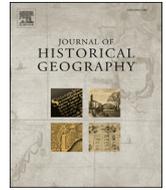




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## 'A dreadful phenomenon described and improved': Reverend John Fletcher's account of the Buildwas earthquake of 1773

James P. Bowen\*, Neil Macdonald

Department of Geography and Planning, University of Liverpool, Roxby Building, 74 Bedford Street South, Liverpool, L69 7ZT, United Kingdom



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## ABSTRACT

Earthquakes are of interest to geologists and physical geographers, yet rarely attract historical geographers' attention. This paper uses contrasting representations of the Buildwas, Shropshire, 'earthquake' of 1773 to reconstruct the course of the event and its immediate aftermath. The contemporary mapping of the scene records the changes in the physical landscape, with the hillside slippage blocking the River Severn, a vital inland navigation route, forcing a new channel to be cut. This paper examines the role of Reverend John Fletcher, a prominent theologian and leading figure in the Methodist movement, who preached on the site immediately following the event drawing Biblical parallels from a providentialist perspective. However, Fletcher was the epitome of an eighteenth-century 'clerical naturalist' and his account provides equal attention to the moral and physical causes of the event, including numerous personal testimonies. Reviewing the evidence and its interpretation, this paper questions why contemporaries who debated the precise causes referred to it as an 'earthquake', or alternatively a landslip, contextualising their discussions in the wider intellectual movement of the Enlightenment and debates about the relationship between 'science' and 'religion'. It shows how this local event was compared with other well documented earthquakes at London and Lisbon in 1750 and 1755 respectively, influencing how contemporaries understood what happened at Buildwas. Furthermore, our analysis indicates that it was not an 'earthquake', but rather a landslip following a period of prolonged precipitation combined with high river levels which probably undermined the slope.

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All wonder at the strangeness of the overthrow: some ascribe it to an earthquake; others to a slip of the ground; and not a few remain neuter, confessing that providence has conducted this phenomenon in such a manner, as to confound the wisdom of the wise, and force even philosophers to adore in silence the God of nature.<sup>1</sup>

In the early morning of 27 May 1773 a remarkable event occurred at a place called 'the Birches' located on the hillside above the River Severn between Buildwas and Coalbrookdale in Shropshire. After

several days of rain, and with the river in heavy flood, the hillside above slipped into the valley below completely blocking the river for several days. More than eighteen acres of land were carried forward, stopping the river which subsequently took possession of its ancient riverbed. Great chasms thirty feet deep and between eight and ten yards long appeared in the hillside above, with pillars of earth four feet high left standing within the chasms, the ground below having moved a considerable distance. What is intriguing about this little-known local event is that there was a debate when it happened over whether it was an earthquake or the result of a landslip. In interpreting the event at Buildwas it is important to understand what contemporaries thought it was and why.

Earthquakes were frequently remarked upon in the medieval and early modern periods and are typically recorded in civic chronicles, parish registers, diaries and journals. Such documentary records are, however, brief and generally give little more than the date and time of the event and perhaps a few impressionistic remarks about impact. Yet, printed sources show that when an earthquake occurred in the past it was often a newsworthy event, attracting much interest with people recording what they or others

\* Corresponding author

E-mail addresses: [J.P.Bowen@liverpool.ac.uk](mailto:J.P.Bowen@liverpool.ac.uk) (J.P. Bowen), [Neil.Macdonald@liverpool.ac.uk](mailto:Neil.Macdonald@liverpool.ac.uk) (N. Macdonald).

<sup>1</sup> J. Fletcher, *A dreadful phenomenon described and improved. Being a particular account of the sudden stoppage of the River Severn, and of the terrible desolation that happened at the Birches between Coalbrook-dale and Buildwas Bridge in Shropshire, on Thursday morning May the 27th, 1773. And the substance of a sermon preached the next day on the ruins, to a vast concourse of spectators, Shrewsbury, 1773*, 17, Shropshire Archives, Shrewsbury [hereafter SA] M 15 and 665/3/89; British Library, London [hereafter BL] 8775.a.33.

claimed to have observed. Alexandra Walsham has highlighted that in the sixteenth and seventeenth centuries unusual natural disasters were often seized upon as ‘visible sermons’ by protestant ministers who put forward providentialism as a religious response, emphasising penitential judgement, communal solidarity and the need for reform.<sup>2</sup> The cause of earthquakes was also much debated in periodical literature. For example, in 1750 the *Philosophical Transactions of the Royal Society of London* published the first scientific analysis of the effects of an earthquake, drawing on amateur recorders’ accounts.<sup>3</sup> Notably, William Borlase published an account of the 15 July 1757 earthquake in Cornwall, which drew extensively on the oral testimony of local gentry, the experiences of miners working underground and his own personal observations.<sup>4</sup>

Similarly, landslips were a subject of contemporary discussion. This includes those that occurred at Much Marcle, Herefordshire in the 1570s, for which there are several near-contemporary accounts; Mottingham, Kent in 1585; Westerham, Kent in 1596; and Selborne, Hampshire in 1774.<sup>5</sup> Significantly, the latter was discussed by Gilbert White (1720–1793) in a letter published in his *Natural History and Antiquities of Selborne*, where he described the reaction of local residents who believed that the chasm which opened under their homes was the result of a landslip rather than an earthquake.<sup>6</sup> Indeed, such early accounts often reflect a divergence between those attempting to scientifically understand and differentiate between landslips and earthquakes by examining the physical causes and processes and those conflating them to support a primarily religious interpretation. As Roger Musson has noted, ‘The word earthquake was still being used for landslip occasionally in the early 19th century’.<sup>7</sup>

Eighteenth-century interpretations of such events were characteristically produced by what have been termed ‘clerical or parson naturalists’, showing that ‘religion’ and ‘science’ are not easily separated in this period.<sup>8</sup> The study of earthquakes was an adjunct of both natural history and antiquarianism, which were often pursued by those with a university education, particularly clergymen.<sup>9</sup> Rosemary Sweet’s study of antiquaries has shown the close links between antiquarianism, natural history and natural philosophy originating in the seventeenth century, with observation being the principal method of inquiry (whether into antiquities or natural phenomena), and the locality or region being the

geographical setting.<sup>10</sup> In Britain, the development of a university educated and intellectually active element of the population who were literate and interested in religion and science, and stimulated by the increasing availability of printed material, encouraged the recording of natural events including earthquakes and landslips from the late eighteenth century onwards.

Prior to the development of modern disciplines such as seismology, which emerged in the late nineteenth century, many natural occurrences including earthquakes were interpreted in an Aristotelian sense as ‘meteorological’. The ‘meteoric’ tradition, as outlined by Vladimir Janković, was essentially concerned with the empirical study of single notable events, rather than long-term processes. It was characteristically qualitative and descriptive, in contrast with the modern discipline of meteorology as a predominantly quantitative pursuit.<sup>11</sup> Those who sought to explain the causes of earthquakes frequently made reference to the meteorological conditions preceding them, specifically periods of drought, fireballs, lightning, a fall in barometric pressure, rain, hail and snowstorms, and the occurrence of the aurora borealis.<sup>12</sup> In the late seventeenth and eighteenth centuries it was believed that earthquakes, as well as other natural phenomena like meteorological events and volcanic eruptions, were caused by explosions in the bowels of the earth (known as ‘explosion theory’).<sup>13</sup> As we will show, the published accounts reporting the Buildwas ‘earthquake’ resemble those of the ‘meteoric tradition’, describing both the event itself and subsequent changes to the physical landscape.<sup>14</sup>

The categorisation of earthquakes with other natural events has meant that they have generally not been studied in their own right by historical geographers. Research into historical earthquakes has focused on those that occurred in the eighteenth century at London, Lisbon and Calabria in 1750, 1755 and 1783 respectively.<sup>15</sup> Recent research in environmental history which has emerged from the study of natural hazards and disasters, has employed techniques of

<sup>10</sup> Sweet, *Antiquaries*, 8–10.

<sup>11</sup> Janković, *Reading the Skies*, 33–36. For the development of seismology, see A. Westermann, Disciplining the earth: earthquake observation in Switzerland and Germany at the turn of the nineteenth century, *Environment and History* 17 (2011) 53–77. The word ‘seismology’, defined by the *Oxford English Dictionary* as ‘The science and study of earthquakes, and their causes and effects and attendant phenomena’, was first recorded in R. Mallet, *The Earthquake Calendar of the British Association, with the Discussions, Curves, and Maps, Etc.*, London, 1858.

<sup>12</sup> An example of this was T. Short, *A General Chronological History of the Air, Weather, Seasons, Meteors, etc.*, London, 1749, which sought to correlate the incidence of both meteorological events and ill-health. For contemporary accounts of the Lisbon and Calabrian earthquakes, see J. Michell, Conjectures concerning the cause, and observations upon the phenomena of earthquakes; particularly of that great earthquake of the first of November 1755, which proved so fatal to the city of Lisbon, and whose effects were felt as far as Africa, and more or less throughout almost all Europe, *Philosophical Transactions of the Royal Society of London* 51 (1759) 566–634 and Sir William Hamilton, An account of the earthquakes which happened in Italy, from February to May 1783, *Philosophical Transactions of the Royal Society of London* 73 (1783) 169–208. Borlase’s account of the earthquake in Cornwall in 1757 similarly describes meteorological conditions, noise, surface and subterranean movements before and during the event, see Borlase, An account of the earthquake, 499–505.

