

The Helm Wind of Cross Fell

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Introduction

Cross Fell is the highest point along the 268-mile route of the Pennine Way, at 893 metres above sea level (Figure 1). The climate of the North Pennines is temperate, with a small area classified as subarctic (Manley, 1936). The hills generally receive more precipitation, stronger winds and lower temperatures than the surrounding areas. They are also home to the Helm, one of England's most notorious named winds.

The Helm is a true 'local' wind, being a product of the particular landscape and climatic conditions found at Cross Fell, and is an example of a 'Foehn' type wind (Brinkmann, 1971). The name itself most probably comes from the Anglo-Saxon, signifying a helmet or covering for the head, and is a reference to the distinctive bank of cloud that covers the summit when the wind blows (the 'Helm Cloud'). The Helm is initiated when there is high pressure over or to the north of Scotland and low pressure over or to the south of England, resulting in relatively strong east to northeasterly winds across the Pennines. It occurs when the horizontal component of airflow is virtually perpendicular to the hills, restricting wind to a northeasterly direction, and when a stable layer of air lies about 600 metres above the summit of the range. A temperature inversion above the Pennines helps to force the air through a relatively narrow gap, and the wind speed is intensified as it descends the 600 metres of the Cross Fell escarpment to the Eden Valley. Three or four miles from the foot of the Fell, a signature cigar-shaped, rotor cloud (the 'Helm Bar') often forms and remains stationary. The cold wind blows down the Fell until it reaches the 'Bar' and suddenly ceases, while clear sky usually separates the 'Bar' from the Helm Cloud (Uttley, 1998). The gap between the Helm Cloud and the Helm Bar arises from the descending air and will vary according to temperature, pressure, wind and humidity conditions.

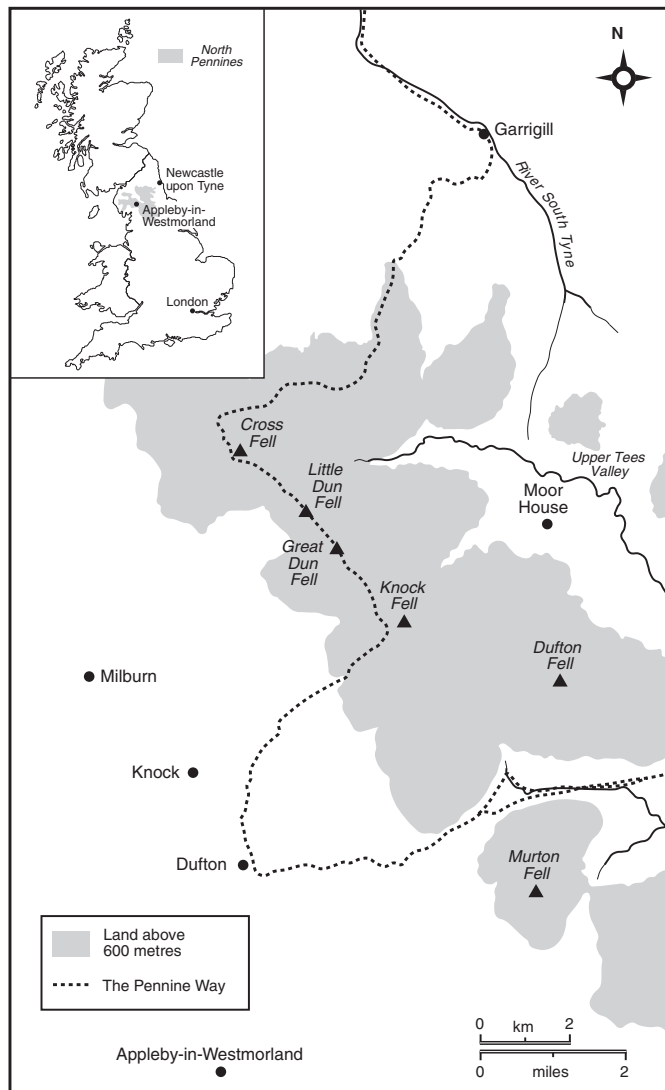


Figure 1. Map of the Cross Fell region. (© Elaine Watts, School of Geography Cartographic Unit, University of Nottingham.)

