

The Helm Wave

By NOEL MCCLFAN

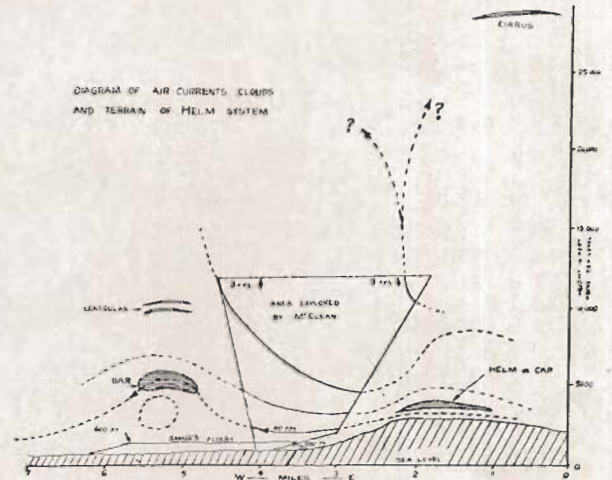
(Holder of former British Altitude Record, June 22nd, 1939)

THE best authority on the Helm system is Mr. Manley, late of Durham University, and now of Cambridge. Since the very distinctive wind and cloud formation of West Cumberland were mentioned well back in history, he is the only man to have spent any considerable time studying them. He stayed 18 months in camp on top of the ridge to get his data, thanks to a Leverhulme grant. The investigations by the Newcastle Gliding Club have only taken place over about four days of actual Helm activity, so that most of our information comes from Mr. Manley's books, lectures and chats.

The ridge in which the Helm wind has its source appears on the map as the Pennine Chain. It is a very regular escarpment running north-west to south-east, the steep face being the west side, where there is a sudden drop averaging 2,000 ft. in height, to the plain of Cumberland. When a north-east wind blows over this ridge, the ridge acts as a submerged weir. If this happens in a stream only little deeper than the weir, then we get the common phenomenon of a depression and increase of speed followed by a standing wave. The Newcastle Gliding Club group explained the necessary shallowness of the north-east wind by assuming that the prevailing south-west wind blew just over it, but Mr. Manley prefers the presence of an inversion at a height not very much greater than the ridge—something like 4,000-6,000 ft. above sea-level. Apparently the air above this inversion follows the contours of the air beneath it.

There is rarely any doubt as to when the Helm system is in action, as it is accompanied by very noticeable sights, sounds, and forces. The cloud formation is of a very distinctive character, probably more so than the "Moazagot!" It takes the form of a long roll of cumulus-type cloud, the Helm Bar, at a height of 2,500-5,000 ft., hanging just in front of the ridge, with a lenticular, the High Bar, immediately above it at a height of 8,500-16,000 ft. Both clouds are, of course, stationary in position, but the Bar is visibly rolling, far faster than any cloud movement we have ever seen.

