The Oxford University Arctic Expedition, 1935–36

By A. R. GLEN and D. B. KEITH

AN interesting feature of post-War university life has been the active part played by Cambridge and Oxford in exploration. This activity has by no means been limited to a few places, and to mention only one or two of the places visited, Cambridge expeditions have carried out useful work in various parts of Africa and in Greenland, while Oxford expeditions have obtained valuable scientific results in South America, Borneo and Spitsbergen. The first of this kind to spend a winter in the arctic was the British Arctic Air Route Expedition of 1930–31, and the expedition which was organised by Mr. E. E. Shackleton and led by Dr. G. N. Humphreys, now making its way from Etah to Ellesmere Land, is the first Oxford expedition to winter.

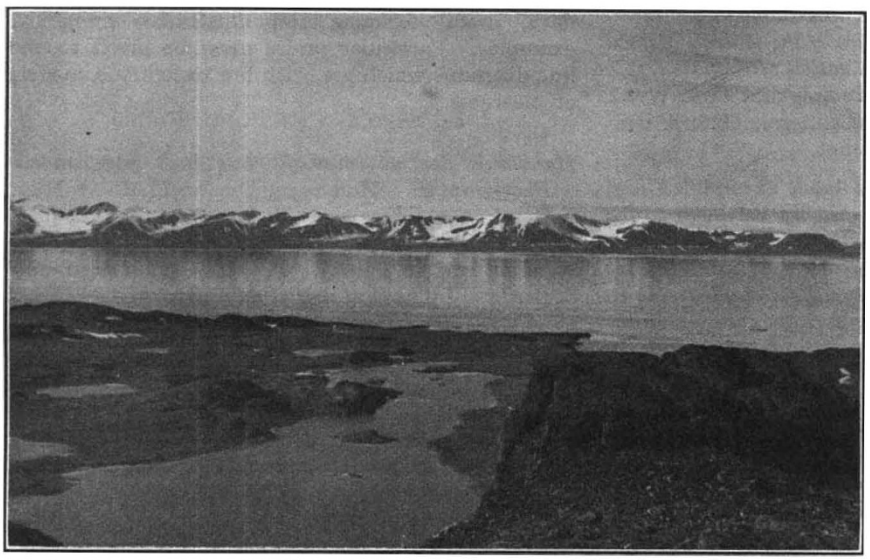

FIG. 1. The lake country of north-east Spitsbergen. It is believed that similar country exists to the east of Rijp's Bay, and if so, it should be of considerable biological interest.

In July, another Oxford expedition is leaving England to spend fourteen months on the north coast of North-East Land. It is being organised by Mr. A. Dunlop-Mackenzie; Mr. A. R. Glen, leader of the 1933 Oxford University Arctic Expedition, is going as leader. The personnel of nine is made up by three surveyors, two physicists, a wireless operator, a glaciologist, a doctor who will also be in charge of the marine biology, and a dog-driver. The last, Mr. Andrew Croft, was a member of the British Trans-Greenland Expedition of last year, and will be second in command of the present expedition.

The sealer, the M.S. *Polar* of Tromsø, has been chartered, and it is hoped that the north coast will be reached during the first week of August. A base hut will be built near the head of Rijp's Bay, and after all the stores and equipment have been landed, the ship will return to Norway. The plans are to carry out a topographical and geological survey of the unknown north and east coasts and of as many of the northern and eastern islands as time and ice conditions permit. In addition to the surveys, researches on the ionosphere, atmospheric ozone, electrical disturbances and terrestrial magnetism, will be carried on at the base over the whole year, and two winter stations are to be maintained on the inland ice with the intention of trying to form an estimate of the present balance of glacial conditions, as well as investigating the crystallography of surface snow, firn, and of blue and white ice.

Finally, a fairly comprehensive biological programme is planned, and the land side of this, which will consist mainly of a study of the birds, will be under the direction of Mr. D. B. Keith, while the marine work will be in the care of the doctor.