Early accounts of the wind

Investigations of the British Newspaper Archive have uncovered accounts of the Helm Wind dating back to 1794 (Table 1). These references afford insight into the frequency, duration and impacts of Helm events, and, when combined with other sources, document how an understanding of this local wind changed during a period of over 200 years.

The earliest reference to the Helm, in a report dated 15 November 1794 charting

penal action against a vicar in Cumberland for non-residence, suggested that its very presence could threaten human health:

...this gentleman was greatly afflicted with a spasmodic asthma; that his house stood on one of the highest mountains in England, where the wind, called the helm-wind, was excessively sharp and piercing... When he was at the communion-table, his lungs were so much affected by the helm-wind that he fell down. He was unable to reside in that place, and therefore he

removed from thence by the advice of his physician. It was admitted ... that if he had continued to reside there, suffocation was unavoidable.¹

A more complex picture of the Helm's effect on health emerged in the published descriptions of the region. It was argued that *in the vicinity of these mountains the air is generally very clear and healthy, owing, perhaps, to the violent Helm-winds in the months of December, January, February, March, and April: but the inhabitants of the countries immediately influenced by that wind, are more subject to rheumatic complaints than those at a greater distance* (Britton et al., 1802: 68–69). Similarly, a reference to the Helm Wind from 1854 noted *It is a curious fact that fever still lingers about Ousby, and is ever breaking out with fatal effect. A more salubrious situation would be difficult to meet with, as the atmosphere is regularly purified by the helm wind.*²

Early descriptions of the physical impacts of the Helm Wind detail *corn stacks, the stone walls which divide the inclosures, the roofs of the houses, the stunted trees that grow in exposed situation, in short everything that is exposed... its impetuous force.*³ Damage to vegetation, and the disruption of agricultural activities, were frequently reported. In 1857 *it took the entire roof from a man's house in Dufton carrying it to a distance... of fifty yards into a field, and leaving it as perfect as if found on the top of the building.*⁴ In 1866 the Helm was blamed for the collapse of the only remaining tower of Haresceugh Castle, whereas tents at a village fair fell victim in 1868, facilitating the actions of an opportunistic thief.⁵ The strength of the wind led to falling trees, horses and carts being overturned and horses also dying of fright, terrified by the strong wind.⁶ Fears for losses of sheep were reported in 1844 and 1886 and an account from 1857 suggested that *[the Helm] sometimes blows the sheep about like so many pieces of wool.*⁷ Disruptions to the mail serv-

ice were reported in 1828 and 1844, and transport difficulties were commonplace, particularly when the Helm was accompanied by snow (1841, 1844).⁸ In 1859, a human tragedy unfolded:

*At Dudmire, a large tree was likely to be blown down upon the roof of the house of a farmer, and fearing the house might be seriously injured by the fall thereof, a man named John Robinson was employed to cut it down. Suddenly a gust of wind broke the remaining hold of the tree, which fell upon poor Robinson, who has since died from the injuries he received, leaving a wife and five children.*⁹

Emerging scientific interest in the Helm Wind

As was the case elsewhere in Britain, clergymen played an important role in documenting weather events throughout the nineteenth century (Jankovic, 2001). Reverend William Walton provided remarks on the Helm Wind to the Royal Society in 1830 in which he explained *It is accompanied by a loud noise, like the roaring of distant thunder: and is carefully avoided by travellers in that district [Cumberland], as being fraught with considerable danger* (1830, p 459). Eight years later, Reverend J. Watson of Cumrew (c. 8 miles from Cross Fell) read a paper 'On the Helm Wind of Cross Fell' at the meeting of the British Association for the Advancement of Science. Watson described the unusual cloud formation and irregularity of the Helm Wind, as well as its sound: *it has been compared to the noise made by the sea in a violent storm, or that of a large cotton mill when all the machinery is going* (1839, p 34).

