

Deviation from the normal course Algué explains as usually due to the presence not far away of another typhoon. However, there is record of a hurricane in Fiji which recurved so sharply on its course that its center passed twice over the city of Levuka, and yet no other disturbance was known to be anywhere near. Furthermore, this hurricane traveled northwest from Levuka after its first passage over that city, the opposite direction from that which tropical cyclones normally take in that latitude in the southern hemisphere.<sup>27</sup>

*Bifurcation of cyclones.*—Sometimes it happens that a well-developed cyclone apparently divides into two independent, comparable storms, each of which henceforth follows an independent course. Algué suggests that topographic barriers may be the cause, but the cases he considers do not make this explanation altogether satisfactory.

Secondary whirls sometimes develop within a cyclone, producing destructive winds far from the center of the main cyclone. Algué has repeatedly observed such secondary centers in the Philippines. Doctor Okada reports that two or three secondary centers sometimes occur within a typhoon.

*Typhoons and mountains.*—It is stated in some standard meteorologies that tropical cyclones can not cross a mountain range 3,000 feet high. This is often disproven in the Far East, for typhoons sometimes cross mountains of greater height than this in Taiwan (Formosa), in the Philippines, in Japan, and elsewhere. Mountainous Formosa often appears to deflect typhoons which approach it at a small angle, and sometimes cuts the typhoon in two, according to Froc, but, on the other hand, other storms clearly cross it with no apparent regard for its mountains, the highest of which reach over 13,000 feet. Doctor Okada reports that studies made on lofty Fuji, near Yokohama, and on the higher mountains of Formosa indicate the depth of most typhoons to be approximately 5 or 6 kilometers (16,000 to 20,000 feet).

Although it is commonly stated that typhoons weaken decidedly as soon as they come upon the land, both Froc and Okada have observed many cases where this was not true in southeast China, the typhoons maintaining most of their force until encountering lofty mountains.

#### THE CHANGING ARCTIC.

By GEORGE NICOLAS IFFT.

[Under date of October 10, 1922, the American consul at Bergen, Norway, submitted the following report to the State Department, Washington, D. C.]

The Arctic seems to be warming up. Reports from fishermen, seal hunters, and explorers who sail the seas about Spitzbergen and the eastern Arctic, all point to a radical change in climatic conditions, and hitherto unheard-of high temperatures in that part of the earth's surface.

In August, 1922, the Norwegian Department of Commerce sent an expedition to Spitzbergen and Bear Island under the leadership of Dr. Adolf Hoel, lecturer on geology at the University of Christiania. Its purpose was to survey and chart the lands adjacent to the Norwegian mines on those islands, take soundings of the adjacent waters, and make other oceanographic investigations.

Dr. Hoel, who has just returned, reports the location of hitherto unknown coal deposits on the eastern shores of Advent Bay—deposits of vast extent and superior quality. This is regarded as of first importance, as so far most of the coal mined by the Norwegian companies on those islands has not been of the best quality.

The oceanographic observations have, however, been even more interesting. Ice conditions were exceptional. In fact, so little ice has never before been noted. The expedition all but established a record, sailing as far north as 81° 29' in ice-free water. This is the farthest north ever reached with modern oceanographic apparatus.

The character of the waters of the great polar basin has heretofore been practically unknown. Dr. Hoel reports that he made a section of the Gulf Stream at 81° north latitude and took soundings to a depth of 3,100 meters. These show the Gulf Stream very warm, and it could be traced as a surface current till beyond the 81st parallel. The warmth of the waters makes it probable that the favorable ice conditions will continue for some time.

Later a section was taken of the Gulf Stream off Bear Island and off the Isfjord, as well as a section of the cold current that comes down along the west coast of Spitzbergen off the south cape.

In connection with Dr. Hoel's report, it is of interest to note the unusually warm summer in Arctic Norway and the observations of Capt. Martin Ingebrigtsen, who has sailed the eastern Arctic for 54 years past. He says that he first noted warmer conditions in 1918, that since that time it has steadily gotten warmer, and that to-day the Arctic of that region is not recognizable as the same region of 1868 to 1917.

Many old landmarks are so changed as to be unrecognizable. Where formerly great masses of ice were found, there are now often moraines, accumulations of earth and stones. At many points where glaciers formerly extended far into the sea they have entirely disappeared.

The change in temperature, says Captain Ingebrigtsen, has also brought about great change in the flora and fauna of the Arctic. This summer he sought for white fish in Spitzbergen waters. Formerly great shoals of them were found there. This year he saw none, although he visited all the old fishing grounds.

There were few seal in Spitzbergen waters this year, the catch being far under the average. This, however, did not surprise the captain. He pointed out that formerly the waters about Spitzbergen held an even summer temperature of about 3° Celsius; this year recorded temperatures up to 15°, and last winter the ocean did not freeze over even on the north coast of Spitzbergen.

With the disappearance of white fish and seal has come other life in these waters. This year herring in great shoals were found along the west coast of Spitzbergen, all the way from the fry to the veritable great herring. Shoals of smelt were also met with.

#### BIRDS STORM-SWEPT OVER THE NORTH ATLANTIC OCEAN.

By WILLIS E. HURD.

[Weather Bureau, Washington, D. C., Dec. 10, 1922.]

An interesting memorandum was recently received by the Weather Bureau in connection with a marine weather report from Mr. W. Scott, fifth officer of the American S. S. *Manchuria*. It deals with the appearance of several varieties of small land birds a considerable distance at sea on the 27th to 29th of October, 1922, during a voyage from New York to Hamburg, and is presented here, with an inclusion of the list of observed bird varieties, for the scientific interest involved.

S. S. *Manchuria*,  
Voyage 50—N. Y.—HAMBURG,  
October 23, 1922.

It may be of some interest to the Department of Plants and Animals or to the Smithsonian Institution to note that on October 27, latitude 40° 36', longitude 66°, to noon 28th, latitude 41° 45', longitude 59° 27',

<sup>27</sup> R. L. Holmes: Quart. Journ. Royal Meteorol. Soc., January, 1905.