<sup>13</sup> J. Golinski, *British Weather and the Climate of Enlightenment*, Chicago, 2007, 22; R. Rappaport, The earth sciences, in: R. Porter (Ed), *The Cambridge History of Science*, volume 4: *Eighteenth-Century Science*, Cambridge, 2003, 422, 427–428; J.O. Taylor, Eighteenth century earthquake theories: a case history investigation into the character of the study of the earth in the Enlightenment, unpublished PhD thesis, University of Oklahoma, 1975.

<sup>14</sup> Janković, *Reading the Skies*, 33–54.

<sup>15</sup> The classic book concerning the Lisbon earthquake is T.D. Kendrick, *The Lisbon Earthquake*, London, 1956; P. Gould, Lisbon 1755: Enlightenment, catastrophe, and communication, in: D.N. Livingstone and C.W.J. Withers (Eds), *Geography and Enlightenment*, London and Chicago, 1999, 399–413. For a review of the impacts of the 1755 Lisbon earthquake, see D.K. Chester, The 1755 Lisbon earthquake, *Progress in Physical Geography* 25 (2001) 363–383.

<sup>2</sup> A. Walsham, *Providence in Early Modern England*, Oxford, 1999, 116–166.

<sup>3</sup> An account of the earthquake which happen’d about a quarter before one o’clock, on Sunday, September 30, 1750 by Mr. Steward to the Earl of Cardigan, *Philosophical Transactions of the Royal Society* 46 (1750) 721–723.

<sup>4</sup> An account of the earthquake in the west parts of Cornwall, July 15th, 1757 by the Rev. William Borlase, M.A. F.R.S. communicated by the Rev. Charles Lyttelton, LL.D. Dean of Exeter, F.R.S., *Philosophical Transactions of the Royal Society* 50 (1757) 499–505.

<sup>5</sup> T. Fuller, *The History of the Worthies of England*, volume 2, London, 1840, 70, 115–116. These are discussed in A. Walsham, *The Reformation of the Landscape: Religion, Identity, and Memory in Early Modern Britain and Ireland*, Oxford, 2012, 340–343.

<sup>6</sup> G. White, *The Natural History of Selborne*, London, 1987 [orig. 1789], 221–224; P. Foster, White, Gilbert (1720–1793), *Oxford Dictionary of National Biography*, Oxford, 2004; D. Worster, *Nature’s Economy: A History of Ecological Ideas*, Cambridge, 1994, 3–25.

<sup>7</sup> R.M.W. Musson, A critical history of British earthquakes, *Annals of Geophysics* 47 (2004) 597–609.

<sup>8</sup> For the role of clergy as naturalists, see V. Janković, *Reading the Skies: A Cultural History of English Weather, 1650–1820*, Manchester, 2000, 8, 78, 115–121, 123; P. Armstrong, *The English Parson-Naturalist: A Companionship Between Science and Religion*, Leominster, 2000.

<sup>9</sup> V. Janković, The place of nature and the nature of place: the chorographical challenge to the history of British provincial science, *History of Science* 38 (2000) 79–113; R. Sweet, *Antiquaries: The Discovery of the Past in Eighteenth-Century Britain*, London, 2004; Janković, *Reading the Skies*; S. Naylor, *Regionalizing Science: Placing Knowledges in Victorian England*, London, 2010, 18–57.

historical reconstructive analysis, bringing together researchers in the humanities, social and natural sciences.<sup>16</sup> Historical seismology has been particularly effective in this respect, augmenting instrumental records by drawing on a wide range of source materials and applying this knowledge in order to deduce risk and inform decision making.<sup>17</sup> This methodology has also been utilised by researchers who have adopted approaches focusing on a single notable event, such as the 1771 ‘eruption’ or bog burst of the Solway Moss, or incidences of historical flooding.<sup>18</sup>

While little attention has been paid to the social, cultural and religious context of the numerous earthquakes that occurred in the British Isles during the eighteenth century, Deborah Coen’s detailed history of earthquakes charts the development of modern earthquake science, engaging with disaster and hazard research. She illustrates, for example, how the residents of Comrie, a village in Scotland, observed a long history of seismic activity attracting national attention between 1788 and 1897. Drawing on this and other examples, Coen has suggested that nineteenth-century descriptions of earthquakes are essentially ‘stories, above all, about individuals and communities and their relationships to the land they lived on’. ‘Quaint as they may at first appear’, she argues,

earthquake reports based on human observations (‘felt reports’) hold a rich ore of information .... [I]t was on the basis of felt reports that earthquakes came to be understood as the result of horizontal movements of the earth’s crust .... Felt reports profit from the familiarity of local observers with the normal state of their surroundings: locals are in the best position to recognize anomalies such as variations of groundwater levels, unusual weather, remarkable animal behaviour, or changes in the surface of the land.

These stories can be recovered using a range of source material, thereby enabling geographical and historical comparison, an approach which it has been argued is fundamental to a ‘science of disaster’ which ‘must constantly move back and forth between the natural and the social, the objective and the subjective, the global and the local’.<sup>19</sup>

The Buildwas earthquake of 1773 provides a case study of the interpretative problem that a natural event presented to eighteenth-century observers: first, from a religious standpoint, determining whether it was a providential event; and second, whether it was an ‘earthquake’ or a ‘landslip’. The main descriptive account of the event is that of the Reverend John Fletcher (1729–1785), formerly Jean Guillaume de La Fléchère, the vicar of

Madeley and personal acquaintance of the founders of the Methodist movement John (1703–1791) and Charles Wesley (1707–1788).<sup>20</sup> In recovering the story of Buildwas, Fletcher, a clergyman, is examined through his published account and sermon, which draws more widely on the testimony of the local community, providing a detailed understanding of the event and familiarity with the local landscape. In doing so, the Buildwas ‘earthquake’ is contextualised, both from a religious perspective and within the broader field of scientific understanding in late eighteenth-century provincial Britain, illustrating how emerging scientific culture could inform, but also misinterpret, natural events. The seeking out of the causes of the supposed Buildwas ‘earthquake’ should be viewed in the wider cultural context of the spirit of the Enlightenment characterised by the advancement of science and the pursuit of non-religious explanations for such natural events which challenged providential interpretations.<sup>21</sup>

### Representations of the Buildwas ‘earthquake’

The survival of a contemporary plan detailing the effect of the ‘earthquake’ on the landscape and numerous narrative accounts allow a picture to be built up of what people thought had happened and why. We begin by describing and analysing the plan as a form of representation, discussing the event’s mapping in the wider context of eighteenth-century developments in cartography. There follows a profile of Reverend John Fletcher, the author of the main contemporary providential account and an accompanying sermon, which is further supplemented by the accounts of others. This evidence allows us to examine contemporaries’ views of the impact on the landscape of what happened at Buildwas, detailing the chronology of physical processes prior to and during the event, and subsequent responses. Our discussion will consider how Fletcher’s religious beliefs shaped the debates over the event in order to explore the challenges that ‘science’ presented to prevailing religious explanations. In contrast to other well-known clerical naturalists who deliberately contributed to emerging scientific discourses, it is suggested that, through his account, Fletcher inadvertently engaged with the developing culture of provincial science. We examine how contemporaries understood and interpreted the event itself, contrasting between those that claimed it was an earthquake and those who thought it a landslip. This paper argues that the event at Buildwas was likely to have been a landslip rather than an earthquake, with the use of the term earthquake reflecting its broader usage in the past, rather than specific misattribution.

### Mapping the ‘earthquake’

The most important source outlining the scale of the impact of the event is the surviving plan (Fig. 1).<sup>22</sup> It was produced by George Young (1750–1820) in 1773, and published according to an act of parliament as part of the process of reconstructing the turnpike road and restoring the river channel.<sup>23</sup> Young, who was a land surveyor, resided at Mealcheapen Street, Worcester and worked in

<sup>16</sup> For example, see D.J. Chester and O.K. Chester, The impact of eighteenth century earthquakes on the Algarve regions, southern Portugal, *Geographical Journal* 176 (2010) 350–370.

<sup>17</sup> G.J. Schenk, ‘Learning from history’? Chances, problems and limits of learning from historical natural disasters, in: F. Krüger, G. Bankoff, T. Cannon, B. Orłowski and E. Lisa F. Schipper (Eds), *Cultures and Disasters: Understanding Cultural Framings in Disaster Risk Reduction*, London and New York, 2015, 72–87; R.M.W. Musson, The use of newspaper data in historical earthquake studies, *Disasters* 10 (1986) 217–223; Musson, A critical history of British earthquakes, 597–609; C. Walker, *Shaky Colonialism: The 1746 Earthquake-Tsunami in Lima, Peru, and Its Long Aftermath*, Durham, 2010, especially chapter 2 which discusses a range of textual responses to the earthquake.

