



## Exceptional weather events

Type of event:

Weather of the Irish Famine

Date:

1845 - 1847

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*"The potato, blight, weather, and the Irish famine"*  
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Chapter 5THE WEATHER OF THE GROWING SEASONS, 1845-7A GENERAL SURVEYThe legend of unprecedented wetness

There is a persistent tradition that the rainfall of the seasons in which blight first broke out in Europe was quite abnormal. 'It was the wet, the everlasting wet', says Large (1940, p. 42) in explanation of Lindley's preoccupation with the weather, and he goes on to describe how a breakfast-fete at the Chiswick gardens of the Royal Horticultural Society was ruined by the rain. The sagging tents had to be supported by gangs of men hastily hired by Lindley, who was secretary to the Society, to counter imminent disaster, and, when the damp festivities had ended, a whole bushelful of sodden shoes and stockings was gathered up, which had been thrown out of carriage windows as the owners drove off.

It was, no doubt, a traumatic experience, but, although the year is uncertain, it did not occur in either 1845 or 1846, when every day of these annual summer frolics at Chiswick was blessed with fine weather (Murray, 1863, p.33). It was, indeed, rainfall figures for this same Chiswick which Berkeley quoted, with doubtless unintentional irony, to show that the wetness of the 1845 growing season, either month by month or in total, was in no way abnormal. (GC, 1845, p. 837).

The same exaggerated legend attaches to the summer of 1846 in Ireland:

The month of July which was just drawing to a close in this year of 1846 had been wet beyond the ordinary 'weeping July' of Ireland. The torrential rain had practically never ceased since early in June, and the whole country lay water-logged and soaking. Mountain brooks had long since turned to torrents, and the small streams had become rivers. The great arteries of the island were unable to carry off the volume of water poured into their channels, and had overflowed in all directions. Everywhere lakes, large and small, and swamps of dark mud met the eyes. Even the turf on the hillside was sodden; where not actually flooded by the rivers, the continual rainfall had converted all the low-lying lands at the base of the mountains into morasses. Every footfall sent a miniature fountain into the air, for the mosses and close-growing grasses of the hill pastures were like sponges filled with water. (Merry, 1910, pp. 23-4)

The circumstantial detail in this account is oddly convincing; it is with an effort that one recalls as a corrective that the first three weeks of June 1846 were part of a period of great heat and dryness (Appendix 6), so that early signs of failure in the potatoes were attributed to drought (DMA, 3 July 1846), and that, in the month of September 1846, there were problems in many places in milling grain, because 'there is a great want of rain in the country and the mills almost everywhere are dry' (Distress Correspondence, 1847, pp. 85, 87, 100).

#### The origin of the legend

Two of the lesser factors which contributed to building up the bad reputations of the early summers of potato blight are common to all centuries and all peoples.

The first is the perennial conviction among those no longer young that the climate, the country and the rising generation are not at all what they were in the good old days:

I do not like to alarm the public, but I have observed a gradual atmospheric change going on in our summer atmosphere for many years past, and particularly by the increased frequency of thunderstorms, sudden whirlwinds, local torrents of rain, hail, &c.; and if I am right in my conjectures as to the causes, they, the electrical innovations, must increase in number. (GC, 1846, p. 629)

Dr. Varlez (*Journal de Liège*, 1 Sept. 1845) considered that the potato disease would never have appeared 'if winter had not got into the habit of spending the summer in Belgium'; the less sensational Decaisne (1846, p. 75) considered that it was autumn which had taken the place of summer in France. This type of popular witticism has clearly plagued meteorologists for a very long time.

The reasons put forward, sardonically or in all seriousness, for the presumed deterioration in the climate were, in this pre-atomic age, varied. Was it, perhaps, traceable to 'the shocking use of medical galvanism, so common nowadays', or to Franklin's explorations and 'our cursed meddling with the North Pole'? (AG, 23 Sept. 1845). The majority argued that it was due to the coming of the railways, with miles of metal rails disturbing the electrical balance of the atmosphere and with locomotives filling the air with alien smoke and fumes (GC, 1845, p. 361; 1846, pp. 805, 812).

The second contributory factor is the notorious shortness of the popular weather memory, and the conviction of the man in the street that the present vagaries of the weather are of a kind such as 'has not occurred since the year of the rebellion or other memorable event' (IFJ, 1846, p. 504). Words like 'exceptional' (CRASP, 1845, p. 701)

and even 'unprecedented' (GC, 1845, p. 760) were freely applied to the weather of 1845, without reference or regard to the data of previous years. It was a summer marked, it is claimed, by 'torrential rains, hurricanes, waterspouts, volcanic eruptions, drought, hail and all the elements let loose' (Bonjean, 1846, p. 106). The note of exaggeration appears in accounts, not only of the season in general, but also of what were considered to be critical days. The Dumfries Courier (quoted in NCT, 30 Sept. 1845) says that the potato disease set in north of the Tweed on 25 August 1845, after 'an interminable day of rain, followed by thunder, lightning, wind and fire'. The Cambridge Chronicle (6 Sept. 1845) dates the attack in the Wisbech area from 19 August 1845, 'which, it will be remembered, was one of the heaviest rains almost ever known'.

