

## RESEARCH IN FROZEN GROUND

EACH District Office of the United States Corps of Engineers is given a research programme related to a particular problem in engineering construction. It is of interest to record that the St. Paul Engineer District Office of the Upper Mississippi Valley Division of the United States Corps of Engineers has been assigned a comprehensive long-range research programme on permanently frozen ground. Work is in progress at a field laboratory near Fairbanks, Alaska. Also, the laboratories of the University of Minnesota have provided facilities for determining the thermal properties of soils and insulating materials. The object of this work is to find solutions to the many problems which are encountered in permanently frozen ground in the course of general service construction in the cold regions (*Highway Magazine*, April 1946).

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Investigations on partly built houses on chalk were carried out in this country in February 1947 at Saffron Walden. These were found to have frost-heaved about  $1\frac{1}{2}$  in. (3.8 cm.), the frost having penetrated 9 in. (22.9 cm.). It appears that the chalk is more seriously affected by frost-heaving than any other ground in the South. The Downs were obviously subjected to severe solifluction in the past when the climate was colder.

W. H. WARD.

## OBITUARY

Dr. Phil. h. c. Otto Lüschtg died in 1947 in his seventy-fifth year. A civil engineer by profession, he worked for the Swiss Federal Department of Hydraulics from an early age until 1924. For the next ten years he was head of the hydrological department of the Swiss Central Meteorological Office in Zürich. In 1935 the Hydrological Institute of the Swiss Federal Institute of Technology was founded on Lüschtg's initiative and he became its chief until his retirement in 1941.

Lüschtg supported or directed many societies and institutes. He was a member of the Swiss Hydrobiological Commission and of the Commission for Snow and Avalanche Research. He was Vice-President of the Swiss Glacier Commission. In 1933 he became President of the International Association of Hydrology, a post which he held until near the end of his life.

His many publications were characterized by immense thoroughness and were detailed most minutely. As a man Lüschtg was gentle and kindly and many of us miss a good and faithful friend.

G. S.

## NOTES

**SNOW SURVEY.** This issue contains the first report on the Snow Survey of Great Britain since the war. Its authors pay tribute to the many observers who have assisted them in its compilation. On behalf of this Society the Editors wish to record their thanks to Messrs. E. L. Hawke and D. L. Champion for the immense amount of time they have devoted to organizing the survey. The work has involved the study of individual reports which cannot have numbered much less than one thousand.

**MOUNTAINEERING CONTRIBUTIONS.** The Editors would welcome accounts from mountaineers or ski-mountaineers on any noteworthy snow or ice phenomena they may find.

THE AUSTRALIAN NATIONAL ANTARCTIC RESEARCH EXPEDITION of 1947 will have left Sydney before these Notes appear. Two land stations are to be set up for meteorological and other research, one at Macquarie Island, 800 miles south-west of Hobart, and the other at Heard Island, which lies between Australia and South Africa. Dr. Fritz Loewe, a member of this Society, is in the *Wyatt Earp*, whose main purpose is to find a site for a permanent Antarctic research station. Dr. Loewe has also prepared a small glaciological programme for the surveyor of the Heard Island party.

SNOW ACCUMULATION ON THE CLARIDENFIRN. Herr Walter Kuhn of the Swiss Meteorological Office, Zürich, is taking over the detailed observations which have been made for so many years by Dr. R. Streiff-Becker. Arrangements have also been made to take over work of a similar nature carried out by Dr. R. Billwiller on the Silvretta Glacier and elsewhere. What has thus been private research has now become a matter of official routine, and it is satisfactory to know that the continuity of these very valuable records is thus assured. Dr. Billwiller and Dr. Streiff-Becker will continue to keep in touch with the work.

THE BRITISH MOUNTAINEERING COUNCIL now publishes an attractive quarterly bulletin. It is likely to contain articles of interest to glaciologists, especially where glacier research necessitates the use of climbing equipment. Information about the bulletin may be obtained from the Editor, 26 Beaufort Gardens, London, S.W.3.

AERIAL PHOTOGRAPHS. Prints of vertical photographs of the greater part of Britain on a scale of about 1 : 10,000 can be obtained at a charge of 5*d.* each from the Air Ministry (S.6), London, S.W.1. The prints are about 9 in. square. Applications should state the exact latitude and longitude or grid references from the Ordnance Survey one-inch G.S.G.S. 3907 map series. These photographs should be of value in studying the glaciation of this country.

