And $\overline{1,443}^2 = 2,082$; And $2,082 - 1 = 1,082 = \overline{\frac{256}{216}}^2 - 1$.

Alſo $vv = \overline{\frac{9}{4}}^2 = \frac{81}{16}$; And $\frac{vv}{48} = \frac{81}{16 \times 64.3596} = 0,0786$.

Then $1,082 \times 0,0786 = 0,084$ feet, the fall ſought.

Which is about 1 inch; and is about half an inch more than the greateſt fall obſerved by Mr. Labelye.

LXIV. *An Account of the Earthquake in the Weſt Parts of* Cornwall, July 15*th* 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.*

Read Jan. 26. 1758.

ON Friday the 15th of July, 1757. a violent ſhock of an earthquake was felt in the weſtern parts of Cornwall.

The thermometer had been higher than uſual, and the weather hot, or calm, or both, for eight days before; wind eaſt and north-eaſt. On the 14th in the morning, the wind ſhifting to the ſouth-weſt, the weather calm and hazy, there was a ſhower. The afternoon hazy and fair, wind north-weſt. The barometer moderately high, but the mercury remarkably variable.

On the 15th in the morning, the wind freſh at north-weſt, the atmoſphere hazy. Being on the ſands, half a mile eaſt of Penzance, at 10 A. M. near low water, I perceived on the ſurface of the ſands a very unuſual inequality: for whereas there are ſeldom any unevenneſſes there, but what are made by the rippling of the water, I found the ſands, for above 100 yards ſquare, all full of little tubercles (each as large as a moderate mole-hill), and in the middle a black ſpeck on the top, as if ſomething had iſſued thence. Between theſe convexities were hollow baſons of an equal diameter. From one of theſe hollows there iſſued a ſtrong ruſh of water, about the bigneſs of a man's wriſt, never obſerved there before nor ſince.

About a quarter after ſix, P. M. the ſky duſky, the wind being at weſt north-weſt, it fell quite calm. At half paſt ſix, being then in the ſummer-houſe at Keneggy, the ſeat of the Hon. J. Harris, Eſq; near Penzance, with ſome company, we were ſuddenly alarmed with a rumbling noiſe, as if a coach or waggon had paſſed near us over an uneven pavement; but the noiſe was as loud in the beginning and at the end, as in the middle; which neither the ſound of thunder, or of carriages, ever is. The ſaſh-caſements jarred: one gentleman thought his chair moved under him; and the gardener, then in the dwelling houſe (about an hundred yards diſtant from us) felt the ſtone pavement of the room he was in move very ſenſibly.

In what place the ſhock began, and whether progreſſive or inſtantaneous in the ſeveral places where it was felt, is uncertain, for want of accurately determining the preciſe point of time in diſtant places.

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The ſhock was not equally loud or violent. Its extent was from the iſles of Scilly eaſtward as far as Liſkerd, and towards the north as far as Camelford; thro' which diſtrict I ſhall trace it, according to the beſt informations I could procure.

In the iſland of St. Mary, Scilly, the ſhock was violent. On the ſhores of Cornwall, oppoſite to Scilly (in the pariſh of Senan, near the Land's-end) the noiſe was heard like that of a ſpinning-wheel on a chamber-floor. Below ſtairs there was a cry, that the houſe was ſhaking; and the braſs pans and pewter rattled one againſt another in ſeveral houſes in the ſame pariſh. In the adjoining pariſh of St. Juſt, two young men being then ſwimming, felt a ſtrong and very unuſual agitation of the ſea. In the town of Penzance, in one houſe the chamber-bell rung; in another the pewter plates, placed edgeways on a ſhelf, ſhifted, and ſlid to one end of the ſhelf: and it was every-where perceived more or leſs, according as people's attention was engaged.

At Trevailer, the ſeat of William Veale, Eſquire, about two miles from Penzance, the noiſe was heard, and thought at firſt to be thunder: the windows ſhook, and the walls of the parlour, where Mr. Veale ſat, viſibly moved. The jarring of the windows continued near half a minute; but the motion of the walls not quite ſo long: and ſome maſons, being at work on a contiguous new building, the upright poles of the ſcaffolds ſhook ſo violently, that, for fear of falling, they laid hold on the walls, which, to their ſtill greater ſurprize, they found agitated in the ſame manner. And a perſon preſent, who was at London at the time of the two ſhocks in the

the year 1751, thought this ſhock to reſemble the ſecond, both in degree and duration (1).

At Marazion, the next market-town eaſt of Penzance, the houſes of ſeveral perſons ſhook to that degree, that people ran out into the ſtreet, leſt the houſes ſhould fall upon them.

In the borough of St. Ives, on the north ſea, ſix miles north of Penzance, the ſhock was ſo violent, that a gentleman, who had been at Liſbon during ſeveral ſhocks, ſaid, that this exceeded all he had met with, except that on the 1ſt of November 1755, ſo fatal to that city.