It was, in fact, the protagonists of the weather theory as the cause of blight who built up a formidable and persistent barrage of propaganda about the uniqueness of the contemporary weather conditions. It gradually grew into something more than 'the common tendency in all epidemics to blame the weather' (de Gasparin, 1845, p. 1339), and the familiar election of the climate as a scapegoat by men desperate to find a cause (Quetelet, 1845, p. 205). In the battle of rival theories, and, more particularly, the venom of the campaign against the fungal hypothesis, the guilt of the weather, and of the weather alone, became for many an article of faith, irrefutable by even the most telling statistics.

The Count d'Ex was apparently the first to advance the weather theory in public (MB, 12 Aug. 1845). The theme was taken up almost immediately by Lindley, with the

supporting chorus of the trio of British prize essayists (Phillips, 1847; Graham, 1847; Cox, 1847). It was trumpeted forth in its purest form by the Medical Times:

The 'potato disease' and 'potato murrain' are merely idle terms that bear no direct relation whatever to existing things. There is no 'disease', no 'murrain', properly so called; the potatoes are just rotten, and that is the long and short of it ..... Cold water is the fountain head! Take our word for it, there is no mystery in the affair; cloudy skies and drenching rains have done it all! (MT, 1845-6, p. 79)

Graham (1847, p. 388) repeated the tune with variations:

When have we had such a summer as that of 1845? Such extreme heat succeeded by long-continued gloom and chilling rains, with a temperature almost reduced at times to the freezing point?

It was a theme particularly close to the weather-conscious English heart, but the chorus was taken up all over Europe; however, as Bourson (1845, p. 16) *truly daily* pointed out, the fact that it was the majority view did not make it a scientific law; 'opinions should be weighed, not counted'.

There were discordant voices amid the general harmony. Morren (L'Indépendance belge, 20 Aug. 1845) asked, if the disease was due to rainfall, why it had not ~~yet~~ appeared in Ireland, a far wetter country than Belgium? It was a question which might have been better phrased, as blight was to be reported from Ireland a few weeks later. The point was more clearly put by Sainville (BSSPCA, II (1846-7), p. 158); the weather which France experienced in the summer of 1845 was typical of that usual in Britain and Ireland, where the potato had been grown successfully

for a very long time. The Scotsman (12 Nov. 1845) denied that 'rain has done it all', and pointed out that many earlier seasons had been as wet as the present one. Several reports to the Scottish commission of inquiry made the same point (Johnston, 1845-6, pp. 16, 79, 92); there had been many seasons of more rain, in particular in the years 1816-7, and in fact a year such as 1845 was of the type up to then considered best suited to the potato (Morton, 1846, p. 371). The oats crop had formerly thrived or suffered in parallel with the potato, yet the oats crop had done well in 1845. (Townley, 1847, pp. 6-7).

The comparison with the year 1816, which few dared claim to have had a better summer than 1845, was constantly flung in the faces of the weather theory faction. (CRASP, 21 (1845), p. 934; BSSBOA, I (1845-6), p. 486). The general crops had been a disastrous failure in that year, but the potato had struggled through, without a sign of blight.

The odd feature of the great weather controversy was that it was conducted, for the most part, on the basis of subjective impressions, with 'few direct observations and proofs' (CRASP, 22 (1846), p. 349). The party which supported the 'unique weather' theory was naturally chary of the earlier records. Those who quoted statistics tended to fall into two errors. One was to compare the weather of 1845 only with that of the previous year, which had been, in most European areas, dry and fairly warm. (Lortet, 1845; CRASP, 22 (1846), p. 555). Another, for which meteorological terminology cannot escape blame, was to assume that long-term 'normals' of rainfall and

temperature are values to which a season ought to accord, rather than mere arithmetical means of quantities which fluctuate widely from year to year. It would be exceptional for a period to strike the exact 'normal' in any one element, and unprecedented for it to show 'normal' values in every respect. Yet, for a medical man like Wilde, working from the false analogy of the 'normal' body temperature, it was easy to fall into the error of assuming that deviations from the meteorological normals were a sign of an unhealthy, even 'abnormal', season. (Census of 1851, p. 258).

