

words in brackets altogether, or say "old snow which has outlasted one summer at least and is transformed into a dense material." Polar, as indeed all, firn is characterized by the fact that (a) the particles are to some extent cemented together, but that (b) the air interstices still communicate with each other. (a) distinguishes it from snow, (b) from ice.

Department of Meteorology,  
University of Melbourne  
12 December 1952

F. LOEWE

SIR, "Processes of ice deformation within glaciers" by the late Max Harrison Demorest

In reference to the last paragraph of the very interesting comments by Mr. J. W. Glen, of the Cavendish Laboratory, on the paper by the late Max Harrison Demorest (*Journal of Glaciology*, Vol. 2, No. 13, 1953, p. 219 and 201-3 respectively), the recrystallization induced by deformation in Demorest's experiments was, in reality, so rapid as to be practically *instantaneous*. In fact, it was so rapid that the process is recorded in moving pictures that were taken by Dr. Demorest during the course of an experiment. The recrystallization could be observed to have taken place as a sudden change during the passage of a few frames, at minute intervals, of the moving picture film.

Since recrystallization in metals proceeds with variable speed at different temperatures, it may be that the instantaneous recrystallization in ice is caused by the fact that Demorest's experiments were carried on at temperatures that were relatively near the melting point of ice.

School of Mineral Sciences,  
Stanford University,  
California, U.S.A.  
23 May 1953

ELEANORA B. KNOPF

## REVIEWS

SIR DOUGLAS MAWSON ANNIVERSARY VOLUME. Contributions to Geology in honour of Professor Sir Douglas Mawson's 70th Birthday Anniversary, presented by colleagues, friends and pupils. *Eds.* M. F. Glaessner and E. A. Rudd. University of Adelaide, 1952. ix+224 pages.

SIR DOUGLAS MAWSON, who is so well known to glaciologists for his work in the Antarctic—member of Shackleton's Expedition 1907-08, leader of the Australian Expedition 1911-14 and of the British, Australian and New Zealand Expedition 1929-31—was born at Bradford, Yorkshire, in May 1882. Since 1905 he has been lecturer and professor in geology in the University of Adelaide, and in honour of his 70th birthday anniversary his colleagues, friends and pupils have presented him with this volume of contributions to geology. All members of the British Glaciological Society will wish to be associated with their Australian colleagues in paying honour to their fellow member.

The book consists of sixteen articles, all but one of which deal with geological subjects. It is the exception which is of particular interest to glaciologists, for it is an article on "Pleistocene glaciation in the Kosciusko region," by W. R. Browne. The Kosciusko plateau, in the south of New South Wales, is the only region in Australia known to contain traces of extensive glaciation. There can now be little doubt that this glaciation is of Pleistocene age, and therefore may be expected to throw some light on the extent and development of the Pleistocene Ice Age in the southern hemisphere. Considering the importance of the questions involved it is surprising how little it has been studied. Glacial features were first reported from the Kosciusko area in 1851, but it was not until fifty years later that the first detailed account was given by Professor David in 1901. Nearly another fifty years passed before further extensive work was undertaken, in 1946 and 1951, by a Joint Scientific Advisory Committee of several Australian scientific societies and

authorities. The information presented in the Anniversary Volume by Mr. Browne was gathered chiefly on trips to the area in connexion with this investigation.

The article contains a description of the glacial features in the highly glaciated area around Mount Kosciuszko, illustrated by a sketch map, and a short concluding paragraph on the interpretation of the observations. The description is too detailed and the map too crowded for satisfactory reading in one's study; but it will be invaluable to anyone on the site wishing to get a grasp of the work already done, and of the interpretation reached by previous workers. It is to be hoped that good use will be made of it for this purpose, for a great deal more field-work is necessary before all the information which the region can give has been extracted. Mr. Browne's interpretation of the observations can be summarized in a few sentences, chiefly in his own words:

"The glaciation of the Kosciuszko region is capable of being divided into three episodes. The first was a calotte or ice-cap glaciation, the next was characterized by valley-glaciers, and the last was marked by small cirque and valley-head glaciers. Whether these are all phases of one cycle of glaciation or were independent and distinct and separated by long time-intervals is a debatable question." Two questions are asked "(a) Were the three glaciations distinct and separated by interglacial stages, or were they all phases of one stage? (b) With what glaciation of the Northern Hemisphere are they to be correlated, if we assume synchronism of glaciation?" After a discussion of these questions the following answer is reached: "All the circumstances considered, it seems better to refer the glacial phenomena to three distinct glacial stages than to group them as phases of one glacial stage. . . . There are at present no reliable bases for correlating these with the Pleistocene glacial stages of Europe and North America, and the best that can be done is to refer them provisionally to the Mindel, Riss and Würm stages respectively." G. C. SIMPSON

LA GLACE ET LES GLACIERS. V. ROMANORSKY *et* ANDRE CAILLIEUX. Paris: Presses Universitaires de France, 1953. 120 pages, 20 text-figures. Price 150 francs.

THIS small book is number 562 in the "*Que sais-je?*" Series of Presses Universitaires de France, an excellent collection roughly equivalent to the Pelican Series. It sets out to discuss the physical properties and occurrence of ice, and, in particular, its presence in glaciers of to-day and of the past. In such a field it would seem to have a place to fill, since a small and authoritative book at a reasonable price is not readily available. Unfortunately this book does not completely supply the need, for it is marred by several errors of fact in the first part, where, for example, it is stated that "la température de fusion de la glace augmente avec la pression, ainsi à 50000 kg/cm<sup>2</sup> la glace ne fond qu'à 200°." This statement gives a totally wrong impression, for the melting point of ice at first drops as the pressure increases, reaches a minimum of -20° C. at 2,000 kg./cm.<sup>2</sup> and then rises to reach 200° C. at the pressure quoted. Other mistakes include the statements that one angström unit is a ten-thousandth (instead of a ten-millionth) of a millimetre, that the iceberg aircraft-carrier was an American project and that the *Journal of Glaciology* is published by the Royal Geographical Society. The diagram given for the position of the atoms in the structure of water is incorrect; all the points marked are the sites of oxygen atoms, not half oxygen and half hydrogen as indicated (this figure has been miscopied from a correct version in the quoted source). Apart from these errors and several misspelt names, the book covers its ground adequately, the second part being much the more satisfactory.

The subjects dealt with in the first part include the relation between water and ice, the structure of ice and its physical and mechanical properties, methods of studying ice in glaciers, ice in the atmosphere (but rather curiously omitting snow), ice in lakes and rivers, sea ice, icebergs and the industrial production of ice. The second part comprises a general description of glaciers, secondary effects of glaciers, glacial erosion and sedimentation, history of glaciations and mechanisms and causes of glaciations. In a book of this kind new ideas are not to be expected, and the matter in this volume is mostly of an agreed nature, although the use of the term "*zonation*" for structures