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Historical Seismicity in the
Southern Appalachian Seismic Zone

by

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HISTORICAL SEISMICITY IN THE SOUTHERN APPALACHIAN SEISMIC ZONE

ABSTRACT

This report presents the result of an effort to compile as complete and accurate an historical earthquake catalog as is possible for the Southern Appalachian Seismic Zone (SASZ). This catalog is unique in that substantially all of the supporting documentation is provided as an integral part of the history. Consistent and methodical interpretation of intensity and location is maintained throughout.

New formulae developed by Sibol and others (1986) for converting epicentral intensity and felt area to magnitude are used. The equation relating mb to I_0 and felt area is thought to provide the best estimates yet of magnitudes for non-instrumental earthquakes in the SASZ. Additionally, depth of focus estimates are made.

Four events mb ≥ 5.0 are listed among the 166 events that comprise this catalog. The largest event is the Modified Mercalli intensity VIII, 1897 Giles County, Virginia earthquake, mb = 5.6 (this study). Recurrence curves are plotted for both intensity and magnitude data. These suggest that an intensity VII (mb ≥ 5.0) should be expected roughly every 20-40 years. The last events in the SASZ generating intensity VII occurred in 1916.

INTRODUCTION

This report presents the results of a new study of the historical seismicity of an area of the sOUTHEAStern United States known as the Southern Appalachian Seismic Zone (SASZ). It is intended to complement current and ongoing instrumental studies that began in 1977 and therefore provide an improved data base for seismic hazard assessment of the region.

The Southern Appalachian Seismic Network (SARSN) achieved a locational capability in mid-1981, and the network was substantially completed by the end of 1983. Johnston and others (1985) reported more than 100 new or relocated hypocenters obtained from the initial 2 1/2 years of operation; through 1985, there have been more than 230 earthquakes located (TEIC Bulletin, 1986). Although these data are of high quality and are accumulating rapidly, a significantly longer time is needed to make judgements about recurrence intervals and maximum possible earthquakes. Therefore, a reliance on historical (non-instrumental) seismicity is mandated.

Bollinger (1975) published a comprehensive seismic catalog for the entire southeastern United States which has been the key reference for historical seismicity in this area for a decade. This study focuses on the Southern Appalachian Seismic Zone (SASZ), which is a relatively small part of Bollinger's area and contains the area monitored by SARSN. Its purpose was to compile as complete and accurate a catalog of earthquakes as is possible from historical data. This was accomplished by adding significantly to the data base used by Bollinger from both published (e.g., journal articles, contemporary newspapers) and non-published (e.g., personal files) sources.

The first catalog entry is November 1776, and entries extends through 1976, the year preceding the first published instrumental data bulletin (SEUSSN Bulletin, Bollinger and others, 1978-1984). Only events that were reported as

being felt are included. Contributions of data from 176 different published papers and/or reports and more than 100 different newspapers were used to obtain a working data base in excess of 400 events for the SASZ and surrounding area (exclusive of Charleston, SC). It was necessary to compile a list of events for a wide area around the SASZ in addition to those within. This was done so that a felt report recorded from a location within the study area that may have been the result of a large, distant earthquake could be properly associated; delineation of felt areas for events originating within the SASZ also requires felt information from outside the zone. Evaluation and interpretation of the volumes of data for these events resulted in a catalog of 166 earthquakes that originated and were felt in the SASZ. (Most events identified as foreshocks or aftershocks are not listed separately.) Location, epicentral intensity (I_0), and felt area are the critical interpreted parameters. Magnitudes (m_b) and depth of focus estimates are additional derived parameters, using techniques described later in the report.

Table 1 is a summary listing of source information for all events of this compilation; felt area maps for 94 of the events can be found in Appendix A. A catalog documenting all relevant data for each event constitutes Appendix B. The Appendices are bound separately from this report.

SOUTHERN APPALACHIAN SEISMIC ZONE (SASZ)

The Southern Appalachian Seismic Zone (SASZ) has been a source of moderate seismic energy release for at least 200 years. The area referred to in this study is essentially the same as that delineated by Bollinger (1973); its boundaries are shown in Figure 1. The SASZ lies primarily in the Valley and Ridge and Blue Ridge physiographic provinces of eastern Tennessee and Western North Carolina and includes parts of the states of Virginia, West Virginia, Kentucky, South Carolina, Georgia, and Alabama. The boundaries extend from the

Table 1.

Historical Earthquakes in the Southern Appalachian
Seismic Zone: 1776 through 1976

<u>DATE</u>	<u>TIME</u>	<u>NLAT</u>	<u>WLON</u>	<u>LOCALITY</u>	<u>FELT AREA</u> (km ²)	<u>Io</u>	<u>mb</u>	<u>h</u>
1776 Nov 5	p.m.	35.4	83.0	Richland Balsam, NC		IV	3.1	
1825		36.2	81.2	Wilkesboro, NC		III	2.8	
1827 May 11	p.m.	36.2	81.2	Wilkesboro, NC	1,800	IV	3.1	14
1829		35.2	83.8	Andrews, NC				
1836 May 7		36.0	83.9	Knoxville, TN		III	2.8	
1844 Jun		35.4	83.4	Bryson City, NC				
1844 Nov 28	13:00	35.8	84.0	Maryville, TN	2,900	VI	3.7	6
1848		35.5	82.2	Stone Mt., NC				
1851 Aug 11	01:55	35.6	82.6	Asheville, NC		V	3.5	
1852 Apr 29	18:00	36.7	82.0	Abingdon, VA	274,000	VII	5.0	13
1852 May 3	08:00	36.7	82.0	Abingdon, VA		III	2.8	
1852 Sep 18		36.7	82.0	Abingdon, VA		III	2.8	
1854 Feb 13	00:00	37.2	83.8	Manchester, KY		III	2.8	
1854 Nov 22	21:00	37.1	81.5	Tazewell, VA		III	2.8	
1857 Dec 11	03:00	37.8	80.4	Lewisburg, WV		III	2.8	
1859 Mar 22		37.1	81.5	Jeffersonville, VA		IV	3.1	
1861 Aug 31	10:22	36.2	81.2	Wilkesboro, NC	586,000	VI	4.9	23
1874 Feb 22		35.5	82.2	Stone Mt., NC				
1875 Nov 12	08:00	36.0	83.9	Knoxville, TN		III	2.8	
1876 Jan 23		35.5	82.2	Stone Mt., NC				
1876 Dec 21	15:30	37.0	81.1	Wytheville, VA		III	2.8	
1877 Apr 26	22:00	35.2	83.4	Franklin, NC		III	2.8	
1877 May 25		36.0	83.9	Knoxville, TN		III	2.8	
1877 Oct 9	01:00	35.3	82.5	Hendersonville, NC	1,200	IV	3.1	13
1877 Nov 16	08:38	36.0	83.9	Knoxville, TN	3,200	IV	3.2	15
1878 Nov 23	15:00	35.1	84.0	Murphy, NC		III	2.8	
1880 Jan 28		35.5	82.2	Stone Mt., NC		IV	3.1	
1882 Oct 15	17:30	35.1	84.0	Murphy, NC		III	2.8	
1884 Jan		35.5	82.2	Stone Mt., NC				
1884 Apr 30	11:46	35.2	84.2	Ogreeta, NC		II	2.6	
1884 Summer		35.7	82.5	Elk Mt., NC		IV	3.1	
1884 Aug 25	00:45	36.0	83.9	Knoxville, TN		IV	3.1	
1885 Feb 2	12:10	37.0	81.1	Wytheville, VA		IV	3.1	
1885 Aug 13	13:00	36.1	81.7	Blowing Rock, NC	500	IV	2.9	11
1886 Sep 25	02:56	37.0	81.1	Wytheville, VA		III	2.8	
1888 Mar 17		36.3	82.5	Jonesboro, TN		III	2.8	
1889 Sep 28	p.m.	35.1	84.6	Parksville, TN		III	2.8	
1892 Dec 2	08:00	35.0	85.3	Chattanooga, TN	1,900	V	3.4	9
1897 May 3	17:18	37.1	80.6	Radford, VA	47,000	VI	4.2	12
1897 May 31	19:00	37.3	80.7	Pearisburg, VA	725,000	VIII	5.6	13
1897 Jun 29	04:00	37.3	80.7	Pearisburg, VA	12,000	V	3.7	13
1897 Sep 3	11:00	37.3	80.7	Pearisburg, VA	2,000	IV	3.2	14
1897 Oct 22	03:25	37.3	80.0	Salem, VA	36,000	V	3.9	16
1898 Feb 5	20:02	37.1	80.7	Dublin, VA	50,000	VI	4.3	12
1898 Nov 25	20:10	37.1	80.6	East Radford, VA	92,000	V	4.2	21
1899 Feb 13	09:30	37.1	81.5	Tazewell, VA	115,000	V	4.2	22
1902 May 18	04:00	37.3	80.7	Pearisburg, VA		V	3.5	
1902 May 29	07:30	35.0	85.3	Chattanooga, TN		IV	3.1	

<u>DATE</u>	<u>TIME</u>	<u>NLAT</u>	<u>WLON</u>	<u>LOCALITY</u>	<u>FELT AREA</u> (km ²)	<u>Io</u>	<u>mb</u>	<u>h</u>
1902 Oct 18	22:00	35.3	85.7	Tracy City, TN		V	3.5	11
1904 Mar 5	00:30	35.8	84.0	Maryville, TN	2,500	IV	3.2	14
1905 Apr 29		37.3	79.5	Bedford, VA		III	2.8	
1909 Oct 8	10:00	34.8	85.0	Dalton, GA	900	III	2.9	20
1911 Apr 22	03:00	35.3	82.5	Hendersonville, NC	3,900	IV	3.3	16
1913 Mar 13	05:00	34.5	85.0	Calhoun, GA		III	2.8	
1913 Mar 28	22:50	36.0	83.9	Knoxville, TN	4,000	VI		
1913 Apr 17	17:30	35.5	84.4	Madisonville, TN	6,500	V	3.6	11
1913 May 2	07:00	35.5	84.4	Madisonville, TN		III	2.8	
1913 Aug 3	17:45	36.0	83.9	Knoxville, TN		III	2.8	
1914 Jan 24	04:24	35.6	84.5	Sweetwater, TN	5,900	IV	3.4	17
1915 Jan 14	09:20	36.6	82.2	Bristol, TN		IV	3.1	
1915 Oct 29	05:45	35.6	82.6	Asheville, NC	700	V	3.2	7
1916 Feb 21	22:39	35.5	83.0	Waynesville, NC	458,000	VII	5.1	15
1916 Aug 26	19:35	35.9	81.2	Taylorsville, NC	7,100	V	3.6	11
1916 Oct 18	22:04	33.5	86.7	Irondale, AL	358,000	VII	5.1	14
1916 Oct 22		33.5	86.8	Birmingham, AL		III	2.8	
1916 Nov 4	12:15	33.5	86.8	Birmingham, AL		V	3.5	
1917 Jan 2	10:30	36.1	83.7	Mascot, TN		IV	3.1	
1917 Jan 25	22:15	36.1	83.5	Jefferson City, TN		III	2.8	
1917 Mar 5	03:07	36.0	83.9	Knoxville, TN		III	2.8	
1917 Mar 27	21:00	36.1	83.5	Jefferson City, TN		V	3.5	
1917 Apr 19		37.0	81.1	Wytheville, VA		III	2.8	
1917 Jun 21		36.0	83.9	Knoxville, TN		IV	3.1	
1918 Jan 17	16:45	36.0	83.9	Knoxville, TN	2,300	IV	3.2	14
1918 Jun 22	00:59	35.8	84.3	Lenoir City, TN	5,800	IV	3.4	17
1920 Dec 24	08:30	35.8	84.7	Glen Alice, TN	2,600	V	3.4	9
1921 Jul 15		36.7	82.3	Mendota, VA		VI	4.0	
1921 Dec 15	14:20	35.9	84.5	Kingston, TN	2,700	V	3.4	9
1922 Mar 30	22:20	36.6	82.5	Arcadia, TN		IV	3.1	
1923 Oct 18	19:30	35.3	82.5	Hendersonville, NC		IV	3.1	
1924 Oct 20	08:30	34.9	82.7	Pickens, SC	87,000	VI	4.4	14
1924 Nov 13	05:30	36.6	82.2	Bristol, VA		IV	3.1	
1924 Dec 25	04:30	37.3	79.9	Roanoke, VA		V	3.5	
1926 Jul 8	09:50	35.9	82.1	Spruce Pine, NC		VI	4.0	
1927 Jun 16	13:00	34.7	86.0	Scottsboro, AL	3,000	V	3.4	9
1927 Jul 20	09:58	36.0	83.9	Knoxville, TN		V	3.5	
1927 Oct 8	13:58	35.0	85.3	Chattanooga, TN	2,000	V	3.4	9
1928 Nov 3	04:04	35.9	82.8	Hot Springs, NC	187,000	VII	4.9	12
1928 Nov 20	03:45	35.9	82.8	Hot Springs, NC	4,700	IV	3.3	16
1930 Aug 30	10:28	35.8	84.3	Lenoir City, TN	4,000	V	3.5	10
1930 Oct 16	21:50	36.0	83.9	Knoxville, TN		V	3.5	
1931 May 5	13:18	33.5	86.8	Birmingham, AL	33,000	V	3.9	16
1935 Jan 1	08:15	35.2	83.7	Topton, NC	15,000	VI	4.0	9
1936 Jan 1	08:00	34.9	84.3	Blue Ridge, GA	4,800	III	3.2	27
1938 Mar 31	10:10	35.5	84.0	Tapoco, NC	14,500	V	3.7	13
1939 May 5	03:45	33.7	85.8	Anniston, AL	2,000	V	3.4	9
1939 Jun 24	11:27	34.7	86.6	Huntsville, AL	6,400	IV	3.4	17
1940 Oct 19	05:55	35.0	85.1	Ryall Springs, TN	3,200	V	3.4	10
1940 Dec 25	06:50	35.9	82.8	Hot Springs, NC	17,000	V	3.8	14
1941 Mar 4	06:15	35.9	83.9	Rockford, TN		IV	3.1	
1941 May 10	11:12	35.6	82.6	Asheville, NC		IV	3.1	
1941 Sep 8	09:45	35.0	85.3	Chattanooga, TN	1,100	V	3.3	8
1945 Jun 14	03:25	35.2	84.9	Cleveland, TN	8,100	V	3.6	12

