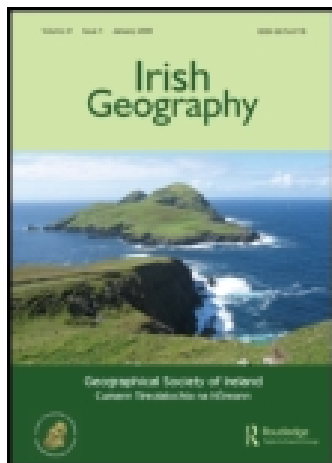


This article was downloaded by: [ECU Libraries]

On: 19 April 2015, At: 03:43

Publisher: Routledge

Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



Irish Geography

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/rigy20>

The 'Night of the Big Wind' in Ireland, 6-7 January 1839

Lisa Shields^a & Denis Fitzgerald^a

^a Meteorological Service, Dublin 9

Published online: 04 Aug 2009.

To cite this article: Lisa Shields & Denis Fitzgerald (1989) The 'Night of the Big Wind' in Ireland, 6-7 January 1839, Irish Geography, 22:1, 31-43, DOI: [10.1080/00750778909478784](https://doi.org/10.1080/00750778909478784)

To link to this article: <http://dx.doi.org/10.1080/00750778909478784>

PLEASE SCROLL DOWN FOR ARTICLE

Taylor & Francis makes every effort to ensure the accuracy of all the information (the "Content") contained in the publications on our platform. However, Taylor & Francis, our agents, and our licensors make no representations or warranties whatsoever as to the accuracy, completeness, or suitability for any purpose of the Content. Any opinions and views expressed in this publication are the opinions and views of the authors, and are not the views of or endorsed by Taylor & Francis. The accuracy of the Content should not be relied upon and should be independently verified with primary sources of information. Taylor and Francis shall not be liable for any losses, actions, claims, proceedings, demands, costs, expenses, damages, and other liabilities whatsoever or howsoever caused arising directly or indirectly in connection with, in relation to or arising out of the use of the Content.

This article may be used for research, teaching, and private study purposes. Any substantial or systematic reproduction, redistribution, reselling, loan, sub-licensing, systematic supply, or distribution in any form to anyone is expressly forbidden. Terms & Conditions of access and use can be found at <http://www.tandfonline.com/page/terms-and-conditions>

The 'Night of the Big Wind' in Ireland, 6-7 January 1839

Lisa Shields and Denis Fitzgerald

*Meteorological Service,
Dublin 9.*

ABSTRACT

The notorious storm of 6-7 January 1839 is re-examined, and its effect on Ireland outlined. The country-wide damage as reported by contemporary newspapers and observers is described, source material is listed, and consideration is given to the social and cultural legacy of the storm. The meteorological situation of the night of 6-7 January has been reconstructed from the available data, and displayed in map form. A comparison with the recent storm of 9 February 1988 is made. The much greater damage caused by the 1839 storm suggests that there could have been thundery or even tornado-type activity in places at the height of the storm.

Key Index Words: Wind storms, historical weather maps, folk tradition, newspaper reports.

Introduction

We dare not call this hurricane a phenomenon, however rare or unprecedented. But it will, nevertheless, become a study to our meteorologists.

(Dublin Evening Post 12 January 1839)

It is perhaps a fitting moment, in the year of the 150th anniversary of the most famous Irish storm, to take up this challenge. There have been violent storms before and since the Big Wind of the night of Sunday 6 to Monday 7 January 1839. It was, however, generally agreed at the time that nothing comparable could be remembered by the oldest inhabitants of this island, and subsequent major storms in Ireland (such as the great February storm of 1903) have been universally described, until relatively recently, with reference to the 1839 storm. The greatest British storm in recent centuries — the storm of 1703 described in such detail by Daniel Defoe (Defoe, 1704; Clow, 1988; Lamb, 1988) — passed Ireland by, and so did the severe storm of October 1987.

This paper examines extensive source material, especially reports having a bearing on the development of the storm in Ireland and describing its effects on life and property, forestry and agriculture. From these fragments of information weather maps are constructed showing the likely meteorological situation, and a description is given of what was, in the context of Ireland's normally mild and uneventful climate, an extraordinary meteorological event.

Sources of Documentation

Newspaper reports

Both Irish and British papers gave the storm very full coverage. Apart from the sensational aspects (loss

of life, damage to property and freak occurrences) these reports contain useful descriptions of the evolution of the storm in different parts of the British Isles, indications of wind direction and change, and sometimes even barometer readings. Newspaper reports must of course be used with some caution: they often quote from one another, and observers may be carried away with rhetoric at the expense of accuracy. The *Dublin Evening Post* was outstanding in its coverage of the event and its assessment of the damage.

Meteorological registers

The Ordnance Survey had been carrying out reliable observations at Phoenix Park, Dublin, since 1829, and we are fortunate to have their records for the period of the storm, with the usual thermometer and barometer readings and remarks for 0900, 1200, 1500 and 2100 hours, together with an exceptional reading made at midnight on 6 January (Cameron, 1856). Another observation was made for the Ordnance Survey by James Boyle at Carrickfergus, Co. Antrim (Boyle, 1839).

Private registers available include one for South Frederick Street, Dublin, (Orpen, 1839) and one for Tullygarvan, near Cookstown, Co. Antrim (Dickson, 1839).

An observer had been making meteorological observations in Trinity College, Dublin, since 1838, but unfortunately the manuscripts surviving all show a gap at the end of December 1838 and during the first half of January 1839 (TCD MSS).

First-hand accounts

Contemporary letters and diaries are worth looking at. The antiquarian John O'Donovan, for example, gave an entertaining account of his experiences in Glendalough before and during the storm (O'Donovan, 1839), and a Mrs. Francis Howard of Swords has left a diary which describes her experience of the night (Howard, 1839).

Other sources

One serious and painstaking meteorological study of the storm was carried out soon after the event (Espy, 1841). This was written mainly from an English angle, and before the discovery of Buys Ballot's law. Espy sought to show that winds blow towards the centre of a depression. (Buys Ballot also took into consideration the Coriolis force of the rotating earth which deflects the wind from this direct path.) Espy usefully included as an appendix to his study the original sources on which his work was based — newspaper reports, shipping gazettes, ships' logs, lighthouse observations and miscellaneous meteorological registers (including one made by Viscount Adare, near Limerick). Reid (1849) also gave a brief account of the storm.

Wilde (1856) has given a summary of the event, mainly drawn from contemporary newspapers. Dixon (1959) sets the 1839 storm in the context of other major wind storms from medieval times to the present day. Danaher (1963) gives a popular account.

Local anecdotal memories have survived to this day in folk tradition, and some are recorded among general weather lore in the archives of the Irish Folklore Department, University College, Dublin (DIF MSS).

Reports of Storm Damage

There was nothing very unusual about the weather immediately preceding 6 January 1839 — it was mainly dull and cold, with snow showers. In the early part of Sunday 6 January Dublin was very calm and gloomy. Around three o'clock in the afternoon a light breeze sprang up and it started to become noticeably warm. When the wife of the vicar of Swords in Co. Dublin was going to church on Sunday evening 'the night was very calm and hot — the air felt like air in a hot house'. By nine o'clock in Dublin it was blowing a westerly gale which had turned to a strong gale by midnight, and raged as a 'hurricane' between two and four o'clock on Monday morning (Cameron, 1856; Howard, 1839). All over the country the same pattern was being repeated — strong winds arising late on Sunday evening, developing to hurricane force and raging from about midnight until the small hours, and finally subsiding at about five o'clock on Monday morning. Daybreak revealed scenes of great devastation.