OXFORD UNIVERSITY EXPLORATION CLUB. The *Polar Record*, Vol. 4, No. 32, 1946, pp. 418-20 publishes an article on the revival of this Club. In 1947 the Club sent two expeditions into the field. In Jan Mayen studies were made of snow-patch erosion. The retreat of the South Glacier of the Beerenberg was observed. A survey from the sea showed retreat and change of track of some of the remaining glaciers. In Iceland a party spent four weeks on one of the south-western outlet glaciers of Vatnajökull. Ablation and crystal forms were studied. The mode of occurrence of layers of volcanic ash in the ablation area was related to the 1947 eruption of Hekla.

JUNGFRAUJOCH RESEARCH INSTITUTE. The Annual Report for 1946 states that during the year the number of research workers was 134, 11 being foreigners. During the winter period (1945-6) the snow precipitation was barely half the normal.

PREVENTION OF FREEZING. *Weather* (Vol. 2, No. 8, 1947, p. 242) mentions two anti-freezing devices. One, for harbours, consists of long lines of perforated pipes laid under water through which air is pumped; as the bubbles rise the resulting turbulence prevents freezing. The second device is that of dropping lamp-black on ice; the heat absorbed melts the ice. The former invention is new.

DON MUNDAY, a well-known mountaineer and ski-mountaineer, has been appointed Chairman of the Glacier Committee of the Alpine Club of Canada.

R. HAEFELI, whose work on the mechanics of snow is well known to every student of glaciology, has been appointed Assistant Professor of Soil and Snow Mechanics at the Swiss Federal Institute of Technology, Zürich.

F. E. MATTHES has received the Honorary Degree of LL.D. from the University of California in recognition of his many valuable contributions to glacial geomorphology and glaciology. Mr. Matthes has now retired from the U.S. Geological Survey and has settled in California.

## REVIEWS

### L'HYPOTHESE DU DEPLACEMENT DES PÔLES ET LA CHRONOLOGIE DU QUATERNAIRE. JACQUES BLANCHARD. Le Mans: Monnoyer, 1942, pp. 168

KÖPPEN and Wegener<sup>1</sup> suggested that the main changes of climate during geological time were due to a movement of the poles relative to the main surface features of the globe, while the relatively small and quasi-periodic changes which gave rise to the glacial and interglacial epochs of the Quaternary Ice Age were due to changes in solar radiation caused by the main perturbations (the precession of the equinoxes, changes in eccentricity, etc.) of the earth's orbit. The new hypothesis of M. Jacques Blanchard makes a movement of the poles responsible for all the changes of climate, while the movement of the pole itself is controlled by the perturbations of the orbit. The kind of movement of the North Pole envisaged by Blanchard is shown on the diagram (see Fig. 1, p. 149) which is reproduced here from his paper.

The path of the pole takes the form of a circuit, called *la rotation principale*, round a centre situated in north-west Greenland, on which there are five loops, called *les boucles secondaires*. The principal rotation is said to be controlled by the rotation of the lines of the apsides of the orbit and therefore the whole circuit is completed in 115,000 years; each loop is controlled by the precession of the equinoxes, occupying 21,000 years, so that there are approximately  $5\frac{1}{2}$  loops in each principal rotation. For simplicity the diagram shows 5 loops to a rotation and all the loops are drawn of the same size; but the lengths of the loops are supposed to be controlled by the changing eccentricity of the orbit—the greater the eccentricity the further the loops extend outwards. As the eccentricity varies in a period of approximately 92,000 years the lengths of successive loops increase and decrease in this period. On these lines Blanchard draws the path of the pole from 1,150,750 B.C. to A.D. 85,250; but exactly how he does it is not explained.

Now as the climate of any place is chiefly a function of its distance from the pole (latitude) it is clear that, knowing the path of the pole, the climate of any locality, at any time, can be determined. Blanchard does this for the region of the Somme in north-west France and compares the deduced changes of climate with the geological record in great detail. His conclusions can best be given in his own words:

Toutes ces confrontations semblent faire apparaître une concordance complète des climats et des oscillations théoriques avec les faunes et les niveaux géologiques observés: dans les nombreuses coupes examinées, les plus complètes, aucune difficulté d'interprétation n'a surgi. Au contraire, quelques confirmations nouvelles semblent en être résultées (p. 102).

The climates of regions outside the Somme area are then considered. There are few data and Blanchard's discussion is very perfunctory and superficial; nevertheless he considers himself able to state: