

Descendeurs Clog have at long last made their figure-of-eight descendeur available for general sale. This item, for so long an 'in crowd' status symbol, retails for just under £2.

Sack hauling Ben Campbell Kelly has produced a prototype sack-hauler which seems to solve most of the problems involved in the past in this time-consuming job. Basically, it consists of a prusik-type cam which acts on a pulley. The rope passes over the pulley and the cam releases its hold on the upward pull and clamps on the rope between pulls.

Boots The problems that prevented the injection-moulding process being used for manufacturing climbing boots now seems to be solved. The Brynboot, which was originally aimed at the Outdoor Pursuit Centre market, is now in the shops and cannot be faulted for any lack of torsional rigidity. With a vibram-type sole and rubber band encircling the lower inch or so, it is a light, hard-wearing, waterproof boot and retails for about £9. The main snag appears to be the narrow heel, which makes crampon fitting difficult.

Additional note on fifteenth-century crampons Luciano Serra writes:

In connection with the three notes on the early use of crampons (by B. R. Goodfellow in *A.J.* 73 257, Barbara Harriss in *A.J.* 75 277, and J. Monroe Thorington to T. S. Blakeney in *A.J.* 76 287), I would like to mention an important literary evidence in Luigi Pulci's *Morgante Maggiore*, a mock-heroic poem published in 1483. In fact, the fifth line of the one hundred and forty-third octava rima of the last canto says *I'guarderò in sul ghiaccio ir con buon chiodi*, i.e. I'll try to walk on ice with steady spikes. This sentence about the use of rudimentary crampons was a popular saying in Tuscany, and belongs to tradition. As to Simler's book, the date of its issue is really 1574.

Science Notes 1971

Peter Stubbs

Glaciology The Glacier d'Argentière sports a splendid natural laboratory for studying the vagaries of ice streams. Two kilometres upstream of its snout a 1000-m long sub-glacial channel, carved out of the bedrock by glacial action, forms a cave lying beneath more than 80 m of ice. The Institut de Géographie Alpine, at Grenoble, has equipped it with an extensive range of apparatus, including a device which measures the bottom velocity of the glacier directly, giving a detailed record of what is described as its 'heart-beat'. The Glacier d'Argentière moves at speeds, varying from nearly zero to over 4.0 cm per hour, with an average of 200 m per year.

Results from the 1970 Italian survey of Alpine glaciers, published recently, show that the percentage of glaciers retreating in Italy rose from 43 per cent in 1969 to 51 per cent in 1970; advancing glaciers fell from 22.4 to 13 per cent; the behaviour of the remainder was uncertain.

The current scientific programme known as the International Hydrological Decade has focused attention on glaciers as important frozen reserves of water. North American glaciers hold a total amount of water greater than all the U.S. rivers, lakes, ponds and reservoirs added together. But in the U.S.A., as elsewhere, these reserves are declining, and some American glaciologists believe that steps to ensure conservation of glaciers may be necessary—for example, by increasing precipitation with cloud seeding, which provides new snow, whose higher reflectivity ensures slower melting; or by building snow-fences in strategic places. Airborne or satellite-borne microwave radiometers seem likely to come into service to supply much-needed data on snow depth, layering and water content, which all affect a glacier's radiation temperature.

In fact, Soviet glaciologists recently reported the results of an aeroglaciological expedition in the Pamirs which the U.S.S.R. Academy of Sciences Institute of Geography has been carrying out. In the region of Lake Kara-Kul, they were able for the first time to establish a high rate of accumulation on two glaciers at heights around 5000 m, using purely instrumental means. Another Soviet study in the Altai Mountains revealed in a stake-screening experiment that, of a total depth of melting of 8 cm on a clear day, 5 cm was due to direct solar radiation, 0.6 cm to scattered radiation, and the remaining 2.4 cm to turbulent heat exchange from the air. In the Karkonosze Mountains of Poland, Polish glaciologists have been much concerned with studies of the damaging ablation of snow cover caused by strong and frequent föhn winds which plague this region and the Tatra. Reduction of the snow cover means less water for forests, and the föhn has been responsible for many past forest disasters.

