ASPECTS OF WINTER MOUNTAINEERING IN THE NORWEGIAN ARCTIC

By N. C. NEGRI

The Lyngen Peninsula, 250 miles beyond the Arctic circle on the north coast of Norway, has been the objective of no less than seven expeditions since the end of the last war. Nearly all these parties were organised under the auspices of British universities, and, consequently, although they succeeded in making very useful contributions to the existing knowledge of the area, the fact that the time they were able to spend in the district was limited to the length of the summer vacation, meant that there was a complete absence of information relating to the prevailing winter conditions.

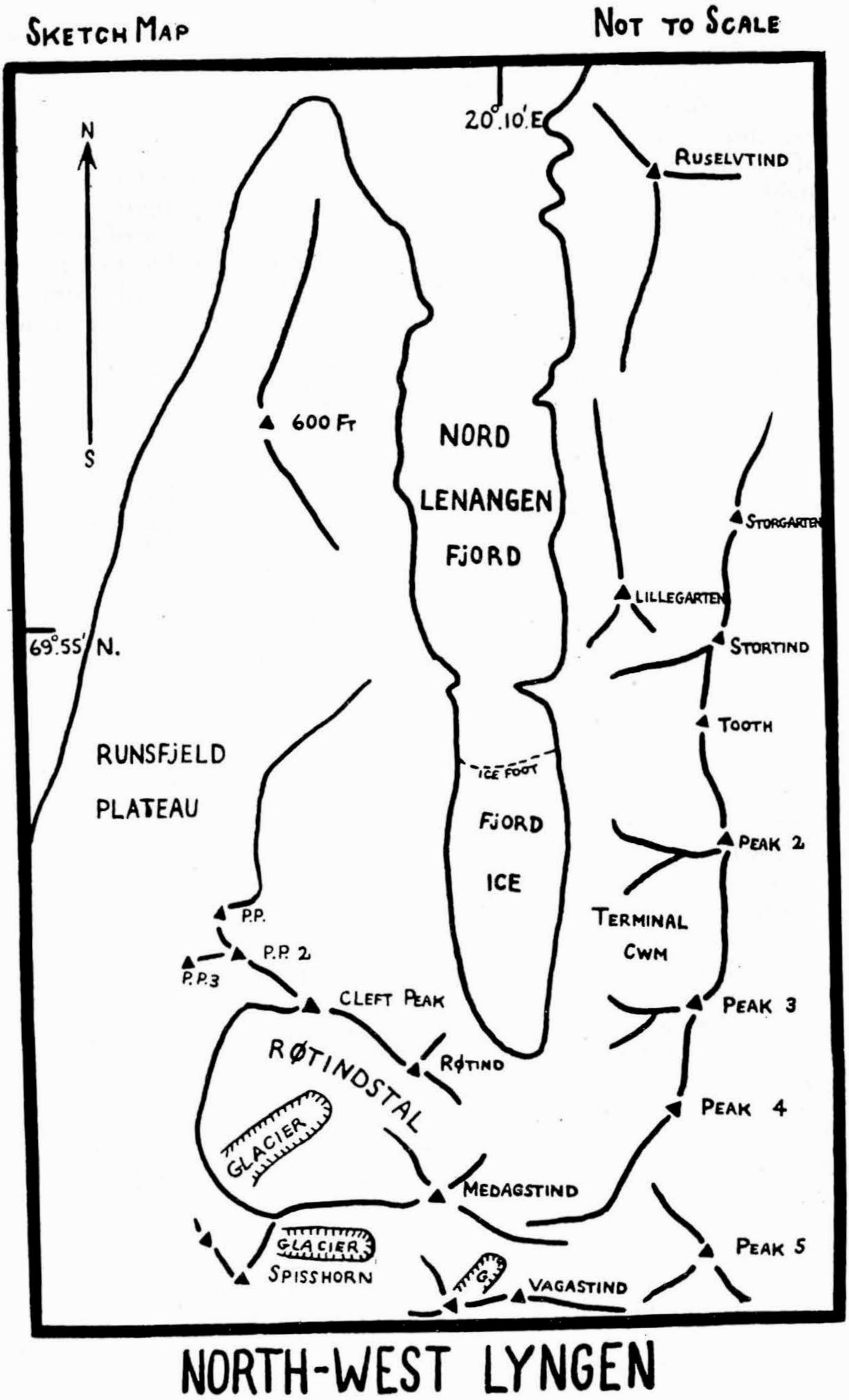
During the latter part of 1954 the plans for the Lyngen Winter Survey Expedition were put before the committee of the Mount Everest Trust Foundation. With the financial aid forthcoming from that body, and the assistance of the Royal Geographical Society, the party was able to spend some sixty days in the region. As the title of the project implies, the purpose of the expedition was the comprehensive survey of climatological, glaciological, and travel conditions during winter.