Surveying the damage a week after the storm, the *Dublin Evening Post* of 12 January 1839 wrote:

Comparing it with all similar visitations in these latitudes, of which there exists any record, we would say that, for the violence of the hurricane, and deplorable effects which followed, as well as for its extensive sweep, embracing as it did the whole island in its destructive career, it remains not only without a parallel, but leaves far away in the distance all that ever occurred in Ireland before. With the exception of the frightful disasters amongst the shipping at Liverpool, Manchester and the surrounding towns, in the interior of Wales, Cheshire and Lancashire, the sister island appears to have escaped with comparative good fortune ... Ireland has

been the chief victim of the hurricane — *every part of Ireland — every field, every town, every village in Ireland have felt its dire effects, from Galway to Dublin — from the Giant's Causeway to Valencia. It has been, we repeat it, the most awful calamity with which a people were afflicted.*

Loss of life

As far as Ireland is concerned, loss of life seems to have been surprisingly low — there must have been very many narrow escapes. It is hard to arrive at firm figures for deaths during and after the storm. Some attempt was made at the time to estimate casualties.

We have seen the loss of life put down at 400. This, we should suppose, includes those who perished at sea on the coast of Great Britain and Ireland. For in this Island, it will be found, we hope, that not more than forty or fifty have fallen victims in that terrible night.

(*Dublin Evening Post* 15 January 1839)

The *Northern Whig* of Tuesday 15 January, quoting from the *Liverpool Mercury* of the previous Friday, gives the following death toll for the British Isles: 115 in the town and neighbourhood of Liverpool (nine killed or suffocated, seventeen drowned in the river and eighty-nine drowned on the banks). A further thirty-five deaths from other towns included ten from Ireland (eight from Dublin and two from Belfast). The paper hastens to add that this total of 150 deaths is only a

... rough guess ... with respect to the shipping in this neighbourhood it is certainly very much underrated.

The *Clonmel Herald* of 9 January states simply

Upwards of 300 lives were lost in Ireland alone by the late hurricane.

This is probably an overestimation. We have noted down, from various newspapers, documented reports of about ninety deaths in Ireland on land and at sea. More than half of these victims died on land, crushed by falling masonry or swept away in the floods. At least thirty-seven died in the seas off the Irish coast, including the captain, pilot and crew of fourteen of the 'Andrew Nugent', the 200-ton sailing vessel that was wrecked off Arranmore Island, Co. Donegal (Ó Gallachair, 1978; *Ballyshannon Herald* 18 January 1838; 'Carraig-an-lme', 1955). Seven drowned when a 'sail-boat' was wrecked near Limerick (*Clonmel Herald* 12 January 1839), and four more when the 'Undine' went down near Kilrush (*Limerick Chronicle* 9 January 1839). Twelve men of the Roundstone coastguard were drowned during the gale (*Galway Patriot* 9 January 1839). We can assume that there would have been many further deaths during the months following the storm, arising from injuries received that night.

Damage to buildings

Many houses in Dublin were wholly or partly demolished, and thousands more suffered damage to

'Night of the big wind'

roofs, windows and chimneys. Dublin was described as resembling in many places 'a sacked city'. The majority of Dubliners quitted their beds and remained all night in 'indescribable terror'. The river Liffey rose many feet and overflowed the quay walls. On 6 January the Bethesda chapel in Dorset Street had given thanks at its Sunday noon service for being delivered from a fire which was thought to have been extinguished on Saturday. During Sunday night the wind must have revived the flames, for the chapel, orphan house and female penitentiary, together with five adjoining houses, were burned to the ground. Destruction of property in the capital was estimated, from police statistics, at £6405, or £3 per house on average (Pettigrew and Oulton, 1840). Nevertheless, the *Dublin Evening Post* (10 January 1839) concluded that

the city has suffered less than might have been expected ... certainly less — relatively — than other parts of the country.

Drogheda was not too badly affected, but in Dundalk most of the buildings were left without roofs and glass, (*Drogheda Journal* 12 January 1839), and in Newry hardly a house remained unstripped (*Drogheda Journal* 8 January 1839). In Limerick

not a public edifice or institution in the city escaped the ravages of the storm, and the best built houses of the New Town, which hitherto defied the shock of warring elements, were sadly dismantled in their upper stories. An estimated £20,000 worth of damage was done to private buildings.

(*Limerick Chronicle* 9 January 1839)

Some of the more sheltered coastal towns in the east and south suffered less than might have been feared.

Cork seems to have come off comparatively well.

(*Kerry Evening Post* 12 January 1839)

Perhaps this city escaped with less injury than any other in the kingdom owing to its sheltered position.

(*Waterford Chronicle* 10 January 1839)

The *Tuam Herald* (19 January 1839) had the same remark to make about Wexford:

Owing to the low position of the town, and the consequent shelter it received from the high ground to the westward, the action of the wind was not so terrible in its affects [*sic*] as it has been in other places less favoured by their natural position.

Many towns in the west and the midlands were much harder hit. In Galway seven died and many were injured by collapsing masonry and chimneys (*Galway Patriot*, 9 January 1839). The damage done to Longford was estimated at from £5,000 to £7,000 (*Tuam Herald* 19 January 1839), and Portarlington suffered more than any town in Ireland for its size (*Galway Weekly Advertiser* 13 January 1839).

In Enniskillen £500 damage was done to the Royal School, Portora, and £200 damage to the barracks. Donegal town, including the old castle, suffered

greatly, and there was destruction of property along the sea coast from Bundoran to Rosstown and Coolmore, where the sea rose to such a height that the poor inhabitants thought it was the end of the world (*Ballyshannon Herald* 11 January 1839).

In some cases more was lost as a result of fires spread in the wind than from the direct force of the gale. Most rural dwellings were roofed in lightly secured thatch, easily ignited when the wind fanned the embers of the turf fires in the hearth below. In Granard, Co. Longford, the country people asserted that they saw the fire falling down from the clouds (*Tuam Herald* 19 January 1839). In Loughrea 103 houses were destroyed, of which seventy-one were burned (*Galway Weekly Advertiser* 19 January 1839). Fifteen houses were burned in Gort, thirteen in Ballinasloe, and more than 100 in Athlone (*Tuam Herald* 12 January 1839). In Castlebar, very few houses escaped damage, and the dwellings of the poor were worst affected (*Mayo Constitution*, quoted in *Tuam Herald* 12 January 1839).

The poor of course, as being the most numerous, have been the greatest sufferers. Tens of thousands of their wretched cabins have been swept away or unroofed — and many, as we have seen, have become a prey to the flames.

(*Dublin Evening Post* 12 January 1839)

Other towns which suffered badly from fire were Kilbeggan, Kells, Naas, Slane, Moate (where 70 houses burned), Birr and Maryborough — now Port Laoise (Danaher, 1963).