<u>DATE</u>	<u>TIME</u>	<u>NLAT</u>	<u>WLO</u>	<u>LOCALITY</u>	<u>FELT AREA</u> (km ²)	<u>Io</u>	<u>mb</u>	<u>h</u>
1946 Apr 7	06:00	35.2	84.9	Cleveland, TN		IV	3.1	
1947 Jun 6	12:55	36.0	83.9	Knoxville, TN		IV	3.1	
1947 Dec 28	00:05	35.0	85.1	Ryall Springs, TN	3,000	IV	3.2	15
1948 Feb 10	00:04	36.4	84.0	Wells Springs, TN	1,700	VI	3.6	6
1949 Sep 17	09:30	36.8	83.0	Pennington Gap, VA	1,700	IV	3.1	13
1950 Jun 19	04:19	35.5	84.0	Tapoco, NC	9,700	V	3.6	12
1952 Feb 6	16:12	33.5	86.8	Birmingham, AL		IV	3.1	
1952 Jun 11	20:20	36.3	82.3	Johnson City, TN		V	3.5	
1953 Nov 10	14:53	36.0	83.9	Knoxville, TN	700	IV	3.0	12
1953 Dec 5	13:45	36.0	83.9	Knoxville, TN	660	IV	3.0	12
1954 Jan 1	01:30	37.2	83.2	Hazard, KY	400	IV	2.9	11
1954 Jan 2	02:25	36.6	83.7	Middlesboro, KY	34,000	VI	4.2	11
1954 Jan 14	p.m.	36.0	83.9	Knoxville, TN		IV	3.1	
1954 Jan 23	01:00	35.3	84.5	Etowah, TN	500	IV	2.9	11
1955 Jan 6	20:30	36.6	82.2	Bristol, TN		IV	3.1	
1955 Jan 12	17:25	35.8	84.0	Maryville, TN	300	IV	2.9	10
1955 Jan 25	19:32	35.9	83.9	Rockford, TN	1,800	V	3.3	9
1955 Sep 28	07:02	36.6	81.3	Piney Creek, NC	3,500	VI	3.7	6
1956 Sep 7	13:36	36.2	83.8	Maynardville, TN	30,000	VI	4.1	10
1957 Jan 25	18:15	36.6	83.7	Middlesboro, KY		IV	3.1	
1957 Apr 23	09:24	33.5	86.8	Birmingham, AL	53,000	VI	4.3	12
1957 May 13	14:25	35.8	82.0	Sevier, NC	20,500	VI	4.1	9
1957 Jun 23	06:34	35.9	84.1	Concord, TN	1,500	V	3.3	8
1957 Jul 2	09:33	35.6	82.6	Asheville, NC	22,000	VI	4.1	10
1957 Nov 7		36.0	84.0	Powell, TN		III	2.8	
1957 Nov 24	20:06	35.8	83.1	Hartford, TN	12,000	VI	3.9	8
1958 May 16	22:30	35.6	82.6	Asheville, NC		IV	3.1	
1959 Apr 23	20:59	37.3	80.6	Eggleson, VA	4,400	VI	3.7	7
1959 Jun 13	01:00	35.4	84.3	Tellico Plains, TN	3,200	IV	3.2	15
1959 Jul 7	23:17	37.3	80.7	Pearisburg, VA		IV	3.1	
1959 Aug 12	18:06	34.8	86.6	Meridianville, AL	10,000	VI	3.9	8
1959 Aug 21	17:20	37.3	80.7	Pearisburg, VA	600	IV	3.0	11
1960 Jan 3	07:30	35.9	82.1	Spruce Pine, NC	1,500	IV	3.1	13
1960 Feb 9	14:00	35.4	82.4	Edneyville, NC	260	V	3.1	6
1960 Apr 15	10:10	35.8	84.0	Alcoa, TN	3,900	V	3.5	10
1963 Jan 17	11:40	37.3	80.1	Salem, VA	2,600	V	3.4	9
1963 Oct 28	22:39	36.6	81.0	Ennice, NC	5,900	V	3.6	11
1964 Jan 20	13:38	35.9	82.3	Pensacola, NC	600	IV	3.0	11
1964 Feb 18	10:31	34.5	85.5	Menlo, GA	2,100	V	3.4	9
1964 Jul 28	19:45	36.0	84.0	Inskip, TN		III	2.8	
1964 Oct 13	16:30	36.0	83.9	Knoxville, TN		III	2.8	
1966 Aug 24	06:00	35.8	84.0	Alcoa, TN	800	IV	3.0	12
1968 Mar 8	05:38	37.3	80.8	Narrows, VA	10,000	V	3.7	12
1969 Jul 13	21:51	36.0	83.9	Knoxville, TN	55,000	VI	4.3	12
1969 Jul 24	18:10	36.0	83.9	Knoxville, TN		III	2.8	
1969 Nov 20	01:00	37.4	80.9	Elgood, WV	322,000	VI	4.8	20
1969 Dec 13	10:20	35.2	83.1	Glenville, NC	11,000	V	3.7	12
1970 Aug 11	06:14	38.4	81.8	St. Albans, WV	3,000	IV	3.2	15
1970 Sep 10	01:41	36.1	81.7	Blowing Rock, NC	14,000	V	3.7	13
1971 Jul 13	03:03	36.0	84.3	Oak Ridge, TN	5,800	IV	3.4	17
1971 Oct 9	16:44	35.7	83.5	Gatlinburg, TN	8,500	V	3.6	12
1973 Oct 30	22:59	35.8	84.0	Alcoa, TN	6,300	V	3.6	11
1973 Nov 30	07:49	35.8	84.0	Alcoa, TN	98,000	VI	4.4	14

<u>DATE</u>	<u>TIME</u>	<u>NLAT</u>	<u>WLON</u>	<u>LOCALITY</u>	<u>FELT AREA</u> <u>(km²)</u>	<u>I_o</u>	<u>mb</u>	<u>h</u>
1974 May 30	21:29	37.3	80.6	Pembroke, VA	21,000	V	3.8	14
1975 Mar 7	12:45	37.3	80.7	Pearisburg, VA	1,300	III	2.9	21
1975 May 2	16:23	36.0	84.6	Oakdale, TN		III	2.8	
1975 May 14	23:03	36.0	84.3	Oak Ridge, TN		III	2.8	
1975 Aug 29	04:23	33.7	86.7	Palmerdale, AL	57,000	VI	4.3	12
1975 Nov 11	08:11	37.3	80.7	Ripplemead, VA	1,100	V	3.3	8
1975 Nov 25	15:18	34.9	83.0	Salem, SC	6,100	IV	3.4	17
1976 Jan 19	06:31	36.9	83.9	Barbourville, KY		VI	4.0	
1976 Feb 4	19:54	35.0	84.7	Conasanga, TN	6,000	VI	3.8	7
1976 Jun 19	05:54	37.4	81.6	Wilcoe, WV	1,000	V	3.2	8
1976 Sep 13	18:55	36.5	80.6	Toast, NC	18,000	VI	4.0	9

north near Roanoke in southwestern Virginia southwest to central Alabama, where the Coastal Plain sediments begin to overlap. Northwest to southeast, the SASZ is bounded by the Cumberland escarpment which marks the approximate westward extent of the folded Appalachians and the Brevard zone which separates the Blue Ridge from the Piedmont.

Long, narrow ridges, generally striking NE-SW, characterize the Valley and Ridge province which is underlain by Cambrian to Pennsylvanian-aged sedimentary rocks that have been folded and faulted. The Blue Ridge is an allochthonous mass of rugged peaks dominantly composed of metamorphic and igneous rocks which range in age from Precambrian to Cambrian and which overthrust Paleozoic and Precambrian sedimentary strata. Thin thrust sheets of large dimensions typify the structure of the southern Appalachians [e.g., Cook and others (1983)].

CATALOG DESCRIPTION

A base data file was established through the synthesis of the data from primary references, original sources of data were tracked, and archival newspaper files searched. The original primary reference list included some additional references from the area surrounding the SASZ, e.g., the rest of the Southeast, the New Madrid seismic zone, Illinois, Indiana, Ohio, etc. Data from over 400 events were compiled and evaluated to produce the present catalog of 166 events.

The complete documentation for each of the SASZ events as contained in Appendix B, Data Documentation, was used for the evaluation and interpretation of the intensity data, the preparation of felt area maps (which were plotted when two or more localities "felt" an event), and determination of epicenters. Computational parameters, e.g., magnitude and depth of focus, depend on the interpreted data and were obtained subsequent to completion of Appendix B.

The following sections contain: (1) a discussion of the primary references

for the SASZ, (2) a description of the catalog format, and (3) a discussion of intensity and location determination.

Primary References

The following 10 references comprise the primary reference list for the Southern Appalachian Seismic Zone: the number in brackets indicates the reference number in the catalog bibliography of Appendix B.

TVA [380] The TVA catalog referenced is an unpublished compilation of data on earthquakes east of 87° west longitude and south of 39° north latitude; A significant part of the data presented in this study is data collected for that catalog which includes Berlen C. Moneymaker's personal files. It covers the complete area and period of present study; Modified Mercalli intensities are used.

USGS [390] This is a general reference that includes any of a number of earthquake compilations published by the U.S. Coast and Geodetic Survey, NOAA, or the U.S. Geological Survey (seismological investigation was assigned by law to the U.S. C&GS in 1925). It includes several editions of the publication, Earthquake History of the United States - these publications list only events with intensities greater than, or equal to V; although the C&GS adopted the Wood-Neumann measure of earthquake intensity in 1931, intensities were reported according to the Rossi-Forel Scale through 1947. Several versions of EQHUS are included, because with time, additions, deletions, changes, and corrections altered the data from one volume to the next. Also included under this reference are the publications--United States Earthquakes published annually

beginning in 1928, (from 1928 to 1930 Rossi-Forel intensities are reported), Earthquakes in the United States (published quarterly beginning in 1975), and Preliminary Determination of Epicenters (PDE's).

McClain [260] McClain compiled a seismic history of the southeast ostensibly for use in hazard analysis. This catalog contains events east of 95° west longitude and south of 37° north latitude; Events are listed from 1699 to 1969; Modified Mercalli intensities are used. Principal source: United States Earthquakes.

Bollinger [33] "A Catalog of Earthquakes for the Southeastern United States from 1754 through 1974". This compilation represents a synthesis of 64 papers and abstracts and has been the key reference for historical earthquakes in the region since publication. It covers the area from 30° to 40° north latitude, 72° to 88° west longitude; Modified Mercalli intensities are used. Bollinger contributed much to this study through numerous individual articles and he graciously provided personal files which included the source data for Bollinger [35] and Hopper [210].

Moneymaker [231] Published a series of articles on Tennessee earthquakes in Tennessee Academy of Science Bulletins covering the period 1699 to 1970; Modified Mercalli intensities; Sources include clippings, letters, questionnaire data, reports from observers, and field investigation of individual earthquakes. Moneymaker's personal files were made available to the authors and constitute a significant contribution to this study.

Woollard [410] Compiled a catalog of earthquakes for the entire United States prior to 1925 based principally on the unpublished data

collected by Harry Fielding Reid; Rossi-Forel intensities are interpreted. Reid's data are available on microfilm and were reviewed for this study; however, Woollard's summary was used as primary reference for this study.

MacCarthy [290] This is an annotated list of earthquakes that were felt in North Carolina from 1774 to 1956; Rossi-Forel intensities are used except where specified.

MacCarthy [310] A descriptive list of Virginia earthquakes through 1960; Wood-Neumann intensities are assigned. MacCarthy's primary sources were the Earthquake History of the United States and United States Earthquakes which were augmented and amplified from contemporary news accounts, various memoirs, and diaries.

Varma [400] & Docekal [100] These are both seismicity compilations that are part of doctoral theses; Varma concentrated on the eastern half of the U.S. exclusive of New England, while Docekal emphasized the mid-continent area. These references were used originally with work by Ross Heinrich and others to establish epicenters outside of the study area. Since their areas of interest overlapped the study area, they were retained as primary references.

Catalog Format

Appendix B contains the data for 164 of the earthquakes documented in this study (Two events, both intensity III, one at Abingdon, VA on Sep. 18 in 1852 and a second on Oct. 22, 1916, an aftershock of the Oct. 18 Irondale earthquake, are omitted from Appendix B; source data are, however, listed in Table 1.). This catalog is unique in that most of the basic source data are presented along with interpreted epicenter and intensity information.

Therefore, the source parameters assigned for any event may be checked against the substantiating historical data.

The form of the catalog is a pseudo-outline with the first entry designated TEIC which contains the final source data assigned by the authors for each event. This entry contains: YEAR, MONTH, DAY (GCT), ORIGIN TIME (GCT), LATITUDE and LONGITUDE (nearest $.1^{\circ}$), LOCALITY, FELT AREA (km^2), and EPICENTRAL INTENSITY (I_0 consistent with the Modified Mercalli Scale). Following the TEIC entry, each of the 10 primary references--if it contains data for the event--is listed with its data and cited references. Information for cited references not shown previously (unless the cited reference is also a primary reference in which case the data is listed with the primary reference) is listed with its cited references, and so on, until all basic data are listed. Presentation of redundant data (i.e., cited in more than one source) is avoided.

In general, explicit source data (latitude/longitude and intensity along with felt area) are listed with the reference entry and then complete data follows. If a location is given in terms other than degrees and tenths of degrees, it is converted to this form; if the felt area is listed as square miles, the entry is converted to the equivalent in square kilometers. Rossi-Forel intensities are indicated, otherwise Modified Mercalli intensity is to be assumed. Date/times are listed as presented in reference; these can be local times, 12- or 24-hour clock or GCT. These have been preserved in the documentation because of past duplications of events, e.g., an event is listed with local date/time in one compilation and is listed on the next day (GCT) in another.

INTERPRETED DATA

Intensity

Intensities are assigned to individual points based on the Modified Mercalli

Intensity Scale as modified by Wood-Neumann (1931). Following standard practice (USGS, 1976), epicentral intensity is assigned the highest level at which any one of its attributes is clearly developed or where several attributes of a given level are reported. It is relatively simple in most cases to assign an intensity rating objectively to a particular report; however, establishing that a particular attribute is "well developed" is frequently a challenge, especially when rating older historical earthquakes where there are unfavorable demographics. Very few intensity ratings are made exclusively on the basis of the effects on people, e.g., "felt by many", "frightened many", with the exception of the "awakened many" attribute for intensity V, and intensity III where the event is simply registered as "felt" or "slight." Usually, in this study, the effects on inanimate objects control the assignment of intensity. A general observation is that for this study and throughout the historical record in the eastern United States the specification of "damage" provides the distinction between intensities V and VI, while the extent of damage to chimneys is the principal determinant of higher intensity, e.g., from VI to VII when chimney tops are "knocked off," "thrown down" or broken off at the roofline. Severe and widespread chimney damage, including twisting fall of whole chimneys, rates an VIII.

A review of the data for the 166 events in this study reveals the following are frequently reported and can be considered characteristic of each indicated intensity:

- III described as "slight" or simply as "felt";
- IV windows, doors, dishes--shaken, rattled
houses shaken, jarred;
- V furniture shaken, light furniture moved
loose objects disturbed, shifted--fall of some objects
from cupboards, mostly at night; many awakened;
- VI "slight damage"
bricks displaced from chimneys
plaster cracked, damaged

windows broken
heavy furniture moved, furniture overturned
groceries thrown from store shelves;

VII tops of chimneys shaken off
chimneys "thrown down", "fell"
moving cars affected

For each event, a description of the effects that helped determine I_o are listed in the documentation catalog. Additionally, each felt point is plotted (two or more points) and a felt area is interpreted. For most events a simple contour is drawn around the plotted felt points--few "not felt" reports are available except for more recent earthquakes.

A number of 19th Century North Carolina earthquakes (6 dates) are listed without an interpreted I_o ; one is thought to have originated near Andrews in 1829, another near Bryson City in 1844, and the rest, part of the series of earthquakes reported from Stone Mountain (referred to by most as the McDowell County, NC earthquakes). These events, all apparently local in nature, produced reported effects that on the occasion of a demonstrably large event might justify assignment of MMI IX-X. In particular, these events are characterized by reports of chasms and large splits in rocks. Ferguson and Stewart (1975) describe recent (approximately 1974) visits to Stone Mountain where they saw "huge relatively recent-looking splits in the mountains there that could have been due to this swarm" (referring to series in 1874) are present.

Event Location

All events in this catalog are located on the basis of macroseismic effects and/or foreshock/aftershock reports. If foreshocks and/or aftershocks are indicated for an event, they are usually felt over a significantly smaller area than the main shock and thus provide an important locational constraint. If a foreshock/aftershock is reported from only a single location, that location is generally selected as the epicenter; if it was felt at several locations, the

area over which it is reported is analyzed with respect to intensity to estimate the best location. In the absence of foreshock/aftershock reports, maximum intensity is used. If one location clearly exhibits the greatest intensity effects, it is designated as the epicenter; frequently several locations will report similar effects; that being the case, a locality near the center of the area including those locations is selected. Lastly, if an epicenter cannot be obtained from any of the above, then the effects of the earthquake must be, roughly, uniform over a large area: A locality near the center of the felt area becomes the epicenter. Figure 1 is a map showing the historical epicenters for this study.

Although all of the events in this catalog were located from historical data as indicated above, there are some events for which instrumentally determined epicenters exist. Dewey and Gordon (1983) and Gordon (1985) located events using a joint hypocenter determination method designed to overcome sparse data. A number of these pre-1976 relocated events are in the SASZ and thus included in this catalog. For catalog consistency, source parameters based on historical data are estimated even though an instrumental location and magnitude are available. However, the instrumental data are listed in the Appendix B catalog.

