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Arctic Aviation.

THE development of aviation, which may already be regarded as a safe means of transport for even comparatively long distances, promises before long to bring the realisation of the sixteenth-century dreams of the north-west and north-east passages and the transpolar routes between Europe and Pacific lands. For three centuries the polar ice has baffled man, but at length the aeroplane and airship have shown him how to avoid it. In 1919, Dr. W. Bruns suggested a series of transpolar commercial routes for airships, and a few years later Mr. V. Stefansson pointed out the advantages that the Arctic offered for flying. Plans for Arctic exploration by air were further discussed at a representative meeting in Berlin in November 1926, which led to the formation of the Internationale Studiengesellschaft zur Erforschung der Arktis mit dem Luftschiff, under the presidency of Dr. F. Nansen. The second general meeting of the society is to be held at Leningrad on June 18-23, when a long programme of papers on Arctic problems will be discussed.

Polar exploration by ship and sledge has made slow advances in recent years. A new method of attack on the inaccessible inner regions of the Arctic Sea is desirable if the remaining problems of the Arctic are to be solved. It was Dr. Nansen who, in defiance of all the accepted canons of polar exploration of the day, introduced the novel idea of a drifting ship in his journey in the *Fram* in 1892-95. At Berlin he dwelt on the value of the airship as an improvement on other means of transport. The new international organisation, of which several well-known British meteorologists are members, aims at raising funds for systematic polar exploration by air, and incidental to that work, the institution of meteorological and magnetic observations in high latitudes. In furtherance of the Association's aims, a quarterly journal entitled *Arktis* (Gotha: Justus Perthes) is being published. The first number, containing several valuable articles on polar work in German, French, and English, has just appeared. It contains also the constitution and membership of the Association, which, for convenience sake, is known as Aeroarctic.

International co-operation in polar exploration is not a new idea. So long ago as 1882-83 eleven States co-operated in a scheme for thirteen Arctic and two Antarctic observatories. The results of that one year's work was the basis of much of our knowledge of Arctic meteorology. To-day there are permanent observatories in west and east

Greenland, Jan Mayen, Spitsbergen, Novaya Zemlya, Siberia, Alaska, and Arctic Canada, but more are needed, and the task of founding and maintaining stations should not prove so arduous as it was forty-six years ago. Northern Greenland, Ellesmere Island, Wrangel Island, the New Siberian Islands, and Nicholas (Northern) Land are among the obvious sites. They could also serve as biological stations, since many of the biological problems of polar regions can be studied only on the spot. At present the Danish station at Disko in Greenland is the only Arctic biological laboratory. Some of the stations might serve as air bases for exploration of the surrounding area. It is important that such stations should be permanent. The intermittency of observations lessens their value. Since the whole of the Arctic regions is now within the nominal political jurisdiction of Denmark, Norway, Russia, the United States, and Canada, it is to be hoped that these States will regard exploration as one of the obligations of sovereignty. To a great extent this has been done already. Arctic sovereignty is no idle claim in Alaska, Arctic Canada, Greenland, Spitsbergen, and Novaya Zemlya.

At the meeting in 1926, when Aeroarctic was founded, discussion favoured the airship rather than the aeroplane in polar exploration. Capt. Amundsen had already used both, and been successful with the airship. The advantages of the airship lie in its great cruising radius and carrying capacity. General Nobile believes that an airship could be constructed to make a non-stop flight of ten days at a speed of 50 to 60 miles an hour; that is to say, it could explore a zone 15,000 miles in length. When he flew with Capt. Amundsen across the Pole, the distance was only 2300 miles, which were covered in 72 hours. Such an airship would obviously be valuable in carrying the materials for establishing a scientific station in regions otherwise poorly accessible. Furthermore, the airship has the advantage over the aeroplane in its powers of going at a low speed or even standing in the air provided the atmosphere is calm. It is said to be possible to land and pick up personnel from an airship. This greatly increases its value in exploration. On the other hand, there is the danger of ice incrustation during fog. However, Capt. Amundsen and Gen. Nobile found this to be less serious than they had anticipated, except when falling pieces of ice were hurled by the propeller against the envelope. The flight of the airship *Norge* in 1926 and *Italia* this year have shown that strong winds can safely be weathered, but it is doubtful if similar

craft could face the sudden and incredibly fierce blasts of the Antarctic blizzards.

The aeroplane has been used successfully in the Arctic by Capt. G. H. Wilkins and Com. R. E. Byrd, following on some experimental flights by Mr. G. Binney and others in Spitsbergen and a daring but unsuccessful attempt by Capt. R. Amundsen to reach the Pole in 1925. Compared with the airship, it has the advantage of speed and is less influenced by weather conditions, but its cruising radius is limited by its comparatively small carrying capacity. It has value, however, in reconnaissance work, and might be used for survey of rugged inaccessible country near a convenient base, as in eastern Greenland.

