

Short Communication

**A List of Previously Unknown Earthquakes in Finland between 1877
and 1887 Based on Newspaper Reports**

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Abstract

This note lists seven previously unknown earthquakes in Finland during the 11-year period from 1877 to 1887 based on findings from printed newspapers. The events are described and their sources listed. The old newspaper reports comprise many similarities to macroseismic observations obtained during modern instrumental times, which supports the notion that the events were of seismic origin.

Key words: earthquake catalogues, historical earthquakes, macroseismic observations, earthquake-related sounds, newspapers

1. *Introduction*

Studies of historical earthquakes constitute an indispensable component of seismicity assessments in any region owing to the brief time span of instrumental monitoring of seismic events. This also applies well to Northern Europe, where the deployment of short period seismographs commenced in the late 1950s and the network remained sparse even up to the 1980s in certain parts of the region. The oldest documentation of seismic activity in Northern Europe was related to a Danish earthquake in 1073 (*Lehmann, 1956*), but it took several centuries before any continuity of earthquake reporting was established. Macroseismic data obtained from newspapers are important information especially prior to the introduction of questionnaires in the 1880s. In Finland they are available from the late 1700s onwards.

This contribution to the knowledge of pre-instrumental seismicity in Finland lists seven earthquakes that were missed in earlier studies such as the descriptive catalogue of *Renqvist (1930)* and the consequent parametric catalogues (e.g., *Penttilä, 1978; Mäntyniemi and Ahjos, 1990*). The time period between 1877 and 1887 was under investigation, and the reports were extracted from contemporary newspapers. In 1877,

the Finnish press comprised 29 different titles, and by 1887 this figure had expanded to 52. A total of 82 issues of national and regional papers were released every week in 1877 and 161 issues in 1887 (*Landgren*, 1988). The search for earthquake reports among such voluminous material greatly benefits from the availability of more and more old newspapers in digital form at the Helsinki University Library.

The events found are listed in the next section. The nature and limitations of the data that may be obtained from the press are discussed in the third section.

2. *Previously unknown events*

After each entry, the report is written in full according to the primary newspaper and the secondary newspapers found are listed. The newspaper that was the first to report the event is regarded as the primary source, while newspapers that repeated the news are classified as secondary.

1) 24 October 1877 at 11 a.m. in Pälkäne

“Earthquake. It is reported from Pälkäne to us that in the church village last Wednesday, the 24th day of this month at about 11 a.m., an earthquake was observed so strong that rooms and windows shook. First an underground roar was heard, as if a cart was passing, and then almost immediately the tremor began, lasting for almost half a minute.” *Uusi Suometar* 29 Oct 1877 № 130 p. 3.

The news was repeated in the following newspapers: *Helsingfors Dagblad* 30 Oct 1877 № 296 p. 3, *Morgonbladet* 30 Oct 1877 № 253 p. 2, *Finlands Allmänna Tidning* 31 Oct 1877 № 254 p. 1, *Ilmarinen* 31 Oct 1877 № 85 p. 2, *Åbo Posten* 31 Oct 1877 № 255 p. 2, *Hämäläinen* 1 Nov 1877 № 44 p. 1, *Suomalainen Wirallinen Lehti* 1 Nov 1877 № 130 p. 1-2, *Tapio* 3 Nov 1877 № 86 p. 2, *Pohjois-Suomi* 7 Nov 1877 № 87 p. 2, *Sanomia Turusta* 7 Nov 1877 № 87 p. 2, *Wasabladet* 7 Nov 1877 № 87 p. 2 and *Länsi-Suomi* 10 Nov 1877 № 39 p. 3.

2) 17 December 1877 at 5.30 a.m. in Kuusamo

“Earthquake or thunder was heard in Kuusamo at 5.30 in the morning of the 17th of December. Some people reported that windows rattled considerably. It felt as if it came from the south and moved towards north.” *Oulun Wiikko-Sanomia* 12 Jan 1878 № 2 p. 2.