The flames from burning houses must have lit up the night sky in a spectacular fashion. Two Dublin papers printed a highly-coloured report of the night of the gale in Dublin which was repeated for Ballyshannon word for word in the *Ballyshannon Herald* of 11 January, omitting the references to flames and the peals of firebells. This report ends with a description of a brilliant aurora:

At intervals dense clouds obscured the sky, and added to the horror of the scene by the gloomy darkness which they produced, but when they were driven by, the heavens did not appear less ominous, for the Aurora Borealis burned brightly a great portion of the night, mantling the hemisphere with sheets of red, and corresponding well with the lurid gleams which ascended the zenith from the flames of burning houses, that the tempest threatened to fan into a general conflagration.

(*Dublin Evening Post* 8 January 1839; *Freeman's Journal* 8 January 1839)

No other reports of the aurora have been found for the period of the storm. The Phoenix Park observations, which mention stars, do not refer to it (though they record aurorae on other occasions). It is possible that the newspaper reporter mistook the glow reflected from the fires for an aurora, and was pleased to incorporate that phenomenon into his fine writing.

Heavy rain in places (for example in Derry, where it fell in torrents) prevented the spread of fires, but

doubtless contributed to the flooding which was experienced in parts of the country. Another cause of flooding could have been the sudden melting of snow as a result of the marked rise in temperature just before the storm. Strabane was flooded, and casualties from flooding were reported from the Limerick area and from Longford.

Damage to shipping

Since the storm came on so unexpectedly at night time, ships at sea, or exposed to the full force of the westerly gales, were hard hit. Ships tied up in sheltered harbours, such as Kingstown (Dunlaoghaire), Wexford or Cobh suffered little harm. Damage to shipping in the Liverpool area caused Lloyds considerable concern — it was estimated at nearly half a million pounds (*Waterford Mirror* 14 January 1839).

About £30,000 worth of damage was caused to ships and structures in Limerick when shipping in port was dashed violently against the quays and Wellesley Bridge, now Sarsfield Bridge (*Limerick Chronicle* 9 January 1839). In Portaferry, Co. Down, all the vessels in the harbour were driven from their moorings on to the shore (*Galway Weekly Advertiser* 12 January 1839), and the *Galway Patriot* (9 January 1839) describes

our shipping, some dismayed, some on their beam ends, some cast high and dry on a rocky shore, and all evidently greatly injured.

Pat O'Halloran, master pilot of the 'Lelia' of Galway, gave a dramatic account in his log book of his crew's narrow escape when their ship was driven on to a reef of rocks and later lifted clear by heavy seas (*Galway Weekly Advertiser* 19 January 1839), and in Lough Swilly, Co. Donegal, there were many ships wrecked (*Ballyshannon Herald* 11 January 1839).

Agricultural damage

The loss of farming stocks of all kinds has been terrible. Many of the most thrifty and industrious husbandmen, whose haggards and homesteads were filled with unthreshed corn on Sunday night, found themselves without a sheaf of grain in the morning.

(*Dublin Evening Post* 12 January 1839)

There were reports of large ricks of corn and hay being blown away a mile from the haggards (*Galway Weekly Advertiser* 13 January 1839) and the rivers and lakes were full of corn and straw. There must have been considerable damage to livestock as well, but there are only occasional mentions of this.

Forests and demesnes

In the absence of accurate anemometer records, the toll of trees would perhaps be the best indicator we have of the severity of the storm. In assessing this toll, however, a number of factors would need to be

considered: the type of tree and its situation (conifers being more vulnerable than broadleaved trees, and woodland trees more vulnerable than isolated specimens), the type of soil and environment, topography, wind direction etc. Also of interest is whether the locality had experienced recent severe storms that would have left the surviving trees in a weakened condition and culled the weaker specimens. It has generally been accepted that trees in winter, bare of leaf, offer less resistance to the wind and therefore stand up better to the force of the storm. Nevertheless, Quine (1988), in an analysis of the October 1987 storm which felled about fifteen million trees in Britain, surprisingly found 'no tendency to increased damage to broadleaved trees that appears attributable to their being in leaf'.

At the start of the nineteenth century about 2% of the country was forested (compared with about 1% at the time of the 1903 storm). During the first half of the century there was a great increase in private planting: in 1801 there were 132,000 acres of plantations apart from natural wood, and this increased to 345,000 acres by 1841, with an eightfold increase in the numbers of conifers (*Irish Builder*, 1903; McCracken, 1971). Their well-wooded demesnes were obviously a source of pride to Irish gentry, and the damage to forests during the storm was emphasised by the press. All over the country demesnes were devastated and roads were blocked by fallen timber.

The damage which it has done is almost beyond calculation. Several hundreds of thousands of trees have been levelled to the ground. More than half a century must elapse before Ireland, in this regard, presents the appearance she did last summer.

(*Dublin Evening Post* 12 January 1839)

DUBLIN COUNTY — The loss of timber is unprecedented; but less, we think, than in the adjacent counties.

MEATH — The damage done in this county is very great. Not a single demesne escaped, and tens of thousands of trees have been snapped in twain or torn up by the roots, and farming produce to a immense amount destroyed.

DOWN — The county of Down has not been, as far as we can yet ascertain, an equal sufferer; but plantations were destroyed, and haggards, almost incalculable, scattered to the winds.

(*Dublin Evening Post* 10 January 1839)

The Enniskillen Chronicle of 10 January describes the loss of trees in Co. Sligo:

... Markree Castle has suffered seriously, and nearly all the ornamental trees have been torn up and otherwise destroyed. Lissadell ... greatly damaged; thousands of trees, many of an enormous size, have been prostrated ...

The same paper gives an account of the damage to trees at the Earl of Belmore's estate at Castlecoole, near Enniskillen, Co. Fermanagh, and remarks that a previous estimate of 15,000 trees destroyed should be changed to 100,000.

'Night of the big wind'

In County Longford

... the surrounding country has the most awful appearance that any eye could perceive. Fifteen thousand trees were blown down in Lord Charleville's demesne near Tullamore.

... The woods and plantation at Castle Forbes are nearly destroyed.

(*Tuam Herald* 19 January 1839)

and in Mullingar

... Trees of fifty and sixty years old were snapped in pieces like glass.

(*Tuam Herald* 19 January 1839)

In Castlebellingham (Co. Louth)

The beautiful demesne of Lady Bellingham has been destroyed. Upwards of two hundred noble trees are prostrated.

(*Drogheda Journal* 12 January 1839)

Tree damage in Dublin included the levelling of splendid avenues of elms in the Phoenix Park and at the Royal Hospital, Kilmainham. Fortunately the Botanic Gardens at Glasnevin were not severely damaged (McCracken, 1969). Great numbers of trees were uprooted in the demesnes of Colonel Brien in Carlow and of Sir W. Cuffe in Co. Kilkenny (*Galway Weekly Advertiser* 12 January 1839). In Co. Tipperary, on Lord Dunally's estate at Kilboy, near Nenagh, £1,000 worth of trees were destroyed (*Galway Patriot* 9 January 1839). More than a third of the timber in the Marquess of Conyngham's demesne at Drumsna, Co. Leitrim, was blown down and two thousand trees were felled in the Bishop of Meath's demesne at Ardbraccan, Co. Meath. Upwards of 50,000 trees of the largest ash, oak, elm and larch were torn up on the property of a Mr. Kirwan of Hillsbrook [Co. Galway?], and Garbally Park near Ballinasloe, the seat of Earl Clancarty, was left almost without a tree standing (*Galway Weekly Advertiser* 13 January 1839). A correspondent from Tulla, Co. Clare reported that

At Newgrove, the seat of Thomas Browne, Esq. over 3,000 trees were blown down, many of them have been the beauty and ornament of that demesne for more than one hundred years — the largest cedar in Ireland was amongst them — the noisy inhabitants of the rookery strewed the ground in thousands ... At Kilgory, whole plantations were swept away by the tempest.

