

VII. *An Account of the several Earthquakes which have happen'd in New-England, since the first Settlement of the English in that Country, especially of the last, which happen'd on Octob. 29, 1727. Communicated to the Royal Society by Paul Dudley, Esq, F. R. S. in a Letter to the Secretary. **

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Roxbury, Nov. 13, 1727.

YOU will doubtless from the publick Prints have an Account of the terrible Earthquake that happen'd here on the 29th of *October* last in the Night ; however, I think it my Duty, and hope it will be acceptable to the Society, to have the Particulars from one of their own Members.

That this Country is subject to Earthquakes is certain ; and we have been often admonished of it since the first Settlement of the *English* here, which now is about an hundred Years. Our printed Books and other good Records have taken notice of the most remarkable that have happen'd. The first and most considerable Earthquake that I find in our History, and which seems to have been much like our last, was on the Second of *June*, 1638. This is said (by the Author, who was a Gentleman of Character and Probity) “ to have been a great and

* See likewise an Account of this same *Earthquake* in *Transact.* N^o 409. p. 124.

fearful

“ fearful Earthquake : It was heard before it came,
 “ with a rumbling Noise or low Murmur like unto
 “ remote Thunder ; it came from the Northward,
 “ and passed Southward ; as the Noise approached
 “ near, the Earth began to quake ; and it came
 “ at length with that Violence, as caused Platters,
 “ Tyles, &c. to fall down ; yea, People were afraid
 “ of their Houses. The Shock was so violent and
 “ great, as that some being without-doors, could
 “ not stand, but were fain to catch hold of
 “ Posts, &c. About half an Hour after, or less,
 “ came another Noise and Shaking, but not so loud
 “ nor strong as the former : Ships and Vessels in
 “ the Harbour were shaken, &c.” In 1658, there
 was another very great Earthquake, but no Particulars related. In 1660, *January* 31st, a great Earthquake. In 1662, *January* 26th, about Six o’Clock at Night, there happen’d an Earthquake, which shook the Houses, caused the Inhabitants to run out into the Streets, and the Tops of several Chimnies fell down. About the Middle of the same Night was another Shake ; also in the Morning following the Earth shook again. In 1665, and in 1668, and 1669, the Earth was shaken ; since which we have also had several Tremors of the Earth, but not very considerable ; so that our People began to hope we should hear no more of them. But we are now convinced to purpose, that *New-England* is still liable to the same Terror and Desolation that other Countries are from these extraordinary Motions of the Earth.

I now proceed to give the best Account I can of our late terrible Earthquake, which has so justly amazed

amazed and terrified the Inhabitants from one End of the Country to the other. The first Thing I shall begin with is to give a short Account of the Weather or Season preceding the Earthquake : Our Winter in *January* and *February* was very moderate, and excepting a few cold Days, the Weather was pleasant, and no great Frost in the Ground. In the beginning of *March* we had a great deal of Snow, and some cold Weather, which soon went over ; and on the 11th Day, 15 Minutes after Four o'Clock, the Sun was eclipsed about five Digits, as near as I could make it without an Instrument ; after which to the End of the Month we had pleasant Weather, Rain at times, and once we had Thunder and Lightning. *April* for the most part had fair pleasant Spring Weather, and a plentiful Rain in the beginning and latter end of the Month. The Beginning of *May* was also pleasant Weather ; the 9th, 10th, and 13th a great deal of Rain : The 18th a white Frost : 24th and 25th cold Weather ; from thence to the End of the Month very dry. The Beginning of *June* the same ; abundance of Thunder and Lightning at times during the whole Month. In *July* also, though we had some Showers in different Places, yet in general it was a very dry Season, and a great deal of Thunder and Lightning also this Month ; the three last Days of it so violent hot, that there was no working or travelling by Day, or sleeping by Night : The Beginning of *August* was also exceeding hot, and in particular the first Day at Night from the Evening to Midnight we had a continued Coruscation or Lightning all round the Horizon ; the like scarce ever remember'd : it was truly

terrible, though the Thunder was not severe. Dry Weather continued to the 10th, and then we had a plentiful Rain all over the Province, but our hot Weather held on to the End of the Month; and till about the Middle of *September* we had very hot Weather: So that take it all together, I have never known so much hot Weather in any one Summer in my Time. On the 16th of *September* we had such a violent Storm from the North-East, as was never remember'd, for the Fierceness and Strength of the Wind; it blew down Houses, Barns, and an infinite Number of Trees in our Orchards and Woods; a great deal of Rain also then fell. In the Month of *October*, preceding the Earthquake, we had a pretty deal of cold Weather; on the 23d a great deal of Rain, with the South Wind; on the 25th at Night, a hard Frost; on the 26th winterish Weather, and a little Snow; 28th cold, the Wind at North-West: Lord's-day 29th, the Wind at North-West, though little of it, but cold; in the Evening quite calm and a clear Sky.