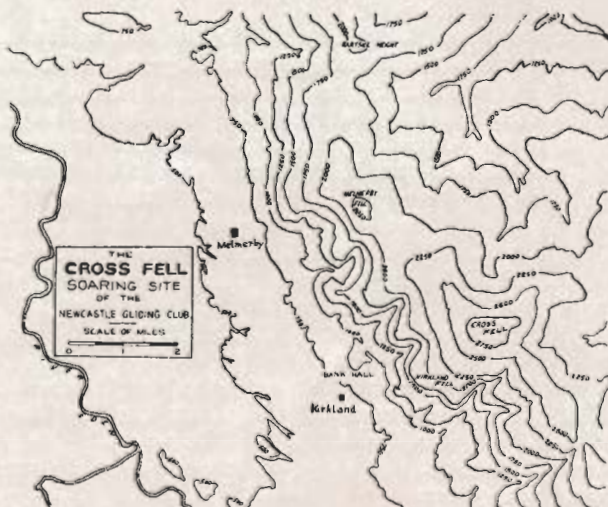
DIAGRAM OF AIR CURRENTS, CLOUDS AND TERRAIN OF HELM SYSTEM

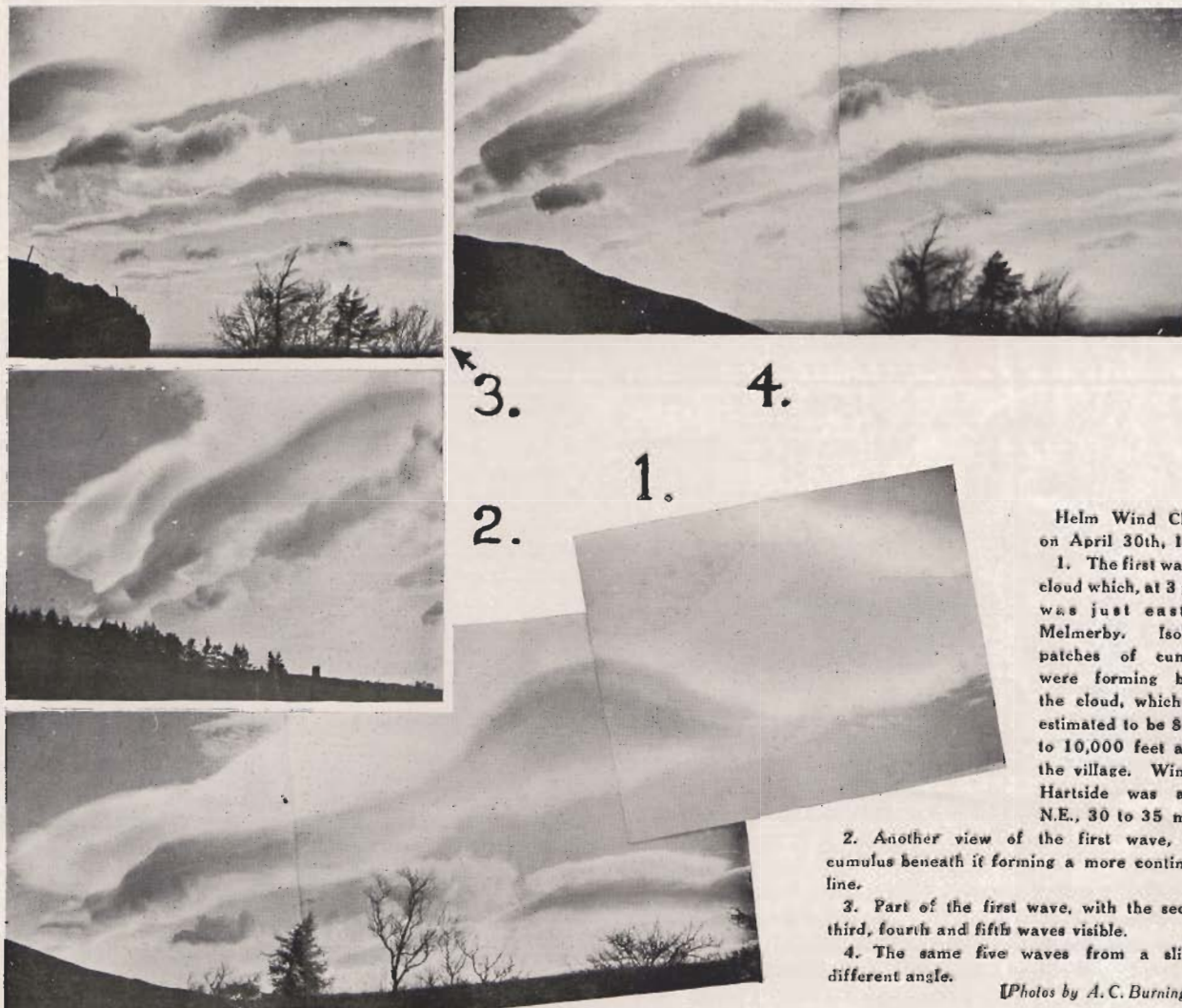


At times of high humidity these clouds unite to form a solid wall, and often the first cloud formation is repeated four times across the plain, without rain or cloud forming in the blue spaces between the walls. The Helm, or Cap, is the helmet of cloud which sits on top of the ridge, and out of which pours the Helm wind—which, however, is not a katabatic wind. It is this wind which causes the distinctive noise in its terrific charge down the rocks and in among the trees at the foot. As for the forces, these are notorious throughout the district to such a degree that the older farm houses have no windows in the east side, while railway engineers were warned of the danger of laying the line through the Eden valley in the old days. I personally have seen a "Whitley" bomber having a very thin time of it just west of the Pennines on the day the second Helm flight was made, when the weather was quite pleasant over the rest of England, but the wind happened to be N.E.

