

## THE ANTARCTIC'S CHALLENGE TO THE EXPLORER.

WITHIN the last few years a swarm of explorers, chief among them Peary, have braved the terrors of the North and laid bare many of the secrets of the Arctic regions; but the vast extent of territory lying about the South Pole has not challenged the attention of recent voyagers nor spurred on discoverers. Indeed, since the existence of land within the Antarctic Circle was first demonstrated, more than a century ago, scarce a dozen attempts have been made to explore its mysteries. The last voyage of importance was that of the British steamship "Challenger" in 1874, and the results of that expedition were confined chiefly to scientific observations as to tides, ocean currents, and the forms of life found in the depths of the Southern Sea. No new land was reached, and the circle of  $66\frac{1}{2}$  degrees was barely crossed. South Polar exploration has been practically suspended for half a century.

This apathy is due to several causes, chief among which are the physical obstacles to navigation. The forbidding character of the coast, which is reputed to be fronted with a gigantic wall of ice from two hundred to three hundred feet high, termed the "Great Southern Ice Barrier"; violent winds of cyclonic strength, prevalent in those regions; icebergs of tremendous size; the dangers of the pack; the angry waste of waters which separates a ship by hundreds of miles from the nearest port of shelter,—cause this quarter of the globe to be greatly feared by navigators. Captain Cook, the great circum-polar navigator of the eighteenth century, who attained the latitude of  $71^{\circ} 15'$  south, in longitude  $106^{\circ} 54'$  west,<sup>1</sup> on January 30, 1774, thus graphically sets forth the natural difficulties of a South Polar expedition, although it may be remarked that his predictions are hardly justified, and several have since exceeded his southing by many degrees:

"The risk one runs in exploring a coast in these unknown and icy seas is so very great that I can be bold enough to say that no man will ever venture farther than I have done, and that the lands which may lie to the south will never be explored. Thick fogs, snow-storms, intense cold, and every other thing that

<sup>1</sup>The meridian of Greenwich is used in this paper.

can render navigation dangerous, must be encountered, and these difficulties are greatly heightened by the inexpressibly horrid aspect of the country,—a country doomed by nature never once to feel the warmth of the sun's rays, but to lie buried in everlasting snow and ice. The ports which may be on the coast are, in a manner, wholly filled up with frozen snow of vast thickness; but if any one should be so far open as to invite a ship into it, she would run a risk of being fixed there for ever, or of coming out in an ice island. The islands and floats on the coast, the great falls from the ice cliffs in the port, or a heavy snow-storm attended with a sharp frost, would be equally fatal."

But the inaccessibility of the South Polar regions to the ordinarily equipped explorer is not the only reason why they have not been explored. There has never been the same incentive to investigate their mysteries which exists in regard to the opposite pole. For several centuries it was believed that a northwest passage would supply a marine highway from the Atlantic to the Pacific, and to find that highway many expeditions set forth. Fruitless though that search was, those engaged in it returned to tell of the northern wonders they had seen, and much popular interest was aroused, which resulted in new expeditions with the avowed object of exploring the "land of the midnight sun." The whale and seal fishery, principally in Baffin's Bay, enlisted the sympathies of commerce; and the Danish government, which was from the first identified with these pursuits, yearly reaped a harvest of thousands of dollars from oil, whalebone, and seal-skins. The Eskimo tribes were an object of deep interest, and well-meaning missionaries established settlements and erected little churches on the Greenland coast which still carry on the work of their founders. The abundance of Arctic fauna and flora gave color and warmth and life to what would otherwise be a waste of snow and ice. Because there was a sentimental notion of glory in reaching the pole, adventurers flocked northward. A large library of Arctic literature has appeared as a result of this enthusiasm, and to-day there is hardly a schoolboy of fifteen who does not know at least as much of the Arctic regions as he does of Australia.

The South Polar regions have lacked all these things. At any rate, no one ever saw a native human being within the Antarctic Circle; we have no certain testimony that the right whale, so-called, inhabits its waters; the known fauna is confined to other kinds of whales, seals, porpoises, and a few birds, and the flora is entirely wanting; in short, we are led to believe, from what is known, that the land of the South Pole is indeed an icy desert, a collection of volcanic islands capped with never-melting snow, whose ice-bound and inhospitable shores are washed by mad seas from season's beginning to



season's end. Yet there is an estimated area of some 8,000,000 square miles of land, water, and ice—one-sixth of the entire surface of the globe—surrounding the South Pole, a territory untrodden and unexplored by man! Shall it remain so?

