

AVALANCHE RESEARCH

THE very severe avalanches in the Alps in the last two winters have shown the need for intensifying the study of snow conditions which precede avalanches, and of spreading further and wider the knowledge already existing.

In the past Switzerland has been alone in organizing systematic research of this kind. In recent years, however, snow and avalanche research has begun in other European countries, and in America.

In 1948 an Avalanche Service Organization (*Lawinendienst*) was founded in Innsbruck. This originally formed a clearing station for Austrian and foreign developments in the construction of avalanche defences for road and rail, and for dwellings; but in order to carry out practical research tests in the field, a small research station was set up at Lizum in the Wattental, some 17 km. east of Innsbruck at a height of 2000 m. This is in charge of Dr. Alfred Fuchs. The whole organization, "Wildbach- und Lawinenverbauung, Lawinendienst," is under Oberforstrat Dr. W. Hassenteufel, who is also head of the Austrian Forestry Department.

The report of the 1950-51 season of the Lizum station includes work on the characteristics of the snow cover, the building of fences to form eddy-pools—large hollows in the snow cover—to intersect and weaken large areas of snow accumulation. (Experiments, said to be satisfactory, had been done in a previous year in reducing and arresting the flow of avalanches by dotting high earth mounds all over the accumulation slopes.) Improvements in testing the strengths of snow samples are noted. A method is also described for fixing snow samples by means of a solution of perspex glass in ethyl chloride—presumably on the Schaefer principle. A copy of the report is available in the Society's library.

In the Haut-Isère the Électricité de France has inaugurated an Avalanche Forecasting Department in the charge of Mons. M. Sales, which has adopted the general procedure of snow investigation in operation at the Weissfluhjoch in Switzerland. This particular service functions as a protection to the hydro-electric schemes around Brévières, but its scope will, no doubt, be extended. Details of last season's work will be found in *La Houille Blanche*, 7ème année, No. 1, 1952, p. 41-51.

In North America research on the snow cover has extended rapidly in the past few years but has been largely confined to problems occurring over the immense snow wastes of the north—traction and the like. In the mountain areas avalanche research and forecasting is beginning to be done on a modest scale. It is hoped to describe American activities later.

With so many investigators now in the field it is to be expected that some definite conclusion will be reached on the mechanism of formation of wind slab. So far as the writer is aware only one piece of detailed research work on this subject has been published, attributing the formation of slab to the effects of high relative humidity combined with drifting*. These findings have never been completely confirmed by other authorities nor disproved, although R. A. Bagnold has shown that sand *in a dry condition* can pack firm by selective deposition after drifting. With the facilities of modern snow research stations work on this subject should now be easier to carry out, and it is hoped that this will be done.

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The Editor,
The Journal of Glaciology

SIR, *Further on the Evaporation and Melting of Snow at High Altitudes*

Supplementing Dr. Robert P. Sharp's letter in the *Journal of Glaciology*, Vol. 1, No. 10, p. 583, there is certainly melting at 12,000 ft.† and higher, but one half or more of the snow is lost by evaporation. This is what François Matthes meant in his "Ablation of snow-fields at high altitudes

* Seligman, G., *Snow Structure and Ski Fields*, London: Macmillan, 1936, Chaps. 7, 8 and 18 and *Journal of Glaciology*, Vol. 1, No. 2, 1947, p. 70-73.

† 1000 ft. = 304.8 m.