The Helm wind is a north-easter, but it rarely penetrates much more than a mile from the ridge, after which there is a sharply defined area of calm, or even westerly breeze. This is repeated, like the clouds, across the plain, the calm or westerly area always beneath the bars of cloud. A roll of cirrus cloud immediately above the ridge, at 20,000-30,000 ft., is seized upon by John Allan to support his suggestion that, as our wave faces directly into the prevailing south-westerly, there is likely to be a curl-over from the top of the wave into the higher westerly, giving lift out of all proportion to the height of the ridge. I am inclined to agree with him, and further suggest that the second or third waves will be better than the first. This seems unreasonable, I know, but the cloud formation seems to suggest it. So to Cross Fell's "normal" attractions of a 30-mile beat, soaring in winds S. to N.W., lift three miles deep, hill lift to 4,000 ft. above take-off for a GRUNAU, we now add a standing wave in north-easters, frequent in the spring, quite often during the rest of the year, with "Golden C" height for children in nacelled DAGLINGS.

This has nothing to do with the Helm system, but





Helm Wind Clouds on April 30th, 1939.

1. The first wave of cloud which, at 3 p.m., was just east of Melmerby. Isolated patches of cumulus were forming below the cloud, which was estimated to be 8,000 to 10,000 feet above the village. Wind at Hartside was about N.E., 30 to 35 m.p.h.

2. Another view of the first wave, with cumulus beneath it forming a more continuous line.

3. Part of the first wave, with the second, third, fourth and fifth waves visible.

4. The same five waves from a slightly different angle.

[Photos by A. C. Burningham.]

there is a cloud formation at Hartside which suggested to me that height records would be broken there before ever I knew of the standing wave, and which may possibly be several times more effective than the wave. It occurs in late summer under conditions exactly opposite to a Helm, i.e. a slight breeze from the S.W. among other things. However, this is, if anything, only conjecture.

Three attempts were made at contacting the Helm wave: by Savage, McClean and Allan respectively. All launches were from our normal flying ground at the foot of the ridge at Bank Hall Farm, the usual positions of machine and winch being reversed.

Savage was launched on the Wednesday in the GRUNAU BABY, and on releasing at 500 ft. flew at once down wind towards the Helm Bar. He had plus six inches showing on the Cobb-Slater variometer all the way to the Bar and reached there at 600 ft. above take-off. At this time we held the theory that the wall of cloud marked the upward flow of the wave. We know now that it marks the apex reached by the various layers of air. In accordance with our former theory, however, Savage proceeded to circle under the Bar, but as soon as he flew to the west side of it, was forced down so quickly that he had no time to do more than

scramble a landing anywhere. By the time we had retrieved him, flying was finished for the day.

On the Thursday the Helm was still blowing, so I took a launch in the GRUNAU and at once found lift. I quartered a little towards the Bar, but profited by Savage's experience and did not approach too closely. The lift speedily mounted to 25 ft. per second, and except for some stickiness at 1,600 and again at 9,000 ft. above take-off, had a perfectly pleasant, if cold, ride to 11,140 ft. above take-off. My object in not waiting to explore the wave fully was to permit Allan and Savage to get their "Golden C" height, after which I intended having another flight, with some exploration this time. But greed did not pay, because when Allan took off in a 50-mile-an-hour Helm he struck only a violent down-draught and a very sticky landing ground, and by the time we had hauled the machine back to the proper landing ground it was late evening. After comparing notes we have come to the conclusion that had John burnt his boats and whistled down wind he would almost certainly have contacted the wave before the ground, which falls away quite rapidly. Apparently the entire system had moved out a mile or so from the ridge. However, that remains to be tried next time the Helm howls.