The news was repeated or referred to in the following newspapers: *Uusi Suometar* 21 Jan 1878 № 9 p. 3, *Ilmarinen* 23 Jan 1878 № 7 p. 3, *Päijänne* 25 Jan 1878 № 8 p. 2, *Keski-Suomi* 26 Jan 1878 № 8 p. 2, *Wasabladet* 2 Feb 1878 № 10 p. 2 and *Waasan Sanomat* 12 Feb 1878 № 2 p. 2.

3) 7 March 1880 at 10 a.m. in Hyrynsalmi

“Earthquake? On Sunday the 7th of March at about 10 o’clock a.m. an unusual minor roar was heard in Hyrynsalmi. Some people claim it was thunder, while others

say it was an earthquake (...) In my opinion it was nothing but an earthquake because it made objects shake.” *Oulun Lehti* 17 Mar 1880 № 11 p. 3.

The news was repeated in the following newspapers: *Morgonbladet* 23 Mar 1880 № 68 p. 3, *Uusi Suometar* 23 Mar 1880 № 35 p. 2, *Helsingfors* 24 Mar 1880 № 68 p. 2, *Östra Finland* 24 Mar 1880 № 36 p. 1, *Hämäläinen* 27 Mar 1880 № 25 p. 1, *Savonlinna* 27 Mar 1880 № 13 p. 2, *Suomalainen Wirallinen Lehti* 27 Mar 1880 № 36 p. 1, *Sanomia Turusta* 30 Mar 1880 № 36 p. 2, *Päijänne* 31 Mar 1880 № 13 p. 2, *Satakunta* 3 Apr 1880 № 14 p. 3 and *Ahti* 8 Apr 1880 № 14 p. 3.

4) 7 February 1882 at 8 p.m. in Lapinlahti

An extraction from a letter from Lapinlahti: “(...) Most unusual was the minor earthquake that occurred here at 8 o’clock in the evening on the 7th of this February. The writer of this visited the site and was told the following by a reliable person: It was 8 o’clock in the evening on the 7th of February in the house № 25 in the village of Nerkoo, where the family was preparing to start resting when they heard a weak roar outdoors, as if a flock of birds had flown. Then they felt the house move on its foundations so sharply that a bed in which people were lying moved and the light chairs in the room changed their position; other pieces of furniture shook as well. In the house № 20 nearby similar observations were made and a man (reliable person) who was lying near the chimney reported it had moved considerably. The weather was calm at that time. The earthquake was noted also elsewhere in that area but not so strongly, and the strongest tremor only lasted for about a minute. This narrative has been repeated as carefully as possible here. (...)” *Sawo* 3 Mar 1882 № 17 p. 3.

The news was repeated or referred to in the following newspapers: *Suomalainen Wirallinen Lehti* 8 Mar 1882 № 56 p. 3, *Sanomia Turusta* 9 Mar 1882 № 39 p. 3, *Åbo Underrättelser* 9 Mar 1882 № 66 p. 2, *Hämäläinen* 11 Mar 1882 № 20 p. 1, *Keski-Suomi* 11 Mar 1882 № 20 p. 2, *Vasabladet* 15 Mar 1882 № 21 p. 3, *Laatokka* 16 Mar 1882 № 11 p. 3 and *Päijänne* 29 Mar 1882 № 13 p. 3.

5) 4 February 1886 at about 12 a.m. in Kiuruvesi

“Kiuruvesi: Around noon on the 4th of February an earthquake occurred and was observed in the whole community.” *Nya Pressen* 21 Mar 1886 № 78 p. 3.

6) 24 October 1887 at 5 p.m. in Elimäki

“At about 5 p.m. on the 24th of this month a noisy roar was heard near the Elimäki church and the ground shook distinctly at the same time. It lasted for a short time, several seconds, and suddenly came to an end. It was more perceptible in other villages. The last tremor resembled a loud bang. Our correspondent cannot state the direction of the shock with great certainty, but believes it moved from the west to the east.” *Uusi Suometar* 27 Oct 1887 № 249 p. 3.