<sup>18</sup> L. McEwen and C.W.J. Withers, Historical records and geomorphological events: the 1771 ‘eruption’ of Solway Moss, *Scottish Geographical Magazine* 105 (1989) 149–157; L. McEwen and A. Werrity, The muckle spate of 1829: the physical and societal impact of a catastrophic flood on the River Findhorn, Scottish Highlands, *Transactions of the Institute of British Geographers* 32 (2007) 66–89; J. Morgan, Understanding flooding in early modern England, *Journal of Historical Geography* 50 (2015) 37–50.

<sup>19</sup> D.R. Coen, *The Earthquake Observers: Disaster Science from Lisbon to Richter*, Chicago, 2014, 4–6. For stories and storytelling, see W. Cronon, A place for stories: nature, history, and narrative, *Journal of American History* 78 (1992) 1347–1376.

<sup>20</sup> For biographical information, see *John Fletcher, 1729–1785, Vicar of Madeley*, Manchester, 1985; P. Ph. Streiff, Fletcher, John William, *Oxford Dictionary of National Biography*, Oxford, 2004.

<sup>21</sup> Janković, *Reading the Skies*; Golinski, *British Weather and the Climate of Enlightenment*; W. Behringer, *A Cultural History of Climate*, London, 2010, 156–158.

<sup>22</sup> Copies are SA 690/13; BL Maps K.Top.36.24.2.b; The British Museum, London 1856,0712.52; Herefordshire Archive Service, Hereford D96/105.

<sup>23</sup> An act for repairing and widening the road from The Birches Brook to Buildwas Bridge, and from thence to join the Watling Street turnpike road at Tern Bridge, in the County of Salop, SA q M 41.2 and q C 41.2.



Fig. 1. 'Plan of the most remarkable Effects of the Earthquake, which happened ye 27th of May, 1773: at the Birches, in the Parish of Buildwas and near Coalbrookdale in the County of Salop, upon the estate of Walter Acton Moseley, Esq. Survey'd & Drawn By George Young.' Source: SA 690/13.

Gloucestershire, Herefordshire, Shropshire and Worcestershire.<sup>24</sup> He produced a plan of the city and suburbs of Worcester in 1779, and plans of canals from Newport to Penkridge and Shrewsbury to Donnington Wood or Wrockwardine, Shropshire in 1792 and 1793 respectively, having become a member of the Society of Civil Engineers in 1786.<sup>25</sup> Fletcher described him as 'an ingenious person of this neighborhood'.<sup>26</sup> The discovery of the plan provided the inspiration for this paper. It details the change in the river's course, showing the alignment of 'The Old Course of The Severn' and 'The Present New Channel' (through 'Wilkinson's Meadow'). Marked is the 'Former Situation of the Turnpike Road' which linked Ironbridge and Much Wenlock, a house, garden and hedge which had been moved in the process, the remains of a barn which had been destroyed, ending up at the bottom of one chasm, and 'Birches Brook'. It shows that there were many large breaches in the land on the north and east sides of the river, particularly in 'The Birches

Coppice' marked on the plan. The title, references and explanation of the map state that 'the Birches' and land affected was part of the estate of landowner Walter Acton Moseley.<sup>27</sup>

The plan is rare for this period in that it illustrates the impact of the hill slope failure on the topography and subsequent movement of the river channel, presenting an early example of geomorphological mapping.<sup>28</sup> A similar example is John Chapman's rudimentary woodcut which shows 'the myraculous mouing and sinking' of nine acres of land at Westerham, Kent, in 1596. Chapman's woodcut also details changes in topography and vegetation, but with much less precision, and gives a list of names of eye witnesses 'for the testimoniall of the truth hereof'.<sup>29</sup> The later plan, however, together with an estate map of Buildwas manor from 1650 (Fig. 2) allows for comparison before and after the event and shows how modes of map production and forms of representation had changed between

<sup>24</sup> *The Universal British Directory of Trade, Commerce, and Manufacture ...* volume 4, London, 1798, 865; S. Bendall, *Dictionary of Land Surveyors and Local Map-Makers of Great Britain and Ireland, 1530–1850*, volume 2, London, 1997, 577; V. Scott (Ed), *Tooley's Dictionary of Map Makers Revised Edition Q-Z*, Tring, 2004, 425.

<sup>25</sup> Plan of the city and suburbs of Worcester, from an actual survey, by G. Young, 1779–80, BL Maps K.Top.43.65.3 and SA DP562; Canal from Shrewsbury to Donnington Wood or Wrockwardine, 10 November 1792–June 1793, SA DP289; Newport to Penkridge Canal, 9 November 1792, SA DP285.

<sup>26</sup> Fletcher, *A dreadful phenomenon*, 16.

<sup>27</sup> Buildwas court roll, 13 October 1777, records the altering of the manorial boundary as a result of the event, SA 2089/1/145–46.

<sup>28</sup> The earliest geomorphological map is C. Packe, *A New Chorographical chart of East Kent*, 1743.

<sup>29</sup> J. Chapman, *A most true report of the myraculous mouing and sinking of a plot of ground, about nine acres, at VVestram in Kent, which began the 18. of December, and so continued till the 29. of the same moneth. 1596*, London, 1596.



Fig. 2. Estate map of Buildwas manor in 1650. The Birches tenement comprised twenty two parcels marked 'X' numbers 150 to 171. Source: SA 6344.

the mid seventeenth and late eighteenth centuries.<sup>30</sup>

The main function of Young's plan was to show the position of the river and the turnpike road. Significantly, it provides an example of a 'scientific map' that pre-dates those of the nineteenth century typically concerned with agriculture, geology, landownership and industry, particularly mining, that formed an important part of the 'visual culture of science'.<sup>31</sup> Furthermore, the plan speaks for itself, showing a two-dimensional visual representation

of the surface vegetation, geomorphological features and dimensions of the earth's movement. It thus parallels the 'sections and views' of the Lisbon and Calabrian earthquakes analysed by Susanne Keller and the 'emergence of a visual language of geological science' in the late eighteenth and early nineteenth centuries as identified by Martin Rudwick.<sup>32</sup> This period saw the growth of 'mapping' to illustrate spatial changes in topography and geological strata, as illustrated by the work of William Smith.<sup>33</sup> The accurate mapping of the Buildwas 'earthquake' to scale corresponds with improvements in cartographic practice during the eighteenth

<sup>30</sup> Map of Buildwas manor, 1650, SA 6344. There is a further map of the 'Birches tenement, Slip farm and Flatt Coppice, Buildwas circa. 1812–1815', see SA 2089/5/2/32. The location of 'Birches Coppice' and the site of 'The Slip' are marked on Ordnance Survey, sheet 242, Telford, Ironbridge and The Wrekin. 1:25,000. OS Explorer Series map, Southampton Ordnance Survey, 2005.

<sup>31</sup> S. Naylor, Geographical mapping and the geographies of proprietorship in nineteenth-century Cornwall, in: D.N. Livingstone and C.W.J. Withers (Eds), *Geographies of Nineteenth-Century Science*, Chicago, 2011, 345–370.

<sup>32</sup> S.B. Keller, Sections and views: visual representations in eighteenth-century earthquake studies, *British Journal for the History of Science* 31 (1998) 129–159; M.J.S. Rudwick, The emergence of a visual language of geological science, 1760–1840, *History of Science* 14 (1976) 149–195.

<sup>33</sup> H.S. Torrens, Smith, William (1769–1839), *Oxford Dictionary of National Biography*, Oxford, 2004.

century which saw maps as a technological development that facilitated the administration and functioning of the state. In his account Fletcher includes detailed descriptions and measurements of the chasms given to him by a 'friend', presumably Young.<sup>34</sup> The plan can also be interpreted not simply as evidence, but as one form of representation of knowledge, that can be read and interpreted alongside Fletcher's account. As Simon Naylor has suggested, 'Whether they were concerned with the communication of scientific or economic information, maps might all be read as texts that expressed forms of proprietorship'.<sup>35</sup> The plan is prominently inscribed to Walter Acton Moseley, the proprietor of Buildwas Park, whose estate included the lands affected. In its more local context the fact that the effects of the event were mapped is suggestive of the large-scale changes to the landscape, in particular the turnpike road and impact on the local community.

The plan was printed and published, and would have had a wider audience than manuscript maps like Fig. 2. It was, therefore, part of the way in which geographical information was presented and increasingly distributed to a wider audience through printing in the eighteenth century.<sup>36</sup> Furthermore, it illustrates how what was labelled an 'earthquake' in the title reflected the state of geographical knowledge and understanding of natural events at that time. The emerging confidence in precise surveying of the effects of the event is comparable to the standardisation and improvements in measurement experienced within meteorology in the eighteenth century.<sup>37</sup> It supports Janković's view of the parallel existence of 'two dissimilar empirical approaches' – the qualitative reporting of extraordinary weather events and the rise of quantitative measurement – and his argument that, by the late eighteenth century, there was a general acceptance of a scientific approach.<sup>38</sup> For Buildwas, qualitative reporting and an attempt to quantitatively measure the scale of geomorphic changes are both evident, framing the interpretative understanding of contemporaries. Having considered this quantitatively-based visual representation of the event, discussion now focuses on the written contemporary accounts and their version of what happened.