There were, for most countries, only a relatively short series of meteorological records available, but they mostly sufficed, for those who troubled to consult them, to prove that the theory of quite unprecedented weather could not be sustained. Berkeley, as we have seen, found the rainfall amounts about usual for England. Milne (1847, pp. 9-18), himself a meteorologist, did a thorough survey of the weather in Scotland and parts of England. He issued a questionnaire to all known weather observers and examined the records of lighthouse keepers. He found nothing unprecedented in the weather of 1845. Nor did Quetelet (1845) in Belgium or Caillat (CRASP, 22 (1846), p. 251) in France. In Holland, Harting (1846, pp. 276-87) did an exhaustive analysis of 5 to 7 years weather data for Utrecht and Breda. He found that the rainfall was not significant, but he noted a high mean value for the air humidity in 1845, and recalled that Unger, as early as 1833, had found that high air humidity was favourable to plant diseases analogous to that which attacked the potatoes in 1845.

What of Ireland in this controversy?

The Lord Lieutenant had written to Peel on 20 October 1845:

With respect to the cause of the disease, the general opinion here is, that the season has been so ungenial, and the absence of sunshine so remarkable during the last two months, that the potato has imperfectly ripened. There is not, it is thought, anything new in the disease but its extent. (Peel Memoirs, 1857, p. 129)

He seems to have been wrong in both respects. Few experienced observers in Ireland failed to recognise blight as a new disease. Lindley's theory of a weather cause, although temporarily adopted by Moore, had already been queried:

This has by no means been the wettest season on record, and surely the degree of wetness in different parts of the same district have been almost the same, yet they have not, certainly, equally suffered. (IFJ, 17 Sept. 1845, p. 816).

Bellingham (1845, pp. 361-2) considered the disease 'altogether peculiar and unlike anything which had been observed previously' in Ireland. As to the weather theory, 'we have had seasons very similar to the last when nothing like the present disease was observed'. Farran (1846, pp. 10-12) refuted the theory by reference to past years, and, in particular, 'the truly remarkable season' of 1816. In 1845, the cereal harvest was not early, but the wheat samples were good, barley and oats excellent, and the hay of fully average quality. As regards the potato blight, if seasonal weather had 'the most remote influence in producing the disease, the species would have become extinct years ago'.

In general, the Irish farmer was too conditioned to poor summers to attribute solely to the weather so spectacular and unfamiliar a disease as potato blight.

The most comprehensive meteorological examination of the potato disease in Ireland was carried out by Edward Joshua Cooper, Climatologist, Egyptologist and astronomer. At his home in Markree Castle, Co. Sligo, he had built what was, for the time, one of 'the most richly furnished private observatories' and there he began in 1833 a series of climatological observations which has continued to the present day.

He commenced his examination of the potato disease (Cooper, 1846) by examining the proportion of diseased tubers in different sectors of that part of the countryside contained in a circle centred at Markree Castle and with a radius of  $1\frac{1}{2}$  miles. As regards meteorological data, he presented tables for fourteen years of monthly rainfall, wind direction, cloudiness, fog, barometric pressure, temperature, frosts, and thunderstorms. The only marked peculiarities he found were that night fogs and thunderstorms were unusually frequent in 1846.

#### A numerical index of the Irish summers, 1845-7

One must be careful, in discarding the extravagance of contemporary descriptions of the summers of 1845 and 1846, not to react to the other extreme. Buckman (1845, p. 9) was right in describing the summer of 1845 as one of low mean temperature and little sunshine; if not unusually wet, it had been continuously damp. The careful Berkeley (1846, p. 21 and footnote) says that the 1845 season was extremely cold and ungenial, but not really wetter than

usual. The meteorological records for Ireland (Appendix 5) confirm that the summer of 1845 was cold, moist, and dreary virtually throughout, that that of 1846 opened most promisingly but deteriorated badly later, and that the summer of 1847 was mainly fair and dry.

To bypass the difficulty of assembling, from a whole series of meteorological tables, an integrated impression of a whole season, it is convenient to use the index suggested by Foulter (1962). This provides a single rating for each summer, based on the mean temperature, total rainfall and total sunshine duration for the months June, July and August. It is, naturally, a rather crude parameter, designed to give an overall impression of a summer as it affects the ordinary man, but, within its limits, it proves, in practice, to be a reasonable method of assessing different years.

Morgan (1965) has calculated the Foulter index for Dublin for each year in the period 1880 to date, using the meteorological data for the Phoenix Park. The average value over this period is 345; a summer with a rating below 330 may be considered as poor, and one with a rating above 360 as good. The exceptionally fine summer of 1959 had a Foulter index of 403; that of 1958, which was the worst in recent years, had an index of 279.

Using the temperature and rainfall figures for the Phoenix Park (Ordnance Survey Met. Returns, 1856) and the cloud cover data for Trinity College (TCD Met. Returns, 1869), an approximate Foulter's index has been calculated for each of the summers of the years 1845-7. The respective values were found to be 305, 355 and 370.