(*Limerick Chronicle* 12 January 1839)

and Joyce (1912) relates

... A gentleman living in the County Mayo had at that time an extensive, well-wooded estate verging on the Atlantic. That night, 70,000 of his trees were blown down; so that, as he expressed himself to Dr. Petrie — who told me the story in Dublin many years afterwards — "my estate is now as bare as the palm of my hand".

One natural consequence of the simultaneous destruction of so many trees was the immediate

depression of the market for timber throughout the country.

We shall only mention, as one of the extraordinary consequences which has followed this calamity — that timber is now a drug in Ireland — absolutely a drug. We know from an eminent timber merchant, that a lot of trees which he would have gladly bought for £300 on Saturday, he purchased for £40 on Monday ... No timber merchant in Dublin would go ten miles out of the city to buy a tree — and he would not, just now, take a present of 1000, twenty miles from Dublin ... There is a glut — and these beautiful trees are now nearly valueless.

(*Dublin Evening Post* 15 January 1839)

The *Dublin Evening Post* lamented the lack of proper statistics, and suggested the Royal Dublin Society as the proper authority to collect these:

... If the Dublin Society was worth a straw — which for any practical and beneficial purposes it is not — they would before a month elapses, furnish to the public a complete and minute account of the mischief, done in every part of the island — of the effects produced in the course of the hurricane, on lakes and rivers, and of the law — if there be a law — as a late treatise maintains, which "guides the whirlwind and directs the storm".

(*Dublin Evening Post* 15 January 1839)

The Society, evidently touched by this goad, appealed to the general public for information on timber losses during the storm, by means of a newspaper advertisement:

THE ROYAL DUBLIN SOCIETY, under an impression that an inquiry into the kinds and circumstances of the trees which have suffered during the recent storm might be productive of national advantage, by eliciting information as to the stability and strength of trees, and the adaptation of different types of soil and climate of Ireland, beg leave to invite communications on the subject, under any one or more of the following heads:—

- 1) The number of Trees destroyed on any given space, with a description of the locality, nature of the soil, and elevation of the land, and the name of the place.
- 2) The kinds of the trees, and whether up-rooted or shattered, and the direction in which they have fallen.
- 3) The general size of the Trees, their probable age, and how computed.
- 4) Whether planted, raised from seed, grafted, or of natural growth.
- 5) General observations.

Communications, with real signatures, will be thankfully received by the Assistant Secretary, directed to him under cover "To the Under-Secretary to the Lord Lieutenant, Dublin Castle", with Royal Dublin Society written in the left hand corner of the cover. By order, Edw. Hardman, Ass. Sec. 26 January 1839.

(*Dublin Evening Post*, 19 January 1839)

Unfortunately, enquiries have not so far succeeded in unearthing the results of this ambitious questionnaire.

Freak Phenomena

We find many accounts of unusual or bizarre phenomena: readers may judge for themselves how many of these are mere 'fisherman's tales'.

Wind effects

There are enough reports of strange wind effects to suggest that there was local whirlwind or tornado-like activity in places.

In the streets, however, it was impossible to tell in what direction the storm was, for it came in sudden gusts, sweeping sometimes up and sometimes down the street; and occasionally two contrary blasts meeting, and forming a whirlwind, which made the stoutest houses tremble and rock to their foundations.

(*Dublin Evening Post* 8 January 1839; *Freeman's Journal* 8 January 1839)

Edengully school, above at the mountain, was a-building at the time, and old Ned Curran, of Tierworker, was a night watchman, and he was coming down the road on his hands and feet — he couldn't stand up — the wind was so strong — and he met a tall man riding a horse at Tackney's brae. The man was sitting up straight in the saddle and was wearing a castor hat, while Ned couldn't stand up and had to go on hands and feet on the side of the road.

(DIF MS 1040: 677-78, Bailieboro region, Co. Cavan)

It was remarked of several of the full-grown pines at Brookhall ... that they were carried to some distance, in a direction opposite to that in which the storm blew; from which it is to be inferred that they encountered a powerful eddy.

(*Londonderry Journal* 15 January 1839)

... In the four Towns (Donaghmore) a completely built stack of oats was lifted clean up, foundation, thatch and all, and after performing sundry wild gyrations, was again laid down, safely and uninjured, at a considerable distance from its former locality.

(*Dublin Evening Post* 15 January 1839, quoting *Newry Telegraph*)

Also in the parish of Donaghmore an immense stack of turf was lifted a foot from the ground and dashed in pieces (*Drogheda Journal*, 8 January 1839, quoting *Newry Telegraph*). Even more extraordinary is the following report from Kilbeggan (County Westmeath):

What appeared to be the most astonishing effect of the storm was, the blowing of the water out of the canal near this town. I visited it this morning, and it was nearly dry.

(*Tuam Herald* 19 January 1839, quoting *Midland Counties Herald*)

Noise and vibration

The roar of the wind was likened to thunder or artillery:

KILBEGGAN. At about a quarter past eleven the hurricane commenced here: there was first a rumbling sound, like

thunder, heard, which was followed by a rushing blast of wind, which swept through the town like a tornado, and shook the houses so much that the glass and delf were broken in many of them, by being thrown down from their shelves ... The gale continued with unabated fury for four hours ... (*Tuam Herald* 19 January 1839, quoting *Midland Counties Herald*)

SLIGO. About half-past ten o'clock, the gale set in with tremendous violence, blowing fiercely from S.S.W., resembling the deafening roar of a thousand pieces of artillery, and continued with unabated fury during the night and succeeding day.

(*Enniskillen Chronicle* 10 January 1839)

From Bruff, Co. Limerick, came a description of the storm raging like 'two invisible armies' fighting. (*Kerry Evening Post* 12 January 1839).

Flights of fish and transported birds

On the morning after the gale a fine specimen of that rare and beautiful little bird, the Stormy Petrel of Mother Cary's Chickens, was found dead in the demesne of Sonna [Westmeath], by Hugh Tuite, Esq. — a distance of more than 90 miles from the sea, in the direction of the gale, affording one of the most curious and striking instances of the violence of the hurricane of which we have yet heard.

(*Kerry Evening Post* 9 January 1839)

Joyce (1912) asserts that

... all along the west coast, for many days afterwards, herrings were found six miles inland — lifted up bodily out of the sea and blown through the air the whole way.

and similar tales have survived in popular oral tradition:

I heard it from an old man that saw it, "The night of the big wind" in 1839, the fish were swept out of the lake and distributed over the fields at Lislea. Large numbers of them were got dead about a mile from the lake.