#### Reverend John Fletcher's account

There are a number of narrative accounts of the event complementing the surviving plan and providing detail as to the impact of the supposed 'earthquake' on the landscape. The main published account is that of the Reverend John Fletcher (Fig. 3), the vicar of nearby Madeley, approximately three miles away from Buildwas. Fletcher was born at Nyon on Lake Geneva, Switzerland. He was educated at the University of Geneva before pursuing a short-lived military career and travelling to England where he became tutor to the sons of Thomas Hill (1693–1782), Member of Parliament for Shrewsbury whose Shropshire residence was Tern Hall, Atcham,

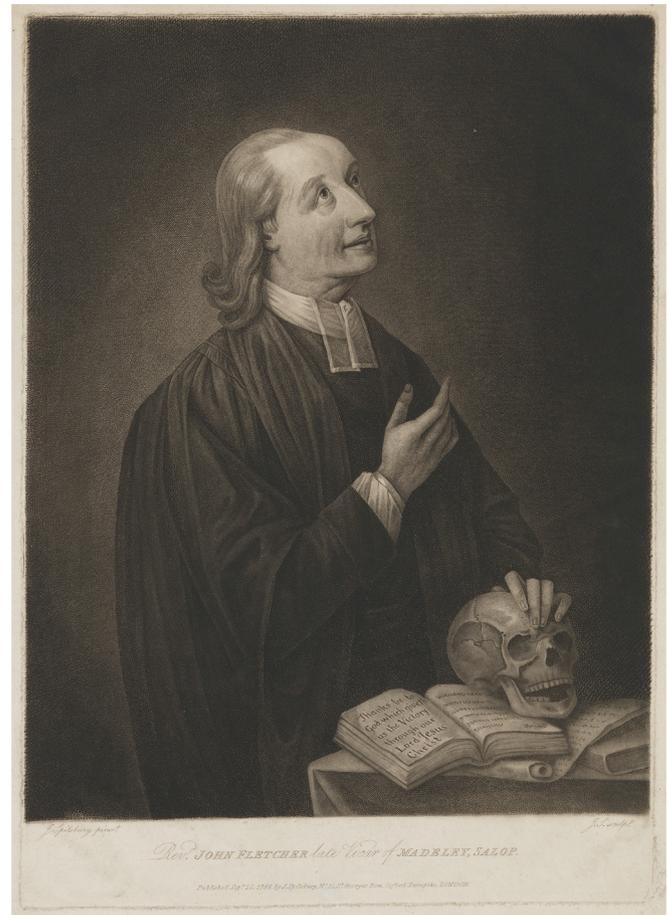


Fig. 3. John William Fletcher by Jonathan Spilsbury (1760–1790), mezzotint, published 1786. National Portrait Gallery, London, D1971.

four miles south-east of Shrewsbury.<sup>39</sup> Whilst in London in the autumn of 1753, Fletcher attended a Methodist service, after which he sought a religious life. He was ordained deacon and priest in the Church of England on 6 and 13 March 1757 and installed as curate on 14 March 1757, subsequently becoming vicar of Madeley in October 1760. He became a notable theologian – the so-called 'saint' of Methodism – and consequently has been studied by church and Methodist historians.<sup>40</sup> During this period there was a crossover of interest between beneficed clergy and Methodism, which operated as an adjunct to and often in conflict with the established Church until they separated after the death of John Wesley in 1791. Notably, in 1773 Wesley proposed that John Fletcher should be his successor within the Methodist movement, but Fletcher refused.<sup>41</sup>

Fletcher was a prolific writer, publishing numerous tracts and religious texts while ministering to what was a challenging parish, given the economic and social changes associated with industrialisation.<sup>42</sup> He was an archetypal provincial 'man of letters'

<sup>34</sup> For a description of the chasms, see Fletcher, *A dreadful phenomenon*, 14–16.

<sup>35</sup> Naylor, *Geological mapping*, 364. For a summary, see A. Sills, *Eighteenth-century cartographic studies: a brief summary*, *Literature Compass* 4 (2007) 981–1002.

<sup>36</sup> For example, see D. Livingstone, *The Geographical Tradition: Episodes in the History of a Contested Enterprise*, Oxford, 1992; C.W.J. Withers, *Placing the Enlightenment: Thinking Geographically about the Age of Reason*, Chicago, 2007.

<sup>37</sup> T.M. Porter, *Trust in Numbers: The Pursuit of Objectivity in Science and Public Life*, Princeton, 1995.

<sup>38</sup> Janković, *Reading the Skies*, 33–36.

<sup>39</sup> B. Coulton, Tutor to the Hills: the early career of John Fletcher, *Proceedings of the Wesley Historical Society* 47 (1989) 94–103; B. Coulton, Tern Hall and the Hill family: 1700–1775, *Transactions of the Shropshire Archaeological and Historical Society* 66 (1989) 97–105. For biographical information about Thomas Hill, see [http://www.historyofparliamentonline.org/volume/1754-1790/member/hill-\(formerly-harwood\)-thomas-1693-1782](http://www.historyofparliamentonline.org/volume/1754-1790/member/hill-(formerly-harwood)-thomas-1693-1782) last accessed 23 January 2019.

<sup>40</sup> J. Marrat, *The Vicar of Madeley: John Fletcher. A Biographical Study*, London, 1902; P.S. Forsaith, *John Fletcher*, Peterborough, 1994; Streiff, Fletcher, John William; G. Hammond and P.S. Forsaith (Eds), *Religion, Gender, and Industry: Exploring Church and Methodism in a Local Setting*, Cambridge, 2011. For Fletcher's religious activities at Madeley, see G.C. Baugh, Madeley including Coalbrookdale, Coalport, and Ironbridge, in: G.C. Baugh (Ed), *Victoria County History: Shropshire, Volume 11: Telford*, Oxford, 1985, 61–62.

<sup>41</sup> H.D. Rack, Wesley [Westley], John (1703–1791), *Oxford Dictionary of National Biography*, Oxford, 2004.

<sup>42</sup> B. Trinder, *The Industrial Revolution in Shropshire*, Chichester, 2000.

corresponding in a national 'republic of letters'.<sup>43</sup> His writings, in a chorographical tradition, reflect events in the locality and region; for instance, deaths in local pits and mining works, the horrors of the furnaces and ironworks and the physical nature of work undertaken by bow-haulers, gangs of six or eight men on the River Severn who 'fastened to their lines, as horses to their traces' hauled boats upstream and were 'bathed in sweat and rain!'<sup>44</sup>

Fletcher's account of the 'dreadful phenomenon', published on 6 July 1773, was written in the immediate aftermath of the event at Buildwas, and, along with the plan, provides sufficient evidence to build up an accurate picture of what happened (Fig. 4). The account was printed by Joshua Eddowes (1724–1811), a printer and bookseller based in Shrewsbury, who billed Fletcher for three hundred copies of the pamphlet which were sold for one shilling each.<sup>46</sup> Accompanying this is an open-air sermon which Fletcher preached on the ruins the day after to more than a thousand spectators.<sup>47</sup> Further editions of his account were printed and published at Bristol and London. Notoriously self-effacing, his publication is more reflective of his evangelical concerns than that of a deliberate engagement with scientific society, compared to other notable 'clerical naturalists'.

When Fletcher approached the scene of the 'earthquake', the first thing he came to was Buildwas Bridge, which separated the parishes of Buildwas and Madeley and appeared to have been destroyed. The turnpike road had also disappeared. As he wrote, 'nothing presented itself to my view, but a confused heap of bushes, and huge clods of earth, tumbled one over another'. He commented that 'The River also wore a different aspect. It was shallow, turbid, noisy, boisterous; and came down from a different point. Whether I considered the water or land, the scene appeared to me entirely new'. Fletcher followed a track made by spectators from neighbouring parishes who had come to view the scene. He came to a field 'well-grown with rye-grass, where the ground was deeply cracked in several places', before passing over a hedge and onto a road, the surface of which had both been raised and sunk, 'concave in a third, hanging on one side in a fourth, and contracted, as if some uncommon force had pressed the two hedges together'. In his account he makes a link between the apparent crumpling of the landscape and his own personal experience of Mount Vesuvius in Italy where, he wrote, 'the solid, stony lava has been strongly worked by repeated earthquakes'. Likewise, the road surface, 'broken every way into huge masses, partly detached from each other, with deep apertures between them', was compared to 'shattered lava'.<sup>48</sup>

Continuing his exploration towards Buildwas he 'found that the road was again totally lost for a considerable space; having been overturned, absorbed, or tumbled .... This part of the desolation appeared then to me inexpressibly dreadful'. Between what remained of the road and the River Severn was a large field of oats. Climbing over a stile which had been 'shocked out of its proper position', he observed the effects of the event, writing that 'Wonderful and unaccountable are the revolutions, which that piece of ground had suffered. It was not flat, but diversified in its

