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as with a Spring, and drop'd again. Many People felt it there in various Shapes. — At *Castor*, a Mile and Half still farther West, one Mr. *Serjeant* says, that, looking out of a Window a considerable Height, he found the House reel more than once, and then come into its Place again with a Jolt. — Many very odd Instances we have of it. Some heard the Noise, and felt not the Shock; others felt it, and did not hear the Noise. I am informed it was felt at *Boston*, which lies about 30 Miles near North of us; and it was felt a few Miles to the South: So that its Extent here, from N.W. to S.E. or thereabouts, seems to be about 40 Miles. — Upon the Whole, I find, the higher one was, as farther from the Centre, the more the Shock was felt; that it was local; the Sound of the Explosion was heard as well abroad as in the Houses, tho' People differently situated judged differently what the Sound was; that not any Smoke, Vapour, or Flame, appeared on the Surface, as I have heard. — I am

Your most obedient Servant,

W^m. Smith.

LVII.

The Philosophy of Earthquakes; by the Rev. William Stukeley, M. D. F. R. S. &c. in a Letter to Martin Folkes, Esq; LL. D. and President of the Royal Society, &c.

Read Dec. 6. 1750. **S**INCE I had the Honour to lay before the Society, in the Spring, my Thoughts upon Earthquakes, we have had many

Opportunities of reflecting on that most awful, and hitherto unusual, Appearance. The Year 1750. may rather be called the Year of Earthquakes, than of *Jubilee*. For, since they began with us at *London*, as far as I can learn, they have appeared in many Parts of *Europe, Asia, Africa, and America*, and have likewise revisited many Counties in our Island: At length, on 30th of last *September*, taken their Leave (as we hope) with much the most extensive Shock we have seen in our Days.

It may well be expected, that these frequent Visits, in themselves so very extraordinary, to us so rare, and that in one Year, should keep up our Attention; and, as to my own Part, induce one to reflect on what I before offered concerning them, and be a sufficient Apology for the present Paper.

We have been acquainted, by those that remember it, that in the Earthquake of *November 1703*. which happen'd in *Lincolnshire*, the Weather was calm, close, gloomy, warm, and dry, in a Degree highly unusual at that Season: And thus it has been with us all the Year: And from the numerous Accounts we have received at the *Royal Society*, in the Beginning and End of the Year, where any Mention is made of the Weather, they agree in the like Particular: Which is consentaneous to what I remarked as the constant Forerunner of Earthquakes, and what prepares the Earth's Surface to receive the electrical Stroke.

In my last we had a Paper read at the *Royal Society*, concerning the first Earthquake felt by us at *London* on 8th *February*. A Shepherd belonging to Mr. Secretary *Fox* at *Kensington*, the Sky being perfectly

fectly serene and clear, was much surpris'd with a very extraordinary Noise in the Air, rolling over his Head, as of Cannon close by: He likewise thought that it came from the North-west, and went to the South-east; a Motion quite contrary to what must have been the Case, if it were really of Cannon. This Noise pass'd rushing by him; and instantly he saw the Ground, a dry and solid Spot, wave under him, like the Face of the River. The tall Trees of the Avenue, where he was, nodded their Tops very sensibly, and quaver'd. The Flock of Sheep immediately took Fright, and ran away all together, as if the Dogs had pursued them. A great Rookery in the Place were equally alarmed; and, after an universal Clangor, flew away, as if chased by Hawks.

I was likewise informed, that, in the same Earthquake, a great Parcel of Hens and Chickens, kept at that time in *Gray's-Inn Lane*, upon the Shock, ran to the Roost affrighted: And the like was observed of Pigeons. And in our Account of the last Earthquake from *Northampton*, it is remarked, that the Birds in Cages put their Heads under their Wings, as to hide themselves.

June 21. at the *Royal Society*, Mr. *Jackson*, Potter at *Lambeth*, gave an Account of some Boats and Loiters, in the River at that time; the People in them seem'd to feel as if a Porpoise, or some great Fish, had heav'd and thump'd at the Bottom of the Loiters. This is sometimes the Case of Ships at Sea; which seems evidently owing to an electrical Impression on the Water.

