Aberdeen Earthquakes

John S. Reid, Hon Curator of the Natural Philosophy Collection of Historical Scientific Instruments, University of Aberdeen.

Scotland is a country known for many things but earthquakes are not among them. Look at the geological map of Scotland, though, and you will see a complex multi-layered sandwich whose layers run approximately SW to NE with a myriad of fault lines between the sandwich ingredients, some extending from coast to coast. In addition the land is still recovering from being depressed by ice a kilometre thick that covered the country some 25,000 years ago. In round figures that’s 1000 tonnes of weight sitting on every square metre of the land, now melted away. A Scot coined the name ‘seismometer’ for the device used to quantitatively record earthquakes and in 1840 the Comrie ‘Earthquake house’ over the Highland Boundary Fault in Perthshire was established. Even by then, Comrie had a reputation as the earthquake capital of the UK, though the UK is a small player in this field. The Comrie observatory is the earliest mentioned in the National Seismological Archive of the British Geological Survey, based in Edinburgh. It was still in existence recording tremors when I visited a few years ago and I’ve no reason to think it’s since been closed down.

Aberdeen is 100 miles from Comrie but barely a dozen miles, as the seagull flies, from the Highland Boundary Fault as it heads into the North Sea just above Stonehaven. In spite of this, Aberdeen is not noted for earthquakes that would be spotted by anyone without a seismometer. James Crombie, a partner in the local woollen manufactory that originated the famous ‘Crombie’ coats, established a seismology station at his house in Parkhill, Dyce. He ran this from 1914 until his death in 1932. Our collection of historical scientific instruments has parts of two very early Milne-Shaw seismometers that Crombie purchased around 1918 and were donated to the University of Aberdeen after his death. The University set up a successor seismic station that ran from 1936 until 1967 in a basement room adjacent to what was then King’s College library at the East end of the quadrangle.

The politics of the mid-sixties was dominated by the cold war and its accompaniment of nuclear weapons’ testing. Professor R V Jones, who had been Scientific Adviser to Churchill during WWII, realised that instruments of his own design operating in the basement of the Natural Philosophy Building (later, renamed the Fraser Noble Building) could detect nuclear bomb tests in the Soviet Union. He initiated a project to set up a seismic station at Tillycorthie House about 10 miles north of Aberdeen and at that time owned by the University. Our historic instrument collection includes a rack of Krohn-Hite

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filters and a large multi-track data tape recorder from this initiative. The collection also has a seismometer that probably dates from this time but the project was left incomplete when the principal academic involved (Dr Harry Mutch) left the University. This seismic station would certainly have detected earthquakes but its motivation was not earthquake hunting.

With the advent of the 1970s the University’s interest in seismology took another twist following the discovery of North Sea oil. Seismology was one of the tools of choice to map in detail the complex geology beneath the North Sea. The department of Geology, later Geology and Petroleum Geology, acquired academics skilled in seismological interpretation with strong links to oil exploration companies. There were, though, no local earthquakes of any significance for them to interpret. The words ‘Aberdeen’ and ‘earthquakes’ are not usually found together. This brings me to the historical excerpts below.

The first excerpt, with its original spelling, is from the Church Session Register of Aberdeen (vol. ii., 1602 to 1609). The Church Session were a kind of moral police with full legislative, judicial and executive powers, which they exercised enthusiastically. Their Minutes below refer to an earthquake of 9th November 1608, felt across the whole city and well beyond. Modern historical analysis estimates its strength at about 4.6 on the Richter scale. The report is an eye-opening reminder that people in 1608 did not have the remotest idea what was actually going on. The Bishop considered the earthquake a sign that God was angered by the sins of the citizens. All were required to participate in a solemn fast and humiliation on the day following the meeting. Five days later he had concluded that among the manifold and innumerable sins of the city the salmon fishers were the main culprits, for fishing on Sunday. Hadn’t a plague of pestilence already struck Torry, with loss of life? This was the same era that Galileo would tangle with the Catholic Church but in Aberdeen the reformation had established itself some half century earlier. The Protestant replacement to Catholicism appeared to be no less authoritative about how citizens should interpret nature and behave.

Just over two hundred years later another quake was felt in Aberdeen, one of the strongest UK quakes at an estimated 5.1 on the Richter scale. The quotations all come from the Aberdeen Journal’s reporting of events in the days following. There’s no suggestion now that the sins of the citizens were responsible but many then would have probably seen it as ‘an act of God’. For NE Scotland locals, the 1816 reports are a glimpse of what happens much more frequently in earthquake prone parts of the world.

The 1608 Aberdeen Earthquake

Wednesday, the Nynt of November, 1608.

The Bishop, Moderator.