Opinion differs among Arctic airmen as to the use of pack-ice for landing. Capt. Wilkins, from his wide experience, believes that ninety per cent of pack-ice is too rough, but that the remainder is smooth enough to afford frequent landing-places. North of Bering Strait, in 1927, he landed safely on the pack and rose again, and in his long flight across the Arctic Sea this year he saw numerous landing-places, although he had no occasion to use them. Com. Byrd suggests water surfaces as being more useful than ice, but Capt. Amundsen in 1926 nearly lost his hydroplanes in a lead in the pack, and, after extricating one with great difficulty, had to abandon the other. Antarctic pack certainly offers little likelihood of landing-places, while the low air temperatures in the south, even in the height of summer, would increase the danger of alighting on water by ice forming and adding to the weight of the machine. A better knowledge of Arctic meteorology may increase the flying season, but owing to the prevalence of fog in summer, April and May are now regarded as the best months. The disadvantage of that season is that the winter snow still lies and obscures underlying surface features.

All countries will benefit from the work proposed. A fuller knowledge of Arctic meteorology and magnetism will have universal value. There can be no national boundaries in scientific research. The Arctic flights that have so far been made have contributed little to our knowledge of the Arctic, although they have shown the skill and daring of the navigators and pilots. They discovered no new land where none was expected. Capt. Wilkins had fog in the one area where land might have been found. That is no reason, however, why other flights should not have important results. For example, a course from Spitsbergen eastward to Nicholas Land and the New Siberian Islands, which Gen. Nobile has followed, will have interesting

results even if they are negative in the discovery of land. In a few hours of flying instead of weeks or even months of laborious sledge travelling, the limits of Northern Land will be defined and the mystery of Sannikov Land solved. Apart from weather, success depends on mechanical efficiency, but the risk is no greater than that of failure of human endurance in the old methods of travelling. The full value of polar flying, however, will not be reached until the problem of voluntary descent and ascent is solved. Ground observations are essential. Without them the work is incomplete; but this difficulty will no doubt be overcome. The Internationale Studiengesellschaft zur Erforschung der Arktis deserves encouragement in its endeavour to make use of new scientific applications in the solution of old problems.

A Frazer Anthology.

Man, God, and Immortality: Thoughts on Human Progress. Passages chosen from the Writings of Sir James George Frazer. Revised and edited by the Author. Pp. xvi+437. (London: Macmillan and Co., Ltd., 1927.) 15s. net.

"ALL that I have attempted in the present volume is to crystallise, as it were, the results of my studies into an optic glass which may afford the reader some momentary glimpses of the long march of humanity on the upward road from savagery to civilisation." So with characteristic modesty, but not unfairly, Sir James Frazer defines the scope and object of this last published of his books. It is an anthology which is virtually a statement of his position as a philosopher and a student of certain phases of human evolution. It brings together within the compass of one volume the more general conclusions of his published works. Except for the slightest of revision, the change of a word here and there to fit the new setting, the original wording of the passages chosen remains unchanged. For their selection and the order in which they appear, M. Pierre Sayn has been responsible; but the compilation has been made under the direction of the author.

The contents have been classified into sections. The first deals with "The Study of Man," in which are embodied the author's pronouncements upon certain of the more general methodological problems of anthropological science. Part II. deals with "Man in Society"; Part III. with "Man and the Supernatural"; and the final section with "Man and Immortality." Few of the passages exceed three pages in length and each is complete in itself, except that in so far as it is the conclusion of an

argument, or an inference from previously recited data, the evidence upon which it is based has been omitted. In a book of this character that is not to be imputed as a fault, but is merely an essential part of the general scheme. The reference to the source from which each extract is taken guards against any misunderstanding on the head of dogmatism or the nature of the premisses upon which the argument depends.

In publishing abridged editions of "The Golden Bough" and "The Folklore of the Old Testament," Sir James Frazer conferred a great boon upon his public. For while the complete works will always be indispensable to students and for use in reference, the abridged form, contrary to the general rule, conveys the greater pleasure to his readers. It contains proportionately more of Sir James Frazer. But this can be said even more emphatically of the present book. Here we have the author entirely to himself in extracts from the whole of his works and not from two only, and unadulterated with quotation from the work of others. For we venture to differ from the author when he expressed the opinion that if his work survives to posterity, it will be on account of his record of quaint and savage customs which will then have long passed away. If for no other reason, it will endure as a monument of pure, lucid, and flexible English of never-failing charm.

There is, however, little danger that Sir James Frazer's work will survive only as a storehouse of anthropological facts, or as a model of scholarly and graceful writing. In the course of his extensive studies there is scarcely a problem in social anthropology, in the comparative study of religion, in fact, in the whole range of the evolution of the mind of man, upon which he has not touched, and, it must be admitted, whether we agree with his conclusions or not, which he has not illuminated. In fact, so comprehensive in its scope is the present volume, and so versatile is the mind of which it is the offspring, that it might well serve as a guide, if not as a text-book, for the student in the mazes of what is admittedly one of the most difficult subjects of study.

It is not unfair to say that Sir James Frazer has sometimes been represented by those who do not accept his position, as if he wrote in the spirit of a partisan incapable of appreciating the force of an argument contrary to his own views. Nothing could be further from the truth, yet this imputation may have been made perhaps for the very reason of his essential fairness, and his aversion from anything that is controversial in tone. Yet if readers will turn to those passages in this volume which