

To the writer, then, it would seem wise that the glaciologist should limit his subject to snow and ice and the conditions of every sort, including climatic and geomorphological, which are attendant upon them; and that he should regard *past* snow and ice, and matters arising therefrom, as the undefined frontier of his subject with several other sciences.

How does such a conception tally with the contents of the third publication (published first in time), namely the symposium in the *Journal of Geology* on frost action, consisting of papers on "permafrost" and periglacial phenomena? Most of the contributors are, or were, students of Professor Kirk Bryan, who introduces the papers with a review of cryopedology, or the study of the effect of frozen ground and intensive frost action. The communications, which are limited to North America, fall into two classes: the first records studies made in the Arctic—orientated lakes, thaw lakes and thaw sinks—in which, in a word, sub-surface freezing and thawing play a dominant part. The second class describes and interprets phenomena "in areas of temperate climate formed by processes now current in arctic areas"—fossil ice wedges, stone nets, stone stripes and soil stripes, periglacial features, Pleistocene wind erosion, some observations in the south Wisconsin driftless area; this group applies the mechanisms known in high latitudes and high mountains to-day to explain phenomena in other regions.

It might be maintained that the first class comes within the terms of reference of the glaciologist, and that the second is more properly the business of the glacial geologist and the student of Pleistocene geology and chronology. So clear-cut a distinction is qualified by the inclusion in the symposium of a study of frost-moved rubbles and their significance in the Pleistocene chronology of Alaska, in which the processes of past and present are contrasted in the same region. Moreover, the reviews which accompany these contributions call attention to yet another symposium: "Strukturböden, Solifluktion und Frostklimate der Erde" by Carl Troll (*Geologische Rundschau*, Bd. 34, Ht. 7/8, 1944, p. 545-694, which covers a wide range of subjects.

To conclude, then, the writer sees a pressing need for glaciology to define itself, lest energy is dissipated over immense fields which are in fact being well surveyed by qualified investigators. Glaciology might do well to deal with snow and ice in all forms, and the conditions which control them, and it may then best benefit from several allied sciences, and contribute to them.

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DILUVIAL-GEOLOGIE UND KLIMA (KLIMAEHEFT DER GEOLOGISCHEN RUND-SCHAU). *Geologische Rundschau*, Band 34, Heft 7/8, 1944, p. 307-787. Stuttgart: Ferdinand Enke Verlag. 20 Marks.

THIS contribution to Pleistocene geology and climate is published by the Geologische Vereinigung of Bonn under a single cover with the above title. The introduction, in effect a survey of knowledge to date, is written by the editor, Professor Carl Troll, whose work is well known in this country.

The rest of the papers are grouped into six sections—a convenient arrangement. It would be impossible in the space available to review each paper individually but as many of the articles in this war-time publication cannot have been available in this country, at least until recently, it is desirable to record them briefly.

Section I on the Ice Age and the pre-glacial period consists of an article by F. Machatschek on the Pleistocene uplift. In Section II (the Pleistocene geology of the Mediterranean area) there are three papers by Max Pfannenstiel, Dimitri Jaranoff and Herbert Louis respectively. Section III dealing with periglacial regions contains papers by Julius Büdel, Albert Steeger and L. Weinberger on the effects of glacial and ice age conditions on ground now free of ice. There is also a paper by Carl Troll on several aspects of cryopedology (Strukturböden, Solifluktion u. Frostklimate der Erde) which has already received notice in this country. Section IV consists of a paper



by Leo Aario on the development of vegetation and climate in Finland in late glacial times. Professor R. Finsterwalder deals in Section V with the regime of glaciers.

Section VI contains three papers on the causes of the ice ages, W. Wundt writing on the effect of the earth's orbit, Wilhelm Meinardus on the principle of radiation and W. Behrmann on pre-glacial climate.

On preceding pages there is a review of three other publications devoted entirely to glaciological subjects—all evidence of the growing importance of these studies as they become redeemed from pure conjecture and approach more nearly the realms of exact science. G. SELIGMAN

## ABSTRACTS

BROOKS, C. E. P. Climatic fluctuations and the circulation of the atmosphere. *Weather*, Vol. 5, No. 3, 1950, p. 113-19.