Published accounts of the Helm Wind appear with greater frequency in historical and geographical guides for the counties of Cumberland and Westmorland from the 1820s. Sopwith's *Account of the Mining Districts of Alston Moor, Weardale and Teesdale in Cumberland and Durham* (1833) was the first to include instrumental measurements of temperature, emphasising the temperature differential (up to 14 degF) between the top and bottom of Cross Fell. Thomas Barnes, Fellow of the Royal Society of Edinburgh and Physician Extraordinary to the Dispensary, similarly provided an account for Whellan's *The History and Topography of the Counties of Cumberland and Westmoreland* (1860), in which he demonstrated an understanding of the effect of temperature on the atmospheric uptake of water vapour (Uttley, 1998). Such county studies show how early meteorologists'

work developed local knowledge that could contribute to a wider picture through comparison with other parts of the country (Sloan, 2011, p 336).

Once blowing, the general belief throughout the nineteenth century was that the Helm Wind could continue, unabated, for 'three hours, three days or three weeks' (Manley, 1945, p 212). Newspaper accounts report the Helm blowing for 15 days in June 1843,¹⁰ and in 1879 'during the spring months the helm wind has blown almost without intermission.'¹¹

Newspaper reports and regional guides thus described a phenomenon that was considered to be at once fascinating and devastating. Limited understanding of the Helm served to attract national attention and fostered a series of investigations.

National interest

The Royal Meteorological Society

A paper entitled 'The Helm Wind' was read by Reverend Joseph Brunskill at the 18 June 1884 meeting of the Royal Meteorological Society (Brunskill, 1884). Brunskill drew on personal experience to describe the distinctive noise that was thought to give warning of the imminent winds. Following the interest generated by Brunskill's paper, the Society appointed a Committee, *consisting of the President, Secretaries, Prof. Archibald, Mr. C. Harding and Mr. Whipple* (Royal Meteorological Society, 1885a, p 76) to collect information on the subject.

The Committee considered it desirable, *that a circular letter should be inserted in the Penrith newspapers...inviting the contribution of records of past dates of Helm winds, and simple observations of various kinds in future* (Royal Meteorological Society, 1885b, p 226). From the material received, 93 instances of the Helm were identified in the period 1871–1884. The highest frequency was found in March and April, but Helm events were reported in all months of the year except July. Using the daily weather charts, the prevailing conditions of 'Helm days' were found to be easterly winds over the entire country. The received accounts highlighted an amateur interest in studying the Helm *Mr Grierson had from time to time, prior to 1865, made experiments with small fire balloons and rockets during some of the Helm winds, but unfortunately his numerous memoranda and diaries containing detailed accounts have been lost* (Royal Meteorological Society, 1885b, p 231).

The Committee requested that William Marriott (Assistant Secretary) visit the Helm Wind district. With T. G. Benn (Fellow of the Society and resident of Penrith who

¹Wednesday's Post, *The Ipswich Journal*, 15 November 1794.

²Died, *Kendal Mercury*, 29 April 1854.

³The Helm Wind (*Newcastle Magazine*, November), *Bath Chronicle and Weekly Gazette*, 22 November 1827.

⁴Kendal Literary and Scientific Institute, The Helm Wind, *Westmorland Gazette*, 25 April 1857.

⁵Fall of Haresceugh Castle, *Carlisle Journal*, 13 April 1866; Robbery of £30 at Brough Hill Fair, *Kendal Mercury*, 10 October 1868.

⁶The Helm Wind, *Westmorland Gazette*, 28 May 1831; The weather, *Kendal Mercury*, 17 February 1855.

⁷Snow storm in the north, *Morning Post*, 26 March 1844; The snowstorm, District Reports, *Carlisle Patriot*, 5 March 1886; The Helm Wind, *Westmorland Gazette*, 25 April 1857.

⁸Mail coach, *Westmorland Gazette*, 19 January 1828; Dreadful snow-storm in the north, *Morning Post*, 19 March 1844.

⁹The Helm Wind, *Kendal Mercury*, 7 May 1859.

¹⁰*Newcastle Journal*, 10 June 1843.

¹¹The lambing season on the border hill farms, *Newcastle Courant*, 23 May 1879.