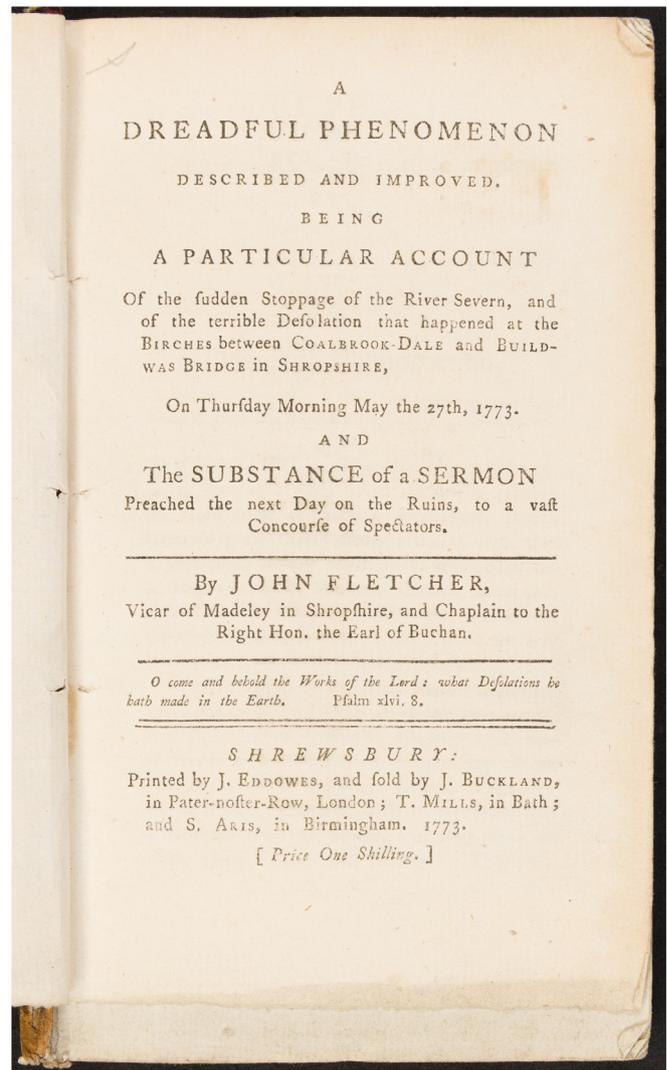


Fig. 4. Title page of Reverend John Fletcher, *A dreadful phenomenon described and improved*, Shrewsbury, 1773. SA 665/3/89.

surface by some gradual falls and eminences; and now I found, it had been tossed in so strange a manner, that the old mounts had sunk into hollows, and the hollows were raised into mounts, one of which is eight or nine yards higher than the road'. There had previously been a bank between the field and river upon which twenty oak trees, as well as underwood had grown. As a result of the earthquake or landslip the bank had moved forward 'with such violence' that those who had observed it said that it forced the water in the river into 'great columns a considerable height, like mighty fountains', giving the overflowing river 'a retrograde motion'. Moreover, he described that the old channel, formed 'chiefly of a soft blue rock, burst in ten thousand pieces, and rose perpendicularly about ten yards, heaving up the immense quantity of water, and the shoals of fishes that were therein'. He observed that at the bottom of the river lay 'one or two huge stones, and a large piece of timber, or an oak tree which from time immemorial had lain partly buried in the mud'.<sup>49</sup>

Having viewed the ruins of the road, Fletcher ascended the slope until he came to a barn which had ended up in one of the recently

<sup>43</sup> Janković, *Reading the Skies*, 34.

<sup>44</sup> Trinder, *Industrial Revolution*; P.E.H. Hair, Accidental death and suicide in Shropshire, 1780–1809, *Transactions of the Shropshire Archaeological and Historical Society* 59 (1969–1974) 69; *The Works of the Rev. John Fletcher with a life by the Rev. Abraham Scott complete in two volumes*, volume 1, London, 1836, 20. For Fletcher's published letters, see P.S. Forsaith, *Unexampled Labours: The Letters of the Revd John Fletcher of Madeley to Leaders in the Evangelical Revival*, Peterborough, 2008.

<sup>46</sup> Forsaith, *Unexampled Labours*, 310. For the printer Joshua Eddowes, see W.A. Champion and B. Coulton with contributions by J. Lawson, Shrewsbury 1640–1780, in: W.A. Champion and A.T. Thacker (Eds), *Victoria County History: Shropshire, Volume 6, Part 1 Shrewsbury: General History and Topography*, London, 2014, 213.

<sup>47</sup> For the sermon, see Fletcher, *A dreadful phenomenon*, 35–104.

<sup>48</sup> Fletcher, *A dreadful phenomenon*, 1–3.

<sup>49</sup> Fletcher, *A dreadful phenomenon*, 3–4.

formed chasms, 'where the shattered roof was yet visible'. Nearby was a hedge which had 'been removed above forty yards downward, together with some large trees that were in it, and the land that it enclosed'. The formation of these chasms, which are marked on Fig. 1, was one of the most impressive effects of the event and are described by all contemporary observers. One particular chasm, which ran perpendicular to the river, attracted Fletcher's attention when he visited the scene and he compared it to a grave. It was there that he delivered his sermon. He also described the other chasms which had been formed, one of which ran for a hundred yards towards the river and Madeley Wood, and 'looked like the deep channel of some great serpentine river dried up, whose little islands, fords, and hollows, appear without a watery veil'. He made further use of metaphor, describing the point at which two or three of the chasms joined as exhibiting 'the appearance of a ruined fortress, whose ramparts have been blown up by mines that have done dreadful execution, and yet have spared here and there a pyramid of earth, or a shattered tower, by which the spectators can judge of the nature and solidity of the demolished bulwark'. Fletcher later likened the whole scene to a battlefield, metaphorically viewing the chasms as sites 'where the demon of war was just going to murder men enough to fill up one of the yawning graves'.<sup>50</sup>

Fletcher's account describes what happened when the river was blocked both upstream and downstream, as he pointed out 'the fall below was as quick as the flood above'. He described how the fields, which were flooded given the recent rains, 'instantly refunded their waters into the Severn', leaving fish on dry land 'panting on the grass; while those that had remained in the rocky bed of the river, were buried in its ruins'. Any that escaped into the river were, he noted, 'to be caught in such a net, as had never been drawn over them before; an earthen and wooden texture, made with the spreading roots of twenty large oaks'.<sup>51</sup>

A disruptive effect of the event was that it blocked the River Severn which was a thriving inland transport route.<sup>52</sup> In particular, Fletcher described the astonishment of the watermen who tried to secure their vessels. In some cases their efforts were ineffective, 'for when the river, which they had so often cursed, was dammed up, some of their loaded vessels being suddenly deserted by the water, were left leaning on one side upon the muddy slope of the shore; and the stream at its quick return, finding them in that unfavourable position, entered into and sunk them'. He stated that this took place in less than a quarter of an hour, giving a clear indication of duration, and furthermore pointed out that whilst it was estimated eight fields (originally believed to be about thirty acres) were directly affected, the area only amounted to eighteen and a quarter acres. Fletcher suggested more land had been affected, referring to spectators who, walking home through Madeley Wood, came across a 'long abrupt cut', running parallel to the river about four or five hundred yards above the highest chasm. The wood had sunk 'downward near a yard' with twice the amount of land being subject to the 'general convulsion'.<sup>53</sup>

An extract of a letter sent from Gloucester dated 7 June 1773,

and published in the *London Evening News* the next day, outlines the disruption to navigation which resulted, although this was quickly resolved as the river formed a new channel with sufficient depth for a vessel laden with thirty tonnes of cargo to navigate. It also argued that the event was the result of the 'late rains', which, 'getting down to the rock on which this bank stood, loosened the foundations, and its weight carried it into the river'.<sup>54</sup> This seemingly local event might not have been deemed newsworthy from a national perspective had it not been for the disruption to the navigation of the River Severn.<sup>55</sup>

Fletcher's account includes the personal recollections of two individuals who witnessed the earthquake as it unfolded. The first were those of Samuel Wilcocks, a countryman, whose house had been moved about a yard. Having got up at four o'clock in the morning 'to see if the weather was fair' and to open the window, he noticed 'a small crack in the earth, about four or five inches wide'. He observed a field of oats 'heaving up and rolling about like the waves of the sea. The trees, by the motion of the ground, waved also as if they had been blown with the wind, tho' the air was calm and serene. And the river Severn, which for some days had overflowed its banks, was also very much agitated, and seemed to run back to its source'. Fletcher's account, written in an engaging narrative style, outlines how Wilcocks was 'astonished at such a sight'. He rubbed his eyes, 'supposing himself not quite awake', woke up his wife and children and left 'as fast as they could', fleeing along with another husband and wife to a wood that had been largely unaffected. Fletcher credited 'A kind Providence' for directing Wilcocks and his family to run west to the wood rather than eastwards to the fields which subsequently gave way.<sup>56</sup>

Once at a safe distance from the house, Wilcocks said he looked back. The land with the trees and hedges moved towards the river 'with great swiftness and an uncommon noise', which he compared to a flock of sheep running. It was at this point, according to Fletcher, that the landslide occurred:

It was then chiefly, that desolation expanded her wings over the devoted spot, and the Birches saw a momentary representation of a partial chaos: — Then Nature *seemed* to have forgotten her laws: — The opening earth swallowed in a gliding barn: — Trees commenced itinerant: those that were at a distance from the river, advanced towards it, while the submerged oak broke out of its watery confinement, and by rising many feet recovered a place on dry land: — The solid road was swept away, as its dust had been in a stormy day: — Then probably the rocky bottom of the Severn emerged, pushing towards heaven astonished shoals of fishes, and hogsheads of water innumerable: — The wood, like an embattled body of vegetable combatants, stormed the bed of the overflowing river; and triumphantly waved its green colours over the recoiling flood: — Fields became *moveables*; nay, they fled when none pursued; and as they fled, they rent the green carpets that covered them in a thousand pieces. — In a word, dry land exhibited the dreadful appearance of a sea-storm; Solid earth, as if it had acquired the fluidity of water, tossed herself into massy waves, which rose or sunk at the beck of him who raised the tempest. — And, what is most astonishing, the stupendous hollow of one of those waves, ran for near a quarter of a mile thro' rocks and a stony soil, with as much ease as if dry earth, stones, and rocks, had been a part of the liquid element.

