

EARTHQUAKE SHOCKS IN SUSSEX.

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The occurrence of an earthquake shock at Brighton in January, 1878, brings up the question, "How many shocks have occurred in the county?"

None are recorded in Sussex before the year 1638 (though several are mentioned in adjoining counties), when, "at Chichester there were several earthquake shocks at the end of the year, which did great damage. There was a smell like pitch and sulphur," and the atmosphere was obscured as if by a cloud.¹

The next shock was in 1692, on Sept. 8th. "About 2 p.m. there was a trembling of the earth under the town of Rye, so as to make the houses shake and household stuff move on the shelves, but lasted not a minute. No wind stirring at the time. This earthquake, as we afterwards heard, was felt throughout England, France, Belgium, and part of Germany, as far as Frankfort."²

Another shock was felt in Sussex on Oct. 25th, 1734. There are two accounts of this in the "Philosophical Transactions." The first, by Charles, *Duke of Richmond and Lenox*, F.R.S., says³—"I know most of the People that have signed the inclosed papers to be Persons of Veracity: And what confirms me in my Opinion, that there really was an Earthquake, is, that almost every Body agree in the same Description, as to the Sensation, the Hours of its happening, and the perfect Calm that was at that Time. I observe the Shock was vastly more felt towards the Sea-side, as at *Shoreham, Tarring, Gore-*

¹ Mallet, in "British Association Report," from "Dresdner Gelehr Anz."

² "Jeakes' Diary," in "Holloway's

History of Rye;" also "Autob. Sir John Bramoton," pub. by Camden Soc.

³ "Phil. Trans.," vol. viii, pt. 2, p. 690.

ing, and *Havant*. At my house of *Goodwood*, which is near 3 miles N of *Chichester*, and about 7 from the Sea, it was not so perceivable as at *Chichester*, and where it was still less so than by the Sea Side. I do not hear as yet there was the least Touch of it in any parts of the Vale on the N side of the Downs, which for the most part run E and W." The second account is by Edward Bayley, M.D., of *Havant*, who "felt the shock between 3 and 4 in the morning, which lasted 2 or 3 seconds; and after a short intermission, a second shock." Certificates of people at *Chichester* and *Funtington* are then given. *Philip Boisdaune*, Esq., says, "shock felt $\frac{1}{4}$ before 4 in the morning, shook beds, and rung a bell." This is the only time stated, and probably is the most correct. "The Rev. Mr. *Richard Green*, Prebendary of *Chichester* and Rector of *Merston*, had informations of the same tremblings at *Shoreham*, *Goreing*, *Tarring*, *Findon*, *Arundel Castle* and *Merston*. The Custom House officer, *West Wittering*, felt the shock. The motion was from E to W, which was shown by its appearing earlier in E." It was also felt in *Northamptonshire*.

The next shock was that of the terrible earthquake on Nov. 1st, 1755, which destroyed *Lisbon*, and in which 60,000 persons perished. It was the most destructive one which ever visited *Europe*. It began at 9.40 a.m., and in six minutes had shaken down all the houses in *Lisbon*, and the concussion extended all over *Europe*; even into *Scotland*, over *Northern Africa*, and its effects extended across the *Atlantic* to *Madeira* and the *West Indies*. Sir *John Herschell* says, "Every lake and firth in *England* and *Scotland* was dashed for a moment out of its bed, the water not partaking of the sudden *shove* given to the land; just as, when you splash a flat saucerful of water, the water dashes over on the side from which the shock is given." It was felt at *Portsmouth* between 10 and 11 a.m., and one of the gates in the dockyard burst open. The "*Philosophical Transactions*" contain two references to it. The first is in a letter from *Philip Carteret Webb*, F.R.S., to

the Secretary of the Royal Society, which says,⁴ "in a mill-pond, at Medhurst, in Sussex, the sudden agitation and swell of the water rolling toward the mill was so remarkable, that the miller imagined a sluice had been opened at the upper end of the pond, and had let a back-water into it; but upon search it was found to be shut as usual. Below the mill the swell of the water was so great as to drive the stream upwards, back into the conduit of the mill." Another letter from John Hodgson, to the Secretary of the Royal Society, says,⁵ he did not consider the fissure in the rock near Petworth was connected with the shock, nor was it "remarkable enough to claim the attention of the Society," and further, that "as to the ponds near Medhurst, everybody agrees, that was an extraordinary swelling of the water the same day that phenomenon was remarked in yours. The water was thrown several feet above its banks, both at north-mill, at south-pond, and the pond in Lord Montacute's Park; and at the first of these, upon its retreat, left some fishes upon dry land."⁶