(DIF MS 1040: 503 Virginia, Co. Cavan)

The water was blown from Virginia lake as far as Ardlow — a distance of three miles, and the fish were got in the fields at Lislea.

(DIF MS 1040: 533-544, Ardlow, Co. Cavan)

Salt inland

Trees, ten or twelve miles from the sea, were covered with salt brine — and in the very centre of the Island, forty or fifty miles inland, such vegetable matter as it occurred to individuals to test had universally a saline taste. The surges of the sea, therefore, must have whipped up and whirled hundreds of miles upon the land.

(*Dublin Evening Post* 12 January 1839)

One William Monday of Kilrush wrote:

The atmosphere, during the gale, became charged with a green saline vapour, which was carried a considerable distance inland, having rendered the water kept for private use, so salt as to be unfit for culinary purposes.

(Espy, 1841)

In Slane, Co. Meath, an observer claimed that, when accidentally chewing on a piece of twig, he found it to be strongly impregnated with salt:

This turned out to be generally the case throughout the place; the spray, therefore, of the Atlantic must have crossed the island.

(*Leinster Express* 19 January 1839)

Alterations to the landscape

The sand banks, at the bar to our harbour, were so considerably lowered by the storm that in the vicinity of this town, a distance of about two miles, carts of sand could be gathered. The sea washed over the 'sugar-loafs' and boats could pass where the tide had not before reached within half a mile.

(*Ballyshannon Herald* 11 January 1839)

Sunday night, the night of the eventful storm, three acres of the bog at Glounamuckalough, within four miles of Newmarket, and eight of Kanturk, moved completely from its position, and after traversing a distance of a mile, and crossing a rapid river, landed on the opposite side. Not an atom of surface is to be seen where the bog left but mere yellow mould. The occurrence fortunately has not done any injury to houses or cattle, but it is an incalculable loss to the owner of the land, Mr James Barry, as the bog rests on the very best portion of his farm.

(*Limerick Chronicle* 19 January 1839)

Social Effects

The landed gentry must have suffered severe losses from the damage to their estates and demesnes, but the real sufferers were the poorer classes who were already near subsistence level. Wilde (1856) quotes a letter written to the Chancellor of the Exchequer by Captain Chads, who had been deputed to inquire into the extent of scarcity in the west of Ireland during the summer of 1839:

The distress this season has been occasioned not only by the partial failure of the potato crop on the west coast, but also from the violent storm on the 6th of January last, which scattered and destroyed the greatest part of the fodder for the cattle. This extended to the midland counties as well as the coast, the consequence of which was the necessity of parting with the cattle or feeding them on the potatoes. The latter was resorted to by most of the poor, although they had a certainty before them that ere the new crop would come in, they themselves would be destitute.

The *Dublin Evening Post* (12 January 1839) remarked, hopefully, that 'the destitution to which they are reduced, must quicken the operation of the Poor Laws'.

Not being highly industrialised, Ireland did not share the plight of Manchester, where unemployment of up to 15,000 was feared because of the destruction of mill chimneys (*Northern Whig* 15 January 1839). Indeed, in the very short term the storm provided extra employment. In Limerick slaters and masons were in demand at 7s. 6d. a day wages (*Galway Weekly Advertiser* 12 January 1839, quoting *Limerick Chronicle*). And at a meeting in Dublin to discuss the relief of the sufferers

[Surgeon Wright said] labour was no drug upon the market. He had asked a poor man how he was employed. He replied that he was a hod-man ... "These were fine times"; and that "there was a power doing".

(*Saunders Newsletter* 17 January 1839)

Folk Memory and Cultural Influence

The name of the storm

The trauma of the 1839 storm was soon to be eclipsed by the much greater tragedy of the great famine. Nevertheless, what came to be known as the 'Big Wind' has remained as part of the national consciousness to the present day. The name attached to the storm has perhaps helped to preserve the memory of the event, and has even inspired a popular novel (Coogan, 1969).

We do not know when the label 'Night of the Big Wind' — probably a translation of the Irish '*Oíche na Gaoithe Móire*' — first gained general currency. The expression '*Oidhche gaoithe móire*' occurs in a poem or song of twenty-five verses composed by Michael Burke of Esker, near Athenry, Co. Galway, reputedly on the day after the storm (Burke, 1884). This poem has survived in folk tradition to modern times, sometimes shortened to fifteen verses (Ní Dhorchaí, 1974; DIF MSS 844:284-8, 1464: 127-34) — a very fine recitation from memory was recorded in 1957 on Achill Island, Co. Mayo:

OÍCHE NA GAOITHE MÓIRE,
NÁ DEIREADH AN TSAOIL
Ar oíche ceann an dá lá dhéag
Béidh cuimhne grinn go h-éag,
Is iomaí mílte d'éag
I mbaile, muir's tír.
Oíche gaoithe móire,
Oíche stoirme's dóite,
A déan [?] dílte, crainnte a' stróiceadh,
Agus obair ag na saoir.

THE NIGHT OF THE BIG WIND,
OR THE END OF THE WORLD
The night of Epiphany
Will be clearly remembered for ever,
Many thousands perished
At home, at sea and abroad.
It was a night of big wind,
A night of storm and burning,
That caused floods, tore trees to shreds,
And made work for craftsmen.

(Collected by Ciarán MacMathúna of RTE from Eamon MacAoidh of Doegaa, Achill)

It is not surprising that Michael Burke was impressed by the awfulness of the occasion: it was in Esker that a house collapsed and took fire, killing and consuming a mother and four of her children, and mortally injuring the father and another child (*Dublin Evening Mail* 9 January 1839). The apocalyptic tone of Burke's poem is in keeping with the popular tradition of religious songs in Irish. The storm was at its height during the small hours of Monday morning — the day of the week traditionally associated in Gaelic Ireland with the Day of Judgement. This may well have contributed to a popular feeling that, if the end of the world was not actually at hand, at least the storm had been sent down from on high. In Ventry, Co. Kerry, some of the local population were convinced that 'the priest's curse had brought it down' as a punishment on those who had forsaken their faith (*Kerry Evening Post* 12 January 1839).

The Old Age Pensions Act

Fresh encouragement for the revival of memories of the 1839 storm was provided by the implementation of the Old Age Pensions Act on 1 January 1909. All old people of seventy years and over could now claim a yearly pension of £13. But many Irish people in that age group had no written evidence that they were over seventy, and local committees were set up to investigate their claims.

The large proportion of pensionable persons to population in Ireland has naturally been the subject of comment in and out of Parliament. The Chancellor of the Exchequer provoked the merriment of the House of Commons in this connexion a month ago by giving the estimated number of persons over 70 years of age in the United Kingdom. He showed that, on the basis of the figures quoted by him, the percentage of the persons claiming old-age pensions to the population over 70 years of age ... was ... in Ireland, 128 per cent ... (London *Times* 31 December 1908, quoted by Carolan, 1981)

The committees found that a convenient way of ascertaining the true age of claimants was to find out if they could remember the 1839 storm, or if they had at least been born at the time. The Co. Galway traditional storyteller, Tomás Laighléis, recalled his delight at being taken out of the schoolroom by the parish priest, who asked him to round up all the old people of the parish to be interviewed. The births of many of these old people had never been recorded in the baptismal register of the parish, and the priest wanted to ask them about their memories of the Night of the Big Wind — 'Oíche an Fheothain Mhóir' (De Bhaldraithe, 1977). The situation gave rise to at least one humorous song (Carolan, 1981).