COMPUTATIONAL PARAMETERS

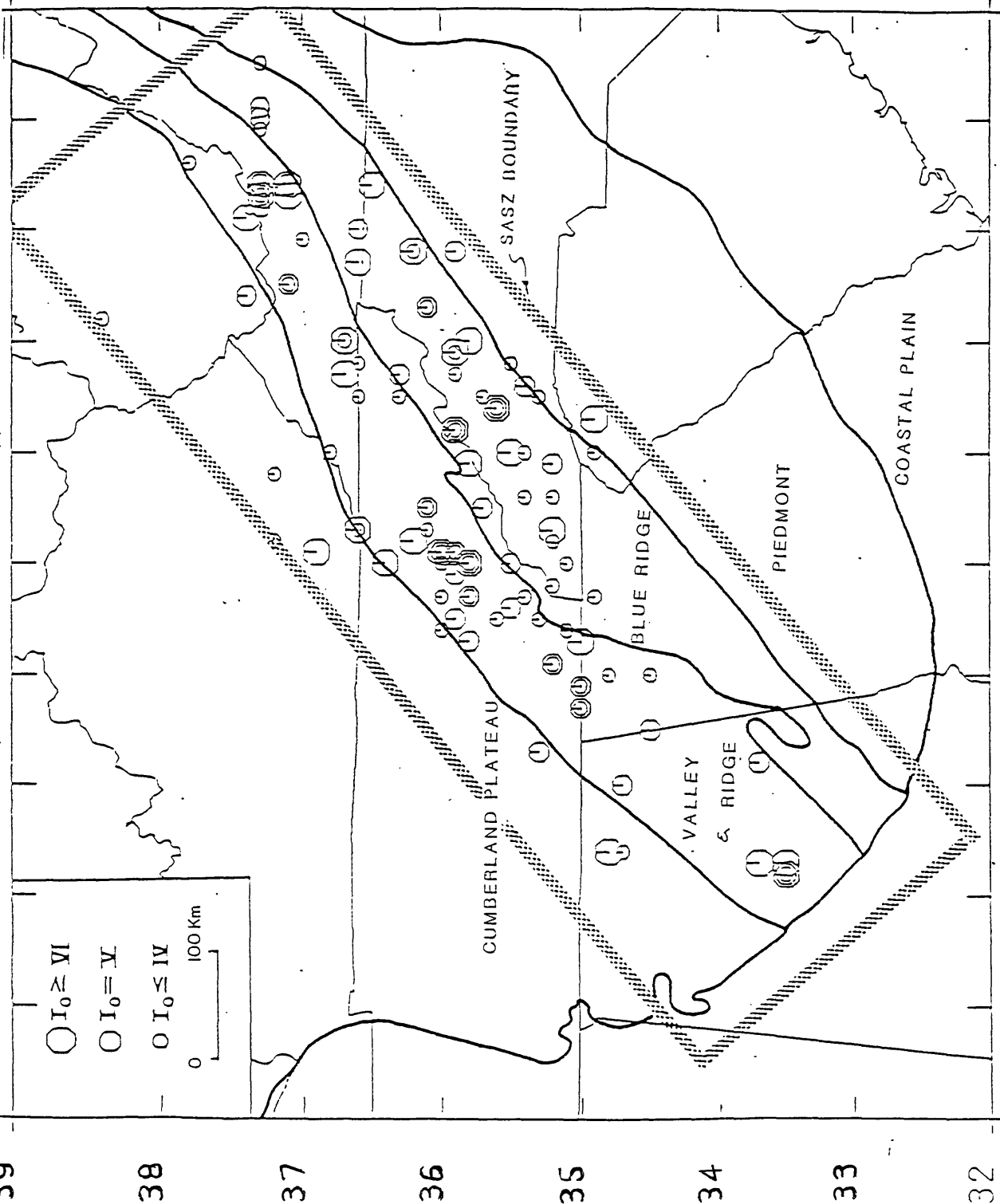
Magnitudes

Magnitudes (mb) are estimated for events in the catalog using either of two equations developed recently by Sibol and others (1986). The preferred equation determines mb from the relation between epicentral intensity (I_0) and felt area.

$$mb = 2.16 + 0.0219 I_0^2 + 0.0596 \log^2 (FA) \quad (1)$$

where FA is the felt area in square kilometers. This equation is the first

Figure 1. Historical earthquakes in the Southern Appalachian Seismic Zone: 1776-1976



published that adequately accounts for differences in focal depth. Generally, for a given magnitude earthquake, a decrease in focal depth results in an increase in I_o and a corresponding decrease in FA; an increase in depth for the same event causes I_o to decrease and the felt area to increase. Formula (1) incorporates the inverse relationship between the two parameters. Obviously, the better the FA is delineated, the more accurate the magnitude estimate.

A second formula from Sibol and others (1986) is employed when I_o but not felt area is available;

$$mb = 2.37 + 0.0466 I_o^2 \quad (2)$$

Equation (2) permits computation of mb from I_o alone and is used when information needed to interpret a felt area is deficient. The accuracy of calculating magnitude using only I_o is very limited and is acceptable only when it is the only option. The difficulty can be illustrated clearly: All events of a given I_o compute to the same mb, but an earthquake as small as 3.8 can produce intensity VII effects over a local area if it is shallow, and one as large as mb = 5.5 may produce intensity VI effects only if its depth of focus is 20 km or greater. This is an extreme example but it serves to illustrate the point.

The largest event listed in the catalog is the May 31, 1897 Giles County, Virginia earthquake, MMI VIII. Bollinger and others (1979) estimated a magnitude of 5.8 (mb) from a method that evaluates the rate of intensity fall-off; using equation (1), an mb = 5.6 is calculated. There are three other events with computed mb ≥ 5.0 , these are:

<u>DATE</u>	<u>LOCATION</u>	<u>I_o</u>	<u>FA (km²)</u>	<u>mb</u>
April 29, 1852	Abingdon, VA	VII	274,000	5.0
May 31, 1897	Pearisburg, VA	VIII	725,000	5.6
February 21, 1916	Waynesville, NC	VII	458,000	5.1
October 18, 1916	Irondale, AL	VII	358,000	5.1

Primarily because of a relatively low epicentral intensity (VI), the 1861 Wilkesboro, NC earthquake, which was felt over nearly 600,000 square kilometers, is listed as having $m_b = 4.9$. Given the uncertainties, this event may also have exceeded magnitude 5.

Magnitudes (m_b) computed from equation (1) or equation (2) for each event are found in Table 1.

Depth of Focus

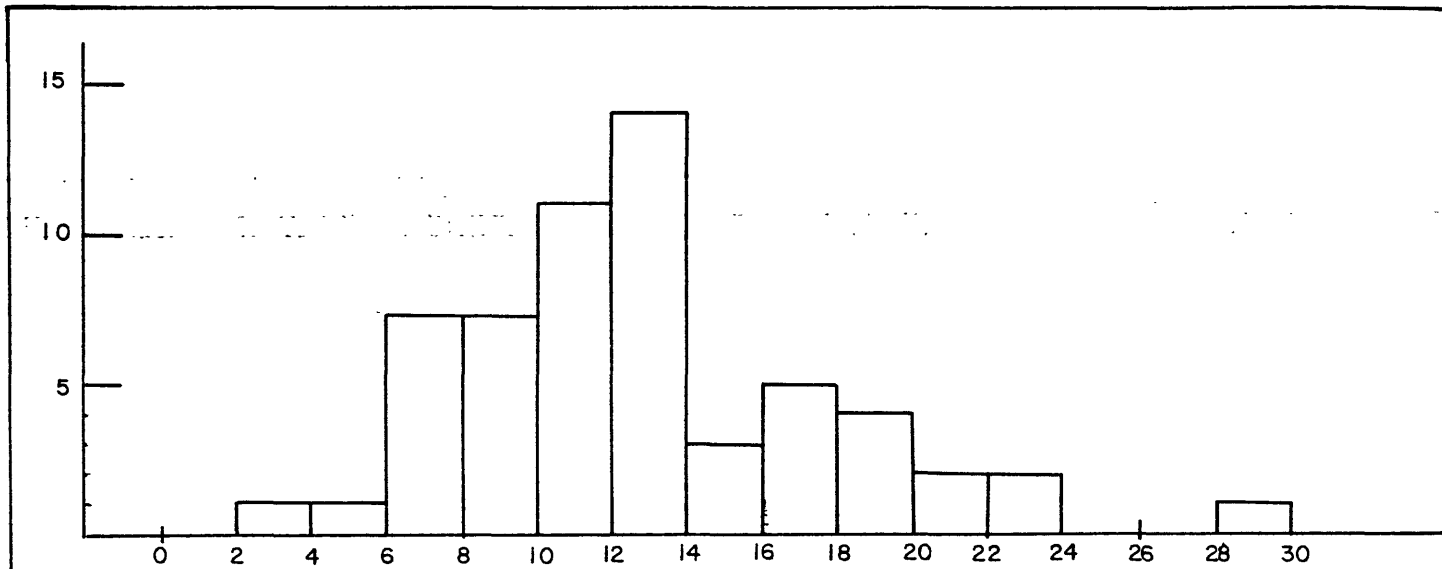
Depth is a parameter not normally found in an historical data set; however, in this study, depths are estimated for all earthquakes for which felt areas are available. These also are the events considered to have the more reliable m_b estimates. The calculated m_b and a relationship between epicentral intensity, magnitude, and depth developed by Shebalin (1961) [Barosh (1969)] was then used to complete depth. The equation is:

$$I_o = 1.58 M - 3.5 \log h + 3.0 \quad (3)$$

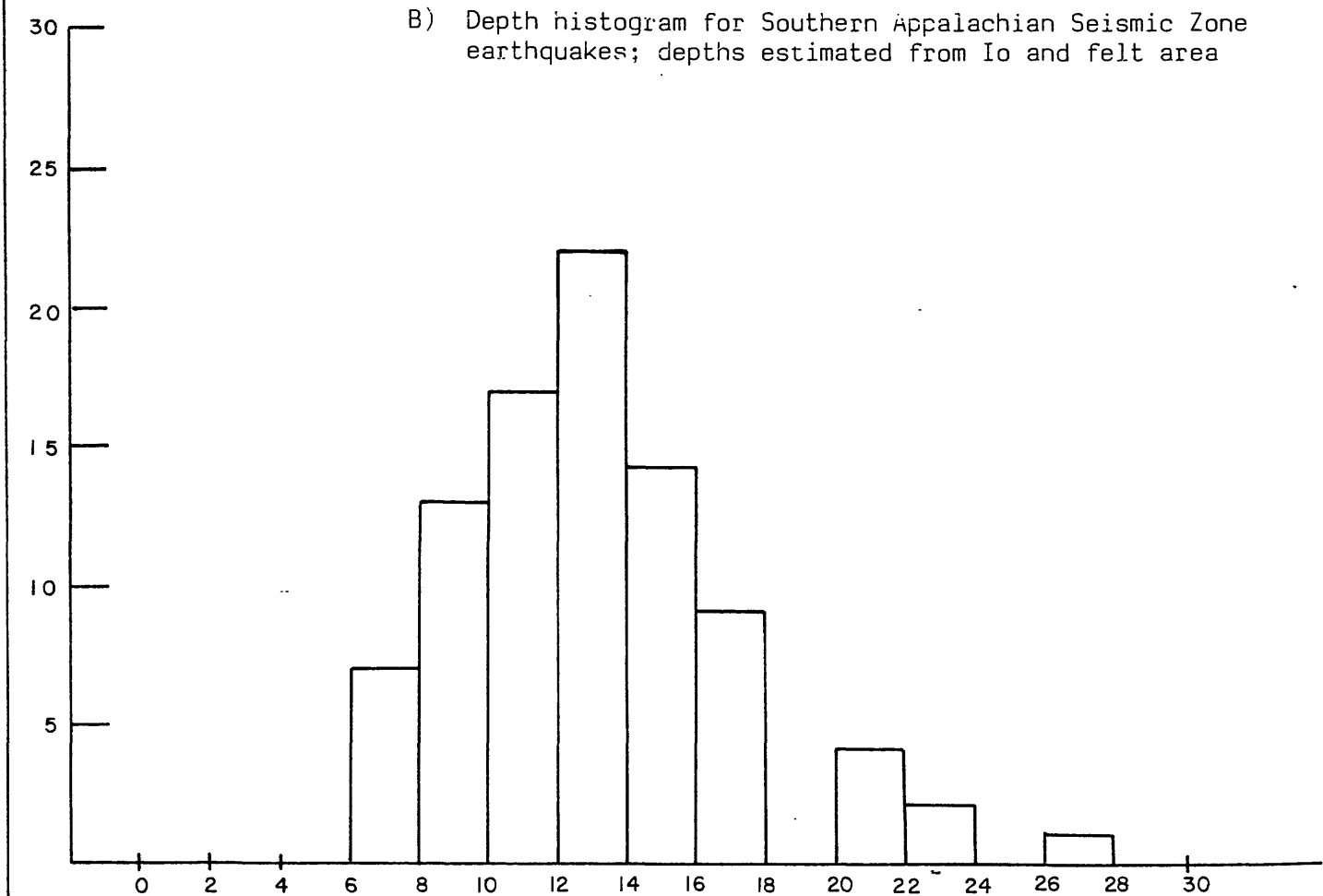
where M is Richter or local magnitude, assumed to be equivalent to m_b in the range $2.5 \geq m_b \leq 6.0$. The original magnitude term was $1.5M$; the new term represents an empirical adjustment to make the equation consistent with SASZ events for which independent depth data were available.

In order to employ equation (3) successfully, I_o and m_b must be well-determined. Equation (1) above gives a reliable estimation of m_b ; however, by balancing I_o and FA it is also indirectly incorporating depth. One indication that the method yields reasonable depth estimates is shown in Figure 2. This figure presents two depth histograms. The top histogram is from Johnston and others (1985) showing the depth distribution for 58 SARN earthquakes with reliable depth determinations. The bottom histogram is from this study using the depths calculated with the procedure outlined above. Given

Figure 2.



A) Depth histogram for 58 SARSN earthquakes with reliable focal depth determination (after Johnston and others, 1985)



B) Depth histogram for Southern Appalachian Seismic Zone earthquakes; depths estimated from I_0 and felt area

the type of data and the uncertainties, a remarkable correlation exists between the two depth distribution graphs. The following table shows the depth distribution by percentages for the ranges of focal depth indicated:

	DEPTH	≤ 5	6-9	10-13	≥ 14
Instrumental		3%	24%	43%	29%
Historical		0%	22%	44%	33%

It seems unlikely that this strong correlation is fortuitous; rather it suggests that equations (1) and (3) are valid for the SASZ.

Depths of individual events, where calculated, are listed in Table 1.

SPATIAL CHARACTERISTICS

Earthquake epicenters are generally distributed (see Figure 1) throughout the Valley and Ridge and Blue Ridge physiographic provinces which substantially comprise the SASZ. However, that is not to say the pattern is totally diffuse; on the contrary, of the 166 events cataloged in this study, 107 originate in the Valley and Ridge while less than half that number are located in the Blue Ridge. [A comparison between events ($M \geq 3.0$) instrumentally-located in the SASZ during the period 1977-1986 (Figure 3), shows more than a three-to-one rate of occurrence favoring the Valley and Ridge.] Within the Valley and Ridge, 32% of all events had epicenters within a 25 km radius of Knoxville, TN and another 15% within a 25-km radius of Pearisburg (Giles County) VA. Together those two small areas contain almost half the events reported felt in the SASZ for 200 years. The seismicity in the Blue Ridge appears somewhat more diffuse; still, a 25-km radius circle drawn to include Asheville and Hendersonville, NC contains 30% of all Blue Ridge events.

There are also several relatively large areas where no historical epicenters are indicated--almost all of the Georgia Blue Ridge and a circular-shaped area

(approximately 60 km radius) of northeastern Tennessee Valley and Ridge.

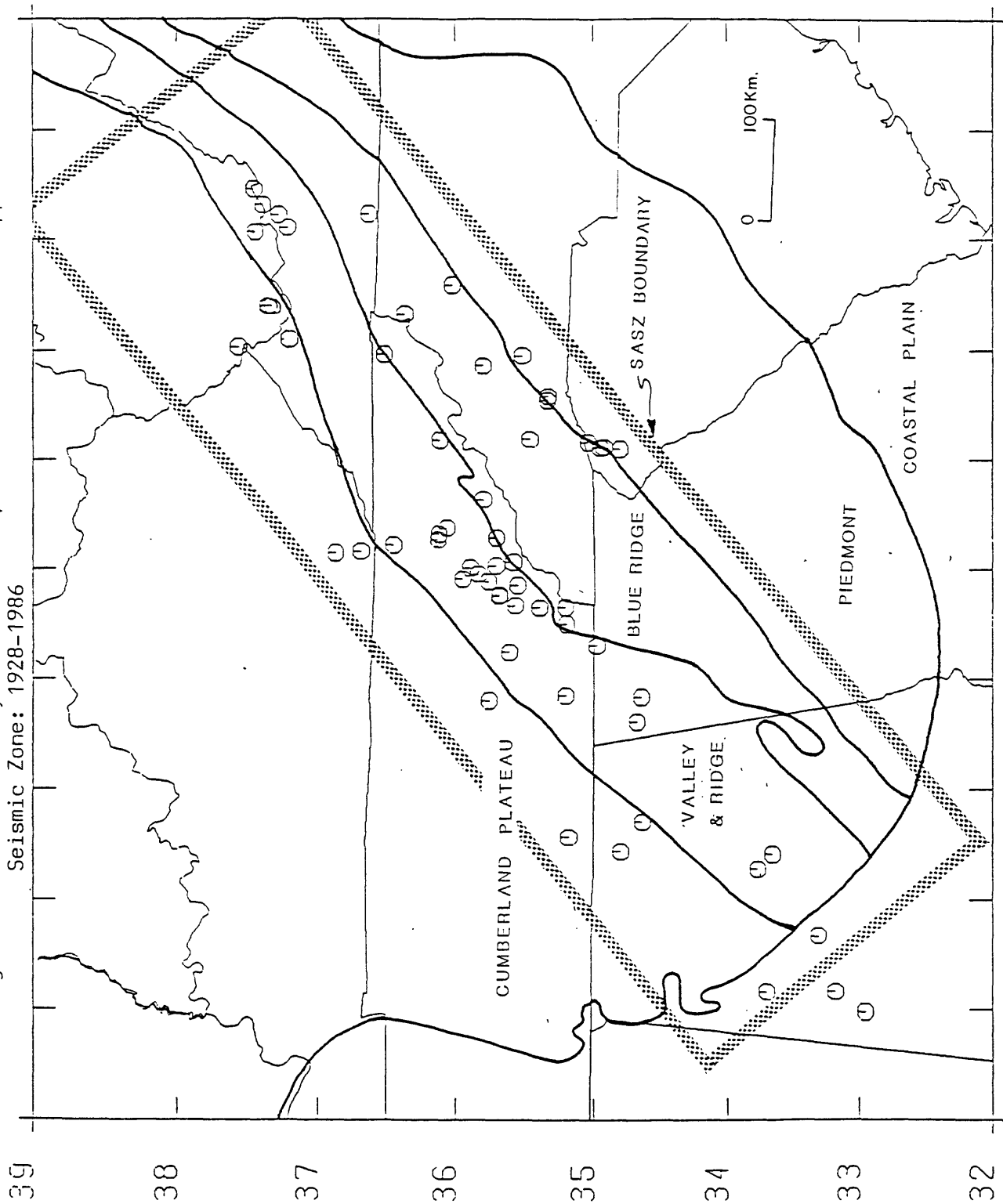
Instrumentally-recorded and located earthquakes with magnitudes equal to or greater than 3.0 are shown in Figure 3. These epicenters are taken from TEIC (Nava, 1986) and SEUSSN (Bollinger and others, 1978-1984) bulletins for the period July 1977 to March 1986, and from Dewey and Gordon (1983) for pre-1977 events. There is very good correlation between the geographic distribution of the historical and the instrumental events.

