S. A., Chief of the Military Information Division of the War Department. The map shows in detail the military roads, mountain passes, and other features necessary to a clear understanding of the country in which the present military operations are taking place. It is the only map of its kind on such a scale that has been published in this country, and its official character is a guarantee of its correctness.

THE attention of the people of Great Britain has on various occasions been called to the fact that the exhaustion of those wonderful beds of coal which have constituted so important a factor in the industrial supremacy of that country is not so remote an event as to justify the complacency with which it is commonly regarded. Such warnings, however, have usually excited nothing but ridicule. It will be interesting, therefore, to note the effect upon the public mind of a recently published report from one of the official inspectors of mines, in which it is stated that within fifty years, which is but a short time in the life of a nation, scarcity will begin to be felt.

THE Russian canal which is now being built from the Baltic to the Black sea, with the expectation of being completed within four years, will be 1,080 miles long. Its width of 217 feet at the top and 117 feet at the bottom and its depth of 28½ feet will permit the largest warship to pass through. Six days will be necessary for a vessel's passage, steaming at the rate of six knots day and night. The whole course is to be lighted by electricity. The total cost is estimated at \$116,796,000. The gigantic extent of the work can be partially comprehended when it is remembered that the Suez canal is 92 miles long, while the proposed Nicaragua course is 169.4 miles from ocean to ocean and would require 44 hours for its transit.

THE U. S. Coast and Geodetic Survey steamer *Pullbender*, Capt. F. Walley Perkins commanding, which left Norfolk June 17 for San Francisco via the Straits of Magellan, arrived there September 17. The voyage was made under favorable conditions, the time (three months between the terminal points) being remarkably short. Stops for several days were made at Santa Lucia (June 23), Pernambuco (July 6), Rio Janeiro (July 19), Montevideo (July 27), Valparaiso (August 29), Callao (August 26), and San Diego (September 14). After a short stay at San Francisco the vessel will probably go to Hawaii to engage in hydrographic work. The harbor of Hilo will probably be taken up first, and afterwards an examination will be made of a region between Honolulu and Moanalua.

Writing in the *Pall Mall Magazine*, Arminius Vambéry concurs in the general expectation of a large increase in the population of Siberia within the next hundred years as a result of the facilities that will be offered by the Russian government for the exploitation of its enormous wealth in timber, minerals, and arable land. M. Vambéry, however, does not look for so large an increase—sixty or eighty millions—as is predicted by many Russian writers. While admitting the migratory propensities of the Russian peasant, he calls attention to the fact that even in the most fertile districts of southwestern European Russia the density of population is far below that of other European countries.

Among the many interesting facts brought out by the U. S. Coast and Geodetic Survey parties operating in Alaska are several relating to tidal phenomena. Observations in the Copper River delta by Assistant Ritter show that the tidal curve as registered on the gauge is of a peculiar type, for while the upper portion remains normal the lower part is very nearly a straight line. A possible explanation of the phenomena may be that a great ledge prevents the water from falling below a certain level. The tidal work in western Alaska by Assistant Pratt shows a rapid transition from an almost strictly diurnal tide at St. Michael's to a well-marked semi-diurnal type at the Kusilvak entrance to the Yukon.

Commercial Africa in 1899 is the title of a recent report issued by G. P. Austin, Chief of the Bureau of Statistics of the Treasury Department. The report is a summary of the physical and ethnical features of the railroads and mining interests, etc., of different sections of British Africa, German Africa, Italian Africa, Abyssinia, the Boer Republics, and of every state of the continent. An excellent chart of Africa (14 by 18 inches) accompanies the report. There are also diagrams showing the languages as well as the religions of the different sections of the continent. The report is an exceedingly valuable and interesting one and should be in the hands of every one interested in the commercial progress of Africa.

At a meeting of the Board of Managers of the National Geographic Society, November 1, 1899, the following resolutions were passed:

Resolved, That the Board of Managers of the National Geographic Society, having learned with profound regret of the death of the Hon. Charles P. Daly, LL.D., president of the American Geographical Society, place on record its high appreciation of the distinguished services to geographic science rendered by Judge Daly during his long and honorable career, and tender to the officers and members of the American Geographical Society its respectful sympathy with them in their loss.

Resolved, That a copy of these resolutions, signed by the President and the Secretary, be transmitted to the American Geographical Society.