The news was repeated in the following newspapers: *Folkwännen* 28 Oct 1887 № 250 p. 3, *Hufvudstadsbladet* 28 Oct 1887 № 250 p. 2, *Finland* 29 Oct 1887 № 251 p. 3,

Hämäläinen 29 Oct 1887 № 86 p. 2, *Turun Lehti* 29 Oct 1887 № 127 p. 2, *Wasa Tidning* 30 Oct 1887 № 127 p. 3, *Östra Nyland* 31 Oct 1887 № 83 p. 2, *Borgåbladet* 2 Nov 1887 № 87 p. 3, *Kaiku* 2 Nov 1887 № 87 p. 3, *Österbottniska Posten* 3 Nov 1887 № 44 p. 2 and *Lounas* 5 Nov 1887 № 88 p. 3. In addition, *Fredrikshamns Tidning* (7 Dec 1887 № 96 p. 2) referred to an earthquake in Elimäki “a few days ago”, but this is interpreted to be an erroneous date.

7) 30 December 1887 at 10.30 or 11 a.m. in Mäntsälä and Pornainen

a) “We were reported from Pornees [Pornainen] the following: an earthquake resembling a quiet, long-lasting breeze was heard in the Kirveskoski village of this community at 11 a.m. on the 30th of last month. The sky was clear and the weather was quite calm. Those indoors felt as if snow had fallen from the roof or a fire had been burning.” *Uusi Suometar* 1 Jan 1888 № 1 p. 3.

The news was repeated in the following newspapers: *Sanomia Turusta* 3 Jan 1888 № 2 p. 2, *Wiipurin Sanomat* 3 Jan 1888 № 1 p. 3, *Keski-Suomi* 4 Jan 1888 № 1 p. 3, *Waasan Lehti* 4 Jan 1888 № 1 p. 3, *Wiborgsbladet* 4 Jan 1888 № 3 p. 3, *Östra Finland* 4 Jan 1888 № 3 p. 3, *Turun Lehti* 5 Jan 1888 № 2 p. 3, *Fredrikshams Tidning* 11 Jan 1888 № 3 p. 3 and *Kotkan Sanomat* 11 Jan 1888 № 2 p. 3.

b) “Mäntsälä, the 4th of January. **Earthquake.** On the last Friday of the previous year, that is the 30th of December, at 10.30 a.m., a peculiar natural phenomenon was observed here. A roar resembling thunder was heard and the buildings shook at the same time as if due to a minor earthquake. This observation was made at several sites in the community such as the Mäntsälä match factory as well as the vicinity of the church.” *Folkvännen* 9 Jan 1888 № 6 p. 3. Note that the original report is shown in Fig. 1.

The news was repeated or referred to in the following newspapers: *Hufvudstadsbladet* 10 Jan 1888 № 7 p. 3, *Borgåbladet* 11 Jan 1888 № 3 p. 3 and *Wiborgsbladet* 11 Jan 1888 № 8 p. 3.

Comments: The two reports point to the same area, since the distance between the two sites is less than 20 km. The observation made in Pornainen comprises mainly audible effects, which suggests that the presumed epicentre was closer to Mäntsälä provided that the reports refer to the same event. The given times differ by half an hour, but an impression of 30 minutes seems quite acceptable at that time.