The main base of the expedition was established in the Nord Lenangen Fjord valley of the north-west coast of the peninsula. This valley was bounded in the east by the 8-mile-long chain of the Lyngen Alps. Composed mainly of gabbro with some schist rock, and varying in height between 3,000 and 4,500 ft. the chain consisted of five separate peaks connected by a knife-edged ridge. The southernmost peak fell away in a series of steep slopes ending in two rock buttresses called the Guardian Bluffs, which formed the southern limit of Nord Lenangen. Beyond the buttresses lay the 4,800-ft. Vagastind, with its complicated glacier system and network of disintegrating subsidiary ridges.

The mountains on the west coast of the fjord were of vastly different character from those on the east. Apart from the cluster of peaks in the extreme south, near the Bluffs, the only mountain that merited any attention was the Runsfjeld Plateau, where interest was centred upon the large cwm, backed by cliffs 800 ft. high, which dominated the East face.

The ' cluster of peaks ' comprised the Medagstind (4,000 ft.), the narrow horseshoe ridge that linked that mountain with the Spisshorn group in the south-west, and the continuation of the ridge that curved around to culminate in the Cleft Peak.

Serious mountaineering commenced in early January with the ascent of the cliffs above the Runsfjeld Cwm. The most important fact that came to light during this climb was undoubtedly the changeable quality of the snow. In the lower slopes of a snow gully immediately above the floor of the cwm the surface changed from fine granular



NORTH-WEST LYNGEN

powder to wind-slab, then to hard snow-ice all in a few feet; there seemed no logical reason for this, as all the snow in the gully was exposed to identical conditions.

Soon after the ascent of the Runsfjeld cliffs, the demands of the expedition scientific programme necessitated travel in the lower zone of the Lyngen Alps. Here the conditions encountered were more stable. Below an altitude of 1,000 ft. the surface was composed entirely of fine powder snow unconsolidated, and bearing evidence of drifting; the former being caused by very low temperatures due to climatic modification. Above 1,000 ft. the comparatively strong winds from the Arctic Ocean consolidated all snow into breakable crust, which made for slow and fatiguing climbing.

Nearly all the upper slopes of this range were prone to the formation of wind-slab, and in view of this, the only peak attempted was the Stortind lying at the northern extremity of the chain.

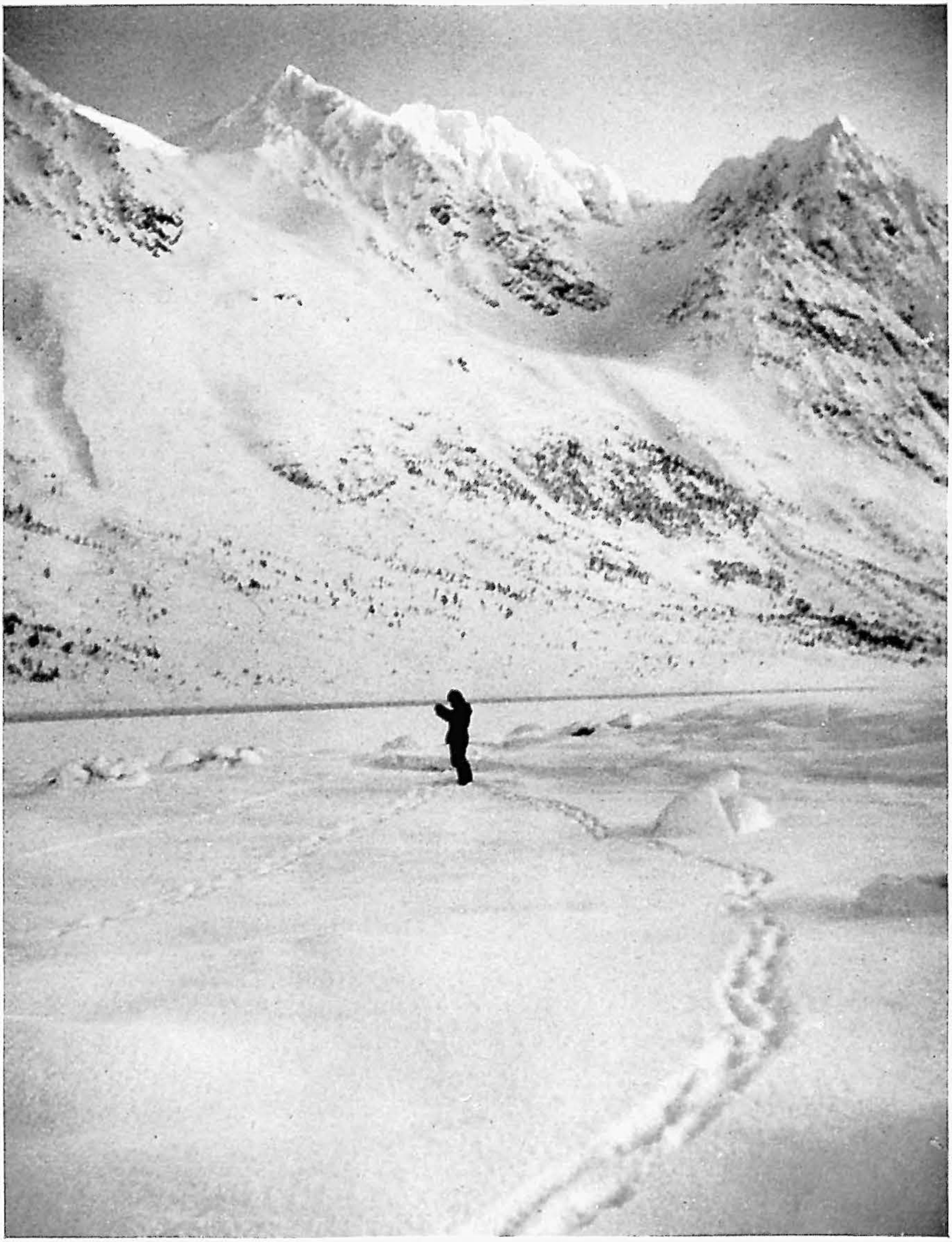
The Stortind party followed a route up a gully on the south-west flank of the Lillegarten, a spur of the main massif. The gully gave access to a shallow depression lying between Lillegarten and the North-east face of the Stortind. From there, they were able to climb directly to the North Col situated at an elevation of 2,500 ft. The ridge leading upward from the col presented some technical difficulty as its eastern side was corniced, whilst on the west it was coated in a particularly treacherous veneer of ice. The party sought to avoid this ice by climbing below the crest of the ridge on the west side, unfortunately, this was also the windward side, and when a sudden and vicious wind sprang up shortly afterwards they were forced to retreat.