One of the most interesting features of railroad travel in the mountain regions of the Far West has hitherto been the steep grades by which the various lines have, with one or two notable exceptions, been made to reach the high elevations at which they have been carried over the different ranges. These, however, are rapidly being done away with, in some cases by the construction of tunnels, in others by the building of new lines over passes of lower altitude. The famous Veta Pass line of the Denver and Rio Grande, with a maximum grade of 4.7 per cent, or

248 feet per mile, will soon be a thing of the past, a new route, with a maximum grade of only 3 per cent, being in course of construction eight miles south of the existing line.

Hydrographic investigations have been extended by the Nicaragua Canal Commission to the Isthmus of Panama, the work being still under the charge of Mr Arthur P. Davis, of the Division of Hydrography, U. S. Geological Survey. The Panama Company has been maintaining on Chagres river three elaborate nivometers or automatic devices for recording the height of water. Two of these records have been kept for a number of years. A third was established in April, 1899, at Alajuela. It is somewhat extraordinary that hitherto no observations of rainfall have been maintained above these river stations and no measurements made of the Rio Grande, the stream on the Pacific slope. Arrangements have been made for obtaining a record of rainfall and for measuring this stream, every facility being afforded by the French company.

The article on "The Relation of Forests and Forest Fires," by Mr Gifford Pinchot, Forester of the U. S. Department of Agriculture, which appeared in the October number of this Magazine, is receiving much favorable comment from students of forestry. A feature of the article is the excellent set of original pictures with which Mr Pinchot has illustrated his text. It is regrettable that, through an error for which Mr Pinchot was not responsible, several mistakes should have crept into the titles. The photograph on page 400, showing most clearly two generations of lodgepole pine, was taken by Prof. C. S. Crandall, of Fort Collins, Colo., a collaborator in the Division of Forestry, and should have been credited to him. Four feet beneath the large cedar tree standing in the background on the right of the cut on page 402, a layer of charcoal was found—a proof that the tree had grown up after a fire. The title of the picture of a seedling longleaf pine on page 399 is misleading, for while the drooping needles still retain their natural downward curve, the young tree is too far advanced for them any longer to afford protection to the lower stem in case of fire.

In a recent communication to the Department of State (see Consular Reports, vol. lxi, No. 230, p. 487) the U. S. consul at Stratford, Ontario, expresses the opinion that the most serious problem that confronts the Canadian people of the future is material for fuel. He states that the gigantic lumber industries and the great annual forest fires have so denuded the timber area of Ontario that the people are thoroughly alarmed about the future fuel supply. So long and severe are the winters that an ordinary residence will consume \$100 worth of fuel in a year. It has been well known for years that there were extensive beds of peat bogs in Canada, and particularly in the Province of Ontario, and an effort has been made during the past six months to utilize this product of nature. It has been tested in locomotives with excellent results, 100 pounds of peat having been found to be equal to 95.15 pounds of coal. The heat produced is much greater than that of coal, but it is 8 per cent deficient in lasting power. The recent invention of machinery, by means of which vast areas of hitherto unused bogs can be converted into marketable peat, has opened up a new Canadian industry.

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ERRATA

Page 60, lines 19 and 30, for *Manilla* read *Manila*.

Page 159, line 31, for *Chili* read *Chile*.

Page 184, line 15, for *Congo* read *Kongo*.

Page 250, line 39, and page 251, line 4, for *Torro* read *Toro*.

Page 238, line 38 : page 240, line 7, and page 242 (map), for *Gulscoyal* read *Gulscoyal*.

Page 251, line 20; page 252, line 2; page 258, line 36; page 262, line 23, and page 265, last line, for *Serapiqui* read *Sarapiquí*.

Map facing page 233, for *Mombucho* read *Mombuco*, for *Zapatera* read *Zapatero*.

