The Hurricane at Bewdley

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This is an account of the trees blown down and damaged at Bewdley and Ribbesford by the hurricane, on Sunday evening, July 6th 1845.

Below is a transcription of an article, with this title, from the Bewdley Civic Society Newsletter, Summer, 2010, which the Editor, Mr. K. A. Hobson, has allowed the Wyre Forest Study Group to use. The article affords a glimpse, by an eyewitness, of orchard fruit production near Bewdley in the mid-19th century.

However, after much searching, there is no record of the author or the source of the particular article, although the internet yields numerous references to the same event. The Newsletter presents a copy of what would seem to be the original, the text is in two columns; the data on the left and the comments on the right. The print is small and would appear similar to that seen in magazines or journals of the period, of which there were very many, such as the 'Gentleman's Magazine', and 'Rural Gleanings', apart from newspapers. A transcription follows, as the original is not clear enough for printing in the present 'Review' format.

TRANSCRIPT OF THE DATA (left hand column)

"In the Borough of Bewdley			
APPLE TREES	*Blown up by the roots*	*216*	
	Broke off in the trunk	*151*	*518*
	Broke off in the boughs	*214*	
PEAR TREES	*Blown up by the roots*	*52*	
	Broke off in the trunk	*71*	*183*
	Broke off in the boughs	*60*	
CHERRY, PLUM and other fruit trees	*Blown up by the roots*	*108*	
	Broke off in the trunk	*151*	*344*
	Broke off in the boughs	*85*	
OAKS	*Blown up by the roots*	*93*	
	Broke off in the trunk	*71*	*253*
	Broke off in the boughs	*89*	
ASH, ELM and other trees	*Blown up by the roots*	*37*	
	Broke off in the trunk	*47*	*151*
	Broke off in the boughs	*67*	
		TOTAL	*1512*
In the Lordship of Ribbesford			
APPLE TREES	*Blown up by the roots*	*26*	
	Blown off in the trunk	*35*	*134*
	Blown off in the boughs	*73*	
PEAR TREES	*Blown up by the roots*	*4*	
	Blown off in the trunk	*3*	*21*
	Broke off in the boughs	*14*	
CHERRY, PLUMS, and other fruit trees	*Blown up by the roots*	*6*	
	Broke off in the trunk	*6*	*22*
	Broke off in the boughs	*10*	
OAKS	*Blown up by the roots*	*90*	
	Broke off in the trunk	*56*	*262*
	Broke off in the boughs	*116*	
ASH, ELM, and other trees	*Blown up by the roots*	*32*	
	Broke off in the trunk	*49*	
	Broke off in the boughs	*67*	
	RIBBESFORD	***TOTAL***	***587***
	BOROUGH	***TOTAL***	***1512***
		TOTAL	***2099***

The number of fruit and other trees blown down in the parish of Dowles, adjoining to Bewdley, and in a few fields on the banks of the Severn opposite to Dowles, taken by another person, amounts to 379. GRAND TOTAL 2468 " (This should be 2478 BMS)

Transcript of the text of the article (right hand column)

"The above account is not taken from hearsay, but from the writer's own observation. He has made a survey himself and seen all the trees above enumerated. He has not included in the account those which were only broken in the smaller branches; to have specified these would have greatly augmented the number. He has only enumerated, 1st, those blown up by the roots; 2ndly, those broken or twisted off in the trunk; 3rdly, those much broken in the larger boughs. No one can form an adequate conception of the force of this hurricane or tornado unless they had witnessed its effects. The writer has seen trees that were torn up by the roots, bringing up with them 15 to 20 tons of soil and rock; he has calculated the quantity by admeasurement; oak and fir trees, from 8 inches to 15 inches in diameter broken off in the trunk; others were split in two from top to bottom, leaving one half standing; some were broken off and the heads carried more than 100yards; others twisted like a wythe; others splintered into pieces as small as lucifer matches. Specimens of these are now in the writer's possession. Some of the trees blown down contained 300 feet of solid timber. A great number of very fine old pear trees (one of which in 1843 yielded fifty bushels of pears) were blown down, after having stood the blast more than a century. The large and beautiful Ribbesford Oak (mentioned in Nash's History of Worcestershire), which must have been many centuries old, suffered greatly, its larger arms being torn off, containing 250 feet of timber. There is a natural curiosity on the glebe land of Ribbesford. A large yew tree grew out of the trunk of an oak; the oak was 15 feet in circumference, the yew is seven feet in circumference and eight feet high in the trunk and is still standing. The present trunk of the yew was formerly the roots which grew in the oak, and still retains the appearance of the roots twisted together. The oak must be probably 1000 years old or upwards, as it was apparently an old pollard oak when the yew berry was dropped into it, and the yew, which is a tree of very slow growth in the best situations, must have required several centuries to reach its present size. About thirty years ago the yew burst one side of the oak as above stated, but is now entirely blown away. The line of the storm in the above parish, from south to north, was about two miles and a half in length, and not more than half a mile in breadth on an average, that is to say, about one mile along the borough of Bewdley and a mile and a half along the Lordship of Ribbesford."