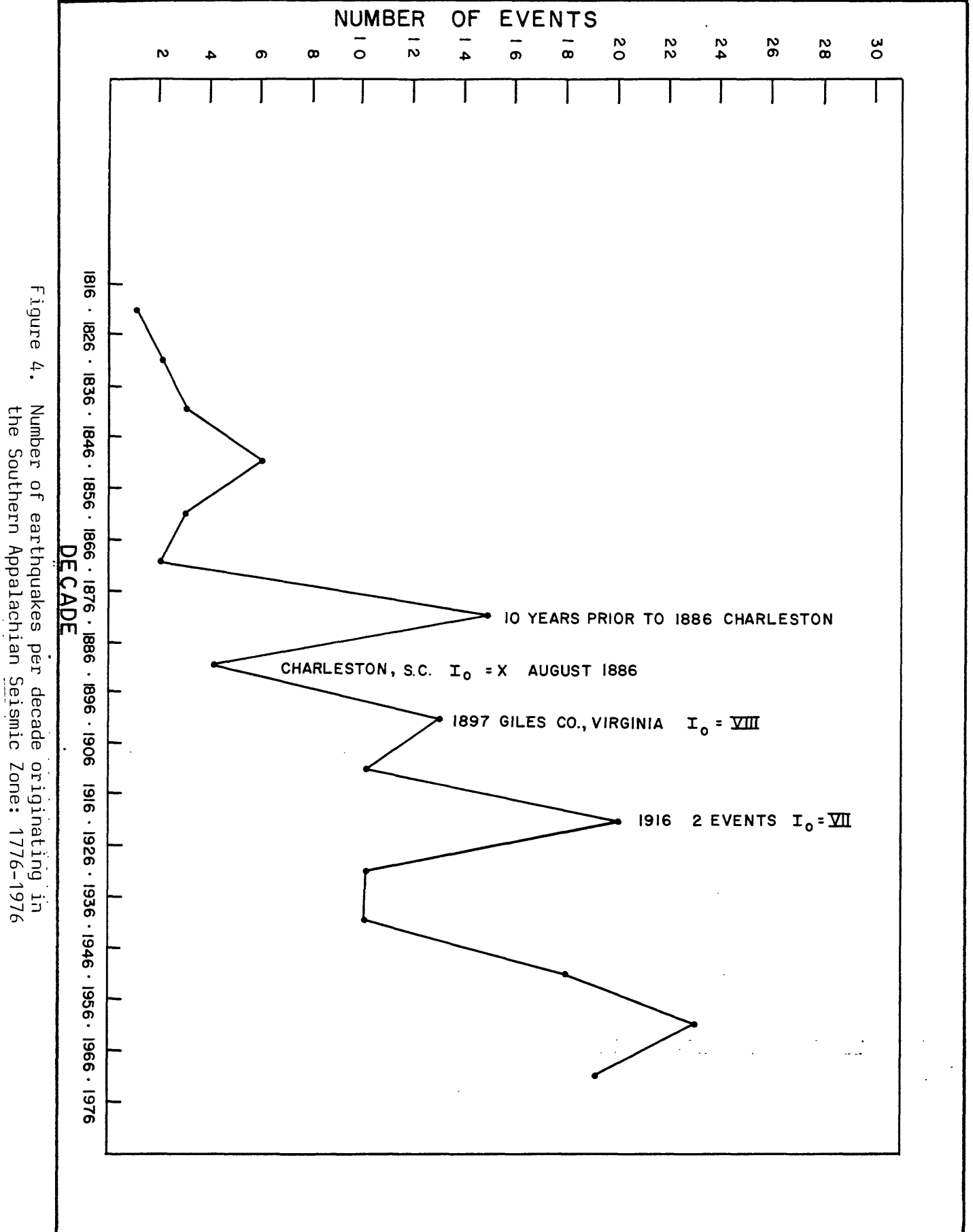
TEMPORAL ASPECTS

Frequency of Earthquakes

On average, the number of felt earthquakes reported in the SASZ has increased continually each decade since 1800. Figure 4 is a plot showing the number of earthquakes for each decade beginning with 1776-1785. Bollinger (1973) plots a similar graph for the entire southeastern United States; one of his observations is that the data are suggestive of a possible 30- to 40-year cycle; such a cycle also is apparent in Figure 4. A significant increase in activity occurs in the SASZ in the 10 years just prior to the 1886 Charleston, SC earthquake (MMI=X), followed by a marked decrease. An intermediate peak in the 1896-1905 period reflects increased activity associated with the earthquake (MMI=VIII) of May 31, 1897 in Giles County, VA. Two of the 5 events originating in SASZ with $I_o \geq VII$ occurred in the same year, the Feb. 21, 1916 Waynesville, NC and the Oct. 18, 1916 Irondale, AL earthquakes; a corresponding peak in the number of events for that decade is indicated. [Note: the MMI=VII Union County, SC earthquake was located just outside the SASZ on January 1, 1913 making three events with intensity VII in a little less than a 4-year period.] The last period of increased activity on Figure 4 is 1956-1965.

Figure 3. Instrumentally located earthquakes in the Southern Appalachian Seismic Zone: 1928-1986





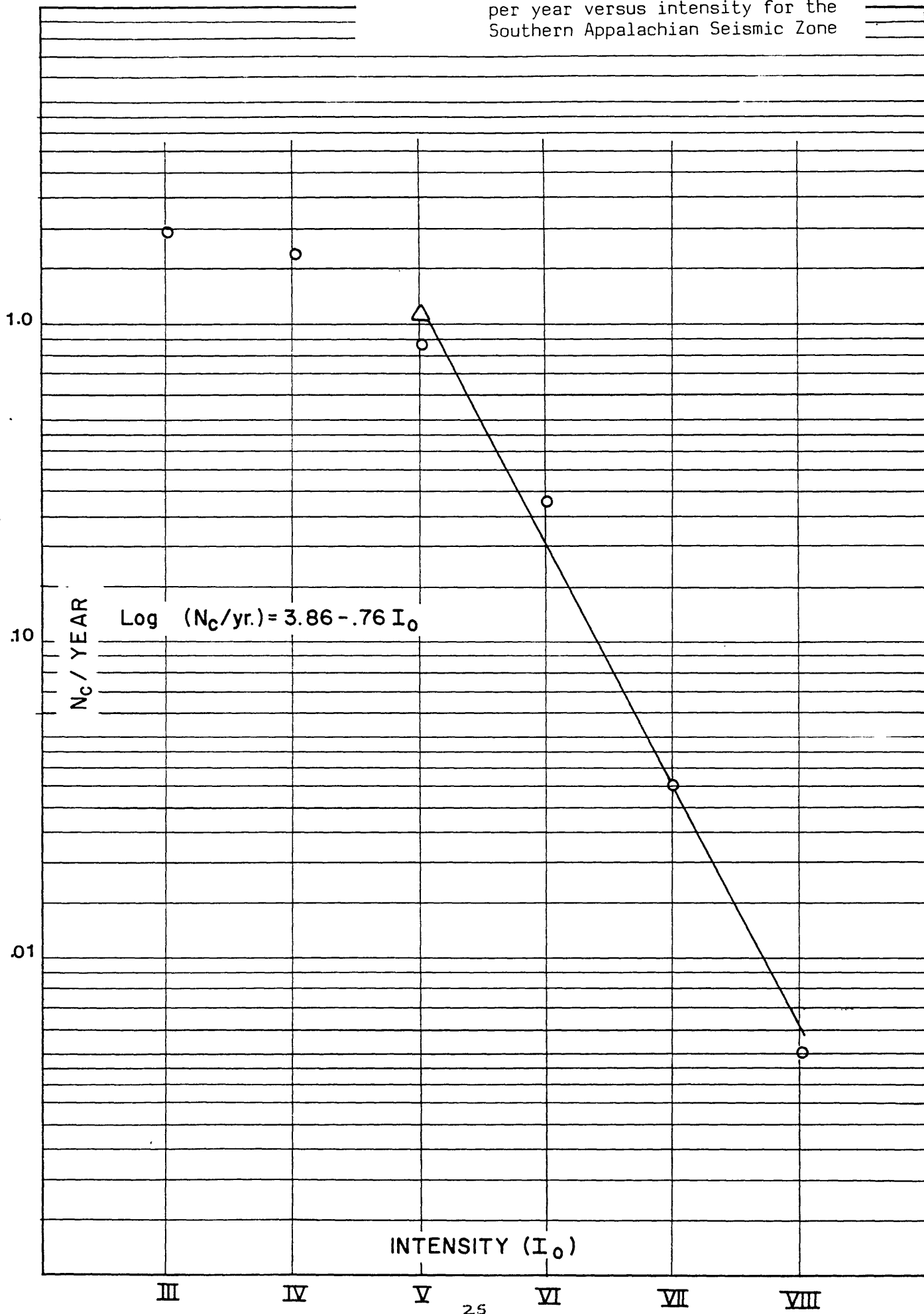
Frequency of Occurrence Versus Intensity

Figure 5 presents the cumulative number of earthquakes per year in the SASZ plotted versus I_o . For the study area, the reporting of I_o =VIII earthquakes is considered to be complete over the entire catalog period (1776-1976) while I_o =VI and I_o =VII are estimated to be completely reported only during the last 100 years. This corresponds approximately to the time in which demographics were such that most of the SASZ was populated at a level of at least 18 persons per square mile. McClain (1970) considered this figure the saturation level of population with respect to earthquake detection. Indications are that I_o =IV and I_o =V events are underreported even in the most recent decades. The points plotted for these intensities derive from data reported in the most recent 25-year period. The circle plotted on the Figure 5 for I_o =V events represents the actual number of events per year reported at that intensity while the triangle is a projected number based on the number of I_o =V events cataloged during the 8-hour nighttime period. The following is a comparison (for the entire catalog) between the number of events reported during three 8-hour periods:

PERIOD (GCT)	I_o	$\leq IV$	V	$\geq VI$
12:00-19:00 (Daytime)		22	10	9
20:00-03:00 (Evening)		23	13	10
04:00-11:00 (Night)		23	21	11

Although the total number of events is small, a diurnal effect is clear: more than twice as many events I_o =V are reported at night as during the day. This differential is not evident for either the larger intensities or the smaller intensities. There are at least two contributing factors: (1) elevated noise levels from cultural activities during the day mask some of the effects and (2) the classification of an intensity V event is often made on the basis of the characteristic "people awakened" criterion, which would rarely be applicable during daylight hours. Almost all intensity V events in this catalog which

Figure 5. Cumulative number of earthquakes per year versus intensity for the Southern Appalachian Seismic Zone



occurred at night awakened many people; nine of the events were classified as such primarily on that basis. The apparent absence of a diurnal variation for $I_o=IV$ events is curious; however, if the main contributor to this effect is classification it would simply shift the effect to intensity IV.

Bollinger (1973) considered the reporting of intensity V events to be complete only for the latest 20-year period in his study. The data for this study indicate that period of time is either too short and/or intensity V and VI events are still not well discriminated. A linear least-squares fit to the data ($I_o=V, VI, VII, VIII$) yields

$$\log (N_c/\text{year}) = 3.86 - .76 I_o \quad (4)$$

where N_c is the cumulative number of events greater than or equal to I_o . For comparison, the relationship in Bollinger (1973) for the entire Southeast is

$$\log (N) = 3.1 - .59 I_o \quad (5)$$

where N is the number of events per year at a given I_o rather than the cumulative number. Using the b -value of .76, one would expect about 7 events of $I_o \geq IV$ within the SASZ per year; in fact, over the last years, an average of only 2 to 3 events per year are reported felt. However, the listing of instrumentally recorded earthquakes since 1977 in the SEUSSN Bulletins (Bollinger and others, 1978-1984) shows an average of about 7 events per year in the SASZ (with magnitude ≥ 3.0). A magnitude 3.0 event at normal depth in the SASZ should produce an intensity IV (Barosh, 1969; Sibol and others, 1986) and yet, less than half on the average are reported felt at all.

Again, several factors may contribute to the underreporting of $I_o=IV$ earthquakes. If cultural activity during the day masks the effects and limits the reporting of $I_o=V$ events, a corresponding effect on $I_o=IV$ events can be reasonably expected--possibly to an even greater extent. At night, a reverse of

the diurnal effect mentioned for $I_o=V$ operates: for $I_o=IV$, if people aren't awakened, there are few available to report having felt the event. Less than vigorous pursuit of felt information for events with magnitude <3.5 is probably an additional contributing factor to the underreporting of MMI IV earthquakes.

Frequency of Occurrence Versus Magnitude

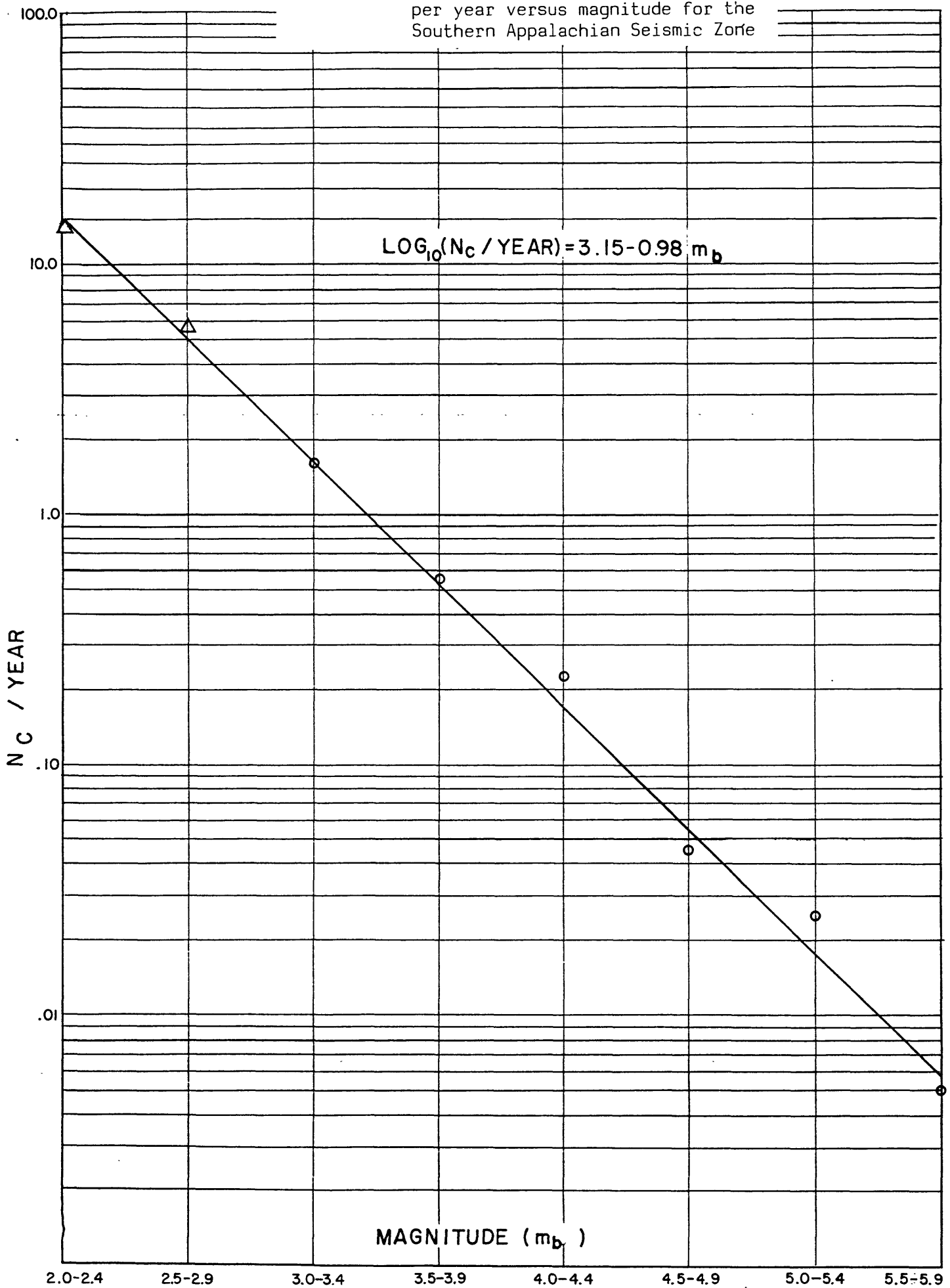
Magnitude data are plotted (Figure 6) to obtain a recurrence curve in a manner similar to that used for intensity data. Qualitative estimates determine the periods for which a given magnitude interval was considered complete. For events of $mb \geq 5.5$ or greater, the entire catalog (200 years) was considered complete, for events $3.5 \geq mb \geq 5.4$, 100 years, and for magnitudes, $mb = 3.0$ to 3.4 , the most recent 25 years. (This does not exactly correspond, one-to-one, to the estimated intensity completeness intervals because variations in depth will cause a distribution of magnitudes that correspond to a given intensity.) The equation which resulted from the regression analysis is:

$$\text{Log } (N_c/\text{year}) = 3.19 - 0.98 \text{ } mb \quad (6)$$

where N_c is the cumulative number of events/year equal to or greater than mb .