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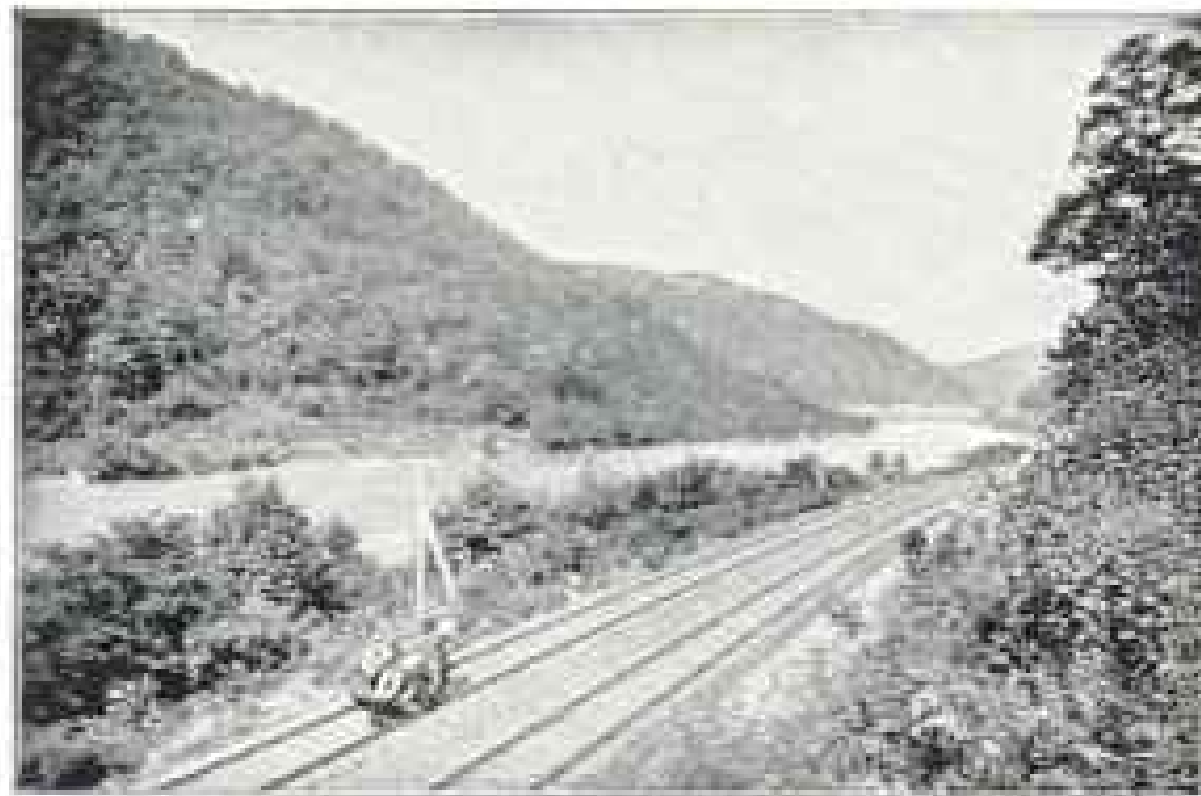
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