Discussion

The author's account is self explanatory, but unfortunately omits details. We learn nothing of which varieties of fruit, areas of orchard and spacing of trees, exact locations or age of trees. That so many trees were broken in the trunk and branches suggests that they were under stress and hence more brittle than normal. However, the implications of the facts presented do allow some insight into the state of local orchards and standing timber, in a small, specific area at a precise time 167 years ago.

Although 1845 was the height of 'Railway Mania' the railway at Bewdley was 16 years from opening, in 1861. So importantly the article confirms that there were extensive commercial orchards before the railway. These would probably have been mostly trees for cider and perry and used locally for brewing, with some culinary varieties for domestic use and local sale, and pollination.

Orchard management has altered over the years, but the counts of damaged trees permit estimates of acreages. There are two basic orchard planting plans, the square, and the triangular, with the trees in adjacent rows alternating, which allowed more trees per acre. (Table 1)

Table 1. The number of trees per full acre with planting at various distances apart (After Bagenal, 1939).

Distance apart in ft. (= x0.3048m)	Square plant	Triangular plant
40	27	31
30	48	55
20	09	125

Apples

Standard apples would probably have been spaced at 30 feet apart, thus, from Table 1, 48 or 55 per acre. A total of 715 apple trees (table 2) would correspond to

Table 2. Summary of Damaged Trees

	Apples	Pears	Cherries etc.	Oaks	Ash
Bewdley	581	183	344	253	151
Ribbesford	134	21	22	262	148
TOTALS	715	204	366	515	299
Fruit trees total 1285	55.6%	15.8%	28.4%	-	-
Acres (estimated)	15 or 13	7.5 or 6.5	7.6 or 6.6	-	-

13 acres on the triangular plan or 15 acres on the square plan. How many trees were undamaged we are not told.

Pears

Old large trees are mentioned particularly, and would, at this time, have been at 40 foot spacing, and planted on the square plan. As above, 204 trees would represent 7.5 or 6.5 acres.

Cherries, plums and other fruit trees

Other fruit trees would include damsons, planted mostly in hedgerows, sometimes in orchards, and perhaps some walnuts and in the grounds of the big houses like Sandbourne possibly almonds, figs, gages, mulberry, quince, medlar and mirabelle. Hazel was grown as an under crop with cherry, as can still be seen in Lower Park, Bewdley, and Sweet Chestnut grown as coppice, as seen near Devil's Spittleful, but these probably would not be blown or broken so easily. Standard cherries were probably growing at 30 or 40 feet apart, while plums would be at 20 or 25 and walnuts at 40 or 50 feet apart or more likely as individuals. We are not told of the proportion of cherry to plum etc. Let us assume that the 366, were mostly at 30 feet, which would correspond to 7.6 acres.

Hardwoods

We can learn something of the hardwoods from the few snippets of detail. No doubt the wood from the 515 oaks damaged would be well used. There are several ways of estimating the useful cut timber from the cylindrical log, quoted in cubic feet. "He has calculated", but the author does not say how. The "square" method reckoned the useful volume as the largest square beam which could be cut, $2 \div \varpi$, giving about 64% of the actual volume. The "Hoppus." formula reckons the volume of a log to be $(\frac{1}{4} \times \text{girth})^2 \times \text{length}$, which amounts to 79% of the cylinder when converted. This rule, known to Evelyn in 1664 was publicised by Hoppus in 1736, and is still widely used. (Rackham, 1980). So "300 feet" is a good sized tree. The high price of timber from 1790-1850 encouraged larger trees, shifting the balance of age composition within woods. Then prices slumped resulting in many large trees remaining uncut.