The summer of 1845 emerges as distinctly below average, and of a kind which recurs on an average about once in ten years. Its poor rating arises primarily from the very low mean temperature of the season (although it was not as cold as the summer of 1912). Similarly 1846 owes its position as an average sort of summer to its high mean temperature, and to the fact that it included nearly a month of hot, dry weather. The summer of 1847 was dry and rather sunny, but the mean temperature was about average.

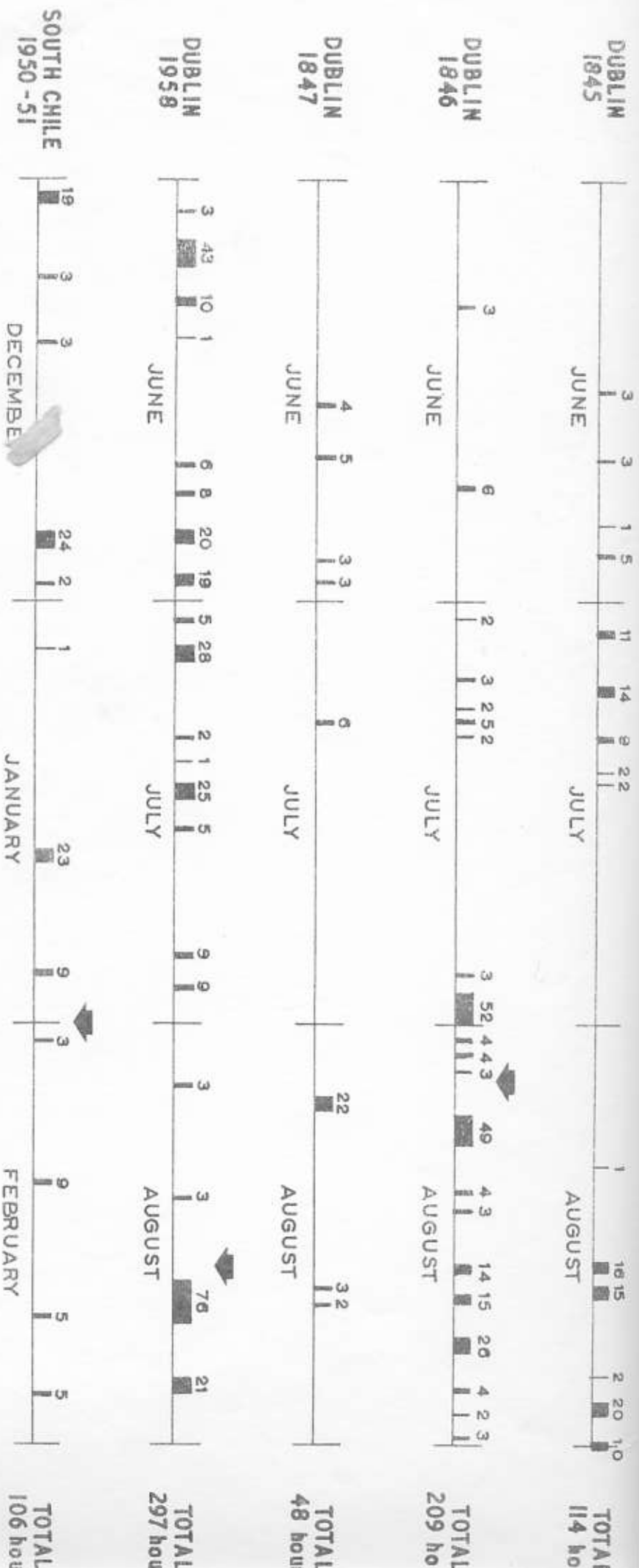
#### Blight weather in the Irish summers of 1845-7

Poulter's index is a poor indicator of how favourable a season is for the spread of potato blight, which has rather specialised weather requirements. Thus the coldness of the summer of 1845, which mainly contributed to its poor rating, would tend to inhibit the spread of blight. Indeed this may be a partial explanation of why the disease stopped short in 1845 of the Scottish Highlands, with their still lower temperatures (Figure 17), and why mountainous areas in Ireland escaped lightly in the same year. (INF, 1845, p. 1185; 1846, p.177).

It will be recalled that Harting (1846) found that in the Netherlands the air humidity in 1845 was higher than normal, a factor favouring many fungi. Woodham-Smith (1962, p. 101) claims that the warmth and 'continual rain' of 1846 were material in creating conditions which 'favoured the spread of the blight fungus to an extent which has not been recorded before or since'. To what extent is this correct?