<sup>50</sup> Fletcher, *A dreadful phenomenon*, 5–6, 17.

<sup>51</sup> Fletcher, *A dreadful phenomenon*, 12.

<sup>52</sup> Traffic on the river peaked in the mid eighteenth century with boats known as Severn 'trows' carrying cargoes including coal, timber, pig iron, malt, building stone and lime, raw cotton, salt, manufactured iron goods, paper, earthenware and cheese. See M.D.G. Wanklyn, *The Severn navigation in the seventeenth century: long-distance trade of Shrewsbury boats*, *Midland History* 13 (1988) 34–58; M.D.G. Wanklyn, *The impact of water transport facilities on the economies of English river ports, c.1660–c.1760*, *Economic History Review* 49 (1996) 1–19; B. Trinder, *Barges and Barges: A Social History of the Upper Severn Navigation 1660–1900*, Chichester, 2005.

<sup>53</sup> Fletcher, *A dreadful phenomenon*, 13–14.

<sup>54</sup> *London Evening News*, 8 June 1773.

<sup>55</sup> Coen, *Earthquake Observers*, 4; E. Richards, *Margins of the industrial revolution*, in: P. O'Brien and R. Quinault (Eds), *The Industrial Revolution and British Society*, Cambridge, 1993, 206–208.

<sup>56</sup> Fletcher, *A dreadful phenomenon*, 7–8.

This is the most vivid description of the event as it unfolded. On the day that Fletcher visited the scene, he also spoke with Samuel Cookson, a farmer who lived about a quarter of a mile below 'the Birches'. Cookson told him that he 'was much terrified by a gust of wind, that beat against his window, as if shot had been thrown against it'. His version of events recounted how when he got up to see if the flood waters had receded, 'he perceived that all the water was gone from his fields, and that scarce any remained in the Severn'. Cookson finding the river blocked, feared that Buildwas, the village upstream from the landslip would be flooded, so immediately 'made the best of his way to alarm the inhabitants'. However, when he got there he found that fortunately no such situation had arisen, as Fletcher commented, 'Providence just prepared a way for their escape'.<sup>57</sup>

Considerable flooding had rendered the river 'doubly rapid and powerful' and 'having met with two dreadful shocks, the one from her rising bed, and the other from the intruding wood, could do nothing but foam and turn back with impetuosity'. Fletcher described how the river level rose, backing up until just before it entered houses at Buildwas. It also flooded neighbouring fields 'spreading far and near over them'. The river then 'collected all its might to assault its powerful aggressor', namely the woodland ('grove') which had slipped and turned the river out of its old course.<sup>58</sup> This is marked on Fig. 1 as 'The old course of the Severn'. The river was repelled whilst trying to revert to its old empty bed by the shortest distance and, when it found it, Fletcher wrote, 'it precipitated therein with a dreadful roar, and for a time formed a considerable cataract; with inconceivable fury (as if it wanted to be revenged on the first thing that came in its way) began to tear, and wash away a fine rich meadow opposite to the grove; and there, in a few hours, worked itself a new channel about three hundred yards long, thro' which a barge from Shrewsbury ventured three or four days after'.<sup>59</sup>

Fletcher's use of eyewitness testimony is important in understanding how he constructed his account of the event. It highlights how his professional standing as a provincial clergyman enabled him to draw on the knowledge of different members of the local community, many of whom were his parishioners. In collating and evaluating the eyewitness testimonies, Fletcher gave validity to the observations of farmers and husbandmen, whose independent testimony may not have otherwise been trusted due to the prevailing social order. As Steven Shapin has shown, such matters of trust underpinned the moral, social and cultural character of scientific understanding in seventeenth- and eighteenth-century England, and it shaped the use of observational testimony as a form of knowledge making. The question of whose observations to trust depended upon a 'moral bond between the individual and other members of the community', such as a clergymen's relationship with his parishioners.<sup>60</sup> Furthermore, the multiple testimonies attested to their plausibility, especially when they were compared with accounts of other contemporary natural events.

Moreover, as Janković notes, clergymen also 'had an opportunity to integrate their occupational isolation into the scholarly cosmopolitanism of national society', although this would perhaps characterise Fletcher less than some of his more famous

contemporaries, such as Gilbert White, the quintessential 'parson naturalist'.<sup>61</sup> The provincial clergyman, such as Fletcher, had, therefore, a 'two-pronged authority – one among his lessers, the other among his fellow-clergymen', that 'ensured that his scientific correspondence could be both trusted and circulated'.<sup>62</sup> Clergymen's observations of events such as Buildwas focused on the physical impacts, eyewitness testimony and contemporary accounts, contributing to emerging scientific discourses and subsequent discussions of event attribution.

#### *Understanding the Buildwas 'earthquake'*

The late eighteenth century marked a transitional period in the way that natural events were explained. Whilst Fig. 1 gives the cause to be an 'earthquake', there was much debate at the time as to the precise cause of the event, a point Fletcher appreciated. By reading the plan and Fletcher's narrative together it is possible to understand how the same event was interpreted differently. Apparent in Fletcher's account is the shifting emphasis he places on the physical and scientific explanations, which were gaining credence at this time and challenging retributive theological interpretations of natural events.

However, the religious dimension was still important, given contemporary beliefs in God's intervention in the world.<sup>63</sup> As Fletcher wrote, 'But whether the *second* or *natural* cause of our phenomenon (if we consider it according to the rules of philosophy) be an earthquake or slip; it is certain that (viewing it according to the rules of divinity, laid down in the oracles of God) the *first* or *moral* cause of it is twofold; on *our* part, aggravated sin; and on *God's* part, warning justice'.<sup>64</sup> Fletcher encouraged readers to view such events from a religious standpoint as being a consequence of divine justice. By offering both religious and scientific explanations, Fletcher recognized the value of scientific awareness of the physical processes, but, at the same time, placed this within the wider context of providential arguments, allowing science and religion to be reconciled.<sup>65</sup> Significantly, Fletcher's discussion of the event reflects an evolving form of providentialism that contrasts with that of the sixteenth and seventeenth centuries by incorporating physical processes as 'the *second* or *natural* cause' of the phenomenon. Whilst Fletcher's motivation for writing his account is religious, it nevertheless enriched scientific understanding by providing an in-depth description using both eyewitness testimonies and personal observations of the event and its impact.

Fletcher's stated intention for the published account 'was to point out that *moral* cause to inconsiderate spectators in general; and in particular to excite in the hearts of my parishioners, an unfeigned gratitude for our preservation, and a salutary fear of the Almighty, who equally fulfills his providential will by storms or inundations, consumptions or fevers, famine or pestilence, slips or earthquakes'. Fletcher also referred those parishioners viewing the chasms which had been formed at 'the Birches' to a book he had published 'as a last effort to awaken to a sense of the fear of God', copies of which he circulated amongst those that had gathered, encouraging them to read his religious arguments.<sup>67</sup> This book, *An Appeal to Matter of Fact and Common Sense*, mirrors other essays, pamphlets, sermons and literature arising from earthquakes and

<sup>57</sup> Fletcher, *A dreadful phenomenon*, 8–10.

<sup>58</sup> Fletcher, *A dreadful phenomenon*, 10.

<sup>59</sup> Fletcher, *A dreadful phenomenon*, 11.

<sup>60</sup> S. Shapin, *A Social History of Truth: Civility and Science in Seventeenth-Century England*, Chicago, 1995, 7, for discussion of trust, truth and testimony, see 3–41, 193–242.

<sup>61</sup> Janković, *The place of nature*, 99; Janković, *Reading the Skies*, 119; White, *Natural History and Antiquities of Selborne*.

<sup>62</sup> Janković, *The place of nature*, 99.

<sup>63</sup> Walsham, *Providence in Early Modern England*, 116–167; Morgan, *Understanding flooding in early modern England*, 36–44.

<sup>64</sup> Fletcher, *A dreadful phenomenon*, 28.

<sup>65</sup> For a discussion of the relationship between religion and science, see P. Harrison, *The Territories of Science and Religion*, Chicago and London, 2015.