The quhilk day, The Ministers and Seasioun, convening in the Session-hous, considerring the fearfull Erthquak that wis yester nicht, the aucht of this instant, throughout this haill Citie, about nyne hours at evin, to be a document that God is angrie aganes the Land, and aganes this Citie in particular, for the manifauld sinnis of the people: Theirfor appoyntis and ordains a soleme Fast and Humiliation of all the Inhabitantis of this Brught, to be the morn, quhilk is Thursiday; and the Covenant to be renewit be the haill people, both Ministers, Magistrattis, and comunitie, with God, be haulding up of thair hands all publicltie befoir God in his Sanctuarie, and promesing be his grace to forbear, in tyme cumming, from thair sinnis, that they promoitnet God’s wraith and anger aganes thame.
The quhilk day, efter incalling of God, Peter, Bischop off Aberdene, Moderator, exponit and declarit to the Magistrattis and Sessioun, that, amangis the manifauld and innumerable sinnis of this Citie that procuris God’s wraith, the sin of bracking and prophaning the Lord’s Saboth, be publict and opin Salmond Fisiching theiron, cheiflie procuris the same, quhilk, howbeit, it has bene, from tyme to tyme, condampnit and forbidden be the hight of God’s word: Yet the Possessors of the Watteris preferring, as apperis, thair gried and avarice to the glorie and wirschip of God, have continewit and persistit hitherto in working and fisching of thair watteris on the Saboth-day, to the heich dishonour of God, the manifest contempt of his law, and sclander of the gospel: And becaus the visitation of the Citie drawis nier, God being threatening the same, pairtlie be the Plague of Pestilence alredie enterit in the Toun of Torrie, on the uther syde of the watter, and pairtlie be a fearfull Erthquak, quhilk wis universallie throughout this Citie, and in many pairtis to landwart, on Tuysday last the aucht of this instant, about nyn hours at evin, to the great terour of the people that felt and persaved the samen: It becumis the people of all rankis to turne to God, and to leave thair sinnis, speciallie these publict and rebellious sinnes quhilk portis on God’s judgementis aganes us: And for this effect, he advyse of the Magistrattis, he had causit warne, to this day, the Possessors of the Towne’s Watteris to understand and knaw of thame, gif thay will singlie promeas to forbear, in tyme cuming, all working or laboring of thair Salmond Fischings on the Saboth-day; --and they being callit comperit the Possessors efter-folowing, quha being inquired be the Moderator gif thay wald sanctify the Lord's Saboth, disist be thameselffs, and thair servands, from working and fisching of thair Salmond Fischings thairon in tyme cuming, that God may be honored, and his judgement, threatened aganes us for that sin inspeciall, amangs many uther sinnis, may be averted:--Anssrit as efter-folows, to wit. The maist pairt comperit promeist absolutely to forbear, both be thamselffs and their servands, in tyme cuming -- uthers promeist to forbear upon the conditioun subscryvent -- and sum plainlie refuissit anyway to forbear -- and sum were not yet throughlie resolved.

The names of those that have promeist absolutlie, for thamselffs and thair servands:-
Alex. Cullen, Provost
Alex. Rutherfurd ………[20 names in total].

The 1816 Aberdeen Earthquake

The weekly Aberdeen Journal and General Advertiser for the North of Scotland of 14th August 1816 reported “EARTHQUAKE – It is with feelings of the deepest awe, that last night, about 11 o’clock, a shock produced by this tremendous agitation of nature, was distinctly felt in the various quarters of this city. It took place at 4 minutes before 11 o’clock, and continued, as nearly as we could estimate, for about 6 seconds. The undulation appeared to come from S.S.E., and was simultaneously felt to the distance of some miles in the direction of N.N.W. From the late hour in which it happened, we have been unable to collect for this day’s paper, the particulars of those varied appearances which it may have exhibited in different quarters of the city. Where we sat the house was shaken to its foundation. The heaviest articles of furniture were moved, and that rumbling noise was heard, as if some heavy body was rolling along the roof. In many houses the bells were set a-ringing, and the agitation of the wires continued visible for some time after the cessation of the shock. It has been described to us by one who was in Lisbon at that period, as exactly resembling the commencement of the earthquake in that city, on the 6th of June, 1807. A second, but more partial shock, was felt at half-past 11; since which time, (blessed be God) we have had no
return of this awful, and, in our happy country, unusual visitation of his providence. The air during the remainder of the night was mild and calm, with clear moonlight; and the only appearance after the shocks was, that of a thin whitish vapour settling on the surrounding hills. “

In the following week’s edition there were extensive reports from a wide area from which some quotes are given here.

“…we have the pleasure to say, that these details [the reports] furnish no instance of the loss of either life or limb in all the wide extent of country which seems to have been subjected to its operation. Contrary to the opinion expressed in our last, we are now inclined to think that the shock came from the N.W. and shall be surprised if we do not soon hear of the simultaneous agitation of the Volcanic mountain of Hecla in Iceland. We are disposed to be of this opinion, from observing the violence with which the shock was felt in the town of Inverness, and the direction it afterwards took, embracing its course the western coast of this kingdom as far as Glasgow, and the eastern, to the mouth of the Tay, stretching across the country between these points, and finally losing its force among the Grampians.