On the basis of the humidity and temperature requirements discussed in chapter 4, the occurrence and effective duration of blight weather periods in the summer months of 1845-7 have been calculated from the Phoenix Park meteorological observations, with cross-reference to the T.C.D. data. In the absence of hourly reports, some ambiguity is inevitable; in all cases of doubt, the validity of the period has been accepted and, in addition, some flexibility in the minimum temperature has been permitted, as the Ordnance Survey station in the Phoenix Park tended, then as now, to be about  $1^{\circ}\text{F}$  colder than other stations in the Dublin area. Accordingly the situation as regards blight weather in Dublin in the years 1845-7, as shown in <sup>Figure 15</sup> ~~Fig. 15~~, represents the maximum likely to have occurred in these years, and is possibly slightly exaggerated in comparison with the modern data for Dublin (Dublin Airport) in 1958 and South Chile (Valdivia) in 1950-1. (Bourke, 1956)

Keeping this reservation in mind, we may compare the different years (Fig. 15). The worst season, for the duration of blight weather, was 1958. There was considerable blight weather in 1846, but much of it occurred in August after the foliage had been destroyed. The ~~total~~ of favourable weather to the time of killing of the tops was about <sup>90</sup> ~~80~~ hours, in close agreement with what happened in Chile in 1950-1. In the modern Irish case (Dublin 1958), the crop held out for 200 hours.



The blocks show the dates and effective duration of blight weather (in hours). The arrows show the approximate date of 75% defoliation of potato plants in the years where this occurred before the end of August (or February).

Fig. 15 Distribution and effective duration of spells of blight weather during the summer months in Dublin in 1845, 1846, 1847 and 1958, and in South Chile in 1950-1.

There was little blight weather in the dry summer of 1847, yet the short periods which occurred caused isolated blackened fields in early July, and the substantial spell in August brought an obvious intensification of the disease, and temporary panic. In general, however, the crop remained green to the end of the season and the yield was very good (Census of 1851, p. 280).

Using modern experience in the application of weather data to blight forecasting, and assuming all other factors to be as they are in Ireland today, we would have expected 1847 to be a year of little or no blight even without spraying. In 1846, the forecast would have been for disease well above average, but the tops would have been expected to survive until about the end of August. In both these years, the course of the disease was markedly more severe than modern Irish experience would suggest from the weather data alone. Fungicides are not so generally or frequently applied in the drier climate near Dublin to explain the difference. The higher susceptibility of the varieties then grown and cultural practices which increased the number of primary foci were clearly very important factors, as they were in Chile in 1950-51, in the rapidity of destruction, which was by no means a reflection of weather conditions alone.

On the other hand, the course of potato blight in Ireland in 1845 was markedly slower. Even in modern times, one would have expected the disease to be obvious by mid-July and to be causing appreciable damage by late August. If we compare the early blight weather of 1845

with that of 1846 and 1847, we should have expected by mid-July to hear of blackened fields in many places. In fact, no trace at all of the disease could be found in many areas as late as mid-September of that year. The explanation can only be that inoculum was scarce or absent early in the 1845 growing season, that the disease had been very recently introduced to Ireland, and that the gradual late spread of the fungus in the autumn of 1845 was a necessary prelude to the early and destructive attack of the following season. This interpretation is confirmed by examining the weather of a season such as 1841 when nearly 150 effective hours of blight weather occurred in the month of July alone; had the blight fungus been then in Ireland, its ravages could not have passed unnoticed.

No positive evidence is to be found that potato blight existed in Ireland at any time before 1845. It is true that Stevens (1933, p. 445) claims that the disease was 'well established' in Ireland in 1842, but it can be shown (Bourke, 1966) that this statement is no more than the final link in a long chain leading back to a misinterpretation of a report from Florence Court, Co. Fermanagh in 1845 (GC, 4 Oct. 1845). It provides an interesting example of how a false rumour, handed on uncritically from author to author and gaining extra conviction and persuasive detail at each transfer, can snowball into an accepted fact.

THE WEATHER AND FARMING IN IRELAND IN 1845

We shall, in this chapter, review, season by season, the sequence of weather in Ireland in the year 1845, with particular reference to its impact on agricultural activities. We have already, in Chapter 5, discussed the general character of the summer weather and its suitability for the spread of potato blight. A more detailed examination of certain aspects of this year's weather - in particular, the occurrence of thunderstorms, high winds, and frosts - will be found in Appendix 6. For completeness, we begin with a brief summary of the winter of 1844-5.

Winter : December 1844-February 1845

The last month of 1844 was, on the whole, dry and extremely cold, with some snow. The first three weeks of January were appreciably milder, but the temperature dropped again towards the end of the month. February was a uniformly cold month, the lowest minimum temperature at Phoenix Park of 23.5°F falling on the first day. Wilde quotes as proof of the severity of the weather a report that the hares on some of the Wicklow mountains had turned white. (Census of 1851, p. 258). It was, apart from some intermissions, a harsh winter indeed, but it was even more severe in Britain and on the Continent. Carriages were driven across the frozen Elbe, and movable bridges on the Rhine were removed for fear of floating ice (GC, 1845, pp. 25, 99, 150, 170).