By this short Journal of the Weather the Learned will be able in some measure to say, how far our Earth might be dispos'd to, or prepar'd for the Earthquake that followed; first by a long continued Drought and extreme Heat, whereby the Earth became more porous, and abounded with Exhalations or Vapours inflamed, and which afterwards being shut up by the succeeding great Rains and Frost, and thereby hinder'd from an ordinary and easy Passage through the Pores and common Vents of the Earth, worked so much more forcibly and terribly upon one another. But Philosophers not be-

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ing yet agreed on the Nature or certain Causes of Earthquakes, I pass on to the second Thing which I propos'd to enquire into, *viz.* what Kind or Sort of Earthquake ours was. *Gilbertus Jacchæus* in his *Institutiones Physicæ, cap. Terræ Motus* distinguishes Earthquakes into four Species ; wherein he agrees with *Aristotle* and *Pliny*, with whom the first Species is a Shake or Trembling, and by them liken'd to the shaking Fit of an Ague. I cannot yet hear of any Breach or Opening of the Earth, through the whole Extent of our Earthquake. It has been said by some that were abroad, that the Earth sensibly rose up, and so sank down again ; but I much question the Truth of it ; for if there had been any such Succussion to raise the Earth to any considerable Height, the Houses would certainly have tumbled down, or the the Exhalation forced its Way by some Breach. Nor was our Motion of the Earth that which *Aristotle* and *Pliny* call a Pulse or an intermittent Knocking, but one continued Shake or Trembling ; and therefore must be ranked under the first Species, *viz.* a Tremor or Shake, without altering the Position of the Earth, and left all things in the same Posture in which it found them, except the falling down of the Tops of some Chimnies, Stone Walls, &c. without doors ; Dishes and some other Things within doors ; which I shall observe when I come to speak of the Degree of the Shake.

That our Earthquake was of the first Species is also proved from the Sound that accompanied it, since tremulous and vibrating Motions are proper to produce Sounds ; which brings me to the third

Particular, *viz.* the Noise or Sound that accompanied or immediately preceded our Earthquake. This indeed was very terrible and amazing ; though I am apt to think it was thought more considerable by those within doors, than such as were without in the Air. Some of our People took this Noise to be Thunder ; others compared it to the Ratling of Coaches and Carts upon Pavements, or frozen Ground. One of my Neighbours liken'd it to the shooting out of a Load of Stones from a Cart under his Window. For my own Part, being perfectly awake, though in Bed, I thought at first my Servants, who lodged in a Garret over my Chamber, were haling along a Trundle-bed : But, in truth, the Noise that accompanies an Earthquake seems to be *sonus sui generis*, and there is no describing it. This Noise, as amazing as it was, in an Instant of Time, as one may say, was succeeded by a Shake much more terrible. My House, which is large and well built, seemed to be squeezed or press'd up together, as though an hundred Screws had been at work to throw it down ; and shook not only every thing in the House, particularly the Bed under me, but the Building itself, and every Part of it so violently for the Time, that I was truly in great Fear it would have tumbled down, and my Family perished in the Ruin : But through the great Power and Mercy of God, we received no Harm. 'Tis impossible to describe the Terror and Amazement that an Earthquake carries with it ; and though I had never felt one before, yet I was thoroughly convinced what it was at the very Time.

The next Thing I proceed to is the Degree or Greatness of the Shake. This will be best known from its Effects. I have already mention'd the falling of the Tops of Chimnies, Dishes from Shelves, *China* Ware, &c. Doors unlatched, Bells jangling, Beds trembling, Chairs moving, &c. A Country Farmer tells me, he had forty or fifty Rods of Stone-Wall thrown down by it : And though I acknowledge these Effects are not very considerable, yet I cannot but be of opinion, that our Earthquake for its Species was as violent and terrible as any we meet with in History : And had the Tremor continued a Minute longer, or been repeated in the like Degree, our Houses had doubtless been many of them overthrown. One of my Neighbours that was walking home at the very Instant, tells me, the Noise first brought him to a stand, and that during the Shake, the Earth trembled so under him, that he was so far from attempting to continue his Walk, that it was as much as he could do to keep upon his Legs, and expected every Moment the Earth would have open'd under him. Another that was riding home, says, that upon the Noise the Earthquake made, his Horse stood stock still, and during the Shake, trembled to that degree, that he thought he would have fell under him. Our House-Dogs were also sensible and affected with the Earthquake ; some of them barking, others howling, and making strange and unusual Noises. Nor was our Earth only affected with this Shake, but the Sea also in our Harbours, and our Shipping small and great much moved with it. I don't suppose it ever happens that Earthquakes of this kind, of any Extent,

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are equal or alike in all Places ; and accordingly I find by Information from our several Towns, that the Shake was much more moderate in some Parts of the Country than others.

