Report on the Kashmir Earthquake of 30th May 1885


The newspaper and other reports of this earthquake, at first, as usual in all such cases, much exaggerated the importance of the event. But, in spite of the comparative mildness of the shock, the loss of life was very great, being in round numbers about 3000. The cause of this is to be looked for in the very insecure manner of building in vogue. In a very considerable number of the cases in which huts were damaged, the supports of the roof had given way and allowed it to subside, frequently carrying the walls down with it leaving only a mass of rubbish to indicate the spot where the house had stood.

**Patan:** The village is situated on the road from Baramula to Srinagar. The ancient Buddhist temple is built of large trimmed blocks of limestone laid together without any cement. In each face there is an arched recess, and inside is a small open space about 10 feet square. From the western face three stones have fallen from near the top of the arch. The greatest damage was done to the S. and E. faces, especially at the SE corner, the greater part of which fell. **The long axis of an ellipse drawn around the fallen stones runs E22S-W22N, which gives an approximate direction for the wave path at this point.**

**Srinagar:** In the Sher Garhi (the Maharaja’s palace) the long walls of the large dining-room run east-west, and the one on the south side, which is an outside wall, consists of a series of brick pillars 3 feet wide with openings between them 4 feet 6 inches across. Three of the pillars are cracked; the two most decided cracks make angles of 27° and 37° respectively with the vertical, and are inclined towards east. **If we take the mean of these two, we obtain an angle of 32°, which, on the assumption that the fractures are formed at right angles to the line of shock, is equal to the angle of emergence of the shock.** A high wall outside this room and facing to the west was partially overthrown in a westerly direction into the court-yard. **Wave path at this point is E-W.** At the Sangin Darwazi, which is a gateway in the wall between the city and the Hariparbat fort, several stones have been thrown down from the top of the gateway in a more or less westerly direction. On the eastern side of the arch a good deal of brick-work fell towards W22S. **Here the direction from which the shock came is W 6.5° N.** In the Tashwan division of the city is a bath-house built of brick and mortar. Both the east and west walls of this building have fallen outwards, carrying some of the arched roof with them. **This indicates an E-W direction of wave path.** The walls of Residency which is situated on the right bank of Jhelam to the east of the city, were fractured in such a way as to indicate a shock very nearly N-S. This is possibly due to a reflection of the shock from the inlier of older rocks which lies to the east of the town.
**Gondikalle:** At this small village, situated about half a mile to the west of Tregaon, near Shadipur, SE and NE facing mud house walls fell outwards. A NE-SW direction of wave path is indicated.

**Mujigund:** On the left bank of the Jhelam, below Srinagar, nearly opposite Bakpura. Here there was a long [N-S] building forming a stable belonging to the Maharaja. It was built of brick and mud pillars at intervals of about 6 feet, the spaces between the pillars being filled up with unburnt bricks. The whole of the walls, with the exception of the one at the south end, fell. A nearly E-W direction of shock is indicated.

**Kaosa:** This village is situated on both sides of a small stream near Magaon. On the left bank is a large three-storied house of bricks and mud built in 1884, surmounted by heavy wooden beams. The pillars on which these beams rested had been broken down, and the beams were lying on the floor. Here a W-E direction of wave path indicated.

**Magam (Magaon):** Three houses with unburnt brick pillars with infilling mud walls fell towards north. We obtain N9W as the direction from which the shock came.

**Makahama (Harda Maka Nana):** At this place the walls of the mosque, which was built of bricks and mud, were uninjured; but the pillars of brick-work above the walls were damaged. A shock about diagonal to the building or W28N-E28S is indicated.

**Sopur:** The fort situated on the right bank of the river at the end of the bridge was considerably damaged. The component materials were rubble, cemented partly with mortar and partly with mud. It was a square building with a tower at each corner. On the SW side the top of the gateway tower fell inwards; the same occurred to the south and west corner towers. On the SE wall a portion fell near the east tower while the east tower fell completely. Several portions of the NW wall and a considerable portion of the NE wall fell. Inside on the ground there were several NE-SW cracks developed. The roof of a small hut along with the walls, just outside the gate fell. All this indicates a shock from a direction somewhat to the east of south (S13E).