<sup>67</sup> Fletcher, *A dreadful phenomenon*, 28–29.

natural events more generally that emerged with the growth of early modern print culture.<sup>68</sup> His account serves, therefore, as an exemplar of the plethora of religious tracts that were distributed by evangelicals to an increasingly literate society, promoting faith whilst also recognizing scientific arguments in the late eighteenth and nineteenth centuries.<sup>69</sup>

In his account Fletcher quotes extensively from this earlier published work. With the gathering crowd increasing in number, he told those present at the aftermath of the event that he would preach a sermon the next day to 'endeavor to echo back and improve the loud call to repentance, which God had given us that day'. The sermon that Fletcher gave to a 'vast concourse of people', including several parishioners who had never attended church before, was emotive and impassioned, making connections and drawing parallels between the event at Buildwas and Biblical stories, emphasising the religious backdrop to such events and displaying many features of a typical earthquake sermon.<sup>70</sup> His aim was to use the event to promote better moral standards and behaviour. Whilst he hoped it would have a positive influence upon his parishioners, he recounted that some gentlemen pulled out not a prayer book but instead 'their favorite companion, a bottle; and imparted the strong contents to each other, as heartily as I did the awful contents of my text to the decent part of the congregation'.<sup>71</sup> Thomas Addenbrooke, a lawyer of Coalbrookdale, and another antiquary and naturalist, described Fletcher's sermon to a 'crowded audience of upwards of one thousand people' as a 'melancholy occasion', during which Fletcher claimed the earthquake was the result of God's divine providence and, furthermore, encouraged those gathered to 'prepare for the last great and awful day', hoping that the 'present dreadful scene would prove a sufficient warning to them'.<sup>72</sup> It may be that since earthquakes had greater providential weight and resonance than landslips, Fletcher identified the event in this way.

Fletcher argued that his religious conviction led him to 'search out the mysteries of heaven' rather than to 'scrutinize the phenomena of the earth; and to point at the wonders of grace, than at those of nature'. Nevertheless, in his account he devoted considerable attention to discussing the various contrasting scientific arguments put forward by those 'abler philosophers' who had visited the site to determine the precise physical causes of the event, contributing to the debate as to whether it was an earthquake and or a landslip.<sup>73</sup> Evidence for an earthquake was that the ground seemed to have moved from several directions, although the main direction of the activity was southwards with the chasms and cracks running parallel to the river. On the basis of these observations, Fletcher pointed out that those who deemed it to be an earthquake concluded that:

it was a *partial* earthquake, of a *singular* nature, accompanied by a considerable eruption of air; and this they infer from the sudden gust of wind, that shook Samuel Cookson's windows, and affected a yew-tree, which seems to have been blasted, as well as two young trees, whose leaves have also turned yellow.<sup>74</sup>

Those who argued it was a landslip, Fletcher wrote, 'urge the abundance of the late rains, the nearness of the Severn, its peculiar depth at the Birches, and the violence of the flood that was in it, which might easily have washed away some important buttress of the left bank'.<sup>75</sup> They also cited 'the steepness of that bank, and weight of the superior grounds, whose pressure might have burst and forced up the soft rock that formed the bed of the river'.<sup>76</sup> Significantly, he pointed out that contemporaries emphasised the role of gravity, the clay and earth, and 'two or three little springs' close to the road which made the ground unstable.<sup>77</sup> Also of note within the descriptions is that flood waters were receding at the time of the event, with reference made to the persistent rains and that the ground was saturated.<sup>78</sup>

Fletcher attempted to evaluate these explanations. He pointed out that those present who interpreted the natural event as an earthquake incorrectly assumed that the same rock type composed the river bed and the higher ground.<sup>79</sup> He also noted that 'the Birches' had 'always been remarkably free' of landslips and argued that other banks, such as Madeley Wood on the opposite side of the river to 'the Birches', which were steeper and undermined by pits and mining works, were more likely to have experienced a landslip (Fig. 5).<sup>80</sup> Indeed, those arguing against it being a landslip referred to one which had occurred on a 'very rainy day' near Madeley church, where the bank was much steeper and bushes were 'pushed by a stream of water capable of turning a mill', giving a sense of the energy involved. They pointed out that the back of landslips generally had 'wet oozing, or water flowing out', whereas in the case of Buildwas all of the chasms which had been formed

<sup>68</sup> J. Fletcher, *An appeal to matter of fact and common sense: or a rational demonstration of man's corrupt and lost estate*, Bristol, 1773, SA P180/U/1/2/5; Walsham, *Providence in Early Modern England*, 8–32; Walsham, *The Reformation of the Landscape*, 327–394. In a letter to John and Charles Wesley dated Sunday 30 May 1773, Fletcher wrote of the earthquake, 'I am afraid of loading the world with pamphlets, but meet so little success in preaching, that I must try to write'. Furthermore, he wrote, 'The awful event has not had the effect one could naturally expect. I fear the people in these parts are gospel hardened', Forsaith, *Unexamined Labours*, 310.

<sup>69</sup> A. Fyfe, *Science and Salvation: Evangelical Popular Science Publishing in Victorian Britain*, Chicago, 2004, 21–42.

<sup>70</sup> Fletcher, *A dreadful phenomenon*, 32; M. Van De Wetering, *Moralizing in puritan natural science: mysteriousness in earthquake sermons*, *Journal of the History of Ideas* 43 (1982) 417–438.

<sup>71</sup> Fletcher, *A dreadful phenomenon*, 32–33.

<sup>72</sup> T. Addenbrooke, An authentic account of the earthquake at the Birches, about half a mile below Buildwas Bridge, and about a mile above the bottom of Coalbrookdale, Shropshire, *The Annual Register or a View of the History, Politics, and Literature, for the Year 1773*, London, 1774, 209.

<sup>73</sup> Fletcher, *A dreadful phenomenon*, 17–18.

<sup>74</sup> Fletcher, *A dreadful phenomenon*, 25.

<sup>75</sup> Monthly figures for England and Wales show that May 1773 had exceptionally high levels of precipitation, with 151.8 mm recorded. This was 65.65 mm higher than the annual monthly average, and it was the month with the highest rainfall throughout the year. Precipitation can also be seen to have been exceptional when compared to the years before and after the event, see L.V. Alexander and P.D. Jones, Updated precipitation series for the U.K. and discussion of recent extremes, *Atmospheric Science Letters* 1 (2000) 142–150. This is likely to have resulted in extensive river flooding of the surrounding meadows and other adjacent land forming the flood plain. The occasion of the slip in 1773 came only three years after the severest documented flood (1770) on the River Severn, see N. Macdonald and H. Sangster, High magnitude flooding across Britain since AD 1750, *Hydrology and Earth Systems Sciences* 21 (2017) 1631–1650. Whilst the potential role of the flooding of 1770 on the slip at Buildwas is difficult to discern, it may have contributed to undermining the slip's toe.

<sup>76</sup> For example, excessive precipitation resulted in a landslip which destroyed the village of Plurs in the Canton of Graubünden, Switzerland, on 4 September 1618, see Behringer, *Cultural History of Climate*, 142.

<sup>77</sup> Intense or prolonged rainfall is the most common trigger of slope instability, and areas subject to high rainfall, whether high winter totals or summer convection storms, are inevitably susceptible to landslips. In temperate areas, landslips are most likely to result from the disturbance of more shallow surface layers brought about by seasonal rainfall.

<sup>78</sup> Fletcher, *A dreadful phenomenon*, 18.

<sup>79</sup> Fletcher, *A dreadful phenomenon*, 20. Buildwas and the area encompassing Birches Coppice is classified as 'Landslide deposits - unknown/unclassified entry (Slip - unknown)' by The British Geological Survey. See also P. Toghill, *The Geology of Shropshire*, Ramsbury, 2006.

<sup>80</sup> For the growth of Madeley, see Baugh, *Madeley*, 27–29. Whilst heavy rainfall is likely to have contributed, other human factors like changes in land management may also have had a role to play. For example, the removal of trees from 'the Birches', improvements in drainage, mining and road cutting undertaken to support the growing industrial development two miles downstream at Ironbridge may have increased the area's vulnerability to a potential landslip.



Fig. 5. Robert Baugh's map of Shropshire, 1808, showing Buildwas, Madeley, Shifnal, the River Sever and the Ironbridge Gorge. SA CM2/40 sheet 5.

were found to be dry and, moreover, 'not one drop of water was to be seen' along the length (four hundred and ten yards) of the 'pretend slip'.<sup>81</sup> They suggested that the scale of landscape change was too great to have been caused by a landslide, and questioned how pyramids of earth survived despite the supposed slipping of the ground.<sup>82</sup> The testimonies detail the different aspects and features of the event, such as the land moving in 'massy waves' and the creation of chasms, which were evaluated in the light of contemporary understanding of earthquakes.<sup>83</sup> The physical movement of the landscape in a wave like action, as recounted by Fletcher, parallels emerging ideas from the 1760s that earthquakes were waves and of subterranean origin.<sup>84</sup> It was the observations made by witnesses which served as the evidence base for understanding the event, and they were judged against prevailing interpretations of earthquakes to verify their truthfulness, with Fletcher's endorsement of eyewitness testimony being sufficient to validate it.