The Time and Duration of the Shock — Our *Boston* News-Papers fix the Time at about forty Minutes after Ten o' Clock at Night : My own Watch was not so much by five Minutes ; but the Clocks of the Town might be truest. The first Day of *November* at Midnight, which was three Days after the Earthquake, the Moon changed. As to the Duration of the Shock itself — Whatever others may print or have printed, I can by no means suppose it exceeded the Space of a Minute, if it was so long ; I mean the first and great Shock ; after which in the same Night we had four or five more lesser Tremors ; and at sundry times since the Earth has trembled in different Places (even to this 13th of *November*) but without any considerable Effects or Extent.

The last Thing I have to mention is the Course and Extent of the Earthquake. *Boston*, the Metropolis of this Province, lies in the Latitude of 42 Deg. 25 Min. North, and 4 Ho. 43 Min. to the Westward of *London* ; as the Longitude between the two Places was settled by Mr. *Thomas Brattle* of this Country, and Mr. *Hodgson* of *London* many Years since : And making *Boston* a Center, we have a certain Account that our late Earthquake was felt in *Kennebeck* River to the Eastward, and at *Philadelphia* to the Westward, one hundred and fifty Leagues distant one from the other upon a W. S. W. and E. N. E. Course nearest : and no Part of the intermediate Country,
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that I can understand, escaped the Shake ; the Colonies *Rhode-Island*, *Connecticut*, and *New-York*, that lie between us and *Pensylvania* being all affected, though not equally, particularly at *Philadelphia* they write, a small Shock. As to the opposite Line or Latitude, as we may call it, of the Earthquake, we have two noted Islands to the South-East, called *Nantucket* and *Martha's Vineyard*, about ninety Miles distant from *Boston*, and the first named lies about twelve Leagues into the Sea, distant from the main Land ; both these Islands had the Earthquake. Our *English* Settlements towards the North-West, don't yet exceed forty or fifty Miles from *Boston* ; but they all of them had this Earthquake very sensibly ; and how far it might reach beyond them towards *Canada*, we cannot yet say. By this Calculation I believe it will be found, that our Earthquake was of a much greater Extent, than any yet taken notice of in History : As to the Course of the Earthquake, or where it first began, I am not yet able to determine by all the Information I can get : For they write from *Rhode-Island*, *Connecticut*, *New-York*, and *Philadelphia*, all to the Westward, that it was between the Hours of Ten and Eleven at Night. The same again is affirm'd from *Piscataqua*, *Casco-Bay*, and *Kennebeck River*, which are to the Eastward : So that as yet it seems to me, that the Earth, through the whole Extent aforesaid, was shaken very near at the same Time. Some of my Neighbours are positive, that it came from the Southward ; while others again are confident, that where they were, it came from the North. But this is not to be wonder'd at, since, as I suppose, the subterraneous

subterraneous Channels or Caverns, through which the Exhalation passes, are not in any one continued straight Line, but branched out, and running upon all Points of the Compass, especially in such a vast Extent of Land.

I am now come to the 28th of *November*, and having met with some further Particulars omitted in the preceding Account : I shall throw them into a Postscript.

A Neighbour of mine, that has a Well 36 Feet deep, about three Days before the Earthquake, was surprized to find his Water, that used to be very sweet and limpid, stink to that degree, that they could make no Use of it, nor scarce bear the House when it was brought in ; and thinking some Carrion was got into the Well, he searched the Bottom, but found it clear and good, though the Colour of the Water was turned wheyish or pale. In about seven Days after the Earthquake, his Water began to mend, and in three Days more return'd to its former Sweetness and Colour. I am also very credibly inform'd, that several Springs and good Watering-Places were some of them lower'd, and others quite sunk and lost with the Earthquake. A worthy Divine in a Town about twenty Miles distant from *Boston*, assures me, that immediately after the Earthquake, there was such a Stink or strong Smell of Sulphur, that the Family could scarce bear to be in the House for a considerable Time that Night. The like is confirmed also from other Places. Persons of Credit do also affirm, that just before, or in the Time of the Earthquake, they perceived Flashes of Light.

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A Gentleman of Probity, from *Newbury*, a Town situate between thirty and forty Miles to the N. N. E. of *Boston*, writes word, that at forty Rods distance from his House, there was a Fissure of the Earth, and near twenty Cart-Loads of fine Sand thrown out where the Ground brake, and Water boil'd out like a Spring, and mixing with the Sand, made a sort of Quagmire ; but at the Date of his Letter, which was the 21st current, the Spring was become dry, and the Ground closed up again. Since the Receipt of this Letter, I understand, that the Ground where this Sand is thrown up, and round about it for a considerable Distance, is a solid Clay for twenty or thirty Foot deep, and nothing like Sand ever to be found there before ; so that the Exhalation forced this great Quantity of Sand through a very deep *Stratum* of Clay. I am also very well satisfied, that the Earthquake was more violent in the Towns to the North and North-East of *Boston*, than in those to the Southward and Westward ; and in some of them that are rocky, the Earth shook but a few Days since.

If any thing further worth communicating should hereafter offer itself, I shall transmit it : In the mean time I hope what I have sent, will be received by the Society with their usual Candor and favourable Allowance, from their and your

Very affectionate and humble Servant,

Paul Dudley.