

the reduced size of the pulp cavities in old animals, but the possible existence of annually deposited rings or ridges was apparently not checked. It is noted (p. 92) that the antler pedicle increases in diameter with age, and here again there is a possibility that stained sections might disclose annual rings.

The illustrations, binding, and format are suitable and adequate for a book of this kind, but it is by no means the luxury volume which the price would indicate. It is unfortunate that such a useful work, which should be in the hands of all moose hunters as well as zoologists working within the range of the moose in Canada, Alaska, the United States, and even Europe, has been published at a price which is double that of comparable volumes. It is strange that the publishers failed completely to realize the demand which adequate advertisement and a reasonable price might have created for this book.

T. H. MANNING

ATLAS DER EISVERHALTNISSE
DES NORDATLANTISCHEN
OZEANS UND UBERSICHTS-
KARTEN DER EISVERHALTNISSE
DES NORD- UND SUDPOLAR-
GEBIETES

DEUTSCHES HYDROGRAPHISCHES INSTITUT.
*Hamburg: 1950. 19½ x 13½ inches; 18
pages text; bibliography; 34 charts.*

The 1955 shipping season was particularly difficult in the Arctic, and reports of unusually poor weather and heavy ice were widespread. As surface traffic increases it is becoming obvious that our knowledge of average and extreme ice conditions must be improved, and that any studies that contribute to this knowledge are of great value. The German ice atlas, published in 1950, is not well known in North America. It is an enlarged edition of the publication produced during the last years of the Second World War by Dr. Julius Büdel of Deutsche Seewarte. Most of the first edition and the plates were destroyed in an air raid in 1944, but some charts were salvaged; they have been revised

by Deutsches Hydrographisches Institut and are used in this atlas.

The atlas is divided into two parts. The first part contains the text and a bibliography on sea ice with 37 titles, while the second part contains 34 charts. In spite of the date of publication no reference is made to 'Ice atlas of the northern hemisphere' published in 1946 by the Hydrographic Office, United States Navy, which contains an exhaustive bibliography on sea ice with no less than 1,700 titles.

Part I begins with a paragraph on sea ice in which the author states that the physical structure of winter ice in the seas distant from the north pole does not differ from that of the semi-permanent ice of the inner Polar Basin except in thickness "the one-year old winter ice seldom exceeds 1 metre, while the older polar ice on the average measures 2-3 metres in summer, and 3-4 metres in winter. Only in the case of exceptionally strong pressure and rafting can the ice occasionally reach a thickness of 25 metres. Normally the ice in the Polar Basin is 2-3 years old. Ice as old as 5-6 years is rare, and an age of 8 years is hardly ever exceeded". Nothing is said about the age of ice governing its salt content.

The author writes that the ice conditions of the inner Polar Basin and the neighbouring parts of the Canadian Archipelago are, even today, "almost unknown". He says that here there is "an ice cover that is uniform over vast distances, and of a permanent character; the lack of observations from this region is therefore not important for the geographical investigation of sea ice". This is a somewhat surprising statement. The manuscript for the text of the atlas was finished in 1947, and the maps, for the most part, show mean values for the period 1919-43; with a publishing date of 1950 one feels that the text, at least, might have been brought up to date. Although these areas can still be called "almost unknown" considerable study of the sea ice has been carried out in the North American Arctic since the Second World War. As the "lack of observa-

tions" has been remedied, surprising things have been found—for example, the ice conditions in Hudson Bay, and the number of ice islands floating in the Arctic Ocean, readily distinguished from the pack ice by their appearance.

The author considers that even more important than this lack of knowledge of ice conditions in the Polar Basin is the sporadic nature of our knowledge of the bordering zones. "These zones are subject to a constant periodic and non-periodic change between ice-free waters and an ice cover of many forms. Here, only two separate regions have been thoroughly investigated". The first includes Atlantic waters off Canada's coasts from the Gulf of St. Lawrence to Davis Strait, and, to a lesser extent, Baffin Bay, Hudson Strait and Hudson Bay, and the west coast of Greenland. The second includes the polar and sub-polar seas of the east and north Siberian coasts, and the western Barents Sea and the Spitsbergen waters, where the Norwegians have reported on ice conditions. However, it is stated, until recently very little was known of the ice conditions in the area between these regions where the largest periodic and non-periodic changes occur—the open North Atlantic extending from Spitsbergen to Denmark Strait and the southern tip of Greenland. From this area only single observations were available, and these mainly for the summer months. All these observations, as well as those from the Barents Sea and the west coast of Greenland, have been collected by the Danish Meteorological Institute since 1893, but it is clear that the annual small-scale synoptic charts of ice distribution include only the summer months, and, the author continues, winter ice conditions have remained practically unknown. One would expect to find a reference to the work of Lauge Koch, published in 1945, which gives an exceptionally good description of the east Greenland ice, including the winter ice.¹ According to the text, the gap in knowledge of ice