The "Diary of a Sussex Tradesman a Hundred Years Ago,"⁷ contains the following entry:—"May 3, 1756—Saw in the Lewes paper of this day that on Saturday last [which would be May 1st] there was several expolitions in the bowels of the earth, like an earthquake, in the parishes of Waldron and Hellingly." This was no doubt a slight earthquake shock.

In 1758, on Jan. 24th, at 2 a.m., "a slight trembling, lasting but a moment," was felt "in the parishes of Worth and East Grinstead, accompanied by a rolling noise. The windows were made to rattle."⁸

No shock is recorded after this, until 1811, on Nov. 30th, about 2.30 a.m. "At Chichester the inhabitants were alarmed by an unusual noise lasting for many seconds, somewhat similar to the rolling of thunder, but

⁴ "Phil. Trans.," vol. xlix., p. 355.

⁵ *Ib.*, p. 359.

⁶ A similar occurrence took place in the earthquake of July 21, A.D. 365, as recorded by Libianus, Jerome, and others, when the waters of the Medi-

terranean retreated, and "great quantities of fish were caught with the hand." Gibbon, *Decline and Fall of the Roman Empire*, ch. xxvi.

⁷ xi. S. A. C., 188.

⁸ "Phil. Trans.," vol. i.

closed with a tremendous crash. The effects were the same at Midhurst, Petworth, Arundel and all adjoining places. It was considered to have been most severe along the coast at Bosham, Sidlesham, Selsea, Pagham and Bognor."⁹ At Arundel the shock was felt at 2.30 a.m., "It was instantaneous, and caused such a tremulous motion in many houses, that the families were awoke by it, and sprang out of bed to ascertain its cause. Furniture in rooms was considerably agitated and the whole house seemed to move. A similar shock was experienced at the time of the great earthquake which destroyed Lisbon, Nov. 1, 1755, and which is recollected by many persons living in this town."⁹ The shock extended E. as far as Shoreham.

The next shock was on Dec. 6th, 1824, about 2 p.m. At Chichester bells were set ringing in houses, and window blinds unrolled, and many families ran out of their houses in great trepidation. The shock was more severe than in 1811, and was felt at Emsworth, Aldwick, Bognor and Arundel, the latter being its eastern limit in Sussex.¹⁰

After an interval of nearly nine years, a series of shocks, seven in number, occurred in the short period of three years. The first was in 1833. About April 2nd, at 8.15 p.m., a shock of earthquake was felt at Horsham, and was more perceptible in some houses than in others. Some persons were greatly frightened, while others felt nothing.¹¹ The next was on Sept. 18th, 1833, and was felt "at Chichester about 10 a.m.; it continued for several seconds. In many houses the bells were set ringing. Two or three chimneys were thrown down, and on the Downs to the north of this place a quantity of chalk was displaced by the force of the shock, and a man buried under the mass, from whence he was taken out lifeless. It is nine years since such an occurrence took place here, and the motion then was rather an undulation, whereas on the 18th it was tremulous."¹² "This

⁹ "Brighton Herald," Dec. 7th, 1811.

¹⁰ "Brighton Herald," Dec. 11th, 1824, and "Philos. Mag.," 1825, p. 70.

¹¹ From a London letter of the 10th, in "Garnier," p. 171.

