

3.92 6 APRIL 1580 DOVER STRAITS

The earthquake of 1580 is one of the largest ever to have affected the British Isles, is one of the most famous of all British earthquakes, and is certainly the best-documented earthquake in the period covered by this report. Accordingly, it has been heavily studied, notably by Soil Mechanics (1982), Ambraseys and Melville (1983), Neilson et al. (1984) and Melville et al. (1996). The account presented here is not intended to be a full description, and draws largely on the four studies listed above, especially the last, which has the fullest collection of continental sources.

The earthquake struck on Wednesday in Easter week, at around 18h or a little earlier.

Despite the numerous accounts preserved, there are still some difficulties in assessing intensities for this event. As is so often the case, accounts speak more about damage to special buildings – churches and castles – than to ordinary houses. To take examples only from Kent, the tower of the church of St Peter’s, Broadstairs was cracked from top to bottom (Hasted 1800; the repairs can still be seen today – see Figure X), St Peter’s and St Mary’s churches in Sandwich were both cracked (Boys 1792), and the church of St Peter and St Paul, Sutton (near Dover) was partly thrown down (Hasted 1800). Damage to ordinary houses is mentioned at none of these locations, but one suspects that this is more due to a sense that what happened to plebeian housing was not worth recording, than to an actual absence of damage. Significant damage to churches in British earthquakes is unusual, and comparable effects are only to be found amongst later events in the case of the 1884 Colchester earthquake, in an area over which the intensity was 7 or 8 EMS. Thus the maximum intensity in England should have been in this range.

Writers who do mention damage to houses are Fleming (1580), Churchyard (1580) and Wood (1796). Fleming (1580) reports householders in London complaining that £20, £30, not even £100 would be enough to meet the cost of repairs. Churchyard (1580) is more precise in describing the fall of chimneys and small pieces of stone and mortar from the tops of houses in London (particularly Shoreditch). Wood (1796), following an entry in the Annals of Merton College (Fletcher 1976) speaks of great damage to both the foundations and roofs of houses and churches in Kent.

The effects in London gave rise to such alarm that many printed pamphlets were rushed out, four of which have survived and provide source information: those by Churchyard (1580), Fleming (1580), Golding (1580) and Twyne (1580 – see also Ockenden 1936). The style of these leans heavily towards the theological; generally more space is given to explaining the need for repentance in the face of this warning from God, than to description of the effects of the earthquake. The work by Fleming (1580), though, is interesting in providing the earliest catalogue of British earthquakes (Musson 2004). A special prayer-book was issued to be read in churches and by families for protection against further shocks (Strype 1821). Churchwarden’s accounts from the period sometimes contain entries recording purchase of the prayer-book (price sixpence) as at Wootton St Lawrence, Hants. (Williams 1913). The first of these pamphlets, “A godly newe ballat moving us to repent by ye example of ye earthquake happened in London ye 6. of Aprill 1580” was issued the very next day after the earthquake, price fourpence (Arber 1875). The author is unknown, and no copy has survived, but Collier (1849) cites a MS ballad which he suggests is this one. As it is little known, three stanzas may be given here:

*It came at eve, as Aprill day
Shut up its water eye,
And fillde all London with dismaye,
And that all suddenly.
In open streete
Did all men meete
Leaving their houses shaking fearfully.*

*The belles of as themselves did toll
 The knell of all the people:
 Huge stones fell downe, and others roll
 From tower and from steeple.
 These none could shun,
 Though fast they run:
 They soon ore tooke and killd both whole and creeple.
 In one short minute, strange to view,
 The cittie stood amazd,
 Confusion rangde the wardes all through;
 Exhe on his neighbor gaz'de.
 All were agast,
 But soone it past:
 If it continued, London had been razde.*

For the role these pamphlets played in contemporary religious (Catholic-Protestant) controversy, see Hamilton (2005). For their social impact, see Walsham (1999).

A curiosity is related, that, the day before the earthquake, at Debden in Essex, a sermon was preached by Laurence Chaderton on the text Joel iii 16 (“The heavens and earth shall shake, but the Lord will be the hope of His people”). This caused some people to imagine Chaderton was inspired to prophecy, when the earthquake occurred the next day (Shuckburgh 1884).

