

lowered into its lowest position. These ribs are placed diagonally, to permit them to run freely over the supporting rolls, which carry the slack side of the belt. At the top of the post this belt discharges into a second receiver, which by means of the long telescopic chute shown discharges into the boot of a second elevator, which is placed on the deck, which in turn raises the grain and empties it into the weigh-house or hopper, from which it is delivered to lighters alongside.

The jib of the elevator is carried at the top of the inclined post, which in turn is supported at the trunnion pin at the top of the frame, which rotates upon the turntable, the supporting ring and rack of the latter being secured to the bottom of the craft. The length of the tilting post above the trunnion is 30 feet, and the height of the trunnion pin above the bottom of the pontoon is 17 1/4 feet. The weigh-house is fitted with six automatic grain scales of 250 pounds capacity each, and these can discharge into sacks or loose into lighters, as may be desired.

A noticeable feature of the machine is the celerity and facility with which it can be brought in and out of action. Once it is moored alongside, the leg can be swung round and lowered into the hold ready for working within about four minutes, and this is considerably less than is possible by any other method. A portable machine to be rigged up, ready for working takes from two to three hours, according to the position of the ship's winches and the weather. Moreover, the great advantage of facility for instant adjustment of the elevator to any width of ship, or for lifting the leg instantly from one side of the ship to the other over shifting boards or propeller tunnels, is perfectly obvious. Again, not only does this machine render possible the use of a single instead of a double leg, but in the event of there being hatch-beams or other obstructions in the hold, it facilitates the placing of the leg in the position required immediately; while in a big hatchway the possibility of being able to sweep the hatchway to its full extent with the combined movements of slewing and post tilting, thereby saving a considerable amount of trimming, is a conspicuous advantage. The exact adjustment of the telescopic leg or the height of the jib also makes it possible to work different consignments of grain in the same hold which are only separated by mats or cloths, as the depth at which the leg is to work can be adjusted to a nicety. As may be seen in the illustrations, the combination of the two levers and the telescopic leg gives a great range of action.

The precise angle of the jib is controlled by means of an electric winch and wire hauling gear, acting on the back end of the jib, while the tilting of the post is performed by means of a screw and nut carried in a bracket near the trunnion pin of the post. All the controlling actions are performed by series-wound motors of 4 B. H. P., and the elevator is driven by a 20 B. H. P. motor attached to the turntable. The direct current at 110 volts is generated on board the pontoon by means of a gas engine and suction gas plant driving a dynamo by belting. The deck elevator is driven from a countershaft in the engine room and a chain belt as described.

The whole apparatus is controlled by one man, for whom a cabin is provided on the turntable. A deck-hand assists in adjusting the chutes when getting the elevator to work, and afterward attends to the suction gas plant. The maneuvering requirements of the machine are signaled by a man on the grain vessel's deck, who indicates the exact desired position of the elevator, and follows its operation.

DR. COOK'S DISCOVERY OF THE NORTH POLE.

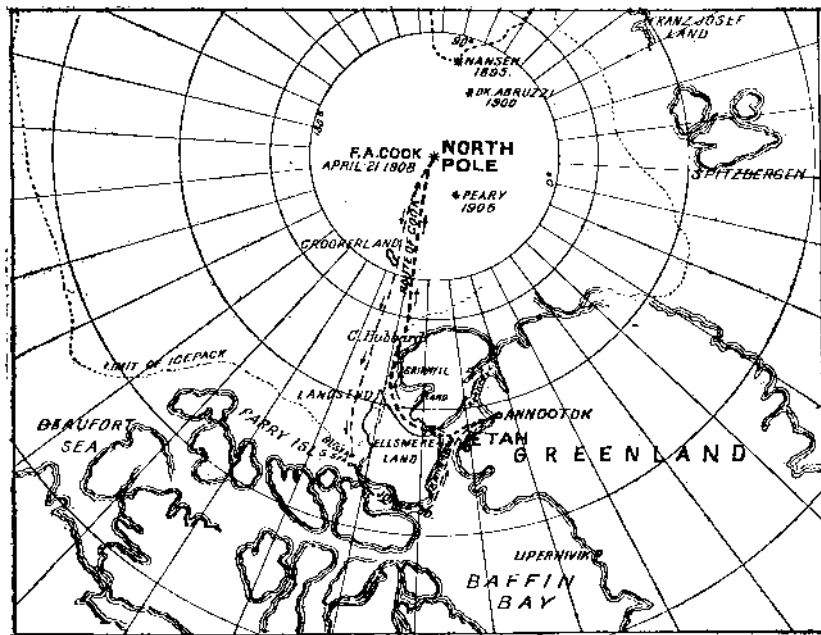
The search for the North Pole, which began in the Middle Ages for the purely commercial purpose of finding a sea passage to the wealth of the Orient, and which continued to attract adventurous and scientific spirits long after a more direct route to the Far East was discovered, seems to have culminated in the success of Dr. Frederick A. Cook, of Brooklyn, N. Y. Dr. Cook announced the remarkable result of his expedition in a telegraphic dispatch sent on August 24th from the Shetland Islands, where he stopped for two hours on his way south to Copenhagen. Although no definite scientific proof is as yet available of Dr. Cook's claim, there can be but little doubt of his great triumph. His previous experience in Arctic exploration and his acknowledged intrepidity are conceded even by those geographers who are disposed to await his arrival at Copenhagen.

