GLACIOLOGY TO-DAY

(Impressions recorded during the Symposium on the Physics of the Movement of Ice at Chamonix, September 1958)

LOOKING back to the early days of the study of snow and ice one discerns a new phase.

The pioneers of glaciological discovery very naturally confined their investigations to observing and recording what they saw in the field. When they offered explanations of the phenomena they had seen these were not very often based on fundamental principles. For example, towards the turn of the century the number of theories to explain the flow of ice was said to be of the order of eighty, most of them random.

When attempts were made to look more closely into prime causes the state of scientific knowledge was not always adequate to provide satisfactory solutions. About the year 1891 J. C. McConnell had indeed found that an ice crystal sheared at right angles to its optic axis, but the real significance of this did not become apparent until some 40 years later when Sir William Bragg discovered the arrangement of the molecules in an ice crystal by X-ray analysis.

True, many of the earlier observers—Forbes, Tyndall, Heim and, later, Sebastian Finsterwalder and Weinberg, to mention a few, integrated their observational work with physical principles, but for many years the geographical and observational work predominated and seemed to overpower the pure scientific approach. Not that this lessens the debt of glaciologists to the early empirical workers. Such a beginning was natural and necessary and has been common to most, if not all, sciences.

Nevertheless, of recent years the scene has changed. Haphazard and random methods, groping in this direction and that, were finally displaced during the years preceding the Second World War. The main move in this direction was probably the installation of a laboratory at the Weissfluhjoch in Switzerland to investigate snow and to combat avalanches by both field and laboratory work.

Glacier research had, for the most part, been confined to observations mainly at the tongues of glaciers and nearly always on their surfaces. Just before the last war an expedition was organized to look more deeply into the glacier question both figuratively and practically. It brought up ice specimens for examination, for the first time we believe, from a depth of 30 m. in the firn region of a glacier—a depth now completely dwarfed by the recent work of the Snow, Ice and Permafrost Establishment of the U.S. Army in Greenland and Antarctica.

Even so this pioneer work was still largely empirical, but it attracted the physicists, and from that time on, and particularly since the war, physicists have become more and more interested in glaciology and have turned their attention to it in ever-increasing numbers.

Naturally their influence on our studies has continually increased. The Symposium at Chamonix can be considered the culminating point to date. It was attended by representatives from Argentina, Austria, Belgium, Canada, France, Germany, Great Britain, Italy, Japan, Norway, Mexico, Poland, Switzerland, the U.S.A. and the U.S.S.R. The emphasis in the papers read was very largely on the physics of ice movement and many of them dealt with the mathematical theory of glacier flow. Without doubt many facets of glaciology hitherto not clear came to greater clarity there.

This by no means implies that observers must now hand over to physicists. On the contrary; at almost every stage during the Meetings the importance of further field investigations was emphasized in order to confirm or negate the views of the physicists.

This Journal will endeavour to keep a proper balance between empiricism and theory. It follows therefore that, in addition to the very welcome co-operation of the physicists, it is for the observers in the field to continue their investigations into every one of the many diverse branches of glaciology.

Only in this way can the desired balance be maintained.

G.S.