At Tehidy, the ſeat of Francis Baſſet, Eſq; the rooms ſhook, and the grounds without doors were obſerved to move. The ſhock was felt ſenſibly at Redruth, St. Columb, Bodman, *&c.* along to Camelford, which is about 90 miles from the iſle of Scilly. From Marazion eaſtward it was felt at ſeveral places in like manner, as far as Loſtwythyel; but at Liſkerd, about ten miles eaſt of Loſtwythyel, it was but faintly perceived, and that by a few perſons. It was ſtill leſs ſenſible at Loo and Plymouth, "ſcarcely ſufficient to excite curioſity or fear" (2).

The times of its duration were various. At Keneggy we thought the noiſe could not have laſted above ſix ſeconds; at Trevailer, not two miles diſtant to the weſt, it was thought to have laſted near half a minute; in the pariſh of Gwynier half a minute; at Ludgvan, three miles eaſt of Penzance, the noiſe was rather longer than half a minute; but

(1) Letter from William Veale, Eſq;
(2) Letter from John Trehawk, Eſq;

the

the ſhaking felt in the garden, and obſerved in the houſes, ſhort and momentary. In Germo great Pin-work, ſeven miles eaſt of Penzance, it laſted only a few ſeconds; but in the iſles of Scilly it was computed at 40 ſeconds.

Thus was this earthquake felt in towns, houſes, and grounds adjacent; but ſtill more particularly alarming in our mines, where there is leſs refuge, and conſequently a greater dread from the tremors of the earth.

In Carnorth adit, in the pariſh of St. Juſt, the ſhock was ſenſibly felt 18 fathom deep; in the mine called Boſcadzhill-downs, more than 30 fathom.

At Huel-rith mine, in the pariſh of Lannant, people ſaw the earth move under them, firſt quick, then in a ſlower wavy tremor; and the ſtage-boards of the little winds or ſhafts 20 fathom deep were perceived to move.

In Herland mine, commonly called the Manor, in the pariſh of Gwynier, the noiſe was heard 55 and 60 fathom deep, as if a ſtuddle (3) had broke, and the deads (4) were ſet a running. It was nothing like the noiſe of thunder.

In Chace-water mine the ſame noiſe was heard, at leaſt 70 fathom under the ſurface.

At Huel-rith mine, near Godolphin, the noiſe was ſeemingly underneath. I felt (ſays the director of the mine) the earth move under me with a prodigious ſwift, and apparently horizontal tremor: its continuance was but for a few ſeconds of time,

(3) A timber ſupport of the deads.
(4) Looſe rubbiſh and broken ſtones of the mine.

not

not like thunder, but rather a dull rumbling even ſound, like deads running under ground. In the ſmith's ſhop the window-leaves ſhook, and the ſlating of the houſe cracked. The whim-houſe ſhook ſo terribly, that a man there at work ran out of it, concluding it to be falling. Several perſons then in the mine, working 60 fathom deep, thought they found the earth about them to move, and heard an uncommon noiſe: ſome heard the noiſe, and felt no tremor; others, working in a mine adjoining called Huel-breag, were ſo frightened, that they called to their companions above, to be drawn up from the bottoms. Their moor-houſe was ſhaken, and the padlock of their candle-cheſt was heard to ſtrike againſt the ſtaples. To ſhew, that this noiſe proceeded from below, and not from any concuſſion in the atmoſphere above, this very intelligent captain of the mine (5) obſerves, from his own experience, that thunder was never known to affect the air at 60 fathoms deep, even in a ſingle ſhaft pierced into the hardeſt ſtone; much leſs could it continue the ſound thro' ſuch workings as there are in this mine, impeded in all parts with deads, great quantities of timber, various noiſes, ſuch as the rattling of chains, friction of wheels and ropes, and daſhing of waters; all which muſt contribute to break the vibrations of the air as they deſcend: and I intirely agree with this gentleman's concluſion, that thunder, or any other noiſes from above in the atmoſphere, could not be heard at half the depth of this mine. This therefore could be no other than a real tremor of the earth,

(5) Mr. J. Nantcarrow.

attended

attended with a noiſe, owing to a current of air and vapour proceeding upwards from the earth.

I do not hear of any perſon in thoſe parts, who was ſo fortunate as to be near any pool or lake, and had recollection enough to attend to the motion of the waters; but it may be taken for granted, that during the tremors of the earth the fluids muſt be more affected than the ſolids: nay, the waters will apparently be agitated, when there is no motion of the earth perceptible, as was the caſe of our ponds and lake-waters in moſt parts of Britain on the 1ſt of November 1755. Whence this happens is difficult to ſay: whether the earth's boſom undergoes at ſuch times a kind of reſpiration, and alternately emits and withdraws a vapour thro' its moſt porous parts ſufficient to agitate the waters, yet not ſufficient to ſhake the earth; or whether the earth, during the agitation of the waters, does rock and vacillate, tho' not ſo as to be ſenſible to man; is what I ſhall leave to future inquiry.

Earthquakes are very rare in Cornwall. This was but of ſhort duration, and did no harm any-where, as far as I can learn; and it is to be hoped not the ſooner forgotten for that reaſon; but rather remembered with all the impreſſions of gratitude ſuitable to an incident ſo alarming and dangerous, and yet ſo inoffenſive.