Dr. Cook's polar expedition seems to have been quite unpremeditated. In 1907 he accompanied John R. Bradley, a wealthy sportsman, on an Arctic shooting trip in a small converted Gloucester fishing

schooner. When they arrived at the limit of navigation in Smith Sound late in August, 1907, the conditions seemed so favorable for a successful polar dash that Cook determined to make the attempt. In that venture he was undoubtedly favored by a combination of fortunate circumstances. Many Esquimaux had gathered on the Greenland shore at Annotok for the annual bear hunt. Great quantities of meat had been brought in by the hunters. Dogs, too, were numerous. Since food and dogs were plentiful, both prime requisites in any polar expedition, Dr. Cook promptly decided to make an attempt to reach the Pole, 700 miles distant. The entire village of 250 people fell to and fitted him out, so that before the end of the long winter night he was ready to set out and to follow a route of his own choosing over Grinnell Land and northward along its west coast out on the polar sea.

The expedition started on February 19th, 1908, with 11 men and 103 dogs drawing 11 sledges. At the very outset the usual hardships of the Arctic explorer were encountered. The crossing of Ellesmere Sound was accompanied by a drop in the thermometer to 83 deg. below zero Fahrenheit. Several dogs were frozen to death. Eventually Land's End was reached. Game was plentiful. In this march to Land's End no less than 101 musk oxen, 7 bears, and 335 hares were killed; there was no lack of fresh meat.

At a point 460 miles from the Pole, Cook sent back all his Esquimaux but the two most capable, and all his dogs but 26. On March 21st the final effort began. A great stretch of open water was crossed—how, Dr. Cook does not tell us in his dispatch. Presumably he used a collapsible canvas boat, which he casually includes in the description of his outfit. On March 30th new land was discovered in latitude 84 deg. 47 min., longitude 86 deg. 36 min. No time was lost in ex-



THE COURSE FOLLOWED BY DR. COOK AND HIS IMMEDIATE PREDECESSORS.

ploring the new country. This was the last land that Cook traversed. Thereafter his course lay on the frozen polar sea.

The game which had previously been so plentiful was conspicuously absent. Even microscopic life could not be found. Curiously enough, the surface of the ice pack opposed fewer obstacles than at the outset. On the other hand, violent winds hampered him. On the night of April 1st, 1908, the sun appeared at midnight over the northern ice. The next day found Cook at latitude 86 deg. 36 min., and longitude 94 deg. 2 min. In other words, he had covered about 100 miles in nine days and was 200 miles from the Pole.

Dog after dog was killed to supply the other animals with food, as well as Cook and his companions. On April 14th latitude 88 deg. 21 min. and longitude 95 deg. 52 min. was reached. The pole was 100 miles away. The few stretches of open water were covered with young ice, so that no difficulty was encountered in crossing them.

On April 21st the first corrected altitude of the sun gave 89 deg. 59 min. 46 sec. The Pole was only a few miles distant. The remaining 14 seconds were covered by April 21st, 1908, on which day Cook planted the American flag at the North Pole, or rather on a shifting bed of ice which was then at the North Pole.