In order to extend the data magnitude range and possibly improve the reliability of the b -value estimate, instrumental data from Johnston and others (1985) in the magnitude range $2.0 \geq MD \leq 2.9$ were added to the historical data set (indicated by triangles in Figure 6) and a second linear regression with these data included produces virtually identical results, e.g., same b -value of 0.98. This lends support to the applicability of equations (1) and (2) from Sibol and others (1986) to historical seismicity in the southern Appalachian region.

Figure 6. Cumulative number of earthquakes per year versus magnitude for the Southern Appalachian Seismic Zone



COMPARISON TO BOLLINGER (1975)

The catalog of southeastern United States earthquakes published by Bollinger (1975) has been the principal reference for historical earthquakes in the region for a decade. This section contains a detailed comparison, event by event, between Bollinger's catalog and this study. Table 2 presents the event data: the interpretation for this study is listed first and directly beneath it, the data from Bollinger (1975).

Number of Events

Bollinger (1975) covers a much larger area than does this study; therefore, had to be screened for only those events with locations within the SASZ. A clustering of events near Anderson-Greenville, South Carolina and another group in the Lynchburg, Virginia area were borderline to the SASZ but judged to be outside the zone and thus excluded.

Ten events listed in this study do not appear in Bollinger (1975); all are Io=III or IV except one, an event assigned an intensity V on December 2, 1892 at Chattanooga, Tennessee. On the other hand, Bollinger (1975) lists 6 "events" that have been deleted from this catalog. One listing, an apparent series of small events in November 1965 reported to Bollinger in a personal communication by L.T. Long of Georgia Institute of Technology, centered at Canton, GA (near Cartersville Dam area) was omitted for lack of documentation. The other excluded events and reason for exclusion are listed below.

<u>Date</u>	<u>Location</u>	<u>Comments</u>
1861	Rutledge, TN	Described as "great earthquake" assumed to be a felt location for Aug. 31, 1861 Wilkesboro, NC event
1886 Sep 3	Wytheville, VA	Maximum intensity effects were @ Dale Enterprise, VA - out of SASZ
1964 Nov 25	SW Virginia	Rockburst
1965 Apr 26	SW Virginia	Rockburst
1967 Dec 16	SW Virginia	Rockburst

Table 2.

A comparison between historical earthquakes source data,
this study and Bollinger (1975)

<u>DATE</u>	<u>NLAT</u>	<u>WLON</u>	<u>LOCALITY</u>	<u>FELT AREA</u> (km ²)	<u>Io</u>
1776 Nov 5	35.4	83.0	Richland Balsam, NC		IV
Nov 5-6	35.3	83.2	Jackson Co., NC		IV-V
1825	36.2	81.2	Wilkesboro, NC		III
[Not Listed]					
1827 May 11	36.2	81.2	Wilkesboro, NC	1,800	IV
May 11	36.2	81.2	Wilkesboro, NC		
1829	35.2	83.8	Andrews, NC		
	35	84	Cherokee Co., NC		
1836 May 7	36.0	83.9	Knoxville, TN		III
[Not Listed]					
1844 Jun	35.4	83.4	Bryson City, NC		
Jun	35.4	83.4	Macon Co., NC		
1844 Nov 28	35.8	84.0	Maryville, TN	2,900	VI
Nov 28	36.0	84.0	Knoxville, TN		VI
1848	35.5	82.2	Stone Mt., NC		
[Not Listed]					
1851 Aug 11	35.6	82.6	Asheville, NC		V
Aug 10	35.6	82.6	Asheville, NC		
1852 Apr 29	36.7	82.0	Abingdon, VA	274,000	VII
Apr 29	36.6	81.6	VA-NC TN	420,000	VI
1852 May 3	36.7	82.0	Abingdon, VA		III
May 3	36.7	82.0	Abingdon (?), VA		
1852 Sep 18	36.7	82.0	Abingdon, VA		III
Sep 18	36.7	82.0	Abingdon (?), VA		
1854 Feb 13	37.2	83.8	Manchester, KY		III
[Not Listed]					
1854 Nov 22	37.1	81.5	Tazewell, VA		III
Nov 22	37.1	81.5	Tazewell, VA		III
1857 Dec 11	37.8	80.4	Lewisburg, WV		III
Dec 10	37.8	80.4	Lewisburg, WV		
1859 Mar 22	37.1	81.5	Jeffersonville, VA		IV
Mar 22	37.2	81.5	Tazewell Co., VA		
1861 Aug 31	36.2	81.2	Wilkesboro, NC	586,000	VI
Aug 31			VA (NC event?)	780,000	VI
1874 Feb 22	35.5	82.2	Stone Mt., NC		
Feb 10-Apr 17	35.7	82.2	McDowell Co., NC		V-VII
1875 Nov 12	36.0	83.9	Knoxville, TN		III
Nov 12	36.0	84.0	Knoxville, TN		III-IV
1876 Jan 23	35.5	82.2	Stone Mt., NC		
[Not listed]					
1876 Dec 21	37.0	81.1	Wytheville, VA		III
Dec 21	36.9	81.1	Wytheville, VA		
1877 Apr 26	35.2	83.4	Franklin, NC		III
Apr 26	35.2	83.4	Franklin, NC		III-IV
1877 May 25	36.0	83.9	Knoxville, TN		III
May 25	36.0	84.0	Knoxville, TN		III-IV

<u>DATE</u>	<u>NLAT</u>	<u>WLON</u>	<u>LOCALITY</u>	<u>FELT AREA</u> (km ²)	<u>Io</u>
1877 Oct 9	35.3	82.5	Hendersonville, NC	1,200	IV
Oct 8	35.0	82.7	Brevard-Hendersonville, NC		
1877 Nov 16	36.0	83.9	Knoxville, TN	3,200	IV
Nov 16	35.5	84.0	E TN	13,000	V
1878 Nov 23	35.1	84.0	Murphy, NC		III
Nov 23	35.0	84.0	Murphy, NC		III-IV
1880 Jan 28	35.5	82.2	Stone Mt., NC		IV
Jan 28, 29, Feb 10	35.7	82.1	Bald Mt. McDowell Co., NC		II-III
1882 Oct 15	35.1	84.0	Murphy, NC		III
Oct 15	35.1	84.0	Murphy, NC		III-IV
1884 Jan	35.5	82.2	Stone Mt., NC		
Jan	35.6	82.0	McDowell Co., NC		
1884 Apr 30	35.2	84.2	Ogreeta, NC		II
Apr 30	35.1	84.0	Ogreeta, Cherokee Co., NC		
1884 Summer	35.7	82.5	Elk Mt., NC		IV
Summer	35.7	82.5	Elk Mt., NC		
1884 Aug 25	36.0	83.9	Knoxville, TN		IV
Aug 24	36.0	84.0	Knoxville, TN		III-IV
1885 Feb 2	37.0	81.1	Wytheville, VA		IV
Feb 2	36.9	81.1	Wytheville, VA		IV
1885 Aug 13	36.1	81.7	Blowing Rock, NC	500	IV
Aug 6	36.2	81.6	Watauga Co, NC		IV-V
1886 Sep 25	37.0	81.1	Wytheville, VA		III
Sep 24	36.9	81.1	Wytheville, VA		
1888 Mar 17	36.3	82.5	Jonesboro, TN		III
Mar 17	36.4	82.5	Jonesboro, TN		
1889 Sep 28	35.1	84.6	Parksville, TN		III
Sep 28	35.2	84.5	Parksville, TN		III-IV
1892 Dec 2	35.0	85.3	Chattanooga, TN	1,900	V
[Not Listed]					
1897 May 3	37.1	80.6	Radford, VA	47,000	VI
May 3	37.1	80.7	Pulaski, VA	75,000	VI
1897 May 31	37.3	80.7	Pearisburg, VA	725,000	VIII
May 31	37.3	80.7	Giles Co, VA	725,000	VIII
1897 Jun 29	37.3	80.7	Pearisburg, VA	12,000	V
Jun 28	37.3	79.9	Roanoke, VA	25,000	V
1897 Sep 3	37.3	80.7	Pearisburg, VA	2,000	IV
Sep 3 & 4	37.3	80.7	Pearisburg, VA		IV(?)
1897 Oct 22	37.3	80.0	Salem, VA	36,000	V
Oct 21	36.9	81.1	Wytheville, VA	60,000	V
1898 Feb 5	37.1	80.7	Dublin, VA	50,000	VI
Feb 5	37.0	81.0	Pulaski-Wytheville, VA	88,000	VI
1898 Nov 25	37.1	80.6	East Radford, VA	92,000	V
Nov 25	37	81	Pulaski-Wytheville, VA	168,000	V
1899 Feb 13	37.1	81.5	Tazewell, VA	115,000	V
Feb 13	37	81	Pulaski-Wytheville, VA	298,000	V
1902 May 18	37.3	80.7	Pearisburg, VA		V
May 17	37.3	80.7	Pearisburg, VA		V
1902 May 29	35.0	85.3	Chattanooga, TN		IV
May 29	35.1	85.3	Chattanooga, TN		V
1902 Oct 18	35.3	85.7	Tracy City, TN	5,300	V
Oct 18	35.0	85.3	SE TN - NW GA	3,900	V

<u>DATE</u>	<u>NLAT</u>	<u>WLON</u>	<u>LOCALITY</u>	<u>FELT AREA</u> (km ²)	<u>Io</u>
1904 Mar 5	35.8	84.0	Maryville, TN	2,500	IV
Mar 4	35.7	83.5	Maryville-Sevierville, TN	13,000	V
1905 Apr 29	37.3	79.5	Bedford, VA		III
Apr 29	37.4	79.6	Bedford City, VA		III
1909 Oct 8	34.8	85.0	Dalton, GA	900	III
Oct 8	35	85	NW GA	2,100	IV-V
1911 Apr 22	35.3	82.5	Hendersonville, NC	3,900	IV
Apr 20	35.2	82.7	NC-SC Border	1,600	V
1913 Mar 13	34.5	85.0	Calhoun, GA		III
Mar 13	34.5	85.0	Calhoun-Gordon Cos., GA		IV
1913 Mar 28	36.0	83.9	Knoxville, TN	4,000	VI
Mar 28	36.2	83.7	E TN	7,000	VII
1913 Apr 17	35.5	84.4	Madisonville, TN	6,500	V
Apr 17	35.3	84.2	E TN	9,100	V
1913 May 2	35.5	84.4	Madisonville, TN		III
May 2	35.5	84.4	Madisonville, TN		III-IV
1913 Aug 3	36.0	83.9	Knoxville, TN		III
Aug 3	36.0	84.0	Knoxville, TN		IV
1914 Jan 24	35.6	84.5	Sweetwater, TN	5,900	IV
Jan 23	35.6	84.5	Sweetwater, TN		IV-V
1915 Jan 14	36.6	82.2	Bristol, TN		IV
Jan 14	36.6	82.2	Bristol, TN		III-IV
1915 Oct 29	35.6	82.6	Asheville, NC	700	V
Oct 29	35.8	82.7	Marshall, NC	3,100	V
1916 Feb 21	35.5	83.0	Waynesville, NC	458,000	VII
Feb 21	35.5	82.5	Skyland, NC	518,000	VII
1916 Aug 26	35.9	81.2	Taylorsville, NC	7,100	V
Aug 26	36	81	W NC	9,800	V
1916 Oct 18	33.5	86.7	Irondale, AL	358,000	VII
Oct 18	33.5	86.2	Birmingham, AL	440,000	VII
1916 Oct 22	33.5	86.8	Birmingham, AL		III
Oct 22	33.5	86.2	Birmingham, AL		
1916 Nov 4	33.5	86.8	Birmingham, AL		V
Nov 4	33.5	86.2	Birmingham, AL		III
1917 Jan 2	36.1	83.7	Mascot, TN		IV
Jan 2	36.1	83.9	McMillan, TN		
1917 Jan 25	36.1	83.5	Jefferson City, TN		III
Jan 25	36.1	83.5	Jefferson City-Talbott, TN		III
1917 Mar 5	36.0	83.9	Knoxville, TN		III
Mar 4	36.0	84.0	Knoxville, TN		III
1917 Mar 27	36.1	83.5	Jefferson City, TN		V
Mar 25-27	36.1	83.5	Talbott-Jefferson City, TN		III-IV
1917 Apr 19	37.0	81.1	(Wytheville), VA		III
Apr 19	37	82	SW VA		
1917 Jun 21	36.0	83.9	Knoxville, TN		IV
Jun 21	36	83	E TN		IV
1918 Jan 17	36.0	83.9	Knoxville, TN	2,300	IV
Jan 16	36	84	Knoxville, TN		IV-V
1918 Jun 22	35.8	84.3	Lenoir City, TN	5,800	IV
Jun 21	36.1	84.1	Lenoir, TN	7,800	V
1920 Dec 24	35.8	84.7	Glen Alice, TN	2,600	V
Dec 24	36.0	85.0	E TN		V

<u>DATE</u>	<u>NLAT</u>	<u>WLON</u>	<u>LOCALITY</u>	<u>FELT AREA</u> <u>(km2)</u>	<u>Io</u>
1921 Jul 15	36.7	82.3	Mendota, VA		VI
Jul 15	36.6	82.3	Mendota, VA		VI
1921 Dec 15	35.9	84.5	Kingston, TN	2,700	V
Dec 15	35.7	84.7	SE TN		IV-V
1922 Mar 30	36.6	82.5	Arcadia, TN		IV
(Mar 29)	(35.5	86.7)	Farmington, TN		(IV-V)
1923 Oct 18	35.3	82.5	Hendersonville, NC		IV
Oct 18	35.6	82.5	Hendersonville, NC		
1924 Oct 20	34.9	82.7	Pickens, SC	87,000	VI
Oct 20	35.0	82.6	Pickens Co., SC	145,000	V
1924 Nov 13	36.6	82.2	Bristol, VA		IV
Nov 13	36.6	82.2	Bristol, VA-TN		IV-V
1924 Dec 25	37.3	79.9	Roanoke, VA		V
Dec 25	37.3	79.9	Roanoke, VA		V
1926 Jul 8	35.9	82.1	Spruce Pine, NC		VI
Jul 8	35.9	82.1	Mitchell Co., NC		VI-VII
1927 Jun 16	34.7	86.0	Scottsboro, AL	3,000	V
Jun 16	34.7	86.0	Madison-Jackson Cos., AL	6,500	V
1927 Jul 20	36.0	83.9	Knoxville, TN		V
Jul 20	36	84	Knoxville, TN		
1927 Oct 8	35.0	85.3	Chattanooga, TN	2,000	V
Oct 8	35.0	85.3	Chattanooga, TN		V
1928 Nov 3	35.9	82.8	Hot Springs, NC	187,000	VII
Nov 2	36.0	82.6	Asheville, NC - Newport, TN	104,000	VI-VII
1928 Nov 20	35.9	82.8	Hot Springs, NC	4,700	IV
Nov 19	35.8	82.3	Asheville, NC	25,900	
1930 Aug 30	35.8	84.3	Lenoir City, TN	4,000	V
Aug 30	35.9	84.4	E TN		V
1930 Oct 16	36.0	83.9	Knoxville, TN		V
Oct 16	36.0	84.0	Knoxville, TN		III-IV
1931 May 5	33.5	86.8	Birmingham, AL	33,000	V
May 5	33.7	86.6	Cullman, AL	16,800	V-VI
1935 Jan 1	35.2	83.7	Topton, NC	15,000	VI
Jan 1	35.1	83.6	NC-GA Border	18,100	V
1936 Jan 1	34.9	84.3	Blue Ridge, GA	4,800	III
Jan 1	35.0	84.2	NC-GA Border		III
1938 Mar 31	35.5	84.0	Tapoco, NC	14,500	V
Mar 31	35.5	83.5	NC-TN Border		III-IV
1939 May 5	33.7	85.8	Anniston, AL	2,000	V
May 4	33.7	85.8	Anniston, AL		V
1939 Jun 24	34.7	86.6	Huntsville, AL	6,400	IV
Jun 24	34.7	86.7	Huntsville, AL	1,300	IV
1940 Oct 19	35.0	85.1	Ryall Springs, TN	3,200	V
Oct 19	35.1	85.3	Chattanooga, TN	1,300	IV
1940 Dec 25	35.9	82.8	Hot Springs, NC	17,000	V
Dec 25	35.5	82.5	Asheville, NC		
1941 Mar 4	35.9	83.9	Rockford, TN		IV
Mar 4	36.0	84.0	Knoxville, TN		III
1941 May 10	35.6	82.6	Asheville, NC		IV
May 10	35.5	82.5	Asheville, NC		III
1941 Sep 8	35.0	85.3	Chattanooga, TN	1,100	V
Sep 8	35.1	85.3	Chattanooga, TN	260	III-IV