In the *Evening Post*, June 23: we had a Paragraph from *Venice*, that a terrible Earthquake had lately been felt in the Isle of *Cerigo*; a little rocky Isle. It threw down a great Number of Houses, and above 2000 Inhabitants were buried in the Ruins.

Another Earthquake about that time happen'd in *Switzerland*, which split a vast rocky Mountain, and an old Castle-Wall, of an immense Thickness.

But, since then, these wonderful Movements have stalked round the Globe; and again been lately felt in our own Island, to the Terror only of many thousand People; besides those that appear'd in the Western Parts, in the more early Time of the Year.

I received a Letter from my Friend *Maurice Johnson* Esq; the Founder and Secretary of the *Literary Society of Spalding*, which has now subsisted these 40 Years. He acquaints me, that, on *Thursday* the 23d of *August* last, an Earthquake was very sensibly felt there, about 7 o' Clock in the Morning, throughout the whole Town and Neighbourhood, and many Miles round; but chiefly spread Northward and Southward. He says, that, for a Fortnight before, the Weather had been serene, mild, and calm; and one Evening there was a deep-red *Aurora australis*, covering the Cope of Heaven, very terrible to behold. This same Shock was felt at *Grantham*, *Stamford*, and *Milton* by *Peterborough*; and generally at all the intermediate Places.

Since then, I had a Letter from Mr. Alderman *Taylor*, of *Stamford*, giving an Account of another Earthquake, that happen'd there on *Sunday*, *Sept.* 30 at 36 Minutes after 12 o' Clock at Noon. He describes

describes it thus: ‘ They were suddenly surpris’d with an uncommon Noise in the Air, like the rolling of large Carriages in the Street, for about 20 Seconds. At the same Instant they felt a great Shake, or Snap (as he calls it); insomuch that it sensibly shook a Punch-bowl, which was in his Parlour, and made it ring. He says, it was perceived of most of the People of *Stamford*, who generally ran out of their Houses. At *Okeham*, the chief Town in *Rutland*, the Congregation ran out of the Church. All the Towns round *Stamford* were sensible of it, and at *Peterborough*, down to *Wisbich*.’

Thus far the Alderman. But we have had many Advices from all Hands, at the first and second Meetings of the *Royal Society*, for the Winter-Season; with further Particulars relating to this great Concussion: That it was felt at the same time at *Rugby* in *Warwickshire*, and reach’d to *Warwick*; at *Lutterworth* in *Leicestershire*; at *Leicester*, and round about. They describe it, that the Houses totter’d, and seem’d to heave up and down, tho’ it lasted but a few Seconds. It was attended with a rushing Noise, as if the Houses were falling; and People were universally so affrighted as to run out; imagining that their own, or Neighbours Houses, were tumbling on their Heads. In the Villages around, the People, being at divine Service, were much alarm’d, both with the Noise, which exceeded all the Thunder they had ever heard, beyond Compare; and with the great Shock accompanying, which was like somewhat that rush’d against the Church-Walls and Roof; some thinking the
Pillars

Pillars crack'd ; many, that the Beams of the Roof were disjointed; and all, that the Whole was falling; and happy were they that could get out first. A few Slates, Tiles, and Parts of Chimnies, fell from some Houses; Pewter, Glasses, and Bras, fell from Shelves; a Clock-Bell sometimes struck; Windows universally rattled; and the like Circumstances of Tremor.

The same extended itself to *Coventry, Darby, Nottingham, Newark*; then came Eastward to *Harborough, Towcester, Northampton, Rowell, Kettering, Wellingborough, Oundle* in *Northamptonshire, Uppingham, Okeham* in *Rutland, Stamford, Bourn, Grantham, Spalding, Boston*, and to *Lincoln*, in *Lincolnshire; Holbeck*, and all *Holland*, in that County; *Peterborough, Wisbech* in the Isle of *Ely*, together with all the intermediate and adjacent Places. Then it passed over the whole Breadth of *Ely-Fen*, and reached to *Bury* in *Suffolk*, and the Country thereabouts; of which we had Notice from *Lady Cornwallis*: An Extent from *Warwick* to *Bury* of about 100 Miles in Length; and, generally speaking, 40 Miles in Breadth. And this vast Space was pervaded by this amazing Motion, as far as we can get any Satisfaction, in the same Instant of Time.