¹² *Ib.*

is the only instance of loss of life owing to an earthquake shock in this county. The next shock was on Nov. 13th of the same year, about 3.40 a.m., which was felt at Chichester, where it caused the town clock to strike, and set bells ringing. Another followed at 5.30 a.m., which was not so severe. The first was felt at Petworth and Bognor, and for six or eight miles round Chichester." On Jan. 23rd, 1834, at Chichester, there was a "violent earthquake shock, with a loud rumbling noise. The third shock in three months. It rained hard at the time. No cause of a volcanic nature can be assigned, and the sensation does not appear to have extended at the utmost beyond 12 miles from Chichester." At Littlehampton and Arundel the shock was felt a little before 3 a.m. Another shock occurred on Aug. 27th of the same year, "all the evening there was a lowering sky with much lightning, at 10.30 p.m., a loud rumbling noise was heard with powerful vibration of the earth. Glasses were rattled, bells rung, and the large town clock struck. Several chimneys were thrown down and windows broken. The shock was more severe than any preceding one in its effects, and extended to a great distance. At Littlehampton it was felt at 10.30 p.m. At the time of the shock, the sea, previously very still, became suddenly agitated, and the same was noticed at Worthing."¹³ On Aug. 3rd, 1835, at Chichester, Emsworth, and the surrounding neighbourhood, at 11.30 p.m., two earthquake shocks were felt, and on Oct. 21st of the same year, another slight shock was felt at Chichester and to the westward about 2 p.m.¹³

The repeated shocks at Chichester attracted considerable attention, and a committee was appointed by the Chichester Philosophical and Literary Society to investigate the matter, but the writer is not aware at what conclusion they arrived. Hayley states that¹⁴ "in the time of the Romans the Lavant flowed entirely round the City of Chichester, whereas it now flows round two sides only, and it is probable that the bed of the river was at an early period diverted by an earthquake shock."

¹³ "Brighton Herald," Nov. 16th, Aug. 8th and Oct. 23rd, 1835. 1833; Jan. 25th and Aug. 30th, 1834;

¹⁴ "History of Chichester."

The next shock was on April 1st, 1853, and was felt at Brighton (being the first recorded there), by a gentleman walking along the King's Road, on the evening of that day.¹⁵ "On Saturday, August 13th [1859], at 10.15 a.m., a low rumbling noise, like a distant cannonade, was heard [at Brighton], the sky being at the time perfectly cloudless, and the air calm. Barometer 29.783 inches, thermometer 76 deg. What little wind there was was SSE. The sound was heard both at the end of the Pier, and on the high ground of the Montpelier district."¹⁶

On Oct. 6th, 1863, at 3.22 a.m., a shock was felt in the W., centre, and N. of England, and several places in the S. At Brighton, a gentleman living in the Old Steine, "heard a noise like the shutting of a door, which also shook the windows." A similar noise was heard by persons living on the Marine Parade, and in Cambridge Road.¹⁷ At Hurstpierpoint the record is "*sensation*—there was a violent concussion, and thought the house was falling in; *sound*—like half a dozen powder mills blowing up instantaneously. An extraordinary red line was visible notwithstanding the profound darkness of the sky; dog barked."¹⁸

One of the most remarkable shocks was that on Aug. 21st, 1864. It was quite local, and does not appear to have been observed outside the county. It was felt at Lewes, Ringmer, Newhaven, Alfriston, *Wilmington, Chalvington, Chiddingly, Uckfield, Framfield, Glynde, Berwick, Laughton, Hailsham, Seaford, Heathfield, Ninfield, Battle and Brighton. The time was 1.27 a.m., and the shock lasted 10 or 12 seconds. An acquaintance of mine was driving from Burwash to Hastings at this time. He was descending a hill, when a sudden rumbling was heard by him, like the wheels of a heavy waggon behind, accompanied by a strong vibration. He drew to the left side of the road, thinking a waggon at full trot was

¹⁵ "Times," abt. April 3rd, 1853, and "Report of Council of the Met. Soc.," May, 1853.

¹⁶ "Times," Aug. 24th, 1859, letter signed J. A. H., Clifton Terrace, Brigh-

ton. (Probably J. A. Hingeston, Esq., M.R.C.S., L.S.A.)

¹⁷ "Brighton Herald," Oct. 10th, 1863.

¹⁸ Note by Annie R. Elwood, in "Proceed. Met. Soc.," 1864, p. 96.

wishing to pass him. At Glynde Place the bells rung. Mr. G. Harvey, jun., of the Friars, Lewes, saw the ceiling of his bedroom oscillate, and felt his bed rock, and Mr. Geo. Jeffrey, son of Mr. H. Jeffrey, High Street, Lewes, attempting to cross his bedroom, was thrown violently against a chest of drawers.¹⁹ On Sept. 16th of the same year, a shock is said to have been felt at Rogate.¹⁹

The next shock was on April 17th, 1865, between 3 and 4 a.m., and was felt, like a violent explosion, at Chichester, Bognor and Portsmouth, and places lying between.¹⁹

The last shock was on Jan. 28th, and was felt at Brighton and Littlehampton. Dr. Hall, of Furze Hill Lodge, Brighton, records two shocks, the first at 11.55 a.m., and the other at noon. Furniture was agitated in many houses in Brighton.²⁰

We thus find that, in a period of 240 years (1638 to 1878), no less than TWENTY-FOUR earthquake shocks have been recorded in the county of Sussex, and it is not improbable that records of others may be found.