Let us see what is really known concerning this vast area. With the exception of a small portion of Graham Land, which is 60 degrees west of the Greenwich meridian, and almost due south from Cape Horn, the southern lands lie wholly within the Antarctic Circle. Apparently the bulk of the land is in the eastern hemisphere. It is an irregularly shaped mass, somewhat like a deformed human foot with an excessively large ankle. This outline, it must be understood, is to a degree hypothetical, and only a comparatively small portion of it has been actually verified by navigators. Deep-sea soundings have been relied upon to furnish its unverified parts.

In chronological order, Captain Cook was one of the first navigators in the South Polar Sea. In 1773–75 he sailed completely around the Pole, and by so doing exploded many theories previously held by scientific men. Only once did he venture within the Antarctic Circle. After his voyage, nothing was done until, in 1820–21, Bellingshausen, of the Russian navy, made a partial circuit of the ice-bound continent. He reached his extreme southing of 70 degrees a degree west of the meridian. The ice barrier checked his progress. Bellingshausen's voyage was the signal for the forthcoming of the explorers, the last of whom was Moore in 1845, and to these we are largely indebted for what knowledge we possess of the Antarctic conditions. Weddell, in 1823, boldly pushed his way through pack ice for hundreds of miles, and in February of that year attained a latitude of  $74^{\circ} 15'$  south in longitude  $35^{\circ}$  west. Morrell followed in the same year, probably reaching the 70th parallel at  $54^{\circ}$  west. Biscoe, in 1831, followed three years later by Kemp, made minor discoveries; the latter giving to the hazy outline sighted by him at  $66\frac{1}{2}^{\circ}$  south,  $60^{\circ}$  east, the name of Kemp Land. Balleny, in 1839, reached a point several degrees southwest of Cape North, off what was later named Victoria Land. The next year a veritable fever for Antarctic exploration took the scientific world, and three governments shared in the excitement. Lieutenant Wilkes, of the United States navy, marked out a coast line from 100 to 160 degrees east longitude, which goes under the general title of Wilkes Land, though this is for some reason ignored on the English charts. Simultaneously a French expedition was fitted out under Lieut. Dumont d'Urville, who christened por-

tions of Wilkes' general discovery, Adelie and Clarie Lands. The major portions of these lands lie without the Antarctic Circle.

But the most valuable in point of results of all the Antarctic expeditions before or since was that under the command of Sir James Ross, 1839-43. This expedition, like those of America and France, was a governmental enterprise, and two stout ships, the "Erebus" and "Terror," were commissioned by the British Admiralty. Ross' plan of action was to visit the Antarctic in the summer months, and with the approach of the months of darkness and cold to retreat to the Falklands, Cape Town, or elsewhere, until the returning sun allowed a fresh sally to the south. The route chosen was near the 170th east meridian, and success attended it, for on the 11th of January, 1841, the outlying point of Victoria Land hove in view, and Ross was enabled to follow the ice-bound coast for upward of 500 miles, and to attain the most southerly latitude ever reached. The land appeared to be very high and mountainous, and covered with snow, except here and there a lofty peak, rising above its fellows, showed black in the clear atmosphere. On the next day he took possession of an islet lying off the mainland, and christened it "Possession Island." This islet was occupied by vast numbers of penguins, and, according to a member of the expedition, "would afford valuable cargoes of guano for whole fleets of ships for years to come."

Through a sea clear of ice the barrier was traced until, on the morning of January 28, the sailors were startled to behold a conical-shaped mountain not far inland, from the summit of which rolled a column of thick, murky smoke, lighted up at intervals by flashes of red flame. It was a volcano in an active state of eruption, a sight of infinite grandeur. Although in the midst of that icy waste, the interior heat was sufficient to melt the snow and ice from its sides. The altitude of the mountain was 12,400 feet above the sea. The name Erebus, that of Captain Ross' own ship, was bestowed upon it. Separated by a ridge of land to the east, another tall peak, evidently an extinct volcano, rose to a height of 10,900 feet. This sister mountain was christened Mount Terror. Between them, in latitude  $77^{\circ} 31'$  south, longitude  $167^{\circ} 1'$  east, lay a commodious bay, but choked with ice. A small island on the starboard bow received the name of Beaufort Island. The course being resumed, the next day both land and ice disappeared from view. Numerous white petrel, gulls, lestris and other sea-birds hovered about the ships. Bottom was found in 410 fathoms, and the lead, in sounding, sank at least two feet