In regard to Circumstances, they were pretty similar throughout. At *Northampton*, a Gentlewoman, sitting in her Chair, relates, that she and her Chair were twice sensibly lifted up, and set down again. A Stack of Chimnies were thrown down in *College-lane*; a Place retaining the Memory of a sort of University once beginning at *Northampton*. The Windows of Houses rattled throughout the whole Town; but

but no Mischief done: In general, frightful, and innocuous.

They fancied there the Motion of it, as they express it, to be Eastward. In Streets that run North and South, the Houses on the East Side of the Way were most affected: And Dr. *Stonehouse's* Dwelling, the strongest in the Town, was most sensibly shaken. So it was likewise observed, that Churches were most subject to its Violence. They thought too that the Motion seem'd rather horizontal, or lateral, than upward. Some counted the Pulses distinctly, to the Number of four: That the second and third Pulse were stronger than the first and fourth.

From all these various Accounts, there was no sulphureous Smell, or Eruption; no Fissures in the Ground perceiv'd: Yet several People were sick upon it; infinite Numbers terribly affrighted; and as soon forgot the Impression of it, or talk'd of it in a merry Strain, as commonly with us at *London*. So little are the Vulgar affected, without something very sensible, and so soon is the Sense of it worn out!

It was more evidently perceiv'd by People standing; most, by those that were sitting; least, by such as were walking; and in upper Stories of Houses more than in lower, or in Cellars. Some, coming down stairs, were in Danger of being thrown forwards: Several sitting in Chairs, and hearing the hollow thundering Noise, and thinking it was a Coach passing by, when they attempted to get up, to see what it was, they were thrown back again into their Chair. Some heard the Wainscot crackle. A Lady, sitting by the Fire, with her Chair leaning

forwards, was thrown down on her Hands and Knees.

It was particularly remarked (as before observed), that Birds in Cages were sensibly affrighted, thrusting their Heads under their Wings. Mrs. *Alli-cock*, of *Loddington*, a Lady in Childbed, was so affected, that it caused her Death. Some People felt such a sudden Shortness of Breath, that they were forced to go out into the open Air, it so affected the pulmonary Nerves. Many were taken with Head-achs.

These and, in general, the Observations made at the time of these Earthquakes; when we recollected ourselves, after the Suddenness and Affright. Give me Leave to make the following Remarks.

1. As far as we can possibly learn, where no one can be prepar'd at different Places, by Time-keepers, this mighty Concussion was felt precisely at the same Instant of Time, being about half an Hour after 12 at Noon. This, I presume, cannot be accounted for by any natural Power, but that of an electrical Vibration; which, we know, acts instantaneously.

2. Let us reflect on the vast Extent of this Trembling, 100 Miles in Length, 40 in Breadth, which amounts to 4000 square Miles in Surface. That this should be put into such an Agitation in one Moment, is such a Prodigy, as we should never believe, or conceive, did we not know it to be Fact, from our own Senses. But, if we seek for a Solution of it, we cannot think any natural Power is equal to it, but that of Electricity; which acknowledges no sensible Transition of Time, no Bounds.

3. We

3. We observe, the vulgar Solution of subterraneous Eruptions receives no Countenance from all that was seen or felt during these Earthquakes: It would be very hard to imagine how any such thing could so suddenly and instantaneously operate thro' this vast Space, and that in so similar and tender a manner, over the Whole, thro' so great a Variety as well as Extent of Country, as to do no Mischief.

A philosophical Inquirer in *Northamptonshire*, who had his Eye particularly on this Point, takes notice there were not any Fissures in the Ground, any sulphureous Smells, or Eruptions, any where perceiv'd, so as to favour internal Convulsions of the Earth; yet we learn, from a Letter, at *Uppingham* in *Rutland*, that a Plaister Floor became crack'd thereby. These kind of Floors are frequent in this Country; what we call *Stucco* in *London*; and it gives us a good Notion of the undulatory Vibration produc'd by an Earthquake; which some have compared to that of a musical String; others, to that of a Dog, or a Horse, shaking themselves when they come out of the Water.