<u>DATE</u>	<u>NLAT</u>	<u>WLON</u>	<u>LOCALITY</u>	<u>FELT AREA</u> (km ²)	<u>Io</u>
1945 Jun 14	35.2	84.9	Cleveland, TN	8,100	V
Jun 13	35.2	84.9	Cleveland, TN	10,400	IV-V
1946 Apr 7	35.2	84.9	Cleveland, TN		IV
Apr 6	35.2	84.9	Cleveland, TN		III-IV
1947 Jun 6	36.0	83.9	Knoxville, TN		IV
Jun 6	36	84	Knoxville, TN		III
1947 Dec 28	35.0	85.1	Ryall Springs, TN	3,000	IV
Dec 27	35.0	85.3	TN-GA Border	780	IV
1948 Feb 10	36.4	84.0	Wells Springs, TN	1,700	VI
Feb 9	36.4	84.1	Lafollette, TN		V-VI
1949 Sep 17	36.8	83.0	Pennington Gap, VA	1,700	IV
Sep 16 & 17	36.8	83.0	Lee Co., VA		IV-V
1950 Jun 19	35.5	84.0	Tapoco, NC	9,700	V
Jun 18	35.7	84.0	Alcoa, TN		IV
1952 Feb 6	33.5	86.8	Birmingham, AL		IV
Feb 6	33.5	86.2	Birmingham, AL	260	IV
1952 Jun 11	36.3	82.3	Johnston City, TN		V
Jun 11	36.4	82.4	Johnston City, TN		
1953 Nov 10	36.0	83.9	Knoxville, TN	700	IV
Nov 10	36.0	84.0	Knoxville, TN		IV
1953 Dec 5	36.0	83.9	Knoxville, TN	660	IV
Dec 5	36.0	84.0	Knoxville, TN		
1954 Jan 1	37.2	83.2	Hazard, KY	400	IV
[Not Listed]					
1954 Jan 2	36.6	83.7	Middlesboro, KY	34,000	VI
Jan 1	36.6	83.7	Middlesboro, KY		VI
1954 Jan 14	36.0	83.9	Knoxville, TN		IV
[Not Listed]					
1954 Jan 23	35.3	84.5	Etowah, TN	500	IV
Jan 22	35.3	84.4	Athens-Etowah, TN		V
1955 Jan 6	36.6	82.2	Bristol, TN		IV
Jan 6	36.6	82.2	Bristol, TN-VA	4,700	IV
1955 Jan 12	35.8	84.0	Maryville, TN	300	IV
Jan 12	36.0	84.0	Blount-Knox Cos., TN		IV
1955 Jan 25	35.9	83.9	Rockford, TN	1,800	V
Jan 25	36.0	84.0	Knoxville, TN		IV
1955 Sep 28	36.6	81.3	Piney Creek, NC	3,500	VI
Sep 28	36.6	81.3	NC-VA Border	4,400	IV-V
1956 Sep 7	36.2	83.8	Maynardville, TN	30,000	VI
Sep 7	35.5	84.0	E TN	21,500	VI
1957 Jan 25	36.6	83.7	Middlesboro, KY		IV
Jan 25	36.6	83.7	Middlesboro, KY		IV
1957 Apr 23	33.5	86.8	Birmingham, AL	53,000	VI
Apr 23	34.5	86.8	N AL	29,800	VI
1957 May 13	35.8	82.0	Sevier, NC	20,500	VI
May 13	35.8	82.1	Marion, W NC	21,000	VI
1957 Jun 23	35.9	84.1	Concord, TN	1,500	V
Jun 23	36.5	84.5	E TN		V
1957 Jul 2	35.6	82.6	Asheville, NC	22,000	VI
Jul 2	35.6	82.7	Asheville, NC	3,100	VI
1957 Nov 7	36.0	84.0	Powell, TN		III
[Not Listed]					

<u>DATE</u>	<u>NLAT</u>	<u>WLON</u>	<u>LOCALITY</u>	<u>FELT AREA</u> (km ²)	<u>Io</u>
1957 Nov 24	35.8	83.1	Hartford, TN	12,000	VI
Nov 24	35.5	83.5	NC-TN Border	10,600	VI
1958 May 16	35.6	82.6	Asheville, NC		IV
May 16	35.5	82.5	Asheville, NC		IV
1959 Apr 23	37.3	80.6	Eggleston, VA	4,400	VI
Apr 23	37.5	80.5	VA-WV Border	7,800	VI
1959 Jun 13	35.4	84.3	Tellico Plains, TN	3,200	IV
Jun 12	35.4	84.3	Tellico Plains, TN	2,300	IV
1959 Jul 7	37.3	80.7	Pearisburg, VA		IV
Jul 7	37.4	80.7	Giles Co., VA	1,300	IV
1959 Aug 12	34.8	86.6	Meridianville, AL	10,000	VI
Aug 12	35.0	87.0	AL-TN Border	7,300	VI
1959 Aug 21	37.3	80.7	Pearisburg, VA	600	IV
Aug 21	37.4	80.7	Giles Co., VA	1,600	IV
1960 Jan 3	35.9	82.1	Spruce Pine, NC	1,500	IV
Jan 3	36	82	Avery, McDowell, Mitchell Cos., NC		
1960 Feb 9	35.4	82.4	Edneyville, NC		V
Feb 7-9	35.4	82.5	Henderson Co., NC		
1960 Apr 15	35.8	84.0	Alcoa, TN	3,900	V
Apr 15	35.8	84.0	E TN	3,400	V
1963 Jan 17	37.3	80.1	Salem, VA	2,600	V
Jan 17	37.7	79.9	Salem, VA	9,900	IV
1963 Oct 28	36.6	81.0	Ennice, NC	5,900	V
Oct 28	36.7	81.0	Galax, VA-Laurel Springs, NC	3,400	V
1964 Jan 20	35.9	82.3	Pensacola, NC	600	IV
Jan 20	35.8	82.2	Cane River, NC		IV
1964 Feb 18	34.5	85.5	Menlo, GA	2,100	V
Feb 18	34.8	85.5	GA-AL Border		V/4.4
1964 Jul 28	36.0	84.0	Inskip, TN		III
Jul 28	36.0	84.0	Knoxville, TN		
1964 Oct 13	36.0	83.9	Knoxville, TN		III
Oct 13	36.0	84.0	Knoxville, TN		
1966 Aug 24	35.8	84.0	Alcoa, TN	800	IV
Aug 24	36.0	84.0	Knoxville, TN		IV
1968 Mar 8	37.3	80.8	Narrows, VA	10,000	V
Mar 8	37.3	80.8	Narrows, VA	8,300	IV/4.1
1969 Jul 13	36.0	83.9	Knoxville, TN	55,000	VI
Jul 13	36.1	83.7	Knoxville-Jefferson City, TN	51,900	V/3.5
1969 Jul 24	36.0	83.9	Knoxville, TN		III
Jul 24	36.0	84.0	Knoxville, TN		III
1969 Nov 20	37.4	80.9	Elgood, WV	322,000	VI
Nov 20	37.4	81.0	Elgood, WV	324,000	VI/4.6
1969 Dec 13	35.2	83.1	Glenville, NC	11,000	V
Dec 13	35.1	83.0	SW NC		V
1970 Aug 11	38.4	81.8	St. Albans, WV	3,000	IV
Aug 11	38.4	82.3	Charleston-Hamlin- Eksdale, WV		IV
1970 Sep 10	36.1	81.7	Blowing Rock, NC	14,000	V
Sep 10	36.1	81.4	NW NC	4,600	V

<u>DATE</u>	<u>NLAT</u>	<u>WLON</u>	<u>LOCALITY</u>	<u>FELT AREA</u> (km ²)	<u>Io</u>
1971 Jul 13	36.0	84.3	Oak Ridge, TN	5,800	IV
Jul 12			E TN		IV
1971 Oct 9	35.7	83.5	Gatlinburg, TN	8,500	V
Oct 9	35.9	83.5	E TN		V/3.4
1973 Oct 30	35.8	84.0	Alcoa, TN	6,300	V
Oct 30	35.8	84.0	Maryville, TN	2,100	V/3.4
1973 Nov 30	35.8	84.0	Alcoa, TN	98,000	VI
Nov 30	35.8	84.0	Maryville, TN	64,800	VI/4.6
1974 May 30	37.3	80.6	Pembroke, VA	21,000	V
May 30	37.4	80.4	Giles Co., VA		(3.8)

Locations

There are two events for which Bollinger (1975) does not specify coordinates; one is the August 31, 1861 event listed in this study as having originated near Wilkesboro, NC. Thirty-one events have locations that differ by more than 30 km and half of those by 50 km or more. Several of the latter are the result of Birmingham, AL being listed by Bollinger at 33.5° - 86.2° ; the longitude is incorrect for that locality.

Intensity

Intensity assignments for the two catalogs differ frequently by one or one-half unit. (Bollinger uses intermediate intensities, e.g., VI-VII. When evaluating intensities for relatively large numbers of events, it becomes clear that, in effect, not all assignments for a given intensity are equal. Some can be categorized as "upper level" or "lower level." However, standard practice does not recognize "half" intensities; therefore they were not used in this study.) Three events where differences in assignment of I_0 =VII exist between the two studies are listed below.

<u>Date</u>	<u>This Study</u>	<u>Bollinger (1975)</u>
1852 Apr 29	VII	VI
1874 Feb 22	None Assigned	V-VII
(Feb 10-Apr 17)	(see Appendix B)	
1913 Mar 28	VI	VII

Felt Area

Differences in estimations of felt areas average 30 to 40%. This is one of the more subjective decisions that are made, especially for older events where there are virtually no "not felt" reports available to control the size of the felt area.

SUMMARY AND CONCLUSIONS

The catalog produced as the result of this study is the most completely documented compilation and analysis of the historical seismicity of the Southern Appalachian Seismic Zone available today. It provides adequate data with which to extend the instrumental record for seismic hazard analysis. The principal conclusions of this research are stated below.

1. Locations and intensities were interpreted for 166 earthquakes that were felt in and originated from the SASZ during the period 1776 to 1976.
2. Felt area maps are presented for 94 events.
3. A magnitude formula developed by Sibol and others (1986), which uses I_o and felt area to calculate m_b , gives the most reliable estimates yet of magnitudes for non-instrumental events in the SASZ.
4. For the first time, systematic estimates of focal depth are made for historical earthquakes.
5. Seismic activity in the SASZ favors the Valley and Ridge by more than 2-to-1 over the Blue Ridge Physiographic Province and shows excellent spatial correlation with instrumental epicenters.
6. Recurrence curves determined for both intensity and magnitude data yield b -values of 0.76 and 0.98, respectively.
7. Bollinger (1973) recognized an apparent 40-year cycle in the rate of seismic occurrences for the southeastern United States, that cycle is also present when SASZ historical seismicity is plotted by decades.

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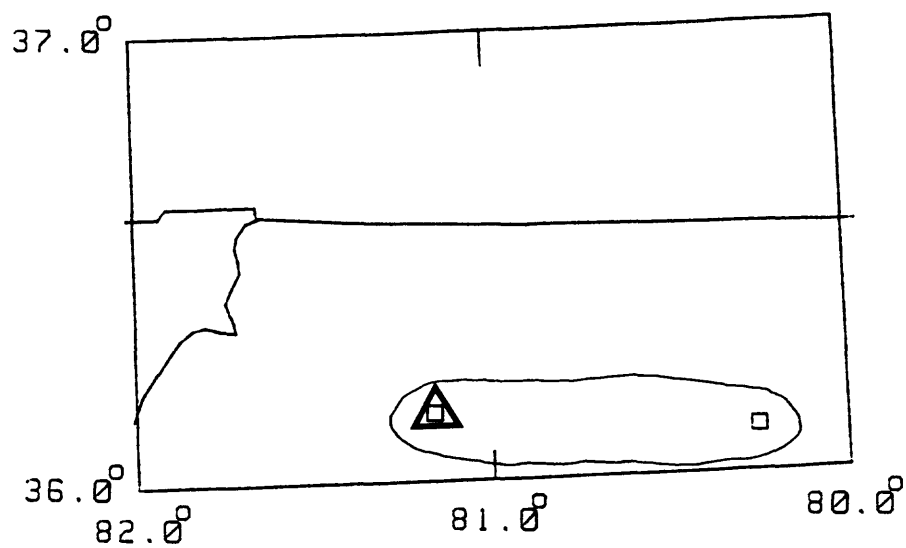
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Appendix A

Appendix B

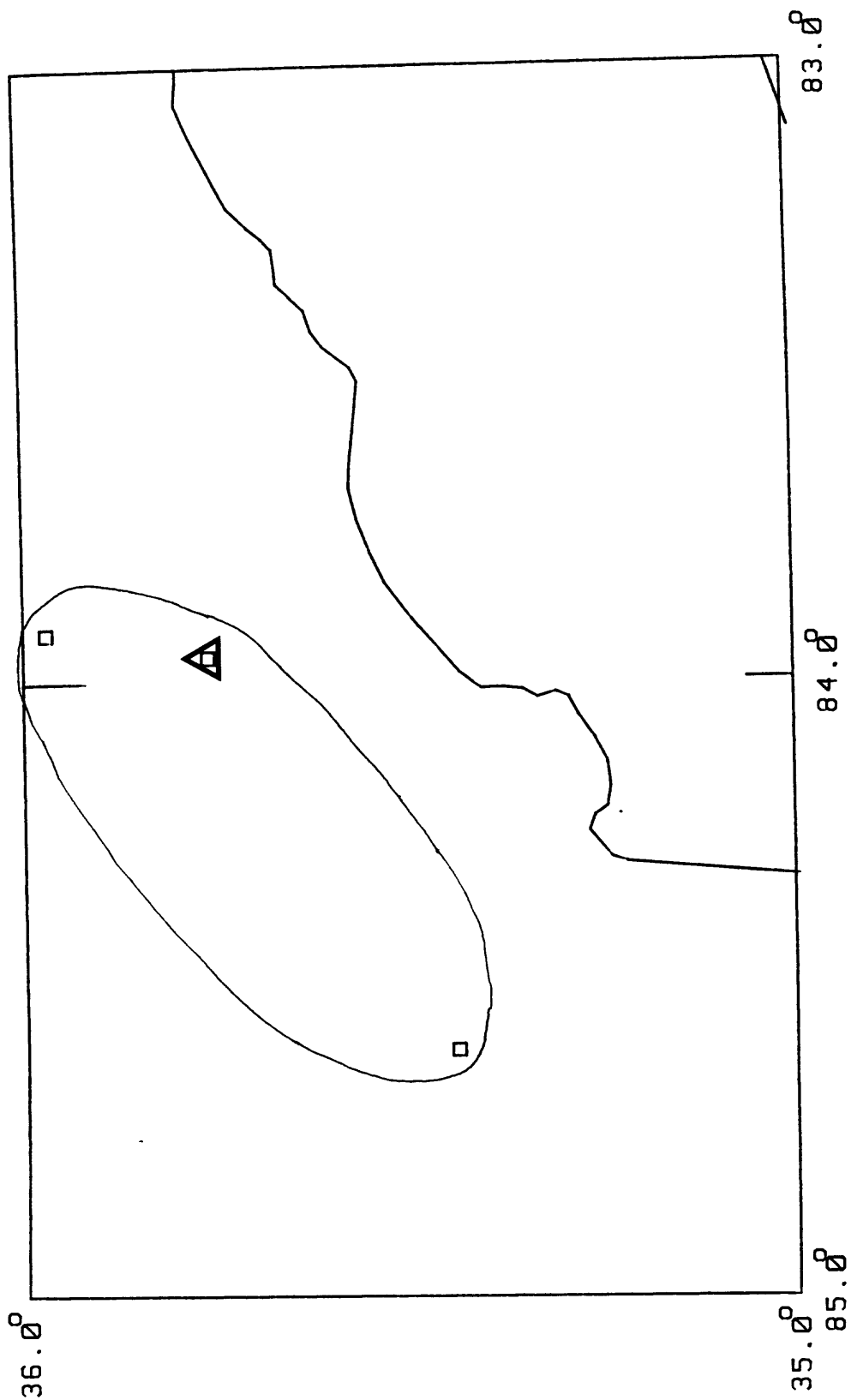
Final Technical Report:
"Historical Seismicity in the Southern
Appalachian Seismic Zone"