Spring : March-May 1845

The first three weeks of March continued and intensified the trend which the winter had set. At Phoenix Park, the cold on 14 March reached a point far below any touched during the preceding three months, with a minimum air temperature of  $15.5^{\circ}\text{F}$ . 'The frost was so intense that the River Liffey was frozen over, above Kings-bridge - a very rare occurrence at this period of the year' (Ordnance Survey Met. Returns, 1856, p. 293, footnote). This must have been a quite temporary phenomenon for it escaped comment in the Dublin newspapers, which, while they confirmed the intense cold and snow throughout Ireland, gave picturesque confirmatory illustrations only for London, where not only were the lakes in Kensington Gardens covered with ice, but the milk in pails and even the froth on beer was reported to be frozen. (DEN, 17 March). It certainly was a period of remarkably low temperatures over a wide area (GC, 1845, pp. 186, 210, 292; IFJ, 1845, p. 410).

It made a fine introduction to the agricultural year, for the severe cold killed pests and broke down the soil to a fine tilth for the spring crops (GC, 1845, p. 422; JA, 1845, p. 34). All that was now needed was milder and reasonably dry weather for the sowing.

On 23 March, temperatures rose to about twenty degrees Fahrenheit above their level of three days earlier. Spring had come and, despite an occasional air frost in April and a hoar-frost on 11 May, it was to remain. Not only that but it continued remarkably dry, with 34 days without any rainfall in Phoenix Park during the months April-May. Here the total rainfall over the three spring

months was 65% of normal; at Portlaw, 68%; at Limerick, 69%; at Sligo, 72%; and at Armagh, 88%. Sowing began early in the season and was quickly finished, leaving the way clear for the poor labourer also to plant his potatoes earlier than usual. A constabulary report from Arva, Co. Cavan (Constab. reports, 1845) comments upon the early sowing of potatoes in this year. Despite the non-meteorological problems of the poor man, the general planting of potatoes was nearly over by 4 May 1845 (IFJ, 1845, p. 281), instead of just getting under way about that time:

The sowing of the potato crop is fully one month in advance this year, an invaluable blessing to the humbler classes, who generally suffer much privation during the interval between the exhaustion of the old and the supply of the new, and staple provision of the vast majority of the population of this country. (IC, 21 June 1845)

Some rainfall in early May made farming prospects still brighter (IFJ, 1845, p. 333). In places, the potatoes were already above ground, so much had the 'recent mild moist weather' encouraged rapid growth, and farmers were urged to earth them up to protect them from late frost (IFJ, 1845, p. 287).

Further warm rain at the end of May and beginning of June completed the favourable picture (HG, 7 June 1845). The coming harvest, early and abundant, should come up to 'the most sanguine expectations'. Grain crops had never looked as healthy in early June. The hay - the heaviest and earliest crop for many years past - would be saved before the end of June. The potatoes, planted early and having escaped dry rot, were 'now safe'. 'The recent rains, which we learn to have been pretty general, have done incalculable

good to the entire country'.

Summer : June-August 1845

After the beneficial rain of the first week of June, the weather turned warm and mainly dry for a further two weeks. At the end of the second week, temperatures soared to the seventies for three brief days, a succession which was not to occur again for the remainder of the summer. In England, this change was greater and more abrupt, and did some damage to vegetation (JA, 1846, p. 224); it also appears to have lasted longer, in some areas at least (Graham, 1847, p. 361). But in Ireland, any tendency towards early drought was negatived by heavy dews and interludes of rain, and the effects on vegetation were wholly beneficial:

This morning there fell what good old people would call 'a shower of honey'. The leaves of the trees were literally covered with a rich sweet dew, similar in colour and taste to virgin honey (LC, 14 June 1845).

The crops universally in the south and west of Ireland are in a most promising condition. The alternate heat and rain caused a great improvement, especially in the meadow and grass lands. (LC, 18 June 1845).

In Wexford, a luxuriant grass crop, yielding twice as heavily as the previous year, was being mown on 18 June; in Limerick, the first crop of strawberries was ripening. The promise of an abundant harvest, in every particular was considered to be unprecedentedly good. (LC, 18 June; NG, 25 June). Things were equally good in Scotland, but somewhat less hopeful in England (JA, 1845, p. 34).

'The genial and bounteous' rain which set in on 24 June was very welcome at first (LC, 25 June). But it expanded into the first really wet spell of the year (roughly 24 June-13 July), and the rainfall at times was extremely heavy, more than one inch falling in Dublin on 3 July. The claim that as much rain fell in Athlone in the first fortnight of July as during the four previous months (Census of 1851, p. 258) is not consistent with the observations (Jones, 1849, p. lxxi), but it is true that the level of the Shannon rose sharply in July after showing a net fall in each of the previous five months. (Ibid.). Not only was the rain persistent and at times heavy during this period, but there were also gales and thunderstorms (See Appendix 6(b) and (d)). Flooding and damage followed; fishermen were lost at sea and the potato crop in exposed places was buffeted by the high winds (LC, 28 June, 5 July; CJ, 30 June; IFJ, 1845, p. 585).