This earthquake was also the first occasion in Britain on which we have specific information on earthquake fatalities (Musson 2003). Two child apprentices, Thomas Gray and Mabel Everite were struck by stones falling from the roof of Christ’s Church, Newgate, in London. The boy was killed outright; the girl died of her injuries a few days later.

North and west of London the earthquake was generally felt and alarming at Norwich (Blomfield 1805), Saffron Walden (Harvey 1885) and Oxford (Wood 1796); isolated damage included the fall of the top of the steeple at Stoke, near Hinckley, Leics. (Burton 1777). The shock was certainly felt as far west as Bristol (Seyer 1823) and possibly Stoke St Gregory in Somerset (Somerset RO MS D/P/Sto.St.g. 2/1/1). To the north, it was felt in York, but the statement in, for instance, Roper (1889) that bells were rung and stones fell from buildings in York is certainly a misreading of Camden (1607). An imperfectly dated observation from Edinburgh (Chambers 1858) may represent an intensity 2 EMS in that city (which had perhaps the tallest houses in Britain at this date). Twyne (1580) believed that the shock was felt generally throughout the whole of Britain, including Scotland, but this does not seem to be based on anything.

On the continent, the strongest effects are reported from Calais, where several houses are reported to have been thrown down; the town walls were damaged and part of the watch-tower collapsed (Haton 1862, Bernard 1715, Bellart and Vion 1991). At Boulogne, damage was done to the church of Notre-Dame, and in houses even heavy furniture was displaced (Hauttefeuille and Bernard 1860, Bellart and Vion 1991).

Damage in France extended to Arras (Bellart and Vion 1991), Douai (Registre 1580) and Lille (Particularités 1728), though the last of these (a detailed 18th century account based on unknown source materials) is doubted by Melville et al. (1996) – and may relate to storm damage the following year. Damage in the Rouen-Pontoise area, described in one contemporary source (Discours merveilleux 1580) seems to have been surprisingly high.

In Belgium, the damage seems to have been significant in Oudenaarde, where falling stones and tiles killed some and injured others. Damage to chimneys extended as far as Brussels (Pottre 1861).

The furthest limits of the earthquake on the continent are marked by Amsterdam and Hoorn in the Netherlands (Hooft 1677, Velius 1740), Liège (Lancaster 1901) and possibly Cologne (Le

Petit 1604, Camden 1607 – no local sources have been found for this, according to Melville et al. (1996). To the south it was felt not especially strongly in Paris (Haton 1862) and no more distant records have been found in this direction. It was strongly felt as far west as Le Havre (Pleuvri 1796), where a commemorative procession was organised. If in England the religious reaction took the form of a prayer-book, on the continent it took the form of processions. That in Calais was made an annual event, only discontinued in 1701 (Bernard 1715).

One contentious issue is whether this earthquake produced a tsunami, as stated, for instance, by Varley (1996). Such arguments are based on two observations: the first is that at Sandwich in Kent “the sea so foamed, that the ships tottered” (Stow 1601). This is evidently a direct effect of the earthquake shock waves on boats, and possibly seiching, and nothing to do with tsunamis. The second is a contemporary French pamphlet (*Discours d’une* 1580) which describes the sea flooding in at Calais and Boulogne with great destruction and hundreds of deaths. This is unbelievable, partly because of the lack of any confirmation of these dramatic consequences in other accounts, and partly because the pamphlet describes the loss of ships at sea (which cannot happen in a tsunami) and even uses the phrase “grande horrible tempeste de la mer”. It also speaks of further destructive flooding between 4h-5h the following day, again, not consistent with a tsunami. There was no storm on the day of the earthquake, but possibly some slightly later storm has been merged with the reports of the earthquake by the anonymous writer. Melville et al. (1996) suggest that perhaps the earthquake caused the collapse of some embankment protecting low-lying land, resulting in floods at high tide on the 6th and 7th April – but this does not explain the reported losses of ships at sea. Whatever the explanation, *Discours d’une* (1580) cannot be taken at face value.