The distribution of the shocks over the different months of the year is as follows:—In Jan, 4; April, 3; May, 1; Aug, 4; Sept, 3; Oct, 3; Nov, 4; Dec, 2. In seasons, the distribution is:—In Spring, 4; Summer, 4; Autumn, 7; Winter, 9. And with respect to the time of day, the distribution is:—Midnight to 6 a.m., 9; 6 a.m. to noon, 5; noon to 6 p.m., 3; 6 p.m. to midnight, 4; and in three no time is specified. The shocks, therefore, appear to have been most frequent in the early morning hours, and in winter.

For convenience of reference, a tabulated statement of the shocks is compiled.

¹⁹ "Brighton Herald," April 22nd, 1865.

²⁰ "Sussex Daily News," Jan. 30th and 31st, 1878.

YEAR.	DATE.	PLACE.	TIME.	MOTION.	REMARKS.	AUTHORITY.
1638	End of Year	Chichester			Smell of sulphur	"Dresdner Gel. Anz."
1692	Sept. 8	Rye	2 p.m.	Oscillatory		"Holloway, Hist. Rye"
1734	Oct. 25	Chichester and W. Sussex	3.45 a.m.	Undulatory	Shock E. to W.	"Phil. Trans.," vol. viii.
1755	Nov. 1	Midhurst, Petworth, &c.	Betn. 10 & 11 a.m.	Oscillatory	Water agitated	Ditto " xlix.
1756	May 1	Waldron and Hellingly			Like an explosion	xi. S. A. C., 188
1758	Jan. 24	Worth and East Grinstead	2 a.m.	Tremulous	Rolling noise	"Phil. Trans.," vol. 1.
1811	Nov. 30	Chichester, &c.	2.30 a.m.	"	Loud noise	"Brighton Herald," Dec. 7, 1811
1824	Dec. 6	"	2 p.m.	Undulatory	Bells rung	Ditto " 11, 1824
1833	April 2	Horsham	8.15 p.m.		Felt in some houses	"Garnier," p. 171
"	Sept. 18	Chichester, &c.	10 a.m.	Tremulous	Man killed	"Brighton Herald," Sept. 21, 1833
"	Nov. 13	"	3.40 a.m.		Town clock struck	Ditto Nov. 16, "
"	"	Chichester only	5 30 a.m.		Not so severe	Ditto " " "
1834	Jan. 23	Chichester, &c.	Before 3 a.m.		Rumbling sound	Ditto Jan. 25, 1834
"	Aug. 27	"	10.30 p.m.	Vibratory	Town clock struck	Ditto Aug. 30, "
1835	Aug. 3	"	11.30 p.m.		Two shocks	Ditto " 8, 1835
"	Oct. 21	"	2 p.m.		Slight	Ditto Oct. 23, "
1853	April 1	Brighton	10.50 p.m.	Tremulous	Shock repeated	"The Times"
1859	Aug. 13	"	10.15 a.m.		Rumbling sound	Ditto Aug. 24, 1859
1863	Oct. 6	Brighton and Hurstpierpoint	3.15 a.m.	Oscillatory	Like an explosion	"Proceed. Met. Soc.," 1864, &c.
1864	Aug. 21	Brighton, Lewes & E. Sussex	1.27 a.m.	Undulatory	Shock S.E. to N.W.	"Brighton Herald," Aug. 27, 1864
"	Sept. 16	Rogate			Shock doubtful	Ditto Sept. 24, "
1865	April 17	Chichester and Bognor	Betn. 3 & 4 a.m.		Like an explosion	Ditto April 22, 1865
1878	Jan. 28	Brighton and Littlehampton	11.55 a.m.	Oscillatory	Furniture swayed	"Sussex Daily News"
"	"	Brighton	12 (noon)	"	"	Ditto