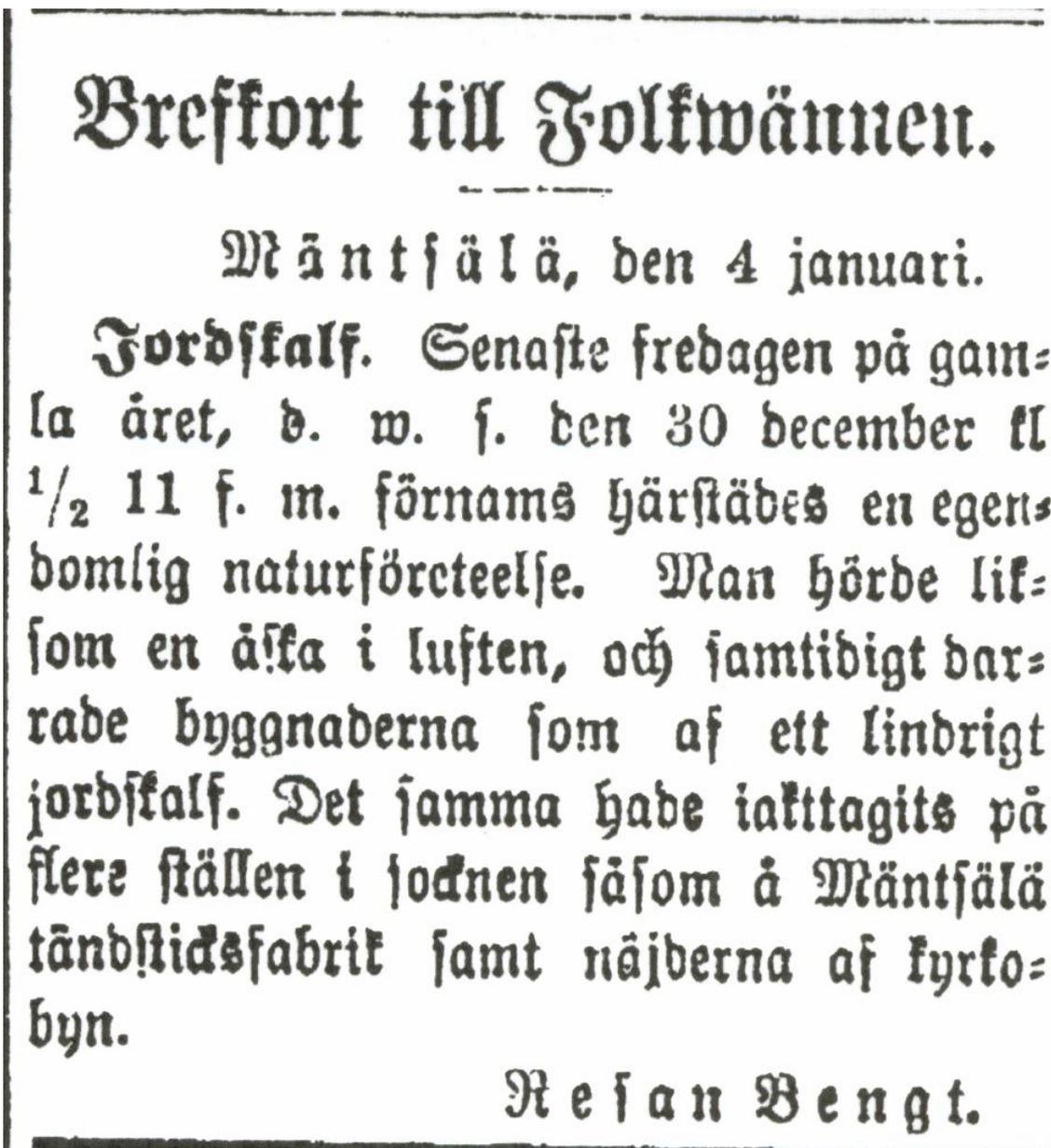


Fig. 1. An example of a newspaper reporting on earthquake effects extracted from *Folkwännen* 9 Jan 1888 № 6 p. 3.

3. Discussion

The list given in the preceding section presents the findings that were selected from several candidates. Assessing their credibility is of fundamental importance for the compilation of a historical database and expressing them in parametric form. It is common practice in macroseismic studies to compare contemporary written documents and rely on their being trustworthy. In the conditions of Northern Europe such guidelines are difficult to follow because there are so few sources available.