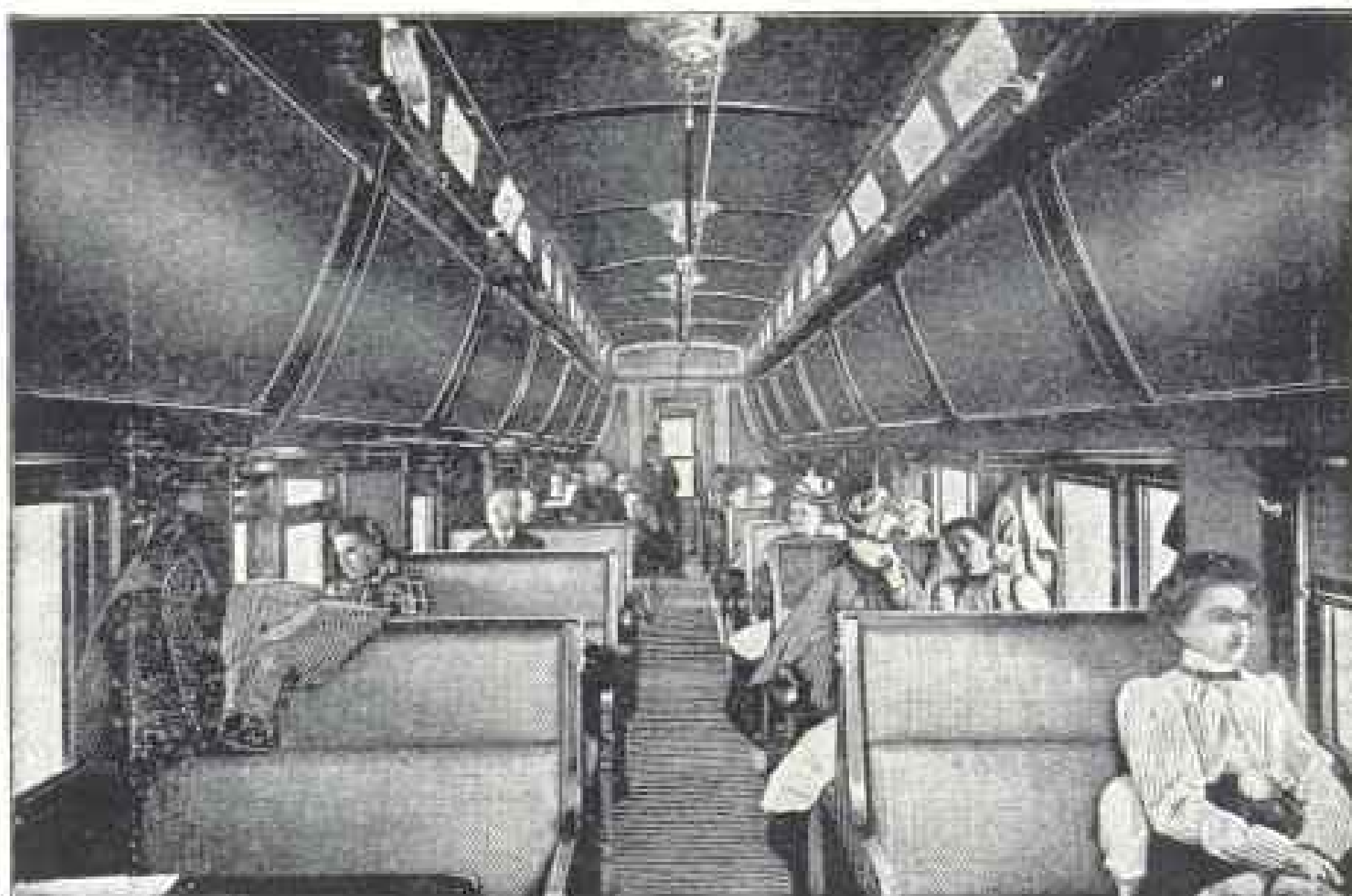
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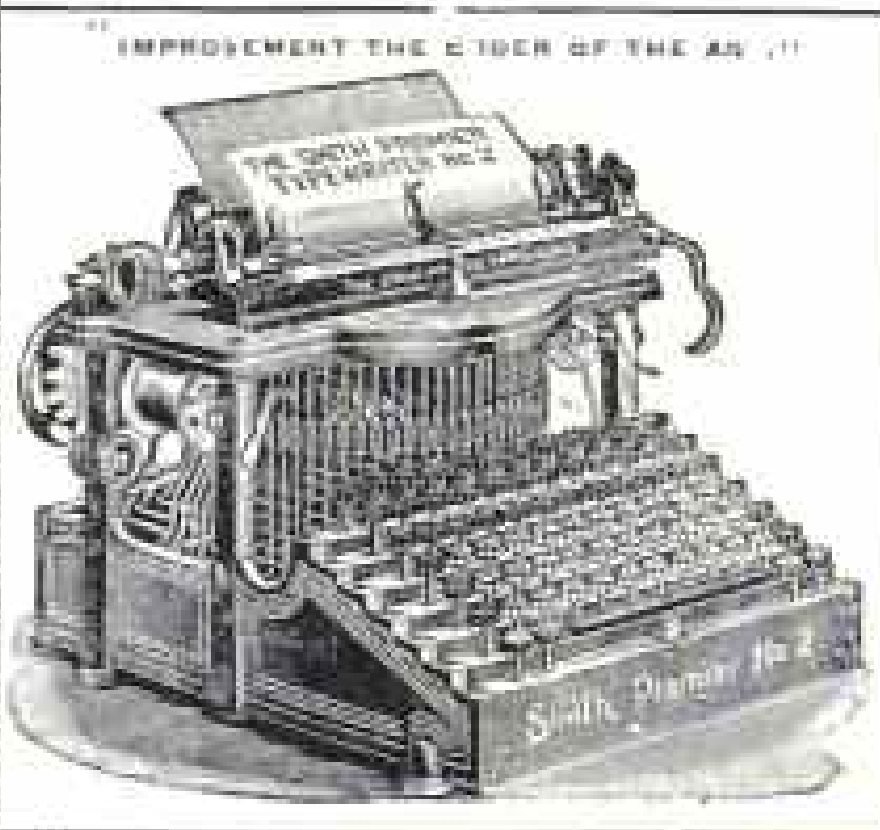