Solar influences cannot be entirely ruled out, but the interaction of winds, ice and ocean currents may produce weather variations of sufficient intensity and duration to cause a transition from one type of climate to another. Briefly refers to past and possible future oscillations. [G. S.]

CAHN, R. W. Recrystallization of single crystals after plastic bending. *Journal of the Institute of Metals*, Vol. 76, Part 2, 1949, p. 121-43.

Experiments have been carried out to determine under what conditions it is possible to procure in deformed crystals a special type of recrystallization which leads to discontinuous asterisms in the Laue patterns. It has been found that bent single crystals are particularly liable to this type of recrystallization, which has been observed with zinc, magnesium, aluminium and rock-salt. The microstructures of the bent and of the annealed specimens have also been examined; the annealed specimens consisted of many crystallites separated by straight boundaries perpendicular to the slip planes.

The theory of the phenomenon is discussed, and it is concluded that it is the result of the motion of dislocations during annealing. The bearing of the results on the general theory of recrystallization is briefly considered. [From author's abstract.]

CAILLEUX, ANDRÉ. L'indice d'éroussé: définition et première application. *Comptes rendus sommaires des Séances, Société Géologique de France*, No. 13, 1947, p. 250-52.

The index of "bluntness" (l'indice d'éroussé) which though similar in aim should be distinguished from the index of "roundness" of Wentworth and others, is designed to assess the wearing of pebbles, quickly and without ambiguity. Measurements were made on 7000 stones from a hundred different formations, 70 from modern, 20 from Pleistocene and 10 from pre-Pleistocene materials. Assuming the rock is of the same type, marine abrasion is more active than that of rivers, whereas glaciers wear the rocks very little. They confine their action mostly to polishing and breaking. Subglacial streams, however, are powerful agents of abrasion. The rates of wearing of the more common rocks examined in the following order: flints, gneiss, volcanic rocks, quartz, limestones. [W. V. L.]

CROCE, KARL. Messversuche an Schneeräummaschinen für Landstrassen, Entwurfsgrundlagen. *Fortschrittsberichte aus dem Strassen- und Tiefbau*, Bd. 4, 1950 (Strassen- und Tiefbaugesellschaft m. b. H. Berlin), 58 p., diags., illus.

Results achieved in Germany up to 1945. Six tested snowfraisers and snow-throwers are described and their basic functions explained. The mechanism of clearing is examined and mathematical fundamentals are deduced from the results of distance of throw, quantity of snow cleared, capacity of absorption and of clearing, efficiencies and losses. In order to define the workings of these machines certain concepts are laid down. The mutual correlation of such characteristic figures derives from working diagrams which have given good service. The big range of the low efficiencies obtained, amounting to from 5 to 45 per cent, indicates that snow-clearing machines are not as perfect as they might be. Nothing has evolved so far on this important subject from other countries with large snowfalls. [Author's abstract.]

DEEVEY, EDWARD S., jr. Biogeography of the Pleistocene. *Bulletin Geological Society of America*, Vol. 60, No. 9, 1949, p. 1315-416. Pleistocene research. A review by the members of the Committee on Interrelations of Pleistocene Research, National Research Council. 3.

Pleistocene biogeography has many points in common in North America and Europe, these regions differing in the character of their problems from Africa, south-east Asia and South America. An attempt to summarize facts by means of fauna and flora with considerable stress on pollen. Full bibliography. [From author's outline.]

FARROW, R. C. Report of Committee on Snow, 1947-48. *Transactions of the American Geophysical Union*, Vol. 30, No. 3, 1949, p. 444-47.

Brief notes on new work and methods, conferences and papers relating to snow in North America and especially in western United States and in British Columbia. Reference is made to work in Canada and especially to G. J. Klein's proposals for "Nomenclature for Snow" which it is suggested might well form a basis for a general standard nomenclature. [From Canadian Geophysical Bulletin Abstract (J.T.W.)]