However, the macroseismic data obtained during the instrumental era provide helpful comparisons, and the value of the above reports basically originates from their bearing a resemblance with recent non-instrumental data. Remarks on an audible underground roar simultaneous with or slightly preceding the tremor, descriptions of the sound resembling that of a fire, thunder or snow falling from the roof and the rattling of windows belong to the most frequently mentioned effects of local earthquakes in modern times. Also, the description of movement from one direction in another is often encountered, but the presumed directions are not to be trusted in the case of a weak tremor. The reported earthquake sounds indicate that the observations given in section 2 were due to local earthquakes with epicentres relatively close to the site of the observation rather than distant observations belonging to large events (cf. *Tosi et al.*, 2000).

The present list is seasonally unbalanced: it does not contain any observations made between April and September. This could be attributed to the small amount of data, but *Renqvist* (1930) found the annual maximum of observations between December and February in his extensive database as well. *Renqvist* (1930) named contamination of the data by frost-related phenomena and classification of seismic occurrences as thunder during summer months to explain this bias that concerns minor events only. It was noted recently that the historical Norwegian events were more abundant in winter than in summer only in the 1880s, which was a very cold decade in Norway (*M. Boulaenko and E.S. Husebye*, personal communication), but this explanation does not hold true in the case of historical Finnish data because they are seasonally biased in other decades as well. Report 4 is interesting, because it presents some degree of detail and stems from the year 1882, which was subjected to an early seismicity study by *Moberg* (1891). The reported observation times range from morning till evening. It is reasonable that minor events occurring during night pass unnoticed, since they are too weak to wake people.

Figure 2 shows the sites of the reported earthquake observations as listed in section 2. The sites tend to be located within the more populated areas, which is generally expected from macroseismic data. Only observation 2 is found in the area that is known on the basis of instrumental data to be seismically the most active in the country. Figure 2 also illustrates the geographical distribution of the 22 publishing towns of newspapers in 1887. The towns concentrated in the coast and the south-eastern part of the country. The correlation between the publishing town of the primary newspaper and the site of the observation was not bad, because the northern observations were first reported in newspapers published in Oulu, while the southern observations appeared first in newspapers such as *Uusi Suometar* that were issued in Helsinki.

Although newspaper reports are not written for scientific purposes, they may comprise valuable and usable macroseismic data with the caveat that the user is aware of their limitations. *Musson* (1986) divided reporting errors into five categories: total fiction, factual errors, exaggeration, embellishment and inadequate information. Of these, inadequate information is probably the most pervasive obstacle in view of

macroseismic intensity assessment that is based on proportions of people who made an observation and proportions of earthquake effects that took place, which are seldom obtainable from newspaper reports. The present search brought to light total fiction in the form of a hoax on April fool's day (*Ekenäs Notisblad* 1 April 1887 № 25 p. 1). It was not without value to distinguish the primary source from all the others, because mistakes were made when repeating the news, e.g. the names of sites were misspelled and the reports were often abbreviated.