The intensity values given here differ from those in previous studies, but are closest to Melville et al (1996). The difficulty here is giving values to very limited information. Neilson et al (1984), with the aim of comparing different intensity scales, give literal “point intensities” to each damage report, which will not serve here. On the other hand, one should not try and guess what the intensity ought to have been for a location for which there is a bare report that the earthquake was felt, which tends to be the practice in SHWP (1995). In the present study 7-8 EMS has been assigned to Broadstairs and Sutton in Kent (meaning 7 or 8, not 7.5) on the grounds that shaking strong enough to cause the reported damage to churches must have caused a good deal of unreported damage to ordinary houses. However, one cannot really assign any intensity to Dover, where the reports focus on secondary damage to the castle. A “D” has been given to problematic damage cases, including far-field reports and reports that may attribute to the earthquake damage from the storm the following year. For details of the effects in each place, see Neilson et al. (1983), SHWP (1995) and Melville et al. (1996).

<i>Place</i>	<i>Latitude</i>	<i>Longitude</i>	<i>Intensity</i>
Abbeville	50.10	1.83	4-5
Aire	50.63	2.40	6-7
Amiens	49.90	2.30	5
Amsterdam	52.35	4.90	F
Antwerp	51.22	4.42	F
Arras	50.28	2.77	6
Axel	51.27	3.92	F
Beauvais	49.43	2.08	5-6
Béthune	50.53	2.63	D
Bishop's Stortford	51.88	0.15	5-6

Boulogne	50.72	1.62	7
Bristol	51.45	-2.58	F
Broadstairs	51.37	1.45	7-8
Bruges	51.22	3.23	5-6
Brussels	50.83	4.33	6-7
Calais	50.95	1.87	7-8
Cambrai	50.17	3.23	F
Caudebec-en-Caux	49.53	0.73	F
Chateau-Thierry	49.05	3.40	5
Chauny	49.62	3.23	F
Clairmarais	50.77	2.30	F
Cologne	50.93	6.95	F
Dammartin	48.90	1.62	F
Debden	51.97	0.25	F
Dendermonde	51.03	4.10	F
Dieppe	49.92	1.08	5
Douai	50.37	3.08	6
Dover	51.13	1.32	D
Drenthe	52.75	6.50	F
Duisburg	51.43	6.75	F
Dunkirk	51.03	2.83	5-6
Edinburgh	55.95	-3.22	2?
Edwardstone	52.03	0.83	F
Ely	52.40	0.27	5
Ename	50.85	3.63	F
Fécamp	49.75	0.38	5
Friesland	53.05	5.75	F
Gent	51.03	3.70	6-7
Gisors	49.28	1.78	F
Gravesend	51.45	0.40	F
Great Massingham	52.77	0.67	F
Harelbeke	50.85	3.32	F
Hatfield	53.57	-1.00	F
Hazebrouck	50.72	2.53	F
Hoorn	52.63	5.05	F
Hythe	51.08	1.08	6
La Fère	49.67	3.37	F

Laon	49.57	3.62	5
Le Havre	49.50	0.10	5
Leyden	52.17	4.50	5-6
Liège	50.63	5.58	F
Lille	50.65	3.08	D
London	51.50	-0.08	6
Lydden	51.15	1.25	D
Mantes	48.98	1.72	F
Mechelen	51.03	4.48	F
Mons	50.30	3.97	6-7
Montreuil	50.47	1.77	F
Norwich	52.63	1.30	5
Noyon	49.58	3.00	5
Oudenaarde	50.83	3.62	7
Oxford	51.77	-1.25	5
Pamele	50.84	3.61	F
Paris	48.87	2.33	3-4
Pilton	51.17	-2.59	F
Poissy	48.93	2.03	F
Pontoise	49.05	2.08	5-6
Postling	51.10	1.07	D
Rochester	51.40	0.50	F
Rouen	49.43	1.08	6-7
Saffron Walden	52.07	0.25	5
Salisbury	51.08	-1.80	F
Saltwood	51.08	1.08	6-7
Sandown	51.28	1.33	F
Sandwich	51.27	1.34	6
Schiedam	51.92	4.42	6
Soissons	49.38	3.33	F
Saint-Amand-les-Eaux	50.45	3.43	5-6
Saint-Germain-en-Laye	48.88	2.07	F
Saint-Omer	50.75	2.25	F
Staines	51.43	-0.50	F
Stoke Golding	52.57	-1.40	D
Stoke St Gregory	51.04	-2.93	F
Sutton	51.19	1.34	7-8