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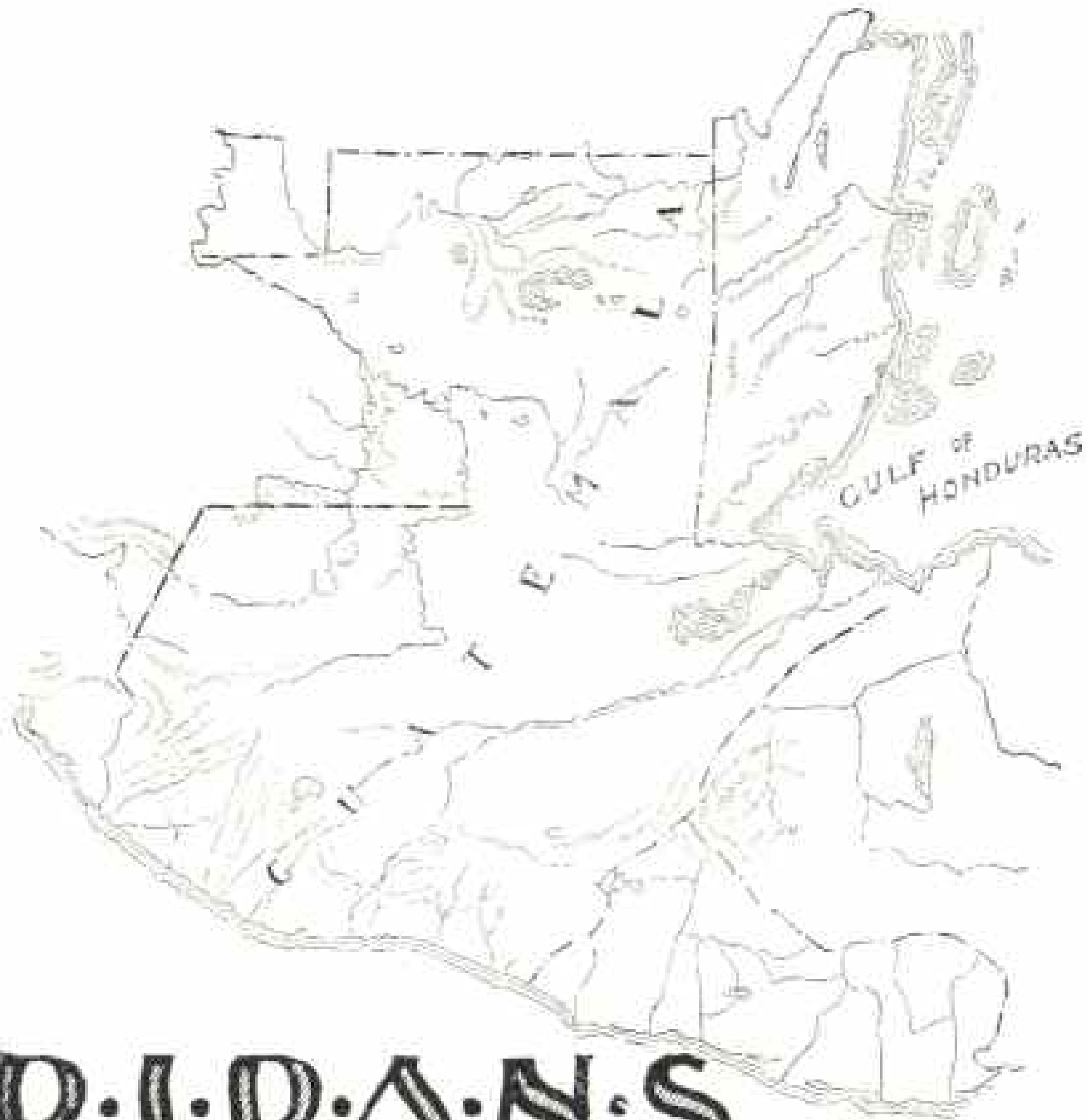
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