Table 1

Occurrences of the Helm Wind reported in regional British newspapers. Data generated using the British Newspaper Archive (<http://www.britishnewspaperarchive.co.uk>).

Year	Number of events	Month(s)	Comment
1794	1	?	Affecting health of resident vicar.
1807	1	May	Unabated force of wind for two days, accompanied by a sudden transition from intense heat to extreme cold.
1815	1	December	Postman from Keswick to Alston perished in snow. Two countrymen travelling in same area – one blown from his horse as if struck with the rapidity of lightning
1821	1	Winter	Indirect reference from 1827.
1828	1	January	Terrible storm, mail upset near Appleby.
1831	1	May	Carrying peats high into the air, terrifying a horse which set off at a gallop, rushing into a rock and killed on the spot.
1841	1	January/ February	Blowing for a fortnight; no serious damage.
1843	1	May/June	Blowing for 15 days.
1844	2	March November	Raging with unusual violence, mail disrupted by wind and snow. Blew with more violence than it has been known to do for many years past.
1845	1	September	Helm wind from the east.
1849	1	April	Blowing for three weeks.
1850	1	January	Helm wind roaring and blowing with considerable violence.
1853	1	May	Helm wind blew most boisterously.
1854	1	March	Blowing most furiously for a fortnight.
1855	2	February November	Never known to be stronger, horse and cart blown over and the horse killed. Blowing most monstrously.
1856	4	April July September December	Blowing everyday for a week. Like a hurricane stopping all mowing. Grain shaken from heads of corn. Christmas Day.
1857	2	March April	Wind of great fury. Magnificent clouds and great noise.
1858	1	March	Helm wind blowing.
1859	1	May	Helm wind blowing boisterously and piercingly cold, houses partially unroofed, trees broken, fences and stone walls damaged and a laden cart blown over injuring the driver seriously. Death of man employed to cut down damaged tree.
1866	1	March	Only remaining tower of Haresceugh Castle blown down.
1867	1	March	Strong helm and snowstorm, farmers prevented from going to market.
1868	1	October	Strong helm wind, lifting tents at fair, facilitating opportunist theft.
1879	1	Spring	Helm wind blowing almost without intermission.
1880	1	July	Terrible helm doing considerable damage.
1885	41?		As reported in press by RMetS investigation.
1886	1 63?	March	Helm wind and snowstorm together, roads blocked. As reported in press by RMetS investigation.
1887	19?		As reported in press by RMetS investigation.
1888	1	April	Indirect reference from 1895 – not for many years had there been so severe and prolonged a prevalence of the Helm wind. It began on Friday and lasted until Wednesday night.
1890	2	April August	Boisterous helm winds preventing angling in the Upper Eden. Helm raging with much violence, cartloads of hay blown away.
1891	3	January June October	Helm wind sweeping in from snow covered hills. Cold helm prevailing made erection of tent very difficult. Harvest failure; hurricanes of the helm wind uprooted trees and hurled grain still standing out in the fields.
1895	1	December	Prevailing on Christmas Eve with much violence in Cumberland and Westmorland.
1899	1	August	Reference to the appearance of the Helm Bar.
1909	1	March	Helm Wind blowing on Cumberland for some days, accompanied by snowstorms.
1913	1	October	Reference to a Helm Wind brewing during a ramble.
1935	1	July	Tufts of hay seen floating along 2000 feet up over Windermere. Reference to previous events where the spray from the lakes has been lifted several hundred feet high by the wind.
TOTAL	42 (+123 reported by RMetS) in 141 years.	Occurring in all months of the year.	

volunteered to act as local superintendent for the Society in the investigation) he travelled around the area, making numerous inquiries at each of the villages as to the appearance of the Helm Cloud, the Helm Bar, the peculiarities of the wind, and its effects, &c (Marriott, 1886, p 1). The pair were presented with multiple accounts of havoc induced by the Helm Wind, although they found that *At very few places could we get precise information as to what the persons had actually seen or experienced.* This led them to conclude that *past accounts were of little value, and that observations must be made on a systematic plan in order to obtain reliable data to throw light on the cause of the Helm Wind* (p 2).