in soft green mud. Whales were seen, and seals were observed on floating cakes of ice. On the 4th of February, in latitude  $78^{\circ} 15'$  south, with the barrier again at hand, a sounding was taken at 260 fathoms, green mud and clay composing the ocean bed. At this point the "Erebus" and "Terror" were put about, and the first voyage was ended. In November of the same year the ships were again turned to the south from Tasmania. Unfortunately a pack of ice, whose breadth was estimated at 800 miles, and from which the ships did not emerge for forty-six days, thwarted the plans of Captain Ross, although a southing of  $78^{\circ} 7'$  was reached before the retreat. The third voyage was also unsatisfactory, the course of Weddell being attempted. Therefore the first voyage must furnish us with the results of all three.

One of the most important facts reported is that all the islands were simply rocky uprisings from the depths of the sea, apparently of volcanic origin, and they, in common with the larger mainland, were clothed with snow and ice. No land animals or vegetation of any kind—not even the simplest forms of that lowest of cryptogamic growths, moss—were seen. Ross, however, speaks of the silicious animalculæ, the Diatomaceæ, which are so numerous that their chalk-like shells give a milky appearance to the shore waters. The soundings taken showed that there is a perceptible rising of the ocean bed as the Antarctic continent is approached. Unlike the northern conditions, the ice is not landlocked, and therefore the danger of being crushed by ice is partly eliminated in a voyage to the south. Meteorological observations point to an excessively heavy snowfall and very low atmospheric pressure. The temperature within the Antarctic Circle rarely rose above the freezing-point, even on the sunniest days in the height of summer. These reports, together with those of hurricanes and giant icebergs, present a cold picture of desolation, of an uninhabitable, barren land, perpetually covered with an immense cap of ice,—a region wherein nothing lives, and given up to the shrieking of ice-charged winds across the lonely plateaus. But is this the true picture?

Only three explorers, Cook, Weddell, and Ross, passed beyond the 70th parallel of south latitude, and but two men, Ross and D'Urville, ever set foot on land within the Antarctic Circle. Their curiosity did not urge them to venture into the interior. Their fields of observation were so restricted that they could but note the mountainous highlands of altitudes ranging from 7,000 to 12,000 feet.

Consequently what may or may not be the conditions beyond the lines put down on our charts for the border of a vast continent are matters of conjecture. It is not impossible that a thermal belt or area may exist where the temperature is several degrees higher than elsewhere, and where vegetable life finds sustenance in turn to nourish a higher order of creation. Whale Sound in the north is such an oasis, the duplicate of which may be found in the south. Within this conservatory of nature there may be strange forms of life undreamed of by the biologists of to-day. If we accept the theory advanced regarding the population of the South Sea islands,—that of accidental drift rather than changed geological conditions,—it is reasonable to suppose that human beings have been carried to Antarctic lands, and, once there, have by a universal law adapted themselves to their new situation and found some means of overcoming the natural difficulties of existence in that rigorous climate. While I scarcely expect to find a strange and isolated tribe of men on the new continent, yet their existence is by no means improbable. For aught we know, the Antarctic may possess valuable minerals and precious stones. The fossils obtained on Cape Seymour, belonging to the Tertiary age, may furnish slight encouragement in the direction of a previous age of heat and life. As to practical utility along certain lines, the most unchecked imagination cannot hope that the southern continent will ever become what Greenland is fast becoming,—a possible pleasure-resort. Fifty years ago the idea of any man taking a party of pleasure-seekers on a summer's jaunt to the north, as I shall do in June, would have been laughed at. And I do not predict any such wonderful things for the south.

The benefits to pure science in a campaign over the southern continent, carefully planned and carried out, are inestimable. Not only would many entirely new branches of science in all probability be opened up, but the standard sciences would be enriched. A knowledge of the meteorological conditions in the Antarctic is needed to solve the weather problem of the world. The theory of the earth's magnetism awaits confirmation or rejection according as the facts of the south may be found in this regard. Geography, geology, botany, biology,—not a science is there on which we cannot obtain new light.