In Limerick, the third of July, 'the second only of the dog day season, was characterised by such a cold, wet and wintry aspect that many householders had to re-light fires in their rooms, which they had given up for the summer' (LC, 5 July). There were destructive floods in Ulster; in low lying areas, potato crops were submerged and looked 'very badly' when the waters subsided; in sloping areas, soil erosion by heavy rain removed 'the soluble parts of the ground' (CC, 12 July). It was learned with envy that, meanwhile in Paris, the weather was so hot that several horses fell dead in the boulevards (LC, 12 July). Prayers were called for to the God of the Harvest at this critical period (CC, 10 July).

The festival of St. Swithin, 'that ominous personality', was marked in Limerick by showers, 'no index, we trust, of forty humid days' (IC, 16 July). This 'degrading superstition' (JA, 1846, p. 225) was, luckily, once again at fault. The next ten days were dry and warm, and spirits soared again:

Summer in its most fervid, glowing and splendid features, appears to have set in at last, and the corn fields are ripening fast towards the golden hue of full maturity. The height of the thermometer indicates a very warm temperature. (IC, 23 July).

With the sun hot and powerful, and the weather remarkably fine, every hope was entertained that the crops would yet be all that could be wished or hoped for. (HG, 19 July)

The pendulum was soon to swing back with the onset of the second spell of bad weather from about 27 July to 10 August, again featured by thunderstorms and heavy rain (HG, 2 Aug.). The continued rain 'spread universal gloom and despondency' (IC, 6 Aug.), and Catholic and Protestant joined in prayers for good weather (CC, 2 Aug.; IC, 6 Aug.; WI, 16 Aug.). Later, this period was to be blamed for laying the foundations of the potato disease (IC, 11 Oct. 1845), but, in fact, it provided only a short period of blight weather. Lengthier blight spells occurred later in August, for although the heavier rains ceased after 8 August, and there were a number of dry days in the following week which renewed forecasts of an abundant, if late, harvest (IC, 16 Aug.), there was some rain or drizzle on most days afterwards until 26 August.

Autumn : September-November 1845

From 27 August to 12 September, little or no rain fell and the harvest was pushed forward in 'most delightful weather'. 'There is not, we believe, on record a finer harvest week than the September of this year has so far proved itself' (LC, 30 Aug., 6 Sept.)

This is a convenient point to consider how the yields of crops, which had got away to such a flying start up to late June 1845, were affected by the later rainy periods. Wheat we should expect to have suffered some reverse and perhaps barley too; the more rugged crops, like potatoes and oats, should have thrived in this season, despite local flooding and lodging, more particularly since they had the benefit of an unusually early start. The trend of grain prices suggests that wheat supplies were about the same as the previous year, barley slightly up on 1844 supplies and oats abundant. (Baker, 1883, pp. 286-7).

In Scotland, the grain harvest was late. Wheat was of inferior quality and damaged by rust but had not lodged as much as might have been expected. It did not yield abundantly. Barley suffered in quality but not in quantity. Oats cropped heavily and hay was abundant. Had there been no potato disease, the potato 'would have yielded both a great and a good crop' (JA, 1845, pp. 130-1; 1846, p. 228). The crop reports for the North of England broadly agreed (CC, 1845, p. 598). The grain harvest here also was late, and Irish migrant workers who have travelled to England at the usual time suffered great privation as they waited for work (CC, 26 Aug. 1845).

For Ireland Trevelyan (1848, p. 39) gives the following summary of the 1845 crops:

The wheat crop was a full average; oats and barley were abundant; and of turnips, carrots and green crops, including a plentiful hay harvest, there was a more than sufficient supply.

The account given by O'Brien (1896, p. 66), although superficially less optimistic about oats and barley, appears, in fact, to be a mere rewording of Trevelyan's verdict:

A further compensation, too, was found in the fact that the other crops had that year proved to be exceptionally abundant. Wheat was a full average; oats and barley the same; and there was an ample supply of turnips, carrots, and other green crops, together with a plentiful hay harvest.

The Quakers confine themselves to the general remark that the yield of the potato, before subtracting disease losses, had been unusually plentiful, and that the grain crop was also abundant. (Society of Friends, 1852, p. 30).