4. The former Earthquake, that happened at *Grantham, Spalding, Stamford* (which Towns lie in a Triangle) took up a Space which may in gross be accounted a Circle of 20 Miles in Diameter; the Centre of which is that great Morass called *Deeping-Fen*. This comprehends 14 Miles of that 20 in Diameter; and where, probably, the electrical Impression was first made. Much the major Part of *Deeping-Fen* is under Water in the Winter; underneath is a perfect Bog: Now it is very obvious how little favourable such Ground is for subterraneous Fires.

In the second Earthquake, not only this Coun-

try was affected again, but likewise a much larger Space of the same sort of fenny Ground, rather worse than the former: All *Donington-Fen*, *Deeping-Fen*, *Croyland Fen*, *Thorney-Fen*, *Whitsea-Fen*, *Bedford-Level*, and the whole Extent of *Ely-Fen*, under various Denominations. This Country, under the Turf, abounds with subterraneous Timber of all kinds; Fir, Oak, and Brush-wood; Stags Horns: Now-and-then they find a Quantity of Hazel-nuts, crouded together on a Heap: I have some of them. This is a Matter common to all boggy Ground over the whole Globe. They are the Ruins of the antediluvian World, wash'd down from the high Country, where they grew, here lodg'd, and by time overgrown with the present Turf. They that seek for any other Solution of this Affair, than the universal *Noachian* Deluge, want to account for a general Effect by a partial Cause; and shut their Eyes, both to the plain History of this Matter, and to the infinite notorious Demonstrations of it from fossil Appearances.

5. All this Country, tho' underneath it is a watry Bog, yet, through this whole Summer, and autumnal Season (as they can have no natural Springs in such a Level) the Drought has been so great on the Superficies, that the Inhabitants were obliged every Day to drive their Cattle several Miles, for watering. This shews how fit the dry Surface was for an electrical Vibration; and we learn from hence this important Particular, that it reaches but very little below the Earth's Surface.

Mr. *Johnson*, in another Letter which he wrote to me concerning the second Earthquake, observed at *Spalding*, says, upon this Occasion, he was obliged
to

to scour his Canal, and deepen it; that they came to a white Quickſand, which afforded to all the Neighbourhood excellent Water in Plenty.

In the gravelly Soil of *London*, and where the two Shocks were felt by us, in the Beginning of the Year, we know there is not an Houſe in the whole Extent of this vaſt City, and all around it, but a Spring of Water is ready, upon digging a Well: Whence we have much Reaſon to believe, that the internal Parts of the Earth are like a Sponge ſoak'd in Water; ſo that the only dry Part of it is the Superficies; which is the Object, and the Subject, of that electric Vibration, wherein (according to my Sentiments) an Earthquake conſiſts.

This ſhews the Miſtake of the Antients; who, fancying that Earthquakes proceeded from ſubterraneous Eruptions, built their prodigious Temple of *Diana of Ephesus* upon a boggy Ground, to prevent ſuch a Diſaſter.

6. Earthquakes are truly moſt violent in a rocky Country; becauſe the Shock is proportionate to the Solidity of the Matter electrify'd: So that Rocks, old Caſtle-Walls, and ſtrong Buildings, are moſt obnoxious to the Concuſſion. The Iſle of *Cerigo* was more liable, and more rudely handled by the late Earthquake; both becauſe it was an Iſle, and becauſe it was rocky. So we muſt ſay of the late Earthquake in *Switzerland*, that ſplit the Mountain and the old Caſtle-Wall. Whence Mr. *Johnſon*, in his ſecond Letter, ſays, it crack'd a very ſtrong brick Houſe in *Gosberton* by *Spalding*. Dr. *Doddridge* obſerves, from *Northampton*, that Dr. *Stonehouſe's* Dwelling, being a very ſtrong one,
was

was most sensibly shaken. And, throughout the whole Extent of this great Earthquake, we find both the Noise, the Shock, and the Terror, was greatest at the Churches, whose Walls and Bulk made more Resistance than Houses: And, generally speaking, the Churches throughout this whole Extent have very fair and large Towers, and very many remarkable Spires of good Stone.