**Chikar:** This is a fort situated above the Jhelam some distance to the south in the neighbourhood of Garhi; it is built of rubble and mud, with horizontal wooden beams at intervals of 2 feet and a mud plastering over the whole. The building is square, with portions of octagonal pyramids forming towers at the corners and in the middle of three of the sides. A portion of the east corner of the SE tower fell down towards east and a portion of the NW tower fell to the west. This gives an E-W direction for the shock at this point.

**Baramula:** Here walls facing north and south were overthrown while those facing east and west fractured. The shock here is N-S and may be due to reflected wave from the hills to the north of Baramula.
Position of the seismic vertical

[Plotting all directions of fall of objects the position of the seismic vertical was positioned at] 12 miles from Srinagar in a westerly direction from the northern end of the city.

Depth of the Seismic focus

We saw that at Srinagar the angle of emergence was 32°. Now the depth of the focus is obtained by the formula, \( d = r \tan \theta \); where \( \theta \) = angle of emergence at any point, and \( r \) = distance of that point from the seismic vertical, we have therefore \( d = 12 \times \tan 32° = 7.5 \) miles.

Meizoseimal area

The greatest damage has been done over an irregularly elliptical area, the long axis of which is 10 miles and the short axis 6 miles long, and the superficial area about 47 square miles, and nearly symmetrically disposed about the seismic vertical. Within this area, marked by broken line on the maps, the destruction was very complete, whole villages being almost entirely destroyed and many lives lost. This corresponds to the meizoseimal area of Mallet.

First Isoseismal

The area outside this, corresponding to Mallet’s first isoseismal, includes the area within which large portions of villages and towns were thrown down and persons killed. This is included by a line passing east of Srinagar through Magaon south of Baramula and across the Jhelam near Gingal, then passing north of Sopur and round again to the south of Srinagar. It includes an area of about 500 sq miles.

Second Isoseismal

Outside is again another area of about 3000 sq miles including those places from which slight damage to buildings etc. is reported to have occurred, but it is probable that even within this area there was some loss of life. It is indicated on the map by the broken line passing north of Gurais to east of Titwal on the Kishengunga river, west of Chikar, southeast of Bagh, and south of Punch, at or near all of which some damage to buildings, chiefly forts, is reported. From Punch to Gurais there are no reports, and the true course of the line is uncertain.

Third Isoseismal

This is a large area, including the places where the shock is reported to have been perceived viz., Peshawar, Gilgit, Simla, Sabathu, Dalhousie, Lahore etc.
Landslips

A large landslip occurred at Larri-dur, a place about 7 miles south of Baramula. This village is situated upon a hill lying NW-SE, composed of slightly hardened Karewa clays resting upon sandstones and dipping to NE at 5-10°. Above the clay is surface soil of varying thickness. The upper 30 feet of clay and surface soil has slipped along to the dip, exposing a fresh smooth surface of clay. The line of parting ran along the length of the hill, and a fissure has been formed along this line varying in width from 30 feet at the SE end to about 500 yards at the NW end and with a length of about half a mile.

Fissures sand craters and springs

In many places, as at Patan, Dubgaon (at the junction of the Jhelam and Pohra rivers), along the banks of the river at and above Baramula, numerous fissures were formed in the alluvial soil and all running roughly parallel to river banks or else across the slope of hills. In the neighbourhood of many of these fissures water and fine sand were thrown out, and the villages stated that there was a strong sulphureous smell given off from the sand for several days. In one case at Nila, near Patan, an inflammable gas without odour being slowly evolved. Several springs were affected by the earthquake, the flow of water being increased for periods of time ranging from a few hours to as many as eight days.

The country occupied by the meizoseismal area is entirely composed of recent alluvium, and that within the first isoseismal line is almost entirely of the same character, the Karewa beds (Pleistocene alluvium) coming into the NW of the area in the neighbourhood of Baramula, and down the river below Baramula the alluvial deposits are underlaid at short depth by the more indurated rocks of the Panjal system, which also appear to the east of Srinagar.

Subsequent shocks

The slight shocks subsequent to the great one continued at intervals up to as late as August 16th, on which date there was a shock at about 7 AM; since that time there have been no reports though the shocks probably continued to a much later date.