In addition to general observations on the bird life, special attention will be devoted to four problems. The first is that of the non-breeding years which seem to occur every fourth year in the Arctic. It is probable that 1936 will prove to be one of these, and if this should prove to be the case, the gonads of selected species will be examined (and preserved) in May, June and July, and an attempt will be made to discover if there is any evidence that the non-breeding is connected with the weather conditions of the summer or of the previous winter. It has also been suggested that exceptionally late breaking of the sea ice, or late melting of lake ice, might cause interference with the food supply of the birds, and this, together with any other factor affecting the food supply, will be examined. In the event of 1936 not being a year of extensive non-breeding, estimates of the proportion of breeding to non-breeding birds will be made, and this may give interesting results, as it is a subject on which very little work has been carried out.

It is hoped that it will be possible to make a detailed study of the snow bunting throughout the breeding season, with special reference to territory. Much work has been done and is being done at home on the breeding and territorial habits of closely allied species, and this should prove a valuable comparison, for not only is the habitat

FIG. 2. One of the first colony of ivory gulls to be discovered in western Spitsbergen by the Oxford 1933 Expedition.

so vastly different from that of the species already studied, but also the snow bunting is the most northerly passerine and hence has no food competitors in the form of other passerines. The bird distribution will also be analysed from the point of view of food supply and nesting sites.

During the Oxford 1933 Expedition in Spitsbergen, Mr. Hartley and Mr. Fisher (*Geog. J.*, 84; Aug., 1934) carried out a detailed study of the marine feeding of sea birds, and correlated the facts with the conditions of the marine fauna investigated by Mr. Stott. The fulmar petrels and kittiwakes were found to have a feeding zone about 100 yards long and 50 yards across, close to the ice cliffs of the Nordenskiöld Glacier, at a point roughly half way from either shore (Fig. 3). This zone remained a permanent feature during July and August, and the normal number of kittiwakes was about 3,000, while that of the fulmars varied between 500 and 700, but these numbers rapidly decreased in the beginning of September. From analyses of a large number of stomach contents, the food was found to consist almost entirely of the Euphausid *Thysanoessa inermis*, although an amphipod, *Euthermistes libellata*, occurred occasionally in small numbers. It was also found that *Thysanoessa* was the basic food of Arctic terns, Brünnich's guillemots and little auks, and also had place in the food of puffins, although these were mainly fish-eaters, and of Mandt's guillemots, which were found to feed also on the general bottom fauna of the inshore zone. Thus it is of the greatest importance to the bird population, and it is probably only through the blanketing effect of the silt brought down by en-glacial and sub-glacial streams that it is able to live in the extreme surface layer in this area. As a large glacier flows from the west ice of North-East Land into Rijp's Bay, and as it is the only glacier with a sea face in the bay, it will be of the greatest interest to discover whether the phenomenon is repeated in this area, and also whether it occurs in the other bays of the north coast of North-East Land.

The 130 miles of almost continuous ice cliffs on the east and south coasts may give interesting conclusions, especially as there are several islands off the northern part of the east coast which may offer suitable nesting sites. It is not intended to repeat this study in the detail with which it was carried out in 1933, but rather to see if the birds in these areas resort to these definite feeding zones, and to discover what effect the zones—if any—have on the distribution of the birds. The work will probably be correlated by observations on the marine fauna, and this will be under the direction of the doctor, who is the only member of the expedition not yet appointed.

Little is known of the breeding habits of the Spitsbergen ptarmigan, and there are no skins of the bird in breeding plumage or of the chicks at the British Museum (Natural History). It seems likely that the birds breed on moderately high ground, and that they come down to the coasts and low unglaciated ground when the snow limit

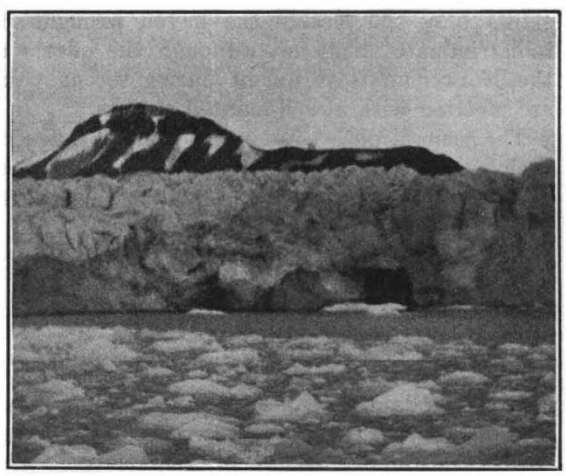

FIG. 3. Nordenskiöld Glacier sea-face, showing the cave in front of which was the zone frequented by fulmars and kittiwakes.