Cook remained at the Pole for two days. On the 23rd he started back. Keeping his course well to the southwest, in order to allow for the easterly drift, he covered considerable distance during the first few days. Food became so scarce that for a time it seemed questionable whether Cook and his companions would not perish by starvation. Cloudy weather, an indication of approaching summer, as well as violent gales made his journey southward difficult. Eventually he reached Crown Prince Gustav Sea, with-

its vast expanse of open water. Fortunately, a few bears were shot, and the diminished food supply was replenished. In July Cook crossed the Firth of Devon into Jones Sound. Eventually Cape Sparbo was reached, where game was plentiful. An underground den was dug, in which Cook and his companions lived until sunrise of 1909. February 18th a start was made for Annotok, and the Greenland shores were reached on April 15th.

Contrasting Cook's achievement with Peary's exploit of 1906, in which year Peary reached latitude 87 deg. 6 min., 200 miles from the Pole, we find that Peary started about three weeks earlier in the season. Cook's outfit was probably inferior to Peary's, hastily prepared as it was. Peary was compelled to turn back because of the great stretch of open water that confronted him. Cook was undeterred by water, possibly because he carried with him the canvas boat mentioned.

Peary's attempt is particularly interesting because Dr. Cook started out with the avowed intention of avoiding some of the drawbacks which had beset Peary. One of these drawbacks was the general set of the floe to the eastward, with which Peary had to contend. Dr. Cook, it is understood, struck off to the westward for the purpose of making allowance for this floe when he started on his direct north route.

Dr. Cook is not a novice at exploration. He was surgeon and ethnologist in the first Peary expedition in 1891-92; assistant in command of the Miranda expedition, which ended in disaster in 1894; surgeon and anthropologist of the Belgian Antarctic expedition which was gone between the years 1897 and 1899, and surgeon in the Peary expedition of 1901. This record must be amplified by the inclusion of his feat as the first conqueror of Mount McKinley in Alaska, about which there has been some controversy.

It is the prevalent view among geographers that there is no land in the neighborhood of the North Pole. This opinion is based upon the fact that no Arctic land is known to rise, except from the continental shelf, or from comparatively shallow waters. But north and northeast of Franz Josef Land the "Fram" expedition under Nansen found depths of 2,000 fathoms or more, and fifty miles to the north of Alaska the Nikkelsen-Leffingwell expedition was unable to reach bottom with its sounding line, which measured 2,060 feet. These and other ascertained facts have encouraged the belief that there is no land around the North Pole. Dr. Cook now confirms these geographical surmises.

The mere quest for the Pole itself is not regarded even by Arctic authorities as an especially worthy undertaking. What are the conditions of the sea and its currents, the air, the ice, the life of the region, and other phenomena between the known Arctic and the Pole? The answer to such questions as these is what is expected in these days of trained explorers. No doubt Cook will be able to

add much to our scant knowledge on these points.

The Norsemen probably were the first Europeans to visit the Arctic regions and Greenland. The struggles to find a short cut to the riches of the Far East were more productive of adventures and loss of life than the latter-day dashes for the Pole. Perhaps the earliest of scientific explorers was Sir Hugh Willoughby, who sailed in 1553 "for the search and discovery of northern parts of the world." He discovered Nova Zembla, but starved with most of his men in Lapland on the return voyage.

The following explorers emulated him:

	Deg.	Min.
1588—John Davis, England, ship.....	72	12
1594—William Barents, Holland, ship.....	77	20
1607—Henry Hudson, England, ship.....	80	23
1616—William Baffin, England, ship.....	77	45
1773—J. C. Phipps, England, ship.....	80	48
1806—William S. Scoresby, England, ship..	81	30
1827—W. A. Parry, English, sledge.....	82	45
1852—E. A. Inglefield, England, ship.....	78	21
1854—E. K. Kane, American, sledge.....	80	10
1868—K. Koldewey, Germany, ship.....	81	5
1870—C. F. Hall, American, ship.....	82	11
1871—C. Weyprechte, Austrian, sledge....	82	5
1875—G. S. Nares, England, sledge.....	83	20
1879—George De Long, American, ship....	77	36
1882—A. W. Greely, American, sledge....	83	24
1894—C. F. Jackson, England, sledge.....	81	20
1895—F. Nansen, Norway, sledge.....	83	14
1897—W. Wellman, American, sledge.....	81	35
1897—Duke of Abruzzi, Italy, sledge.....	86	33
1901—Baldwin-Ziegler, American, sledge....	81	45
1901—R. E. Peary, American, sledge.....	84	17
1903—Ziegler-Fiala, American, sledge.....	82	..
1905—R. E. Peary, American, sledge.....	87	6
1908—Dr. Cook, American, sledge.....	The pole	