The noted Co. Clare fiddler and storyteller, 'Junior' Crehan, (now over eighty) still recounts an anecdote concerning his grandfather, a babe in arms at the time of the storm. Junior's great-grandmother, a widow with twelve children, was left homeless on the night of the gale, and sought shelter in the only house in the

village which had not been unroofed. She made her way with great difficulty against the wind, with her children, and with the baby wrapped up in her apron. When she opened the door she found the kitchen crowded to the door with people, so that she could not make her way in towards the fire. Then up spoke a kind neighbour — 'Make way for mother hen and her twelve chicks'. The family got in from the cold — and doubtless that baby later on had little difficulty in claiming his pension.

It now remains to examine the meteorological evidence, and consider to what extent the synoptic situation during the storm fits in with the folk memory and with contemporary accounts of storm damage.

The Synoptic Situation on 6/7 January 1839

The reports paint a picture of considerable devastation over Ireland, England and much of Scotland. All this is consistent with a major depression approaching Scotland from the west, as indicated by the pressures available in Espy's account.

Figure 1 gives the minimum pressures in inches and hundredths along with the place, the day and the hour of their occurrence. Unfortunately instruments were not standardised in 1839 and inevitably there were inconsistencies. No attempt has been made here to adjust the readings as the main effort has been directed towards obtaining a general picture of the sequence of events; for the same reason times of day, presumably local, have not been corrected. There were fewer temperature readings than pressures but temperatures did contain a good deal of important information.

Units have been left in their original form. The conversion factor for pressures is 1 inch = 33.86 hPa, where the hectoPascal is the new official name for the more familiar millibar. On the maps isobars have been drawn at intervals of 0.25" since this is roughly 8 hPa. Temperatures have been left in degrees Fahrenheit. Windspeeds have been given in terms of the nautical mile per hour or knot where 1 kt = 1.15 mph = 0.515 m/sec.

The time of the onset of the fierce westerly gales was available for many localities and this often proved helpful when it came to choosing between inconsistent observations or to accepting an observation in whole, in part, or not at all.

Estimated Pressure Pattern at midnight on 6/7 January

On 4 and 5 January the British Isles were in the grip of a cold westerly windflow, with widespread snow showers. From Figure 1 we get the general impression that a deep low-pressure area moved in an easterly direction to the north of Ireland late on the 6th and early on the 7th and was passing by the southern tip of the Shetland Isles during the afternoon of the 7th. The pressure of 27.25" (922.7 hPa) recorded at Sumburgh Head is remarkably low but by no means unpre-



Figure 1. Minimum pressure (to one hundredth of an inch) read during 6-7 January 1839. Day and Hour of reading in brackets. [1.00" Hg = 33.86 hPa and so the Phoenix Park pressure of 28.29" = 957.9 hPa]

cedented. In December 1886 Belfast recorded a pressure of 927.2 hPa when a major depression moved eastwards across the north of Ireland. Again in December 1986 a pressure of less than 920 hPa and perhaps as low as 912 hPa was inferred for a mid-Atlantic depression (Burt, 1987). As it is probable that the depression of 1839 was filling by the afternoon of the 7th, acceptance of Sumburgh Head's pressure would imply that the central pressure of the depression which approached Scotland rivalled that of the 1986 storm.

The pressure readings from the lighthouses on the west coast support the picture of a depression of less than 27.50" centred to the west of Scotland at midnight. The frequency of the barometer readings is unknown and, as there were no barographs, the minimum pressure read was not necessarily the absolute minimum attained during the storm.

One important station, Barra Head (56° 48' N, 7° 38' W), recorded 27.40" at 2100 and had a SSE gale from the morning of 6 January which veered NW at a time which is not given. Another key station is Cape Wrath on the northwestern tip of Scotland with its pressure of 27.32" at midnight. The Irish readings played an important part in determining the picture at midnight. At 2300 at Carrickfergus the temperature was reported as 49°F (9.4°C) compared with 35°F (1.7°C) at 0900 and a pressure of 28.35". One hour or so later James Boyle reported 27.95", and added the comment that 'about 10 pm a gale commenced which rose to a perfect hurricane in a couple of hours and continued until between 3 and 4 o'clock of the morning'. The readings from the Phoenix Park were as follows:

Day/time	06/0900	06/1500	06/2100	07/0000	07/0600	07/0900
Pressure (inches)	29.29	28.99	28.55	28.29	28.56	28.72
Temperature (°F)	37.0	41.0	51.5	46.5	41.5	40.0

This invaluable sequence shows considerable warming until 2100, and the drop in temperature between 2100 and midnight indicates that the cold front passed eastwards in that interval and should have been in the Irish Sea at midnight. At 2200 on the 6th Dr. Orpen in North Frederick St. reported a pressure of 28.62" and a temperature of 53°F. At 0200 on the 7th he read a pressure of 28.42" while at 1000 the values were 28.84" and 40 °F.

A difficulty with the Carrickfergus readings is that they imply a pressure fall of 0.4" (13.5 hPa) in about one hour; this would be an unusually high fall even in three hours. Consistency with the Phoenix Park is most easily achieved by assuming that the 2300 observation was made earlier and accepting the 27.95" pressure as read about midnight. Be that as it may, the clear weight of evidence is that the temperatures rose some 14 °F even as far north as Belfast during 6 January and the cold front did not clear the east and northeast coasts until a very late hour, probably 2300. Ballimore, some 30 miles northwest of Glasgow, reported a maximum

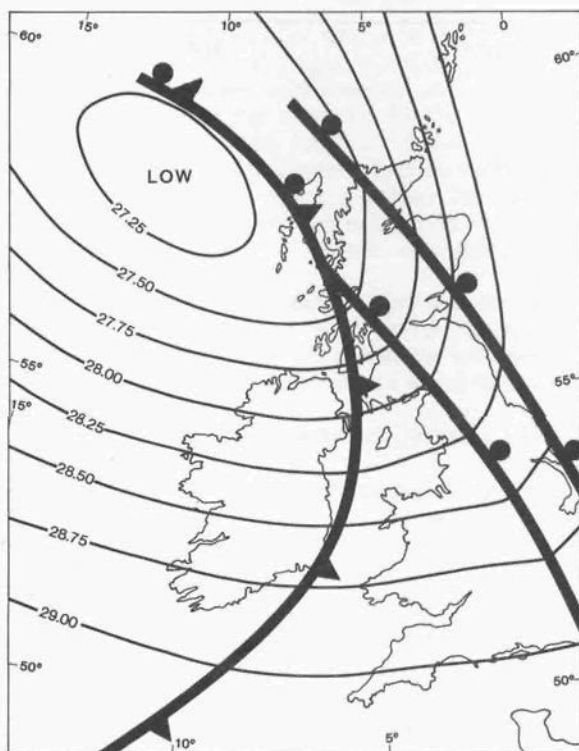


Figure 2. Proposed pressure pattern for 0000 on 7 January 1839 (Isobars at intervals of 0.25" Hg = 8.5 hPa)

temperature of 47 °F on the 6th while Pentland Skerries on the northeastern tip of Scotland reported that 'the rain cleared off at 2 a.m. of the 7th, very warm, 48°F, at 4 a.m.'; this indicates that warm air penetrated at least this far north.