11 May 1827



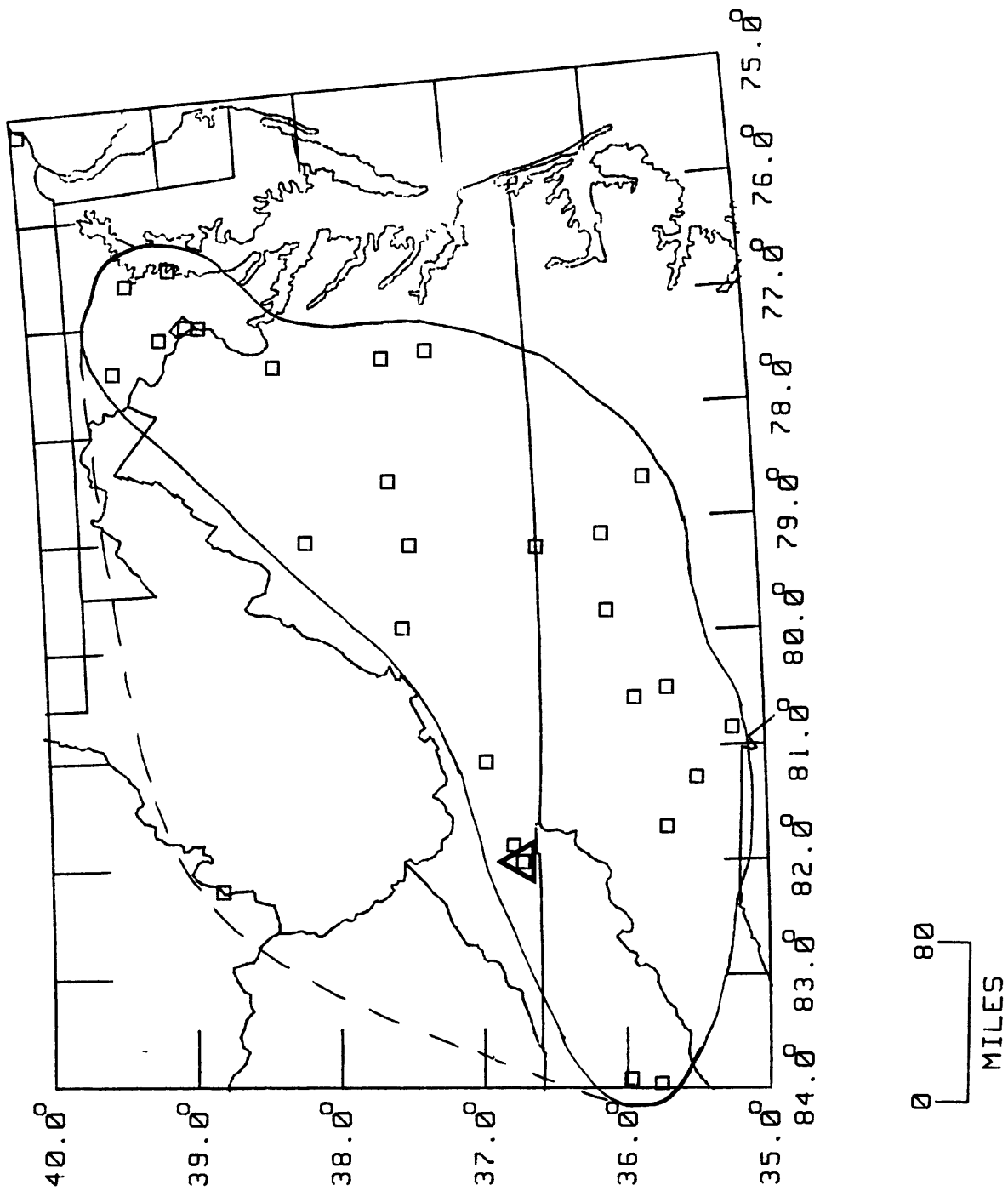
0 30
MILES

28 Nov 1844



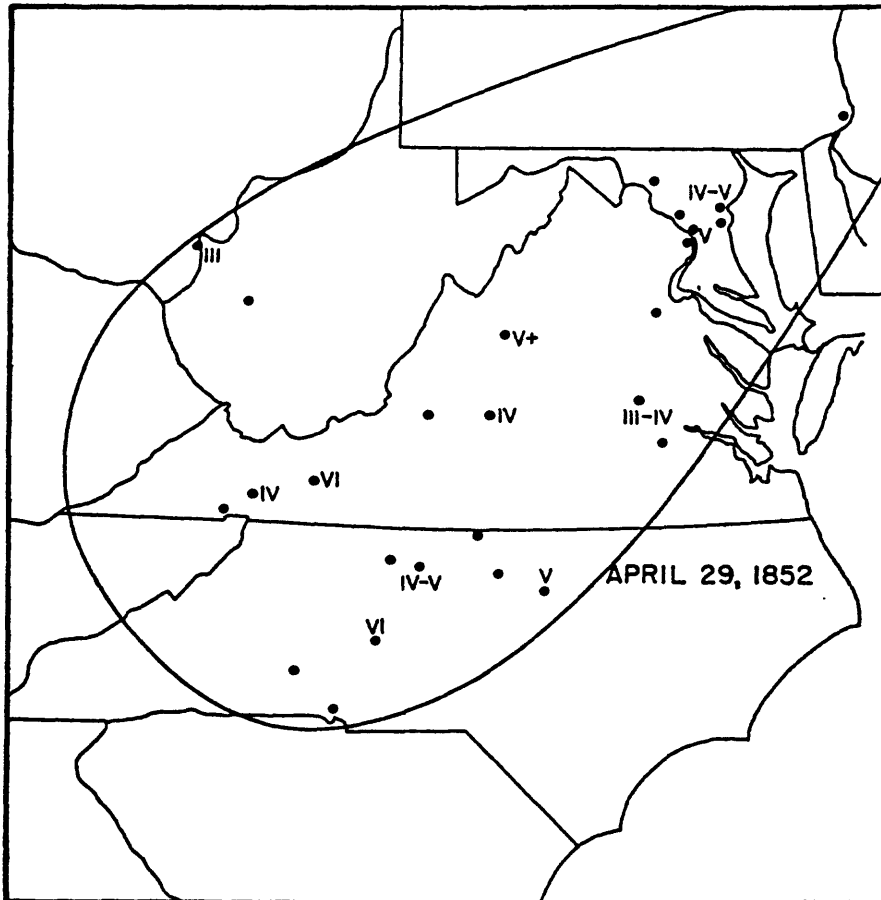
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MILES

29 Apr 1852

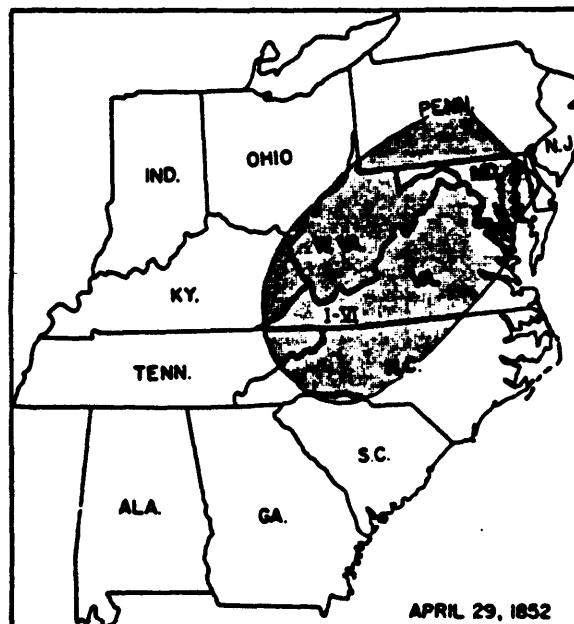


EARTHQUAKE OF APRIL 29, 1852, VIRGINIA, NORTH CAROLINA,
 TENNESSEE (THURSDAY, 1300 Hrs.), FELT AREA: 162,000 SQ. MI.,
 (187,000 SQ. MI., MACCARTHY, 1963; 150,000 SQ. MI., BOLLINGER, 1969)

Ref. : Hopper [210]



Ref. : Bollinger (1973)



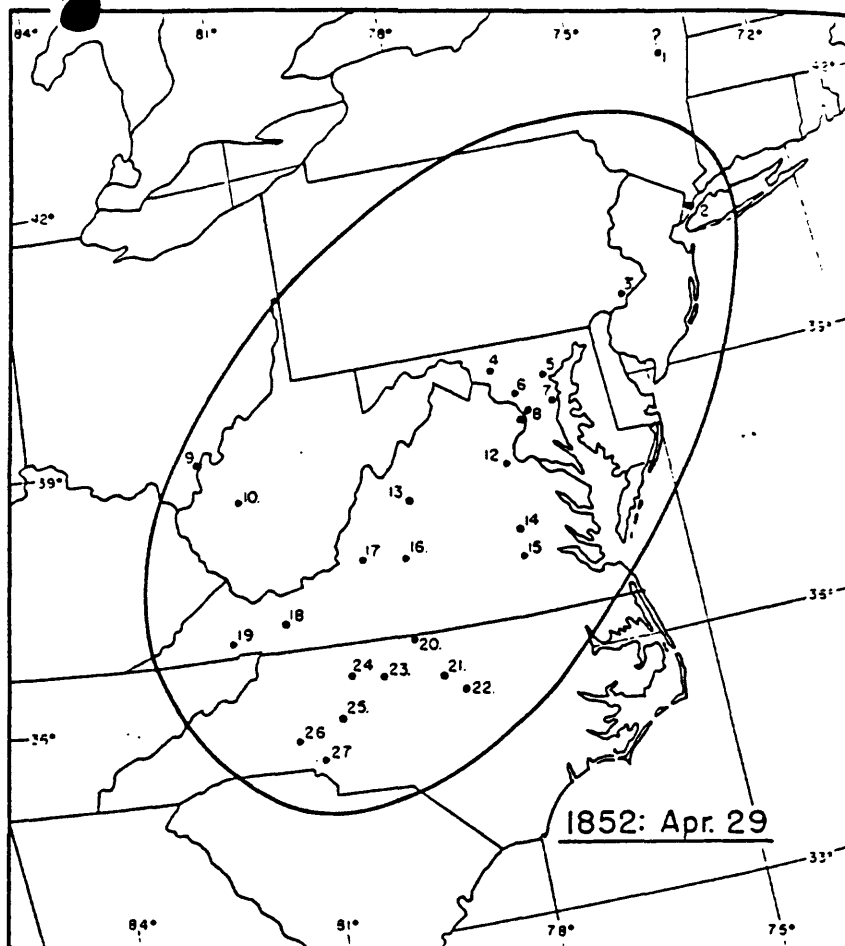
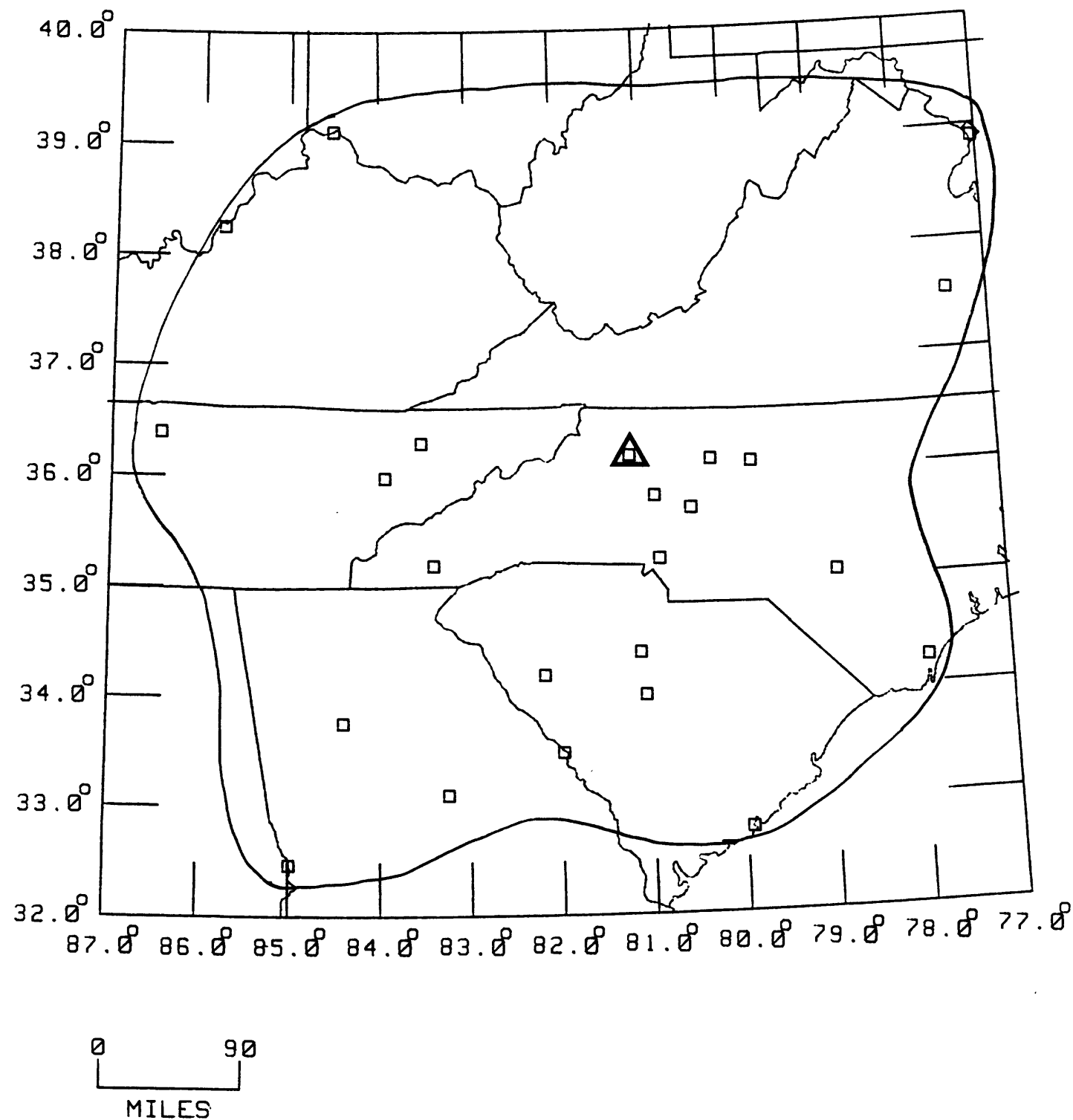


FIG. 2. April 29, 1852.

