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Airships and Arctic Meteorology.

IN recent years great advances have been made in our knowledge of the atmosphere. The increase in the number of observatories and the transmission of meteorological data from ships at sea have made material contributions to these advances. There are, however, still large areas of sea and land of which our knowledge is altogether inadequate for the advancement of science. Nowhere are there more significant gaps in the desirable network of stations than in polar regions. Observatories exist in Greenland, Jan Mayen, Spitsbergen, Novaya Zemlya, and Alaska, but throughout the length of Arctic Siberia and in most of Arctic Canada there are great areas from which no continuous series of observations are obtainable, and even the geographical features of a large part of the Arctic Ocean are unknown. The most northerly observatory is the Norwegian station at King's Bay, Spitsbergen. North of latitude 80°, there is not a single observatory, and even scattered data from the inner or ice-bound Arctic regions are very few and incomplete. In a recent lecture to the Royal Geographical Society, Dr. G. C. Simpson, the director of the Meteorological Office, said that little further advance in polar meteorology can be made by spasmodic meteorological observations. The short series of data brought back by exploring expeditions engaged primarily in other branches of work are not of great value. Permanent observatories alone can supply the want, and if these are provided with wireless, they can not only extend the area of the synoptic charts used in forecasting, but also reduce the area of the unknown for other general purposes of the science.

Within the last three years an International Society for the Exploration of the Arctic Regions by means of Aircraft has been established, with its headquarters in Berlin and with Fridtjof Nansen as president. National groups of members of the Society are in process of formation in many countries. One of the chief aims of the Society is the foundation of meteorological and magnetic observatories in high latitudes in Arctic regions. 'Aeroarctic', to give the society its shorter title, has also other aims, but those relating to meteorology and magnetism are at present in the forefront. The older means of transport, ship and sledge, have so far only allowed difficult and spasmodic advances into the ice-bound areas of the Arctic basin, and the uncertainty of these means of transport, dependent as they are on the variations in the ice-

cover from year to year, are prejudicial to the maintenance of permanent stations in high latitudes. The Society believes that the difficulties and uncertainties of Arctic transport can be overcome only by aircraft. The aeroplane is considered to be less useful than the airship. High speed is of less importance than carrying capacity and power to land without extensive ground preparations.

The programme that the Society has in hand is ambitious; and it will not fail to evoke criticism. The presidency of Dr. F. Nansen and the support of many eminent meteorologists and polar experts throughout Europe and America is, however, a guarantee that the plans have been carefully considered. It must never be forgotten that it was Dr. Nansen who, nearly forty years ago, dared to defy the accepted canons of polar travel and the advice of nearly all polar experts in his daring and successful voyage in the *Fram*. Once again he is in the forefront in adopting new methods of locomotion.

The Society hopes to obtain the use for the spring of next year of the German airship *Graf Zeppelin*, and under the direction of Dr. Nansen a series of preliminary flights are projected. Difficulties have arisen on account of the crew having expressed unwillingness to take polar flights in the airship. The plan proposed is for three flights—the first is to be from Murmansk to Alaska via the north of Spitsbergen, Greenland, and the Beaufort Sea; the second is to be a flight round the unknown Beaufort Sea; and the third is to be from Alaska along the edge of the continental shelf north of Siberia via Nicholas or Northern Land to Murmansk. These are regarded as preliminary flights to settle definitely a few problems regarding the possible existence of unknown land, to investigate possible sites for permanent observatories, and to map the edge of the continental shelf. For the last purpose a form of sonic sounder dragged along the surface of the water will be used.

The Society hopes eventually to found observatories in Nicholas Land, Peary Land (Greenland), Grant Land (Ellesmere Island), and Banks Island, and to arrange for these to be relieved annually by airship. A further and more daring plan is to found observatories on the drifting pack-ice of the Arctic Sea, connected by wireless so that their daily position might be determined. It is calculated that the gross weight of such a station-building with food and fuel for two years would be about twenty-five tons. This, in addition to the weight of men and dogs, could be carried by an airship of sufficient size into any part of the Arctic

regions. Lastly, the Society hopes to encourage the foundation of observatories on various Arctic lands accessible by sea, such as Franz Josef Land, the New Siberian Islands, the Siberian coast, and the Arctic Islands of Canada. It is hoped that the task of founding and maintaining these observatories would be undertaken by the States to which those territories belong.

The whole scheme is a daring experiment. Some people may even call it rash. But if it succeeds, even in part, it should result in considerable additions to knowledge. Amundsen and Nobile crossed the Arctic in an airship three years ago. Since then great improvements have been made in airship construction, and the *Graf Zeppelin* this year made a successful flight round the world, through many difficult weather conditions. It is true that last year the *Italia* airship came to grief in Arctic regions, but the *Italia* was a small ship, not suited to the task she undertook. There is no reason to be sceptical about the failure of aircraft and air navigation, when the advances made in the last few years are borne in mind. 'Aeroarctic' is looking well ahead in formulating its plans, and even if the full programme cannot be carried out for some years, the Society merits support in having devised the only scheme by which the scientific exploration of the inner Arctic regions seems to be at all possible.

In a few years there will occur the fiftieth anniversary of the year of international polar stations of 1882–83. Twelve States took part, each dispatching one or more expeditions to take a year's meteorological observations in high northern or southern latitudes. The jubilee year of that effort might suitably be celebrated by some similar international co-operation in high latitudes. On the other hand, it has been suggested that two permanent Antarctic observatories, in addition to the one already existing at the South Orkneys, and two additional ones in the Arctic, in Canada and Siberia respectively, might serve better the cause of meteorological and magnetic research. The adoption of either plan depends on the resources available and the foresight of the States concerned. It is impossible to promise definite practical results in weather forecasting from the foundation of such stations. All that can be said is that a more detailed knowledge of meteorology may entail results of practical value, and that without this knowledge such results cannot be forthcoming. 'Aeroarctic' makes no promise as to results. It is a purely scientific body, and in its efforts to establish polar observatories and further other lines of research it is moving in the right direction.