This same Vibration, impress'd on the Water, meeting with the Solid of the Bottom of Ships and Loiters, gives that Thump felt thereon. Yet, of the Millions of ordinary Houses, over which it passed, not one fell: A Consideration which sufficiently points out to us what sort of a Motion this was not; what sort of a Motion it was; and whence deriv'd: Not a Convulsion of the Bowels of the Earth, but an uniform Vibration of its Surface, aptly thought like that of a musical String; or what we put a Drinking-glass into, by rubbing one's Finger over the Edge; which yet, brought to a certain Pitch, breaks the Glass; undoubtedly an electric Repulsion of Parts.

7. We find, from all Accounts antient and modern, that the Weather preceding these Shocks was mild, warm, dry, serene, clear, frosty: What notoriously favours all our electrical Experiments. We very well know, that, generally, all last Winter, Spring, Summer, and Autumn, have been remarkably of this kind of Weather; more so than has been observed in our Memory; and have had all those Requisites, Appearances, and Preparations, that notoriously cause Electricity, that promote it, or that are the Effects of it.

8. We

8. We find the blood-red *australis Aurora* preceding at *Spalding*, as with us at *London*. This Year has been more remarkable than any for Fire-balls, Thunder, Lightning, and Coruscations, almost throughout all *England*. Fire-balls more than one were seen in *Rutland* and *Lincolnshire*, and particularly observed. All these kinds of Meteors are rightly judged to proceed from a State of Electricity in the Earth and Atmosphere.

9. Mr. *Johnson*, in both his Letters to me on the first and second Earthquakes at *Spalding*, remarks particularly of their Effects being mostly spread to the North and South, and especially felt on the Sea-coast. We may observe that such is the Direction of *Spalding* River, which both conducts and strengthens the electric Vibration; conveying it along the Sea-shore, thence up *Boston* Chanel, and so up *Boston* River to *Lincoln*; as we discern, by casting our Eye upon a Map.

We observe further, that the main of this second Earthquake display'd its Effects along and between the two Rivers *Welland* and *Avon*; and that from their very Origins down to their Fall into the Sea. It likewise reached the River *Witham*, which directed the electric Stream that Way too to *Lincoln*: For which Reason, as there meeting the same coming from *Boston*, the Shock was most sensibly felt. It reached likewise to the *Trent* at *Nottingham*, which convey'd it to *Newark*.

The first electrical Stroke seems to have been made on the high Ground above *Daventry* in *Northamptonshire*, where the *Roman* Camps are, made by *P. Ostorius* the Proprætor. From thence it descended

scended chiefly Eastward, and along the River *Welland*, from *Harborough* to *Stanford*, *Spalding*, and the Sea; and along the River *Avon*, or *Nen*, to *Northampton* *Peterborough*, and *Wisbech* to the Sea. It spread itself all over the vast Level of the Isle of *Ely*, further'd by very many Canals and Rivers, natural and artificial, made for Drainage. It was still conducted Eastward, up *Mildenhall* River in *Suffolk*, to *Bury*, and the Parts adjacent. All this Affair, duly consider'd, is a Confirmation of the Doctrine I advanced on this Subject.

10. I apprehend it was not the Noise in the Air, as of many Cannon let off at once, preceding the Earthquake, that so much affrighted People, or affected the Sheep, the Rookery at *Kensington*, the Hen and Chickens in *Gray's-Inn-Lane*, and the Pigeons: It could not be barely the superficial Movement of the Earth that disturbed them all at once: I judge it to be the Effect of Electricity, somewhat like what causes Sea-Sickness; such a sort of Motion as we are not accustomed to. So the Earthquake affects all those of weak Nerves, or that have nervous Complaints, obnoxious to Hysterics, Colics, rheumatic Pains in their Joints. Several Women were seiz'd with violent Head-achs, before both the Shocks we felt in *London*. It was this that affected the People with a Shortness of Breath. This made the Dog run whining about the Room, seeking to get out: This made the Fishes leap up in the Pond at *Southwark*; like as the Experiment of electrifying the Fishes; it makes them sick: And this causes the Birds in Cages to hide their Heads under their Wings, because they cannot fly away: Which

is commonly observed of them in *Italy*, and Countries where Earthquakes are more frequent.