A new theory of slab avalanches advanced by two researchers of the U.S. Forest Service suggests that the key factor may be the presence of structurally weak layers, or potential slip surfaces, in the snow-slope. Unlike earlier theorists, who emphasised mechanical failure essentially along the line of tension marking the top of the slab, or else slope instabilities arising across its compressed base, these two believe that, prior to rupture, the avalanche mass 'hangs' from its top edge because of poor cohesion along its slip face. This weakening might be due to conditions in a layer of snow crystals, a sheet of melt water, or any other inhomogeneity.

The Japanese Institute of Low Temperature Science has been having problems in deciding how best to construct slalom courses for the Winter Olympic Games to be held in Sapporo. On the advice of competitors they have been studying the properties of hard natural snow from high mountains, and have arrived at figures for the minimum average density (0.5 g/cm^3) and hardness (10 kg/cm^2) required. After the February 1971 pre-Olympic Games, measurements showed the hardness of compressed snow on the runs to be only 7 kg/cm^3 on average. Three Japanese slalom courses have now been prepared. Problems included the formation of subsurface ice-caves by an underground supply of volcanic heat. Thick soil insulators solved the difficulty.

Aeronomy Cramped unobtrusively into what used to be the public lavatory on the grossly overdeveloped summit of West Germany's top peak, is one of

Europe's highest atmospheric sampling stations. Belonging to the Fraunhofer Institute, the Zugspitze station forms one of a trio of linked mountain laboratories near Garmisch Partenkirchen. Here physicists and chemists collect filtered air samples to study processes of atmospheric exchange, the influx of atomic fallout, and the admixture of pollution from lower levels. The electrical charging processes in thunderstorms form another topic of research and, unbeknown to idle tourists in the cable cars, sensors attached beneath them continuously record the electrical gradient as the *seilbahn* plys up and down through nearly 2000 m.

Alpine Club Notes

Meetings of the Alpine Club 1971

1971 (*continued*)

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| 2 March | Two films shown by André Contamine: 'The Muztagh Tower—1956 French expedition' and 'Skiing on Mont Blanc—Ecole Nationale de Ski et d'Alpinisme' |
| 16 March | 'Kashmir 1970'—Frank Solari
'The Wind Rivers and Bugaboos, 1970'—Michael Westmacott |
| 20 April | 'Scottish Ice'—Bill March (see above, p 75) |
| 30 April/8 May | Lake District Meet organised by Dr Charles Warren |
| 11 May | 'Annapurna Army Style'—Captain M. W. H. Day and Lt G. D. B. Keelan (see <i>A.J.</i> 76 89) |
| 5 October | The annual accounts for 1970
'Climbing in the Media'—Peter Gillman |
| 19 October | 'Filming the Eiger'—Leo Dickinson (see above, p 139) |
| 2 November | 'How To Fail and Keep Happy'—'The Moose's Tooth' and 'Baffin Island'—Chris Bonington and Doug Scott |
| 16 November | 'The Playground of Europe, 1871–1971'—a paper read by Sir Arnold Lunn, with contributions from Mrs. Carleton (Janet Adam Smith) and Michael Ward (see above, p 1) |
| 6 December | A.G.M.
Slides shown by Major J. Fleming, Dr Noel Dilly, the Rev. F. L. Jenkins, F. Jackson, B. R. Goodfellow and Dr W. Kirstein |
| 7 December | Annual Dinner |
| 13 December | A joint meeting with the Royal Geographical Society, held at the R.G.S. 'The Exploration of Everest', by Sir Jack Longland, Eric Shipton, C.B.E., and others |

Anniversary We offer our congratulations to Sir John Beaumont, who has now achieved seventy years' membership of the Club, having been elected in March 1902.