Over the centuries numbers of standard oaks per acre have varied from 5 to 40, so estimating acreage is not meaningful. The 515 damaged oaks at 20 per acre would mean about 25 acres damaged. A 1543 statute, the "Acte for the preservacion of woods" required a minimum of twelve standard trees per acre "not felled... till they...shalbe of tenne ynches square within thre fote of the ground". Many of the blown trees seem to have been young oaks (8") or staddles, left behind at felling to become the next crop, presumably less than ten inches 'square'.

Many standard oaks in Wyre now are above 15 inches in diameter and about 100 years old. Measures of local oaks indicate an average growth rate of 0.124 inches per year adding twice this to the diameter. On this basis 15 inches diameter gives an age of 60 years for oaks, this would mean growing from 1785. Fir trees, ash and others would probably grow faster than oaks.

In this relatively small area of river valley in 1845 we can estimate roughly 13-15 acres of apple orchard, about 7 acres of pears and about 7.5 acres of other top fruit, say roughly 30 acres in all, and clearly fruit growing on a commercial scale, but this reflects only the damaged trees. There is no indication of the proportion of orchard trees damaged by the storm, and no hint of the total land area under top-fruit plantation. Even so, at least 30 acres, is clear evidence that fruit formed an important part of the local economy in 1845.

Even thirty acres of top fruit would require a regular supply of labour for picking and transporting as the season progressed, first cherries from late May to early July, plums in August, pears from September probably mostly perry pears, then apples, probably mostly cider fruit, and damsons from September into October. The population of Bewdley in 1850 is estimated at about 3500, (Barrett, 1991), so one could presume that seasonal casual labour was hired for fruit picking as indeed traditionally necessary for harvesting.

Information on fruit yields is rare. Mention of a pear giving 50 bushels in 1843 is significant. The term bushel derives from Old French ' boissiel', box. It is a dry measure of volume of 8 gallons of grain or fruit. The Imperial Bushel equalled 2219.36 cubic inches (or 36.248 litres). Fifty bushels would amount to 400 gallons. A gallon of water weighs 10 lbs, so 50 bushels of water would be 4000 lbs or 35.7 hundredweight. Say one and three-quarter tons from one tree.

Where were these orchards? The early maps do not give such detail. The Bewdley area was first surveyed by the Ordnance Survey in 1882-3, and first editions of the maps covering Ribbesford and Blackstone published in 1883. Orchards are shown, but of course these cannot be related to any state of affairs prevailing 40 years previously. Plantations at Ribbesford are shown on the hillside between Ribbesford House and the Church and two large fields north and east of the farm. One of these has more widely spaced dots suggesting old trees of Perry pears. Across the river, at Blackstone Farm, several

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fields of orchard on the flat ground extend between the river and the road, from the Rock upstream to where the By-pass now crosses. The map shows woodland on the slopes below Winterdyne, as nowadays; some orchards in Lower Park behind Kateshill and the Vicarage, as nowadays; a small plot in what is now Jubilee Gardens; another on the site of Load Street car park and the Medical Centre, otherwise no fruit trees in the path of the Hurricane either side of the river.

Upstream of Bewdley from the same 1882-3 survey, but first published 1889, there are large orchards on Summer Hill between Grey Green Lane and the railway, and two large plantations at Northwood House, alongside the railway, to the east. The 1845 Tithe Map for Dowles Manor suggests two areas of orchards in two fields along the riverside south of Dowles church. On the west bank a few acres at Dowles Farm completes the picture. To establish a large orchard requires capital and a substantial, speculative, long-term commitment, and again as nowadays, prospects of reliable markets. With conservative farming traditions and economic cycles it would be quite probable that orchards existed on the same sites 40 years before the map record. Cherry trees did not start cropping for about ten years and short term crops were planted underneath.

There was a depression in farming after the Napoleonic wars, for twenty years, but conditions improved markedly in the five years from 1836. So one might expect a mixture of old mature fruit trees, neglected and vulnerable, and young trees newly planted. Both kinds would have suffered.

From around 1790 there was great interest in fruit and the beginnings of scientific farming and horticulture stimulated by the work of Joseph Banks (1743-1820), and locally, Thomas Andrew Knight (1759-1836). Knight, particularly, analysed cider apple juice and reared new varieties of fruit and vegetables, with for the first time known parentage. For various reasons it would be likely that commercial fruit production, mostly cider apples, established around 1800. Thus one could suspect that the main areas of devastation in the path of the tornado were at Ribbesford Farm, Blackstone Farm, Summer Hill as the maps suggest.