11. I observe, the Shepherd of *Kensington* thought the Motion of the Earthquake, and the Sound, were from North-west to South-east. On the contrary, Mr. *Byfield*, the Scarlet-dyer in *Southwark*, thought the Noise came from the River below-bridge, and went toward *Westminster*; where it rattled so, that he did not doubt but that the Abbey-Church was beaten down.

Dr. *Parsons* took Pains to find out the Way of the Motion of the Earthquake, from the different Position of the Beds; but, from the contradictory Answers given, he could obtain no Satisfaction, as to that Point. All this, and what was observ'd from *Northampton*, of the Motion being thought by some to be upward and downward, by others, rather horizontal or lateral, the counting the Pulses, and the like, only points out to us the prodigious Celerity, and the vibratory Species of the Motion of an Earthquake; but far, very far, is this from being owing to the tumultuous Ebullition, the irregular Hurry of subterraneous Explosions.

12. How the Atmosphere and Earth are put into that electric and vibratory State, which prepares them to give or receive the Snap, and the Shock, which we call an Earthquake, what it is that immediately produces it, we cannot say; any more than we can define what is the Cause of Magnetism, or of Gravitation, or how muscular Motion is perform'd, or a thousand other Secrets in Nature.

We seem to know, that the AUTHOR of NATURE has disseminated ethereal Fire thro' all Matter; by

which these great Operations are brought about. This is the subtil Fluid of Sir *Isaac Newton*, pervading all things; the occult Fire diffused thro' the Universe, according to *Marsilius Ficinus*, the *Platonic* Philosopher, in the *Timæus* of his Master. And the *Platonists* insist on an occult Fire passing thro' and agitating all Substance by its vigorous and expansive Motion.

Before them, *Hippocrates* writes in the same Sense, I. *de victus ratione*, that this Fire moves all in all. This ethereal Fire is one of the four Elements of the Ancients: It lies latent, and dispersed thro' all the other three, and quiescent; till collected in a Quantity, that overbalances the circumjacent; like the Air crouded into a Tempest; or till it is excited by any proper Motion.

This Fire gives Elasticity, and Elasticity, or Vibration, is the Mother of Electricity. This Fire is in Water, and betrays itself to our Senses in salt Water. Many a time, when I have passed the *Lincolnshire* Washes, in the Night-time, the Horse has seem'd to tread in liquid Flames. The same Appearance oft at the Keel of a Ship.

The Operation of the ethereal Fire is various, nay infinite, according to its Quantity, and Degree of Incitement, Progress, Hindrance, or Furtherance. One Degree keeps Water fluid, says the learned Bishop of *Cloyne*: Another turns it into elastic Air: And Air itself seems nothing else but Vapours and Exhalations render'd elastic, by this Fire.

This same Fire permeates and dwells in all Bodies, even Diamond, Flint, and Steel. Its Particles
attract

attract with the greatest Force, when approximated. Again, when united, they fly asunder with the greatest Celerity. All this according to the Laws prescribed by the Sovereign ARCHITECT. This is the Life and Soul of Action, and Reaction, in the Universe. Thus has the Great AUTHOR provided against the native Sluggishness of Matter! Light, or Fire, in Animals, is what we call the animal Spirits; and is the Author of Life and Motion. But we know not the immediate Mode of muscular Motion, any more than how, in inanimate Matter, it causes the Vibrations of an Earthquake.

Of this Fire the excellent *Manilius* thus writes, who lived in the Time of *Augustus*, *Astronom. I.*

*Sunt autem cunctis permisti partibus ignes,
 Qui gravidas habitant fabricantés fulmina nubes,
 Et penetrant terras, Ætnamque imitantur
 Olympo,
 Et calidas reddunt ipsis in fontibus undas,
 Ac silice in duro, viridique in cortice, sedem
 Inveniunt; cum silva sibi collisa crematur.
 Ignibus usque adeo natura est omnis abundans!*

Which may thus be englified :

Fire, universal Nature traverses;
 It makes the Thunderbolt in tumid Clouds ;
 In dire *Volcano's* penetrates the Earth ;
 And sends the boiling Water from its Springs :
 In hardest Flint, and softest Wood, it dwells ;
 Which, by Collision, shews itself in Flame.
 With Fire so pregnant is all Nature found !