¹Koch, Lauge. 1945. 'The east Greenland ice'. *Medd. om Grøn.* Vol. 130, No. 3, 373 pp.

conditions in this area was filled by the German Ice Reconnaissance Flights during the years 1941–45. A total of 250 flights was made between Denmark Strait and Spitsbergen-Franz Josef Land. The Ice Reconnaissance Flights carried out in the same regions by the Allied Air Forces are not mentioned. This work is described by Glen, who draws charts of monthly limits of drift ice and the probable means of limits of drift ice.¹

The atlas compares the ice regions of the various oceans, not only the yearly means of distribution, but also the occurrence of ice in percentages of frequency. The oceans are divided into three large regions: the North Atlantic Ocean with bordering seas, the whole north polar region, and the whole south polar region (the latter is defined as the southern oceans at any given time north to the equatorial limit of ice). Monthly charts have been drawn for each of these regions. However, there are only seven charts for the south polar region as, because of the dearth of observations during the winter half of the year, several months are represented by one chart.

A uniform method of presentation has been used for all these charts. It is a gradation of the mean frequencies of ice occurrence, "probability of ice", from 0 per cent probability (continuously ice free) to 100 per cent (continuous or almost continuous ice). Different symbols have been used to distinguish the two most important geographical types of ice, the polar sea ice and ocean ice, and the ice in the bordering seas of temperate latitudes. The charts of the North Atlantic are on a scale of 1:20,000,000; those of the north polar region are on a scale of 1:30,000,000 and for the south polar region the scale is 1:60,000,000.

For areas from which there are continuous observations the charts have been drawn for the same period. These include the North Sea and the Baltic Sea, the

¹Joubert, Sir Philip and A. R. Glen. 1946. "High latitude flying by Coastal Command in support of convoys to north Russia". *Geogr. J.* Vol. 108, pp. 1–21.

Danish and Russian observations in the Arctic Ocean and the North American observations in the Canadian-Greenland waters. In other areas "older sources" have been used, especially for the inner Polar Basin, the Canadian Archipelago, Hudson Bay, and the Gulf of St. Lawrence. These "older sources" give a surprisingly accurate picture of ice conditions in Hudson Bay, as they are now known to be.¹ In this the German ice atlas is better than the 'Ice atlas of the northern hemisphere' which shows Hudson Bay to be practically ice free, even in winter, beyond a narrow belt of land-fast ice.

The German ice atlas is intended for scientific as well as practical usage. For practical use it must be remembered that the outer limits of the symbols do not represent ice limits as in most charts of sea ice. The outer limits of symbols form a connecting link between points where ice was known to come farthest towards the open sea during the years

1919-43. All the local characteristics of an ice front cannot be indicated on a chart showing average ice conditions, and the lines for the different zones of probability follow a nearly straight, or only slightly curved, course for long distances. The introduction states that the atlas will "be a help to the navigator where no other assistance was available before": the risk in a voyage through all partially ice covered parts of the oceans can be read directly off the charts. The numerical values of probability are supplemented on each chart by additional notes on ice conditions. In spite of good printing and clear symbols, the charts will probably be less useful to the navigator in northern waters than the larger scale charts of the 'Ice atlas of the northern hemisphere' published four years earlier. However, a great deal of work has gone into the preparation of this new atlas, and it is a very welcome addition to our meagre knowledge of sea ice.

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INSTITUTE NEWS

Honorary degree conferred on Mr. W. A. Wood

At the 33rd Commencement Exercises of the University of Alaska on 16 May 1955 the honorary degree of Doctor of Science was conferred on Walter A. Wood, Director of the New York Office. Dr. Ernest N. Patty, President of the University of Alaska, presented Mr. Wood for his degree and spoke of his distinguished services in arctic exploration and geography. The degree was conferred by Elmer Rasmusson, Vice-President of the Board of Regents. In his commencement address Dr. Wood spoke of the changes that are taking

¹Hare, F. K. and Margaret R. Montgomery. 1949. "Ice, open water, and winter climate in the eastern Arctic of North America: Part II: The pattern of winter ice". *Arctic*, Vol. 2, pp. 149-64.

place in the north, and the opportunities and responsibilities that these changes present.

Other distinguished personages receiving honorary degrees included Sir Hubert Wilkins, for his exploratory and scientific work in the Arctic, and Dr. George W. Gasser, for his 48 years of pioneer service to Alaskan agriculture.

Award of Institute research grants

The following were awarded research grants, or otherwise sponsored, by the Institute for field work in the 1955 season:

BOYD, WILLIAM L. Dept. of Bacteriology, University of Georgia, U.S.A.

An ecological and taxonomic survey of microorganisms, under winter and summer conditions, in the vicinity of Point Barrow, Alaska.