a pro-talus rampart in Snowdonia, North Wales. On the concentric ridges of the moraine damming Llyn du'r Arddu, a small tarn north-west of the main Snowdon Ridge, they noted that on most of the moraine ridges

"rest sub-angular perched blocks, whilst the innermost crescent of the drift dam consists of angular blocks, as though some at least of this material was rather of the nature of snow-slope detritus than true moraine".

Even more explicit is a remarkable account of recent pro-talus rampart development on the north face of Ben Nevis noted that on most of the moraine ridges

"a little tarn ... enclosed by a semi-circular embankment rising some 6 or 8 feet above the water level. This dam is built up stones of all sizes, from pebbles to blocks 4 feet across. Some of these had plainly fallen last spring ... The way in which the dam is forming is that in the spring a tongue of snow projects over the site of the tarn, and terminates against the dam; blocks wedged off the cliffs by the winter's frost roll or slide down and come to rest at the foot of the snow-shoot, and so build up the dam".

Gatty's account also included two photographs of this feature, and he went on to note that

"Several instances of old semicircular embankments of identical formation are to be found amongst the hills of the English Lake District; these almost certainly all date back to glacial times".

He also mentioned another recent example in the Alps (p. 492). The above examples reveal that Daly's (1912) account of pro-talus ramparts was by no means the first to appear, though it may well represent the first documentation of North American examples.

Secondly, it seems debatable as to whether Daly's term "winter-talus ridge" is more appropriate than "pro-talus rampart". Not only has the latter term become firmly entrenched in the literature on the topic, but also it seems more accurate, on three counts. First, recent work on actively accumulating ramparts in northern Norway (Ballantyne, in press) has shown that rampart accumulation takes place in summer rather than winter, as these ramparts are entirely covered by snow in winter so that debris from the cliffs up-slope overshoots the rampart crests. In such circumstances, the term "winter-talus ridge" seems inappropriate. Secondly, "rampart" is in some circumstances at least more accurate than "ridge", as some examples do not possess a proximal slope (e.g. Ballantyne and Kirkbride, 1986, p. 662). Finally, all examples known to the author or documented in the literature lie at or near the foot of a talus slope, which suggests that "pro-talus" is an apt descriptor; that illustrated by Daly (1912, pl. 57) is a fine example of this.

Finally, recent studies of actively accumulating pro-talus ramparts suggest that traditional definitions of such features require revision. Butler (1986) adopted the genetic definition: "A 'pro-talus rampart' is a ridge or ramp of debris that forms when blocks fall from a cliff face, slide, or roll across the surface of a perennial snow bank of somewhat standard dimensions, and accumulate at its base".

References


Ballantyne, C.K. In press. Some observations on the morphology and sedimentology of two active protalus ramparts, Lyngen, northern Norway. Arctic and Alpine Research.


Harris, C. 1986. Some observations concerning the morphology and sedimentology of a pro-talus rampart, Okstindan, Norway. Earth Surface Processes and Landforms, Vol. 11, No. 6, p. 673-76.


Sir,

Early description of pro-talus ramparts

Butler (1986) rightly pointed out that Daly (1912), early in the present century, drew attention to the distinctive alpine land form that Bryan (1934) subsequently named "pro-talus rampart". However, Daly was not the first to describe and discuss the origin of these features. Cross and Howe (1905, p. 25) described pro-talus ramparts in the San Juan Mountains of Colorado which were forming at the front of snow banks, mainly at the base of north-facing cliffs, and referred to them as "snowbank accumulations".