Despite the longer approach, attempts on the peaks south and east of the fjord proved more successful; four separate mountains were climbed, but a description of the ascent of the North face of the Medagstind will provide a general impression of the conditions.

The route between the expedition base, and the Guardian Bluffs followed the west coast of the fjord as far as the ice-foot, then continued on the ice itself. The Medagstind party took this course turning west and heading up to the snout of the Røtindstal Glacier at the end of the fjord. From the glacier snout they were able to climb a wide couloir for some 2,000 ft., but when the surface of the snow began to show an inclination toward wind-slab formation, they traversed horizontally across the face to the North-east ridge.

The climbing on the ridge was of a very high standard, and included the negotiation of several double cornices. The summit was reached at 11.20 A.M., five hours after leaving base. Of this period three hours had been devoted to the ski journey over the fjord-ice, and the subsequent climb to the glacier snout, a distance of 12 miles.

The above notes give some indication of the various problems that confront the climber working at these latitudes during winter. Now consider the problems individually; the table below shows the average of the prevailing meteorological conditions during thirteen of the major journeys carried out during the period December 27 and February 1.



LYNGEN PEAK II.

[*To face p.* 278.



NORTH-EAST FACE OF MEDAGSTIND. THE EXPEDITION'S ROUTE LAY IN A GULLY JUST BEYOND THE NORTHERN SKY-LINE, THEN ACROSS THE FACE TO THE CLIFFS.

Snow temperature	15° F.
Air temperature	19° F.
Wind speed	8 m.p.h.
Cloud amount	3 oktas
Visibility	12 miles

Snow temperature is the most interesting consideration. Taking a hypothetical instance, when the period of weather suitable for a long journey or climb has been preceded by a snowfall at a low temperature (10° F.) the snow will be of a fine granular consistency, and provided that the temperature does not rise, it will remain in this state indefinitely, unless there occurs a wind of sufficient force to form a surface crust. Naturally such a snow condition will delay a party, whether on foot or ski, by a considerable margin.

If the temperature of the snow is very low (—10° to 0° F.) the pressure exerted on the snow by the ski will not be sufficient to melt the surface layer, consequently the ski will not run. This was often the case when skiers were travelling through the inner reaches of Nord Lenangen where low temperatures were a common feature.

In these areas of extreme temperature, the main factor controlling the consolidation of snow is wind speed or force, and it is interesting to consider the formation of wind-slab in relation to this. It was the experience of the Lyngen Expedition that the phenomena occurred in the following sequence:

(*a*) Old firm snow adhering to rock below
(*b*) New snowfall at low temperature
(*c*) 1–3 days' wind over 20 m.p.h.

The inference of these three stages is obvious. The old snow has a hard, fully consolidated surface. The new snow lies on the top in powder form, then the wind consolidates the surface layer, leaving a stratum of powder snow between the upper and lower layers.

One notable point was that a convex slope of wind-slab was more liable to avalanche when approached from above, whilst a concave slope tended to fall more readily if approached from below.

Owing to the limited daylight available during the Arctic winter, from the middle of January until the return of the sun in February, there are approximately five hours in which safe climbing is possible. Later in February, although the increase in light is rapid, weather, generally speaking, is poor, and a party would be well advised to accept the shorter day and better weather of January.

Peaks Climbed During 1955

Runsfjeld Plateau.
Runsfjeld Peaks 1, 2, 3. (Three minor peaks rising from the ridge south-west of the plateau itself.)
Røtind.
Medagstind.