The Tornado

The final sentence describes the storm. It drove up the River Severn valley from about where the Bewdley football ground now lies, (SO788727) northwards to about Dowles railway bridge (SO780765). If the width of damage was about half a mile then the wind would have funnelled over the flood-plane between the steep sides of the valley. The orchards would have been mostly near the river on the drift of the first river terrace and the Triassic sandstones. The hardwoods would probably have been as hedgerow trees, especially the elms, with the oaks mostly as woodland on the valley sides to the west, on the heavier land of the Upper Carboniferous.

The storm described as a 'hurricane' in Bewdley on 6th July 1845 would have been a classic example of a TORNADO. Hurricanes (West Indies), or typhoons (China Sea), or cyclones (Bay of Bengal), are regional names for the same tropical phenomena in late summer. A tornado is caused by completely different conditions. They can occur when warm moist air at ground level lies below cold dry air giving rise to strong vertical convection currents. An intense whirl of wind develops to about a quarter mile diameter with a reduction of air pressure of 100 to 300 millibars within a few metres of the centre. Wind speeds may exceed 200 miles per hour. In Britain they are most common in the English Midlands, from May to July, almost always in the afternoon, and occasionally cause severe, but very localised damage. They follow roughly in a straight line at 20 to 40 miles per hour dying out after several miles. The accompanying diagram shows the general distribution of tornadoes, and it can be seen that Bewdley would be close to the expected western limit.

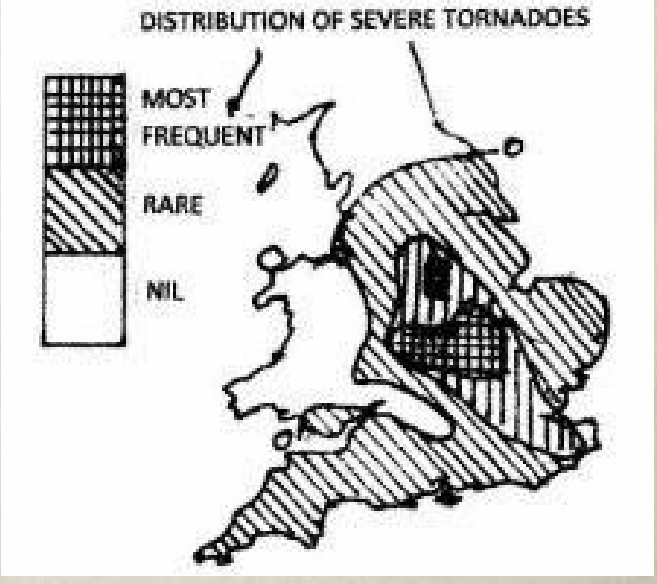

Figure 1. The Incidence of Tornadoes in England (After Goudie 1984)

What were weather conditions like in 1845? The Met Office (formerly the Meteorological Office) was set up in 1851 and no formal data from instrumentation exists before that time. There are private weather diaries for Bewdley for 1838-1840, but none for 1845 from Herefordshire or Worcestershire.

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A publication, "Records of the Season" for 1845, gives some market prices; harvest from 16 August to 11 September; "Wet and cold season, potato disease. Severe frost set in January 27, and continued till March 21, with some heavy snows. Coldest February for 50 years. No such March on record. Warm April. May, cold and gloomy. June fine and bright. July showery and hot, with awful thunderstorms. August, rainy, gloomy, and cold for the season. September, fine for the harvest, unsettled at the end. October, very wet to 11th, then dry, with sunny sky to the end. November, fine, dry, and warm to 15th, then rain and wind. December, wet, windy and mild. Very severe time, and great snows to March 21st. A very bad year."

Another article, 'Rural Gleanings', page 130, "July from 2nd to 9th, very hot sultry weather. The thermometer on 3rd, 84°, and on the 7th, 87°. On the 3rd, early in the morning, a severe thunderstorm all along our Eastern Coast, and in Berkshire, it had been awful, with the loss of two lives. On the 6th night the Midland Counties had a most terrific storm. Hereford, Gloucester, Worcester, Warwick, Northampton, and Nottingham, all felt its violence. .... The latter part of July was very gloomy and rainy, and the notable Potato Disease came on about the 20th day, a great and memorable scourge upon this Kingdom, and widely opposed to the beneficial turn of season at the same period of the preceding year,.."

"The Hurricane at Bewdley" on the 6th July 1845, would have been something to remember.

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