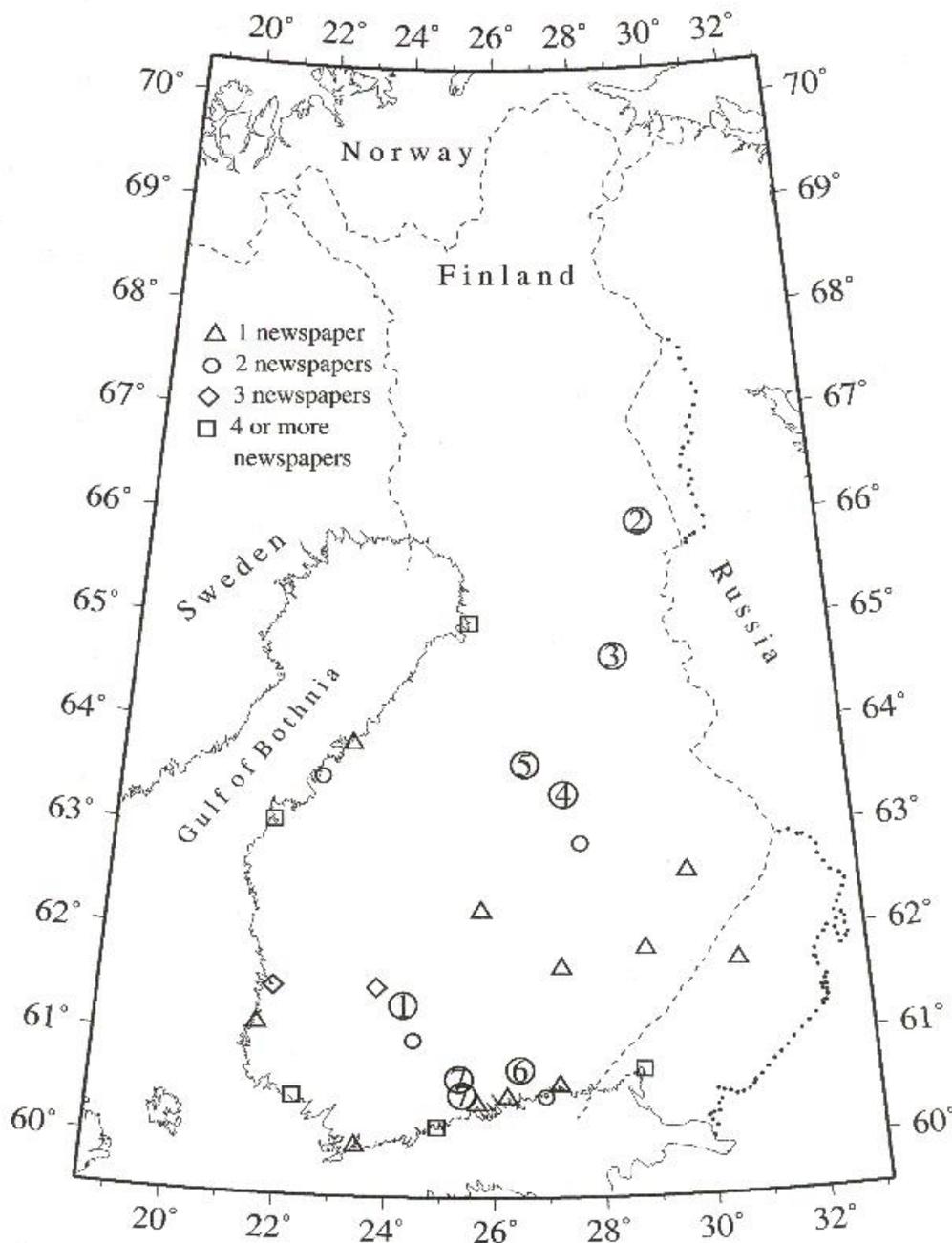


Fig. 2. A map illustrating the sites of earthquake observations listed in section 2 and the publishing towns of newspapers in 1887. The encircled numbers refer to the reports as given in the list. Various symbols show the number of newspapers published in a total of 22 towns. The dotted line denotes the eastern national border as it was in the late 1800s.

During the investigated time period, a typical newspaper was quite well structured: different sections were used and their headings were often written in bold type. The descriptions on local earthquakes usually appeared as separate news in the domestic section, but a few narratives were found in the section “Letters from the provinces”.

Mäntyniemi and Ahjos (1990) stated that macroseismic information alone is not expected to bring relevant changes to our knowledge of past earthquakes in Finland. Although this remains the realistic view, the present list demonstrates that improvements to the historical catalogues can be implemented through an intensified search of the available documents.

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