13. The great Question then with us, is, how the Surface of the Earth is put into that vibratory and electric State by Heat and Driness? We must needs acquit the Internal of the Earth from the Charge of these superficial Concussions. How is the ethereal Fire crouded together, or excited, so as to cause them; seeing, in our ordinary electrical Experiments, we make use of Friction?

But that Friction alone does not excite Electricity, we know, from the obvious Experiment of Flint and Steel; where the Suddenness of the Stroke, and Hardness of the Matter does it. Another Method of exciting it, is the letting off a Number of great Guns; which so crouds the ethereal Fire together, as to electrify glass Windows; observed by my Friend the Reverend Dr. *Stephen Hales*. The *Aurora borealis, australis*, all kind of Coruscation, Meteors, Lightning, Thunder, Fireballs, are the Effects, and may reciprocally be the Cause, of Electricity; but how, in particular, we know not.

Come we to the animal World, we must needs assert, that all Motion, voluntary and involuntary, Generation, even Life itself, all the Operations of the vegetable Kingdom, and an Infinity more of Nature's Works, are owing to the Activity of this electric Fire; the very Soul of the material World. And, in my Opinion, it is this alone that solves the famous Question, so much agitated with the Writers in Medicine, about the Heat of the Blood. How these, how Earthquakes, are begun and propagated, we are yet to seek.

We may readily enough presume, that the Contact between the Electric and the Non-electric, which

which gives the Snap, and the Shock, must come from without, from the Atmosphere; perhaps by some Meteor, that crowds the ethereal Fire together, causes an Accension in the Air, in the Point of Contact, on the Earth's Surface; perhaps another time by a Shower of Rain. We may as readily conclude, that tho' the original Stroke comes from the Atmosphere, yet the Atmosphere has no further Concern in it: No aereal Power, or Change therein, can propagate itself so instantaneously over so vast a Surface as 4000 Miles square: Therefore the impetuous rushing Noise in the Air, accompanying the Shock, is the Effect, not the Cause.

But surely there is not a Heart of Flesh that is not affected with so stupendous a Concussion. Let a Man estimate his own Power with that which causes an Earthquake, and he will be persuaded that somewhat more than ordinary is intended by so rare and wonderful a Motion.

That great Genius *Hippocrates* makes the Whole of the Animal Oeconomy to be administered by what we call Nature; and Nature alone, says he, suffices for all things to Animals: She *knows* herself, and what is necessary for them.

Can we deny then that he here means a conscious and intelligent Nature, that presides over, and directs all things; moves the ethereal Spirit, or Fire, that moves all things; a divine Necessity, but a voluntary Agent, who gives the commanding Nod to what we commonly call Nature; the chief Instrument in the most important Operations of the vast Machine, as well as in the ordinary ones? And this leads us,

14. Lastly, in regard to the spiritual Use we ought to make of these extraordinary *Phænomena*, or of our Inquiries about them; I shall first observe, that we find abroad, several of these Earthquakes this Year have been very fatal. In the last we read of at *Philippoli* in *Thrace*, the whole City was destroy'd, and above 4000 Inhabitants kill'd. At home, where above half a Score separate Concussions have been felt, there has not been one House thrown down, one Life lost. This ought to inspire us with a very serious Reflection about them. 2. We may observe, that if we did but read the Works of *Hippocrates*, *Plato*, and his Followers, of *Tully*, *Galen*, and the like ethic Writers of Antiquity, whilst we study and try the Affections of Matter, we should improve in Philosophy, properly speaking; we should lift up our Minds from these earthly Wonders, and discern the celestial Monitions they present to us.

The original Meaning of the Word Philosophy was rightly applied to moral Wisdom: We, who have improv'd both, should join them both together. By this means we gather the Truth of the highest and most excellent Philosophy, to be found in those Volumes of first Antiquity, which we call sacred; and we should adore that divine Light which they hold forth to us; especially in a Country where the Principles of true Religion are open and undisguis'd; where the establish'd Profession of it is rational, noble, and lovely; worthy of the moral Governor of the World.

W. Stukely.