Readers of *THE FORUM* are doubtless aware that I am now fitting out an expedition to winter within the Antarctic. In brief, my plan of action is this: Securing a stout steam whaler of some 300 tons burden, I shall set sail from New York about October 1, 1895, and pro-



ceed directly to a South American port, where a supply of beef and tallow will be procured, to be manufactured into that standard food of explorers in frozen climes—pemmican. The ship will be provisioned for three years. Our course will be laid for the Falkland Islands, where the coal-bunkers will be refilled. From the Falklands we will steam down to that land, south of Cape Horn, which bears the name of Louis Philippe, which is an eastern division of Graham Land. On an island of this coast a lifeboat will be placed, in order to furnish an avenue of retreat in case of disaster. Thence the course of the vessel will depend upon the openings presented by the drifting fields of ice. If not favored, as some navigators have been, by a clear pathway, the pack will be skirted until a promising opening is found. At the farthest attainable point to the south where there is land and a safe anchorage, headquarters will be established ashore. A structure capable of enduring the strongest gales, and so built as to afford an adequate protection from the cold, will be erected. Smaller buildings for scientific purposes will be put up, and observations will commence upon landing. At the same time parties will set out to explore and survey the country in the immediate neighborhood. Soon the approach of the long Polar night will put a stop to labors in the field. During the period of darkness the time will be taken up with exercising the Eskimo dogs, perfecting equipment, and getting things ready for the grand effort of the next year.

With the dawn of a new season, a select party of three or four men will set out inland on the main journey south. If practicable, an advance station will have been established beforehand, some hundred miles beyond headquarters, so as to afford a good start. This party will have instructions to return when a certain time has elapsed, or when two-thirds of the provisions carried on the sledges are exhausted. A full set of scientific instruments will be taken along, and the most complete and accurate observations will be made at various points along the route. Barring unforeseen accidents, I see no reason why a well-equipped sledging party should not be able to reach the geographical Pole, starting from the 80th parallel. No special effort, however, will be made to that end, which should be at present one of the least-desired objects of an expedition toward the South Pole. Those left at home will devote themselves to a more thorough exploration of the adjacent country; and, as certain observations, to be of value, must be taken at frequent intervals throughout the twenty-four hours of the day, there will be no lack of

employment. We shall at least endeavor to avoid that affliction of nearly all explorers—inaccuracy. Upon the return of the sledging party, which should be about April 1, we shall commence our retreat.

What modifications or changes of this plan may be rendered necessary, depend on the exigencies which may arise: no arbitrary rules will hamper the expedition. The party will be small, not more than fifteen all told, five of whom will comprise the scientific staff: force of numbers are of little avail in the conquest of nature. All its members must be willing volunteers, and of course physical hardihood is a pre-requisite. Each man will have his special duties, and must be able to care for himself independently in an emergency. Indeed, there will be no room for novices. While there will be no useless regulations, discipline must be observed. Where a misstep may mean a life, too great caution cannot be exercised.

Two elements will contribute largely to the chances of success. One is the employment of steam in navigation, and the other the fur clothing to ward off the extreme cold. Steam did not become a factor in Antarctic work until the "Challenger" expedition of 1874. Prior to that, the uncertainty of sail was depended upon to force a vessel through the pack ice, and Sir James Ross, among his *confrères*, has remarked that many times there was an open sea ahead, which proved a useless highway because there was not enough wind to fill the sails of his craft. A modern steam vessel would be independent of currents or winds, and, a favorable opportunity presenting itself, could advance in a day the same distance the ships of the early explorers required a week to make. Fur clothing is a matter of great importance to a party wintering in the Antarctic. With the fur costume that I am having made,—a modification of the Eskimo dress,—I am confident that the extremest temperatures can be withstood. This includes a bird-skin under-garment, which I have learned by experience in the Arctic is a great factor in the comfort of an explorer. Nor must the dogs be left out of our calculations, as they will play an important part in the sledge journeys over the inland ice.

I believe that the time is ripe for an expedition to the southern continent. America has astonished the Old World with her rapid strides in the arts of civilization since the comparatively recent period of her birth. If an American expedition unravels the mysteries of the unknown lands about the South Pole of the earth, it will be another jewel added to the crown of her achievements.

FREDERICK A. COOK.