Figure 2 is an attempt to get a picture of the synoptic situation at midnight. The reports speak of sleet turning to rain in many areas and hence two warm fronts are shown. In the London area winds veered from SSE to S to SW between 2200 and 2400, while other British reports indicate that the positions of the warm fronts are plausible. Over Ireland we have further pressure readings of 28.6" to 28.7" at Adare and of about 28.5" at Birr which, together with Carrickfergus and the Dublin readings, fix the gradient reasonably well. Reports indicate that the westerly gales had set in between 1800 and midnight on the 6 January, a little earlier in the southwest and west than in the east. Placing the depression centre at a latitude between that of Barra Head and Cape Wrath and positioning the cold front as indicated by the Irish

'Night of the big wind'

stations suggests a depression centre of about 27.1" (918 hPa — a most unusually deep depression) at about 58° 30' N 11° W, moving in an east to eastnortheast direction.

Comparison with the storm of 9 February 1988

This immediately invites comparison with the recent storm of February 1988 when a depression, central pressure about 943 hPa, moved eastwards just at 57° N (O'Reilly, 1988). The maximum pressure difference between Malin Head and Roche's Point in the recent storm was 34.5 hPa. From Figure 2 this pressure difference in the storm of 1839 at midnight was nearly 1" (32 hPa), and at 0300 we estimate the pressure difference was about 1.10" or 37 hPa and at its maximum. The storm of 1839 was not as sustained as that of 1988 because, although deeper, the depression centre was further north and may have been moving a little faster on a track a little north of east. In 1988 winds were very severe for 18 to 24 hours while in 1839 there were many reports of two to four hours of 'hurricane force' winds. Thereafter the storm eased fairly steadily, although the Phoenix Park observer was still reporting 'strong gales' at 1800 on 7 January.

Gusts and squalls

Thunderstorms, tornadoes and severe line squalls are occasionally observed on the passage of sharp cold fronts associated with deep depressions in winter. While these are rarely reported in Ireland, the marked changes in temperature brought about by the fronts raise the question in this case, and some of the freak phenomena already detailed are further positive indicators. The *Dublin Evening Mail* (19 January 1839) reports

The old trees in Portland-place, 'on the Royal Canal ... have actually been as it were dug out of the roots, and thrown to the opposite side of the canal.

Again, the *Nautical Magazine and Naval Chronicle* for 1839 says of the Liverpool area that

Another remarkable feature of this storm is the great degree of electricity as evinced by lightning, by which it was accompanied, assimilating it still more with the West India hurricane.

There is also a report of lightning in the Glasgow area (Espy, 1841). We may speculate then that thundery and perhaps tornado activity was associated with the transition from warm to cold air and added to the general mayhem in some areas. However, the onset of gales is commonly accompanied by a rumbling sound, the Irish reports do not mention thunder, and so the case is by no means conclusively made.

That winds were very gusty may be gathered from the following extract from a letter of the surveyor, antiquarian and Gaelic scholar John O'Donovan, who was in a hotel in Glendalough at the time:

About 2 o'clock the storm became so furious that I jumped up determined to make my way out, but I was no sooner out of bed than the window was dashed in upon the floor and after it a squall mighty as a thunderbolt! I then, fearing that the roof would be blown off at once, pushed out the shutter and closed it as soon as the direct squall had passed off and placed myself diagonally against it, to prevent the next squall from getting at the roof inside, but the next blast shot me completely out of my position and forced in the shutter!

(O'Donovan, 1839)

The emphasis in the accounts is mainly on the westerly gales. Some reports, chiefly from England, mention very strong winds from the southeast veering southwest, but they were less furious than the westerly gales which followed. The packet ship 'Doterel', out of Kingstown, was forced to take in its sails and had a hard struggle making the short passage to Holyhead in more than thirteen hours. The 'Doterel' reported fresh southwesterly gales at 2000 on 6 January, 'heavy gales' at 2200 and 'very hard gales' at midnight; at 0200 on 7 January they were experiencing 'quite a hurricane' from the westsouthwest which thereafter veered westnorthwest, but by 8 o'clock the hardy sailors rated it as a 'very hard gale and squally' and by 9.15 a.m. had arrived at Holyhead (Espy, 1841).

Pressure Pattern around 0900 on the 7 January

Several of the lighthouses on the north coast of Scotland and on Orkney reported light winds for a time on the morning of 7 January followed by a northwesterly gale whose onset at Cape Wrath was about 1000 and at Pentland Skerries about noon. Sumburgh Head, on the southern tip of the Shetlands, reported a pressure of 27.25" at 1400 as well as snow and sleet and the onset of a northerly gale. Accepting Sumburgh Head's pressure means rejecting the pressure of 27.55" at Start Point in Orkney. Assuming that the main depression centre passed just north of Scotland's north coast, the most plausible picture becomes as in Figure 3. The pressure pattern over Ireland has been drawn using readings from Carrickfergus, Phoenix Park and Adare; it shows that the Roche's Point — Malin Head pressure difference had decreased to about 0.75" (25 hPa) from its maximum of about 1.10" (37 hPa).

Conclusion

The storm of 1839 invites comparison with the February storms of 1903 and 1988, rather than with those of February 1957 or January 1974, or 'Hurricane Debbie' in 1961. The maximum gusts in the 1988 storm were between 70 and 85 knots generally but ranged from 60 kt in the extreme south to 93 kt in the northwest; maximum ten-minute mean windspeeds ranged from about 35 to 60 kt (O'Reilly, 1988). Many commentators on the 1839 storm have remarked on the extreme gustiness of the westerly winds; such gustiness depends on the instability of the airmass and

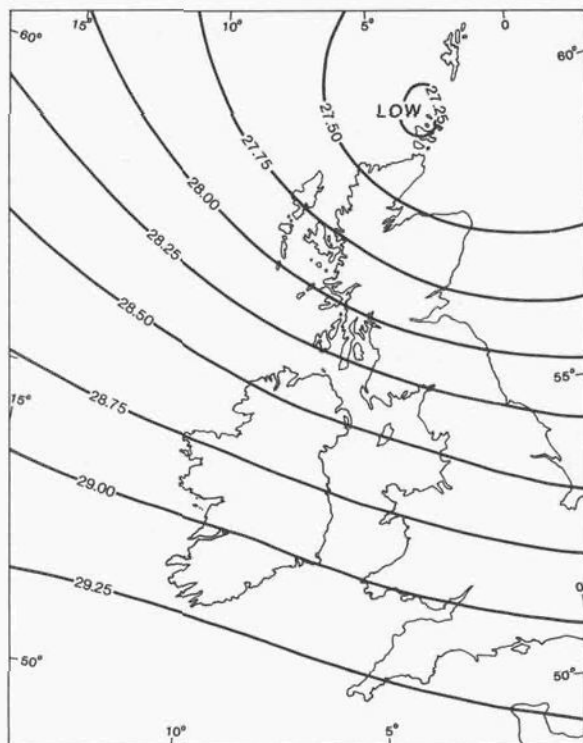


Figure 3. Estimate of the synoptic situation at 0900 on 7 January 1839

the westerly momentum of the flow aloft. In view of the well-established westerly flow both before and after the storm of 1839 it is likely that both were considerable.