On descending Cross Fell on the evening of 18 August 1885, the visiting party were so fortunate as to witness a slight Helm (p 3). Their subsequent account highlighted the local nature of the wind and its effects, both of them experiencing a sudden transition in air temperature and wind speed as they walked away from the Helm (Figure 2). Eight members of the Penrith and District Literary and Scientific Society subsequently agreed to take observations during Helm events and it was suggested that *a meteorological station should be established at Penrith* (p 7). Comments by Mr Symons (founder of the British Rainfall Organization, then honorary secretary of the Royal Meteorological Society) indicated that radical management proposals had been forwarded, including the suggestion that *pipes should be laid up the side of Cross Fell, and when the Helm Cloud was forming quantities of steam should be let off at the top of the Fell by means of these pipes, and so cause the accumulated vapour to disperse* (p 8).

Marriott again presented on the Helm in 1889. The *Athenaeum* (reporting on the findings of the Society's inquiry) revealed the observations that *had been made in the district during the past three or four years showed it [the Helm] was not such a rare occurrence as it was popularly supposed to be, having been observed on 41 occasions in 1885, 63 in 1886, and 19 in 1887.*¹² The apparently greater prevalence of the phenomenon was perhaps a function of more detailed observation during the investigation or mistaken classification of winds/storms as Helm events. Following the years of the enquiry the Helm was reported less than annually in the newspapers (Table 1).

The work of Gordon Manley

The Helm attracted the interest of Gordon Manley, who started collecting meteorological data in the Pennines at Moor House in 1932. Following a research award from

¹²Reproduced in: *The Helm Wind*, Manchester Times, 18 October 1895.

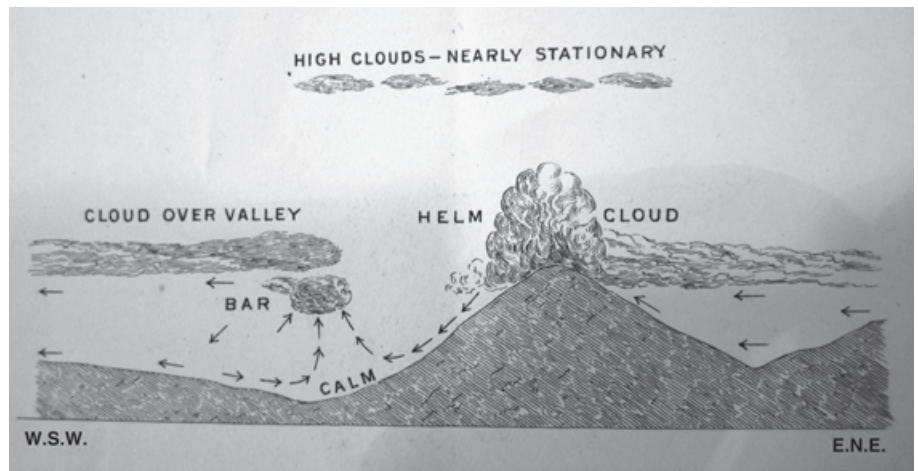


Figure 2. Diagram illustrating Helm Wind formation. (Reproduced with kind permission of the National Meteorological Archive. Published in Marriott (1886: 2). (Note: the original diagram had 'ENE' and 'WSW' transposed. This has been corrected here.)



Figure 3. Manley's hut, close to the summit of Great Dun Fell, at noon on 5 January 1939. Manley's skis can be seen to the right of the hut, and the Lake District is visible in the background. (Durham University Archives, Man 8/139. Reproduced with kind permission of Durham University.)

the Leverhulme Trust in association with an investigation of the 'Helm Wind' of Cumberland and Westmorland, he was able to establish a weather recording station close to the summit of Great Dun Fell in the autumn of 1937 (Figure 3).