Contemporary opinion in Ireland was virtually unanimous that the yields of oats and pre-blight potatoes were markedly high in 1845. 'Potatoes give every promise of being a noble and most abundant crop' (KM, 3 Sept.). 'The potato crop is in quality excellent and in quantity most abundant' (CC, 9 Sept.); this latter dogmatic statement was in reply to an anxious enquiry from England. A comprehensive review of the harvest (DEP, 13 Sept.) rates wheat at more than an average, oats as abundant and very fine, and potatoes so plentiful that disease and

exports were expected to still leave a 'full average crop of sound potatoes' for home consumption. Another review (CC, 26 August) agreed that the potential potato crop was never better, but was less happy about the wheat crop, which had, in places, shown signs of red rust, blight and mildew (NG, 16 July, 23 Aug.).

There had never been so abundant a harvest of oats, said Mr. Gavin at a meeting of the Dublin Corporation, and he was echoed by Mr. Reynolds who argued that the deficiency caused in the potato crop by disease would be more than compensated by the extra oatmeal. They were challenged, not on the point of the bumper harvest, but on how the poor could purchase the oats (DEM, 22 Oct.).

The same consoling aspect of high oats yield was mentioned by Dillon Croker: 'the oaten crop was never so abundant, nor the stacks so numerous in haggards' (IC, 10 Dec.). A report from Ballymore, Co. Westmeath, dated 24 November, claimed:

There has never been for many years such a stock of grain in the haggards as at present; all seem determined in hoarding up for the 'sore foot' or hard times, so we feel quite warranted in hazarding the opinion that 1846 will not be a year of scarcity in this part of the country (NG, 3 Dec.).

The point is important, for if we accept that the 1845 oats crop was a bumper one - say, 1 cwt. per acre above the normal yield, using the immediate post-famine fluctuations as a guide - then the surplus 8% provided, on the basis of Table 13, an extra 125,000 tons of oats for human usage in Ireland over and above the normal supply.

This is a far from negligible figure in the grain accounts of the period; it represents, for example, more than the total imports of Indian corn in 1846 (Table 12).

As regards crops other than oats and potatoes, it may be significant that one report singled out the 'poor man's harvest' for special praise (LE, 13 Sept.). The bigger farmers' crops - wheat and barley - were clearly far from outstanding, but, in the absence of other than isolated complaints, they may be presumed to have been about average. The hay harvest was, as we have seen, early and abundant; but flax did poorly, less because of bad weather than because of fraudulent adulteration of the imported seed. (IPJ, 1845, p. 374).

Let us return to the weather of mid-September, with much of the grain harvest saved. There was rain at Phoenix Park on all but two days from September 13th to the end of the month, but it was substantial only on the 17th and 25th. Both these periods of heavier rain were associated with blight weather. Moore was later to suggest that potatoes dug in Dublin prior to 20 September were less affected by disease than those dug later (IPJ, 1845, p. 1035); a dividing date at least four days earlier would fit more closely with the meteorological data. The agreement is happier in the case of the Clontarf farmer who had all his potato stalks pulled and carted away on 16 September, and who later reported that his crop was sound, well grown and fit to 'endure the pit' (DEM, 15 Oct. 1845).

There were two consecutive nights of sharp frost before the end of the month (See Appendix 6(e)).

In the first twenty days of October there were only four without rain at Phoenix Park, and the rain was heavy on the 2nd - 4th and on the 13th. The rise of real panic about tuber disease may be dated from the heavy rains of the first days of October which occurred during a blight period: 'Very wet weather, however, set in at the beginning of October, a week subsequent to which a material change for the worse was observed' (Bellingham, 1845, p. 360).

The last ten days of October were mainly dry, but continued the mildness that had characterised its earlier days (IFJ, 1845, p. 986). A sprig of wild strawberry, 'fully grown and merging fast into the rich saffron shade of maturity' bore witness to the unusual mildness of the late season, but, simultaneously the Kerry mountains became tipped in snow. (LC, 12 Nov.). November, and indeed December also, had few dry days, and temperatures were, on the whole, rather low.

#### Winter : December 1845-February 1846

Not only rain and lowish temperatures characterised the last two months of 1845, but also gales and high winds. The first month of the new year was very wet; February, in contrast, extremely dry. What the two months shared was a really remarkable mildness which extended to England also (Williams, 1846). The temperature in Dublin reached 50°F or above on 32 days in the winter of 1845-6, as against 13 days in the preceding winter, and only 6 in the one which was to come. The only snow of the year fell in a short cold snap about St. Patrick's Day. Self-sown nasturtiums were green above the ground at Trim on

11 February 1846, daffodils bloomed abnormally early on 25 February, and the blackthorn, with temporary snow on its branches, set a new record by blossoming on 18 March (Butler, 1863, pp. 209, 215). Despite the rain, the mildness of the winter came as a great immediate blessing for the Irish people, for not only food but fuel was in short supply; the earlier rainy weather had made it difficult to save turf in sufficient quantities. (LC, 27 Aug. 1845). But, in the long term view, the winter of 1845 laid the foundations, as we shall see in chapter 8, for the greater disaster which lay in store in the coming year.