Accepting that the Malin Head — Roche's Point pressure difference was 1.10" (37 hPa) at its maximum and that the flow was more unstable, we may fairly expect gusts to have ranged from 75 to 90 kt generally, with some gusts of 90 to 100 kt, and even in excess of 100 kt. in the north and northwest. Maximum mean

speeds should have ranged from about 40 or 45 kt in the extreme south to about 65 or 70 kt near the north coast. The devastation of woodlands was widely reported and mainly attributed to two to four hours of winds of singular ferocity. While evidence was found for thundery activity or line-squalls ahead of and behind the cold front, it is not fully convincing — what may be reasonably inferred about the strength and gustiness of the winds is sufficient to account for considerable damage.

Judged by the reconstructed synoptic situation, the 1839 storm was not quite such an unusual event as folk memory would have us believe. Comparable winds almost certainly occurred in storms of more recent vintage. At its peak, it does seem to have been more severe than the storm of February 1988 — reports of damage done certainly indicate this but, on the other hand, the gales did not last as long. Two factors, however, would have added to the feeling of awe which the 1839 storm provoked, and ensured that its memory would endure: it occurred at night, and it came without warning.

Acknowledgements

The authors are grateful to the National Library, the Royal Irish Academy Library and the Department of Irish Folklore, University College, Dublin for making their collections available and for permission to make use of manuscript material. They wish to thank Cathal Goan and Ciarán MacMathúna of Raidió Telefís Éireann, Tom Munnely of the Department of Irish Folklore, UCD, and Professor Cathal Ó Háinle, Department of Irish, Trinity College, Dublin, for information kindly provided. Thanks are due also to Paddy MacHugh and other colleagues who read the typescript and made valuable suggestions, to Peter Lennon and Gerry Scully for help in preparing diagrams, and to the Assistant-Director of the Meteorological Service for permission to publish this article.

References

- BOYLE, J. (1839) January 1839 entry in the manuscript meteorological register of James Boyle, 1 November 1834—30 June 1839, Ordnance Survey Papers Box 7 (Antrim VII), iv, Royal Irish Academy, Dublin.
- BURKE, M. (1884) Untitled poem beginning 'Beidh oidh' chinn an dá lá dheug Ag-cuimhne grinn go h-eug ...', *An Gaodhal* 3(4,5), 311-312, 322 (Reprinted with corrections in 1895, *An Gaodhal* 11(3), 25-27).
- BURT, S. D. (1987) A new North Atlantic low pressure record. *Weather* 42(2), 53-56.
- CAMERON, J. (1856) *Meteorological observations taken during the years 1829 to 1852, at the Ordnance Survey Office, Phoenix Park, Dublin*, HMSO, Dublin 603pp.
- CAROLAN, N. 'Here's good health to Asquith': songs on the old-age pension. *Ceol Tíre: Newsletter of the Folk Music Society of Ireland* March 1981, 12-16.
- CLOW, D. G. (1988) Daniel Defoe's account of the storm of 1703. *Weather* 43(3), 140-141.
- COOGAN, B. (1969) *The Big Wind*. Michael Joseph, London, 684pp.
- DANAHER, K. (1963) The Night of the Big Wind. *Biatas* 17(5) 310-315.
- DE BHALDRAITHE, T. (1977) *Seanchas Thomáis Laighléis*. An Clóchomhar, Dublin, p. 61.
- DEFOE, D. (1704) *The storm; or, a collection of the most remarkable casualties and disasters which happen'd in the late dreadful tempest, both by sea and land*. Sawbridge, London.
- DICKSON, T. (1839) January 1839 entry in the manuscript meteorological journal 1817-1855 of T. Dickson, surgeon, Royal Navy (who farmed at Tullygarvan, near Cookstown, Co. Tyrone). Original now in the archives of

- the National Meteorological Library, Bracknell. Microfilm copies held in the National Library of Ireland (n.3623) and Irish Meteorological Service Library. The microfilms also contain a weather diary for 1836-1856 from Ballimore, about 30 miles NW of Glasgow.
- DIF MSS. Manuscript volumes of Irish folklore archives held in the Department of Irish Folklore, University College, Dublin (referenced by volume and page).
- DIXON, F. E. (1959) Weather in old Dublin. *Dublin Historical Record* 15, 65-72.
- ESPY, J. P. (1841) Great Liverpool storm of the 6th and 7th January 1839, in, Espy, J. P. *The philosophy of storms*, Little and Brown, Boston, 294-300, 519-532.
- HOWARD, F. (1839) January 1839 entries in the manuscript diary of Mrs. Francis Howard of Swords, Co. Dublin, 1837-1846. MSS 3579-3580, National Library of Ireland, Dublin.
- IRISH BUILDER (1903) Ireland and the recent gale [on the management of the timber glut after the storm of 26 February 1903, reprinted from *Timber Trades Review*]. *Irish Builder* 44 (26 March), 1656-1658.
- JOYCE, P. W. (1912) Recollections of two great storms. *Catholic Bulletin* 2, 15-19.
- LAMB, H. H. (1988) The storm of 15-16 October 1987: historical perspective. *Weather* 43(3), 136-139.
- McCRACKEN, E. (1971) *The Irish woods since Tudor times: distribution and exploitation*. David and Charles, Newton Abbot, 138-141.
- McCRACKEN, E. (1969) The Arboretum, Dublin Botanic Garden, 1795-1875. *Quarterly Journal of Forestry* 63(3)i, 242-253.
- NÍ DHORCHAÍ, P. (1974) *Clár amhrán an Achréidh*. An Clóchomhar, Dublin, 157-158.
- O'DONOVAN, J. (1839) MS letter from Rathdrum dated 7 January 1839. Ordnance Survey Letters (Wicklow), Royal Irish Academy, Dublin.
- Ó GALLACHAIR, B. (1978) Oíche na Gaoithe Móire: scéal an Andrew Nugent. *An tUlltach* 55(1), 9-11.
- O'REILLY, G. J. (1988). Storm force winds over Ireland on Tuesday 9th February 1988. Unpublished internal report, Meteorological Service, Dublin.
- ORPEN, T. H. (1839) January 1839 entries in the manuscript meteorological journal 1804-1841 of Dr Thomas Herbert Orpen of South Frederick Street, Dublin. MS 12 B2. 2 I, Royal Irish Academy, Dublin.
- PETTIGREW AND OULTON (1840) *The Dublin almanac and general register of Ireland, 1840*, Pettigrew and Oulton, Dublin, 800pp + appendix.
- QUINE, C. P. (1988) Damage to trees and woodlands in the storm of 15-16 October 1987. *Weather* 43(3), 114-118.
- REID, W. (1849) *The progress of the development of the law of storms and of the variable winds with the practical application of the subject to navigation*. 2nd. edition, John Weale, London, 329-333, 342-345.
- TCD MSS. Magnetic and meteorological observations, taken between 1837 and 1863. MSS 2751-2769, Trinity College, Dublin.
- [WILDE, Sir W.] (1856) *The census of Ireland for the year 1851*, part 5, vol. 1. HMSO, Dublin, 221-222.