The events at Buildwas, shown in the 'ruins' illustrated on the plan and described by Fletcher and the eyewitnesses, served as a 'local site of Enlightenment knowledge'. The truthfulness of explanations was evaluated by corroborating them with contemporary accounts or human observations – what David Livingstone and Charles Withers term 'geographies or setting dependencies of

conceptions of trust'. The landscape represented a 'knowledge-making site' where the meaning of scientific knowledge was extrapolated and related to other specific, but distant, sites through the circulation of print.<sup>85</sup> Information did not simply come from the physical site, but drew on other texts. Indeed, Young's plan and Fletcher's narrative account entered into this economy of knowledge, being reproduced in subsequent nineteenth-century histories.<sup>86</sup>

In this vein, Fletcher recalled that a gentleman who had seen the ruins of the Great Lisbon earthquake in 1755 judged the 'desolation at the Birches' 'to be of the same kind, tho' they differ in many circumstances'.<sup>87</sup> The gentleman's status, predicated on a culture of honour, meant that he was trusted as a 'truth-teller'.<sup>88</sup> Credible accounts of earthquakes published in contemporary periodicals, such as the *Gentleman's Magazine* and the *Philosophical Transactions of the Royal Society of London*, also influenced the interpretation of what people observed at Buildwas, allowing for an assessment of the plausibility of eyewitness testimony. As Janković has highlighted, the *Philosophical Transactions* 'regularly published

<sup>85</sup> C.W.J. Withers and D.N. Livingstone, Introduction: on geography and Enlightenment, in: D.N. Livingstone and C.W.J. Withers (Eds), *Geography and Enlightenment*, London and Chicago, 1999, 15–19.

<sup>86</sup> J. Nightingale, *The Beauties of England and Wales*, volume 13, part 1, London, 1813, 208–221; C. Hulbert, *The Select Museum of the World*, Shrewsbury, 1822–1825, 390–393; S. Bagshaw, *History, Gazetteer, and Directory of Shropshire*, Sheffield, 1851, 559–562.

<sup>87</sup> Fletcher, *A dreadful phenomenon*, 23.

<sup>88</sup> Shapin, *The Social History of Truth*, 42–125.

<sup>81</sup> Fletcher, *A dreadful phenomenon*, 21–22.

<sup>82</sup> Fletcher, *A dreadful phenomenon*, 22–23.

<sup>83</sup> Fletcher, *A dreadful phenomenon*, 8–10, 14–16.

<sup>84</sup> I.D. Whyte, *Dictionary of Environmental History*, London, 2013, 160.

contributions on inundations, mock suns, earthquakes, lightning damages, fireball explosions, and numerous unclassifiable phenomena in the atmosphere', and the contributors frequently made comparison with descriptions of earthquakes and natural events with which they were familiar such as the London, Lisbon and Calabrian earthquakes and the eruptions of Vesuvius.<sup>89</sup> These well documented European events shaped the interpretation and understanding of the physical characteristics described in eyewitness testimonies and later observations, resulting in the event at Buildwas being attributed to an earthquake.

In terms of people who came to view the site, Fletcher observed that 'An incredible multitude of people of all ranks have come, and gentlemen', he noted, 'continue to come, from far and near, to see this phenomenon', with thousands of people clambering around the chasms, crumbling the earth and stone, and gradually reducing the height of the pillars.<sup>90</sup> Some spectators gathered eels, whilst others fascinated with natural history searched for fossils among the ruins. Indeed, Fletcher noted that 'a great many [of these] were found bearing the impression of a flying insect, not unlike the butterfly', it being remarked that they would be suitable for the British Museum.<sup>91</sup> Given the extent and scale of the event, the ruins were of great interest to both the local population in surrounding parishes and educated gentlemen from further afield who travelled to view the scene for themselves, subsequently reporting on what they saw. Visitors who inspected the effects of natural events such as Buildwas became part of the eighteenth-century culture of public science and should be understood as members of what Simon Schaffer calls a 'philosophical audience'. Indeed, earthquakes were just one aspect of natural history that society became increasingly aware of in the eighteenth century. Along with other atmospheric phenomena, they 'acted as a wider and grander theatre of power and also as a space in which a new economy of understanding and control might operate'. Alongside this, the 'commodification of earthquakes', such as the London earthquake in 1750, provided the opportunity for rival groups – clergymen, journalists, millenarians and philosophers – to promote their interests and respective views on science and religion.<sup>92</sup> Just as John and Charles Wesley did with the London and Lisbon earthquakes, Fletcher used the event at Buildwas to both express his religious arguments and to expound on scientific meaning and understanding.<sup>93</sup> Indeed, John Wesley himself visited the scene of 'the late earthquake' at Buildwas between the 9 and 11 July 1773.<sup>94</sup>

## Conclusions

The purported Buildwas 'earthquake' of 1773 provides a case study of how a natural event was described, analysed and interpreted in different ways. This consideration of Fletcher's account contributes to work on the forms of knowledge produced by provincial 'clergy naturalists' by further examining their contributions to enlightened earthquake discourse. Whilst prominent clergy naturalists such as Gilbert White – who were explicitly concerned with observing and documenting the environment – have attracted most attention, it is argued here that lesser known individuals like Fletcher, who inadvertently observed the environment when

an event was particularly noteworthy or attracted widespread popular attention, are deserving of consideration too. It is significant that Fletcher did not deliberately record the environment in any systematic way, but rather used his descriptions to affirm his religious arguments. This contrasts with White's letter which is devoid of religious justification or reasoning, instead presenting a more scientific, rational interpretation of a landslide.<sup>95</sup> Indeed, it may be the case that Fletcher regarded the Buildwas event as an earthquake because that had more providential valence.

Significantly, Buildwas offers an example of how Fletcher reconciled his religious beliefs and providential discourses with ongoing debates (which had become increasingly prominent after 1755) about the physical or scientific causes of earthquakes. Whilst Fletcher's interest in the event primarily reflected his religious concerns, he drew upon accounts of other comparable natural events thereby engaging with eighteenth-century scientific culture. Interrogating the plan and the narrative supports Coen's view that 'local stories shed light on the making of a global science', illustrating how 'the lives of individuals' such as Fletcher 'can illuminate the organization of a collective effort like earthquake observing'.<sup>96</sup> Furthermore, analysis of Fletcher's account and the recalling of personal observations of the event, suggests that what some people thought of as an 'earthquake' was, in all probability, a landslide based on current understanding.

Yet, Fletcher's account remains valuable and informative precisely because during this period the distinction between landslips and earthquakes was not clearly established and the terms were often used interchangeably. It would be anachronistic to judge the characterisation of what would now be considered a landslide as an earthquake, simply as a misattribution. The period was one of increasingly careful observation and extensive scientific debate, with efforts being made to determine the causes of natural events. The eyewitness testimonies compiled and endorsed by Fletcher of this seemingly provincial natural event informed the debate concerning its origins. They were used in comparison with the London and Lisbon earthquakes, leading to what happened at Buildwas being wrongly explained as an earthquake. The interpretation of Buildwas shows, therefore, how developing scientific culture could be misinforming as well as enlightening: here the observations of other earthquakes, and involvement in scientific culture, contributed to a false confidence in classifying the event.

Research into past earthquakes, therefore, needs to consider their social and cultural context, particularly the historical and intellectual environments in which they occurred and the categories of the time, especially the use and meaning of the term 'earthquake'. In analysing historical accounts of earthquakes it is necessary to bring together understandings of eighteenth-century science and culture with techniques of environmental event reconstruction to better understand past, present and future risks.<sup>97</sup>

<sup>89</sup> Janković, *Reading the Skies*, 34–35.

<sup>90</sup> Fletcher, *A dreadful phenomenon*, 16–17.

<sup>91</sup> Fletcher, *A dreadful phenomenon*, 13.

<sup>92</sup> S. Schaffer, Natural philosophy and public spectacle in the eighteenth century, *History of Science* 21 (1983) 16, 18; Janković, *Reading the Skies*, 72.

<sup>93</sup> J. Wesley, *Serious thoughts occasioned by the later earthquake at Lisbon*, London, 1755. For the London earthquake, see Kendrick, *The Lisbon Earthquake*, 1–23.

<sup>94</sup> N. Curnock (Ed), *The Journal of John Wesley, A.M.*, volume 5, London, 1938, 516–517.

<sup>95</sup> White, *Natural History of Selborne*, 221–224.

<sup>96</sup> Coen, *Earthquake Observers*, 11.

<sup>97</sup> H. Sangster, C. Jones and N. Macdonald, The co-evolution of historical source materials in the geophysical, hydrological and meteorological sciences: learning from the past moving forward, *Progress in Physical Geography* 42 (2018) 61–82; B. Wilhelm, J.A. Ballesteros Canovas, N. Macdonald, W. Toonen, V. Baker, M. Barriados, G. Benito, A. Brauer, J.P. Corrella, R. Denniston, R. Glaser, M. Ionita, M. Kahle, T. Liu, M. Luestcher, M. Macklin, M. Mudelsee, S. Munoz, L. Schulte, S. St George, M. Stoffel and O. Wetter, Interpreting historical, botanical, and geological evidence to aid preparations for future floods, *WIREs Water* (2018) e1318, <https://doi.org/10.1002/wat2.1318>.

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