His station was located in a small wooden hut (8 × 6 × 6 feet) erected in a small hollow, a result of past mining operations, chosen so as to ensure that the hut would not blow over, and, ... *on the score of ease of access, remoteness and freedom from disturbance by passers-by, and the use which might be made of the writer's older station at Moor House* (Manley, 1945, p 200). The hut was placed at the highest point of the escarpment, and where, according to the available evidence, the Helm was most frequent. It was equipped with two thermographs, thermometers, a barograph, portable cup anemometer, as well as tools for cooking and clearing snow (Figure 3).

During the first year of observations at Great Dun Fell, Manley found that occurrences of the 'helm wind' were

tantalisingly few (Manley, 1945).¹³ As well as observing and photographing the Helm and its manifestations (see Figure 4), Manley kept meteorological observations for a period of three years (1937–1939), including a continuous record of temperature. This was the first series of mountain observations to become available in England. Manley himself made around 100 visits to the hut, generally driving over the Pennines to and from Durham (Manley, 1942, p 152). As was the case throughout his career, he regularly reported his findings through the mass media as well as in academic journals. In a radio broadcast for the *Northern Programme* from Newcastle, broadcast on Thursday 16th February 1939 at 19:50 UTC, Manley explained:

There are many places in the world which are known on account of their characteristic local winds. ... We have, however, a

¹³Letter from Armstrong to Manley, 7 November 1940, Gordon Manley Papers (University of Cambridge), Box 2/1.



Figure 4. Helm cloud settled down on the Pennines nearly to bottom – showing the ‘Helm Bar’ breaking up. Photograph taken by Manley and then made into a lantern slide he used in teaching. (Durham University Archives, Man 8/154. Reproduced with kind permission of Durham University.)

single example in Britain of a more violent local phenomenon, the ‘Helm Wind’ of Cumberland and Westmorland [...]

To walk up the fellside against it is an unforgettable experience, and, while I don’t object to wind, I don’t recommend going up in a ‘helm’ for pleasure. One stoops against it with everything buttoned up as tight as it can be, and slogs wearily up the hill with this steady roaring torrent of air pressing against one, sometimes at fifty or sixty miles per hour, even on a ‘fine day’. It is very tiring, and if there is snow about it causes severe drifting. Further, east winds being what they are, it is bitterly cold. On the morning of the First of May, on the summit, it blew a gale from North-East with a temperature of only twenty-nine degrees at my hut.¹⁴

From direct observation and analysis of his tabulated data relating to temperature, wind speed and atmospheric pressure, as well as comparison with synoptic charts and data from other stations, Manley found that for a Helm to occur, the general direction of the surface wind is between east and north-northeast, the strength of the wind at the summit is greater than force 4 and at Tynemouth is no less than force 3, suggesting that the speed of 15mph may represent a critical value. The presence of the Helm Cloud lying on or slightly above the crest of the range was judged to be essential for the distinctive strong wind to blow.

Manley acknowledged that although ‘local intensifications’ of wind of similar origin could be found elsewhere in Britain, the exceptional fall of the Cross Fell escarpment cannot, however, be matched elsewhere in these islands. The combined result of

topography and freedom from obstacles is, that a surface wind of strength similar to that which normally prevails in the free air is felt inland over a narrow belt of country; and this development is sufficiently frequent and well-defined to have been given its local name (Manley, 1945, p 214).

Conclusion

This paper charts how different individuals, social groups and organisations have attempted to observe, measure, understand and explain the complexities of the Helm Wind over a 200-year period, and reveals a long history of fascination with the phenomenon. Ways of knowing the Helm, however, have emerged as much through experience of its impacts as through the data generated by meteorological instruments. The Helm Wind undoubtedly continues to hold a special place in the popular geographical imagination of the region (Uttley, 1998), and the Cross Fell area has continued to be a focus for meteorological investigation more generally.¹⁵ Historical accounts in newspapers and county guides, however, remain a little explored yet rich source of information about the Helm Wind and the general meteorological characteristics of this region that complement the reports of organised investigations and allow insight into this unique phenomenon.

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¹⁴Gordon Manley Papers, Box 2/4.

¹⁵See <http://www.ecn.ac.uk/> [accessed January 2013]. The site has a number of automatic weather stations that continue to help us explore the characteristics of the Helm Wind (see Pedgley, 2001).

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