becomes lower with the approach of winter. Attempts will be made, therefore, to find their breeding places and to examine their winter distribution, as well as the change brought about in this by the approach of spring. Some years ago, reports were brought back from the Ice Fjord region of Spitsbergen that there were remarkable

fluctuations in the numbers of the ptarmigan, but it is very possible that the reports of the scarcity of the birds were made on the evidence of the summer months, when the birds may have been on relatively high ground. One of the parties of the Cambridge 1932 Spitsbergen Expedition spent some time in the Wijde Bay, and while there, found a considerable number of ptarmigan above the 1,500 ft. level. Only on one occasion, and then towards the latter part of August, were birds found below that height. Similarly in 1933, the Oxford Expedition in the north-eastern part of the Ice Fjord found only one family of ptarmigan during July and August, but in September large numbers of the birds were found in the low valleys, the snow level by that time being at about 600 ft. The reports of number fluctuations may thus, in part, be due to variations in the autumn weather conditions at the time when the ptarmigan are likely to be driven from the high ground by the approaching winter into the valleys, where they are most easily seen.

It is hoped that it may be possible to bring back the skins of certain species required by the British Museum (Natural History). Some collecting will be undertaken with the view of ascertaining crop and stomach contents, and all birds shot will be examined for lice, as the parasites of arctic birds are very little known. All bears and seals shot will likewise be examined for parasites. Every effort will be made, however, to restrict the shooting and hunting to a minimum, as the history of the fauna of Spitsbergen during the last fifty years shows only too clearly the havoc wrought by indiscriminate slaughter, although the efforts of the Norwegian Government during recent years are meeting with a well-merited success.

The general observations will include notes on such subjects as numbers, distribution, time of arrival and time of departure, and as no observations of this kind have yet been made from North-East Land, they may produce some interesting results. The only information brought back during the spring was that gained by Nordenskiöld as a result of his journey with Palander in 1873 along part of the north coast. The first birds to be seen after the winter were some glaucous gulls on March 3, and on April 3 the first snow bunting arrived. By the middle of May millions of sea birds had arrived in the fjords and were breeding on the precipitous slopes of the surrounding mountains, notwithstanding that there was no open water in the near neighbourhood. The length of time to be spent in North-East Land by the present expedition ought to give every opportunity for comprehensive study of this kind.

The remainder of the work will consist of straightforward botanical collecting, and will aim at making as complete an ecological survey as is possible. It is hoped, however, that it will be possible to make a detailed investigation of surface markings, and especially of the polygonal markings which appear to be characteristic of arctic and, to a less extent, of Alpine regions. Various studies have been made of these, and perhaps of greatest interest in this respect is the work which has been recently carried out by Mr. N. Polunin. It seems to be probable that the causes vary from place to place, and that no generally applicable theory can be framed; the investigations of the growth of the polygons over the year may, however, throw some fresh light on the subject.

Weather conditions naturally will control the degree in which the biological programme of the expedition is carried out, although it is much more independent of weather than the survey, for example. With a working period of fourteen months, there is ample scope for varied work. The expedition expects to return during the late summer of 1936.

Cancer and the Theory of Organisers

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THE fundamental fact about cancerous tissue is that it has escaped from the normal growth-controlling agents of the body. The escape often involves a change in histological type. The problems which are raised are clearly connected with those studied in experimental embryology, where again it is the causal mechanism underlying growth and histological change which is under investigation. Experimental embryology has recently made important advances, and the time has perhaps come when it would be profitable to consider the way in which the new embryological theories would formulate the well-known problems of cancer research.

The illuminating researches of Spemann[1] provided the beginning of an answer to the outstanding embryological problem of why one part of an egg develops into one organ and another part into a different organ. Spemann showed that in the amphibian gastrula the developmental path followed by any given piece of tissue is defined by its relation to the blastopore region, which was therefore termed the organisation centre. Further research has shown that one facet of the activity