We subjoin the details, promising that similar accounts have reached us, from almost every place north and westward of this city, from Kintore, Inverury, Huntly, Oldmeldrum, Fyvie, Ellon, Oldrain, Turriff, &c.; in all of which its effects were more or less felt, about the same hour.

Perth Aug. 15 “On Tuesday night, about a quarter before eleven o’clock, two smart shocks of an earthquake, the second of which succeeded the first at the interval of half a minute, were felt in this city and over the greater part of the neighbourhood, particularly in the low grounds. The effects of the shocks were perceptible for several seconds, and in some places were so violent as to shake the windows, and cause a rattling noise among the slates. Persons in bed felt a sensible agitation, or rather concussion in an upward direction; and if the bed happened to be in contact with the wall, a lateral shock was also felt. In some houses the chairs and tables were moved backwards and forwards and even the bells set a-ringing. Birds in cages were thrown down from the sticks on which they perched, and exhibited evident signs of fear. A hollow rumbling noise was heard by different individuals, which seemed to die away in the west…..”

Montrose Aug 16 “On Tuesday last, a few minutes before eleven at night, a most alarming shock of an earthquake was very sensibly felt in this town. It was accompanied with a rumbling noise, as below the house, and continued for about three seconds. It seemed to proceed from the east to the north-west. The effects were differently felt in different parts of the town. … Some of the inhabitants speak of a second shock half an hour after the first. … In Arbroath and Brechin it does not appear to have been felt.

Inverness Aug 14 “Last night, a quarter before 11 o’clock, the town of Inverness and the surrounding country was fearfully shaken with one of the most awful phenomena in the dispensations of Providence, an Earthquake. C. and I were sitting chatting together after supper, when we were suddenly startled by the most sudden and uncommon percussion I had ever felt, and which instantly suggested to us the cause. We flew to the street, where we found almost every inhabitant, women and children screaming, and a very considerable proportion of them naked. Many flew to the fields, and there remained for the greater part of the night. Chimney-tops were thrown down or damaged in every quarter of the town. The Mason Lodge, occupied as an Hotel, was rent from top to bottom, the north stalk of the chimney partly thrown down – one of the coping stones of the chimney weighing, I should think, from 50 to 60 lbs. was thrown to the other side of the street, a distance of no less than
60 feet. The Spire of the steeple, which I think one of the handsomest in Scotland, has been seriously injured and must in part be taken down. The Spire is an octagon and within 5 or 6 feet of the top, the angles of the octagon are turned nearly to the middle of the square or flat side of the octagon immediately underneath it. What is more wonderful than anything attending this memorable event, notwithstanding the vast quantities of stones and bricks that have been thrown from such immense heights, not one single person received any hurt. …”

Another letter of the same date “On Tuesday, the 13th inst. About twenty minutes before eleven P.M. a violent shock of an Earthquake, accompanied by a noise like thunder, was distinctly felt here [Inverness]. Some of the inhabitants who had retired to rest, were suddenly tossed out of their beds, and many were terribly alarmed by the universal shaking of the houses, the rattling of the slates, and the tremendous crash of large stones which were precipitated with violence from many of the chimney tops. The streets were very soon afterwards thronged with persons of all ranks and ages, who without scrupulously waiting for dress, rushed out at once to avoid the apprehended danger of a premature burial under the ruins of their own habitations; while some fearing a return of the convulsion, were running out of town, but did not know wither. …”

Forres Aug 14 “ … The houses shook, and the inhabitants were dreadfully alarmed, as nothing of that kind had ever happened before. No damage was done. We happened not to be in bed, and had an opportunity to perceive the whole effects of the shock. The glasses on the table shook, as well as the tables and chairs – the doors also made a noise, and a few things in the garret rattled about. .. in short, today there is no other conversation in town but of the earthquake…. I conversed with a man who, at the time of the shock, was travelling on foot in the mountains near Lochindorb ..who gave me a very distinct account of his sensations. He said he was first alarmed by a sudden and tremendous noise, as of rushing wind, which came sweeping up the hills, like a roar of water – this was instantly followed by the rumbling noise already described; and the ground was sensibly heaved up and down under his feet.”

There were reports from other places, too, but they generally repeated the gist of the stories given above. The following week the Inverness Journal added “The Masons have been busily employed during the last week, in repairing the houses damaged by this awful convulsion of nature, in replacing chimney stalks, &c. It appears that the concussion was more violent here than in any other part of Scotland. A slight shock was felt here about sixteen, and another about forty years ago…” It’s almost certainly just a coincidence but 1816 became known as ‘the year without a summer’, for which the gigantic volcanic eruption of Tambora in 1815 is considered a major culprit. Inverness, of course, lies close to the exit into the North Sea of the Great Glen Fault.

1 All the quotations here are from the Aberdeen Journal, p 3, 14th, 21st and 28th August 1816. Some of the quoted text was repeated (not completely accurately) in Twenty-one Aberdeen Events of the Nineteenth Century by John A. Henderson, pp 18-21 (Aberdeen Daily Journal, Aberdeen, 1912).