Tenterden	51.08	0.68	F
Tirlemont	50.80	4.95	5
Valenciennes	50.37	3.53	5
Windsor	51.48	-0.63	F
York	54.00	-1.08	F
Ypres	50.85	2.88	6-7
Zichem	51.00	4.98	D

Table 41 - Data for the earthquake of 6 April 1580

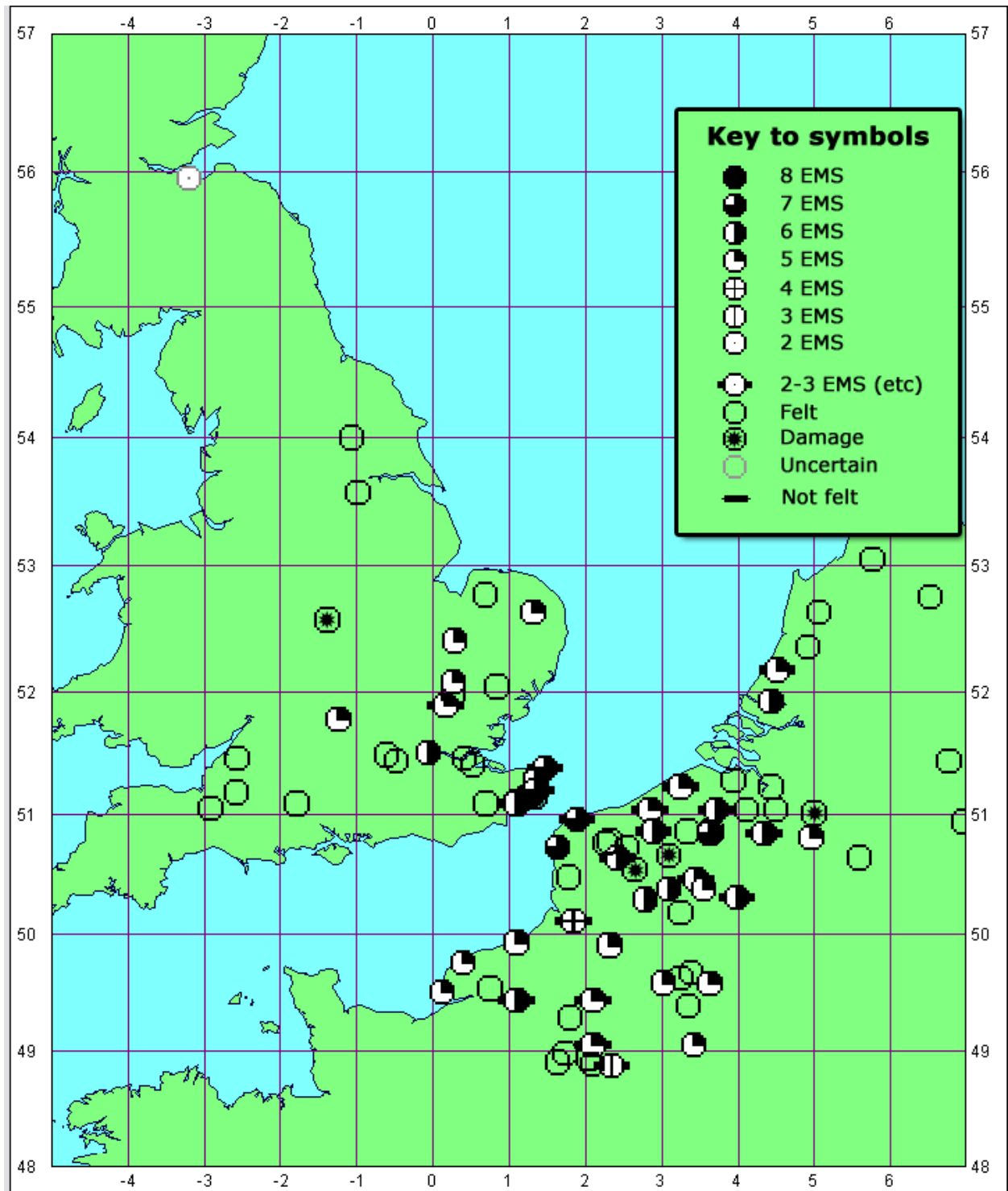


Figure 40 - The earthquake of 6 April 1580