- | | |
|------------------------|---------------------|
| 1) Albany, N. Y. | 15) Petersburg |
| 2) New York City | 16) Lynchburg |
| 3) Philadelphia | 17) Fincastle, Va. |
| 4) Frederick, Md. | 18) Wytheville, Va. |
| 5) Baltimore | 19) Abingdon, Va. |
| 6) Rockville, Md. | 20) Milton, N. C. |
| 7) Annapolis | 21) Hillsboro |
| 8) Washington | 22) Raleigh |
| 9) Gallipolis, Ohio | 23) Greensboro |
| 10) Charleston, W. Va. | 24) Salem |
| 11) Alexandria, Va. | 25) Salisbury |
| 12) Fredericksburg | 26) Lincolnton |
| 13) Staunton, Va. | 27) Charlotte |
| 14) Richmond | |

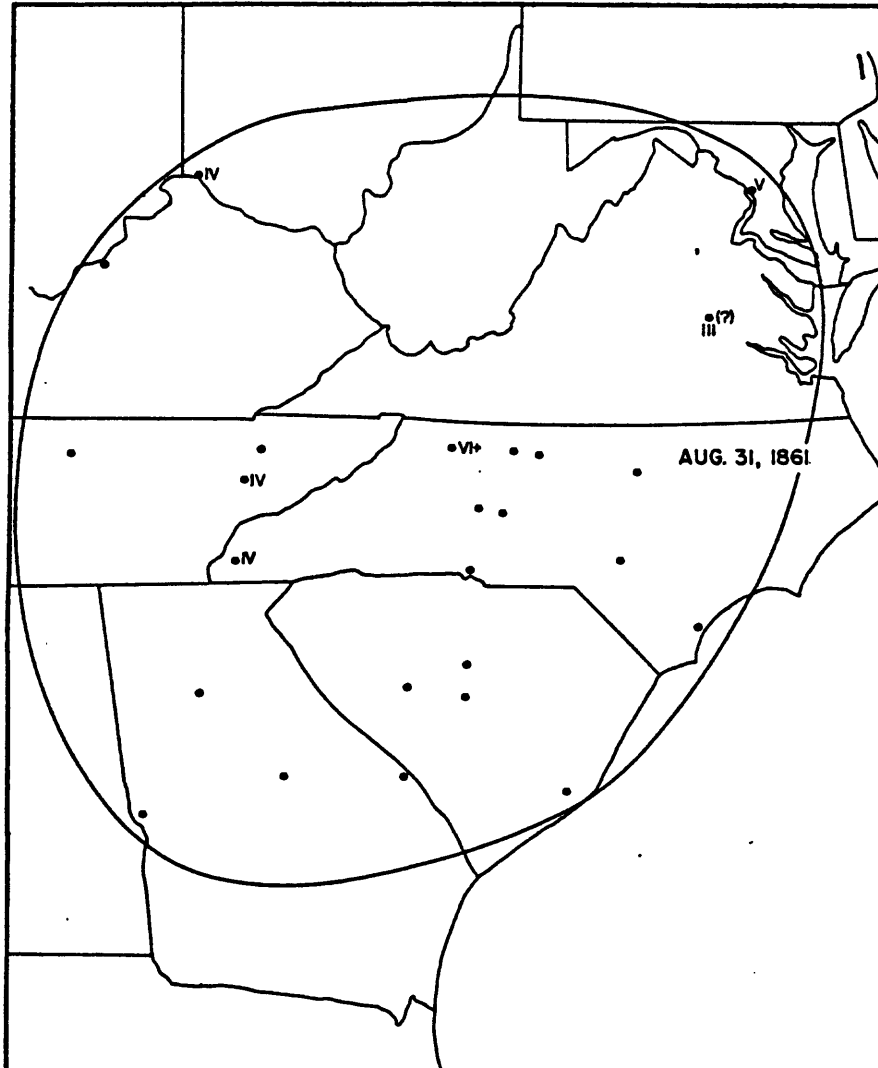
Ref. : MacCarthy [243]
187,000 sq. mi.

31 Aug 1861



EARTHQUAKE OF AUGUST 31, 1861,
VIRGINIA, (SATURDAY, 0522 Hrs.),
FELT AREA: 300,000 SQ. MI., (BOLLINGER, 1969)

Ref. : Hopper [210]



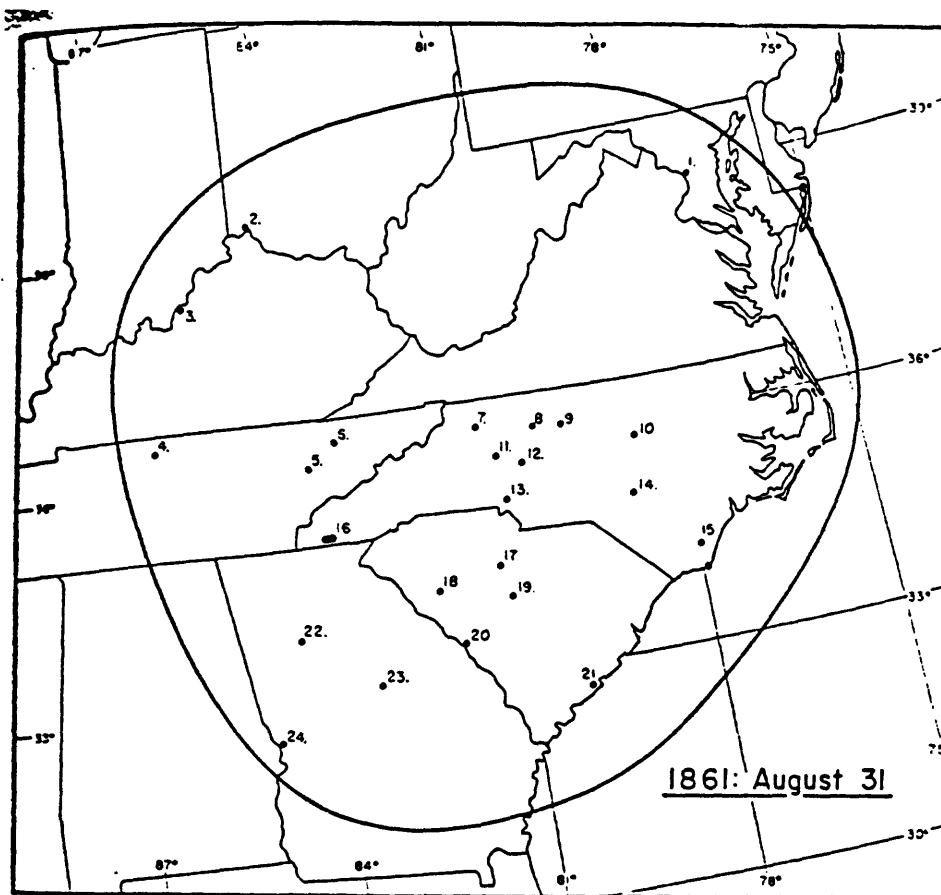


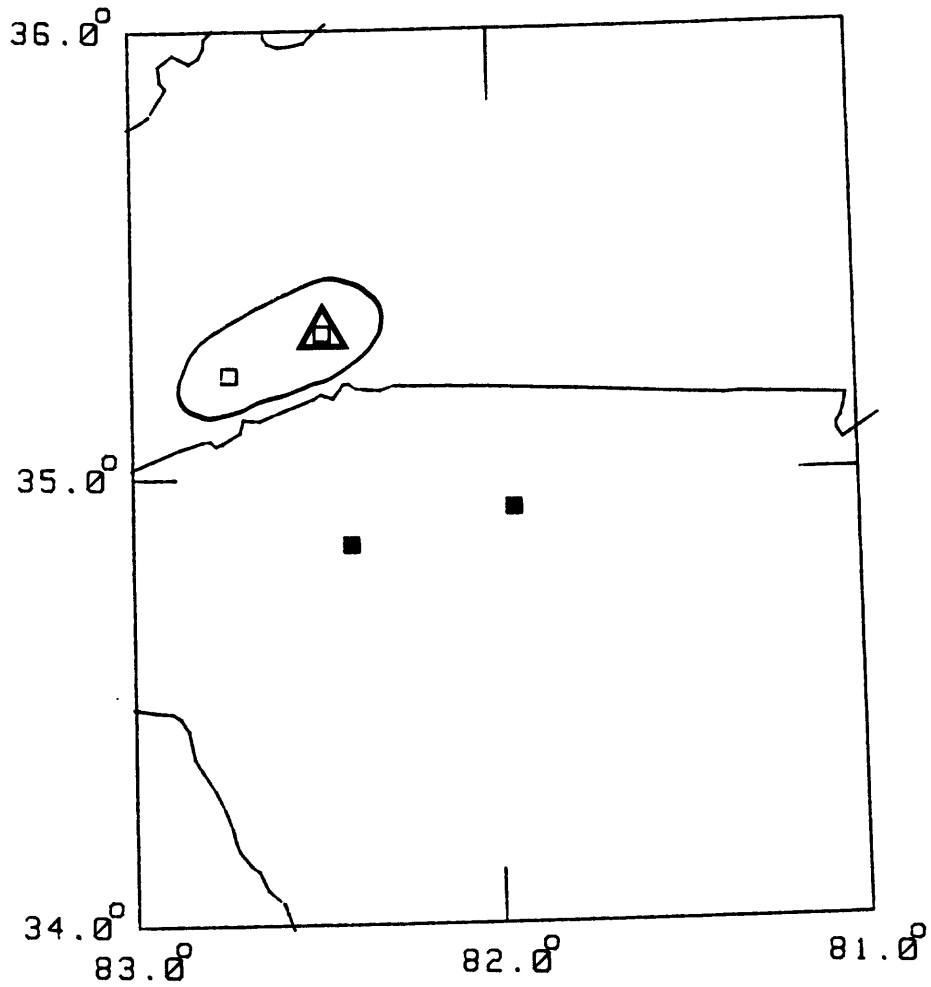
FIG. 3. August 31, 1961.

- | | |
|--------------------|-------------------------|
| 1) Washington | 13) Charlotte |
| 2) Cincinnati | 14) Fayetteville |
| 3) Louisville | 15) Wilmington |
| 4) Gallatin, Tenn. | 16) Nantahala Mountains |
| 5) Knoxville | 17) Winnsboro, S. C. |
| 6) Rutledge, Tenn. | 18) Greenwood |
| 7) Wilkesboro | 19) Columbia |
| 8) Winston-Salem | 20) Augusta |
| 9) Greensboro | 21) Charleston |
| 10) Raleigh | 22) Atlanta |
| 11) Statesville | 23) Milledgeville |
| 12) Salisbury | 24) Columbus |

Ref. : MacCarthy [243]

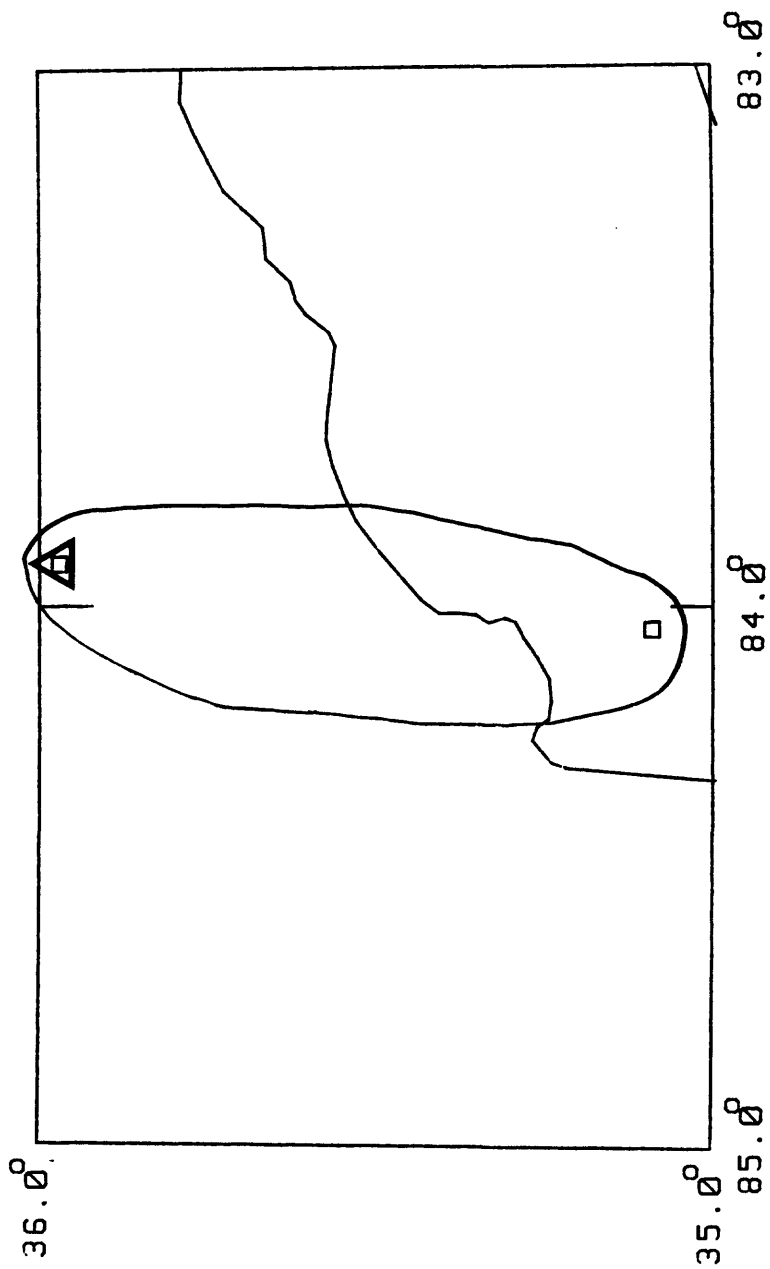
280,000 sq. mi.

9 Oct 1877

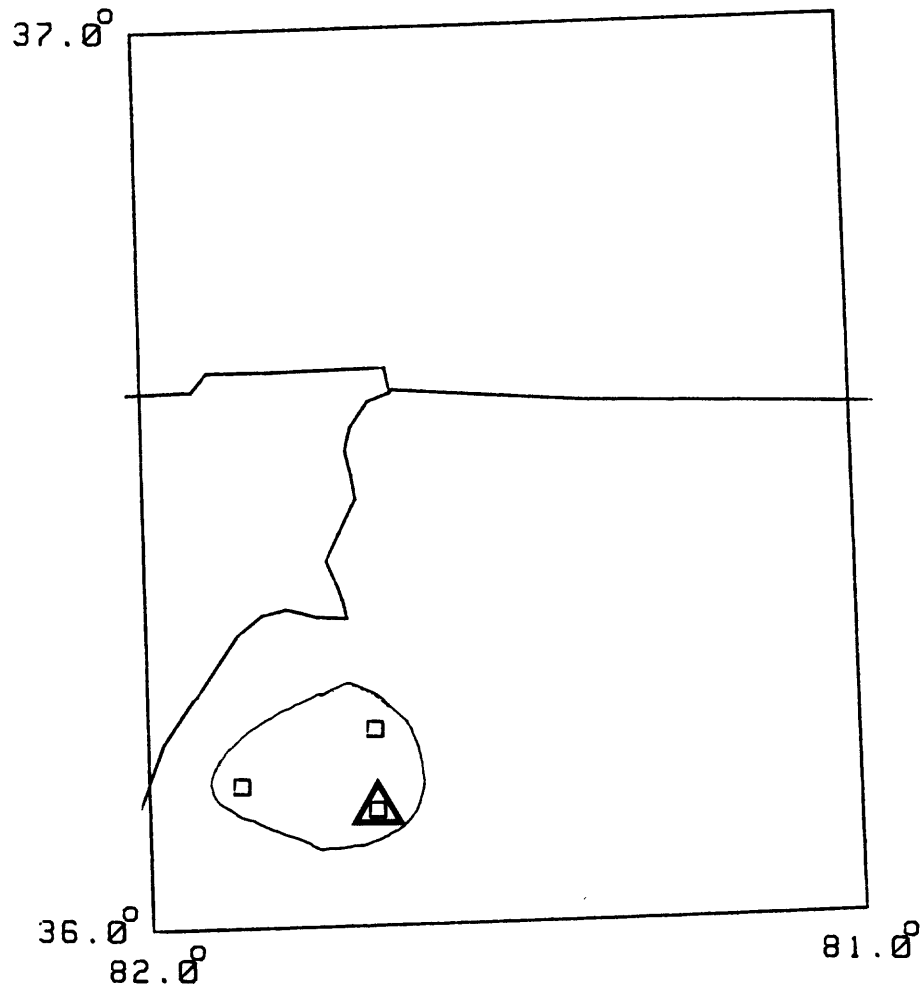


0 30
MILES

16 Nov 1877

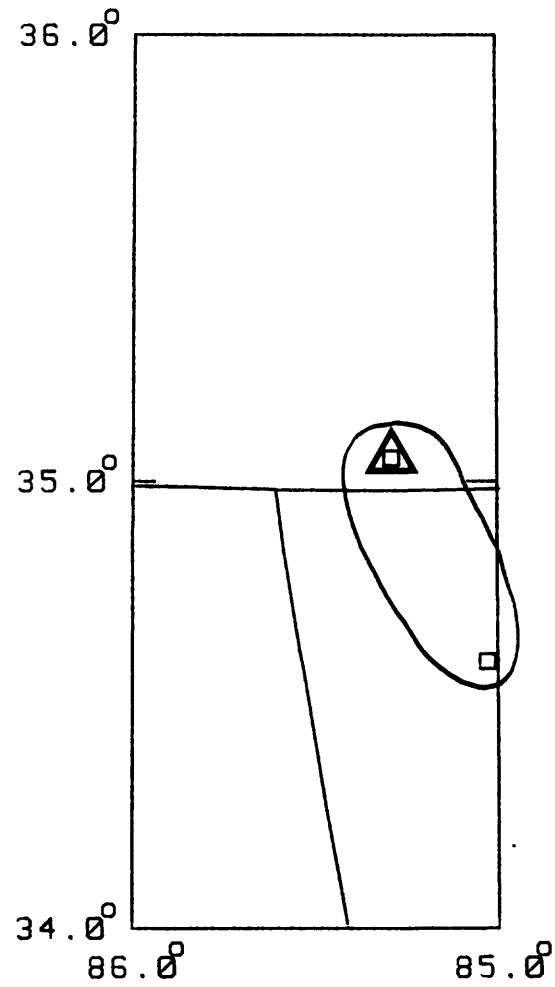


13 Aug 1885



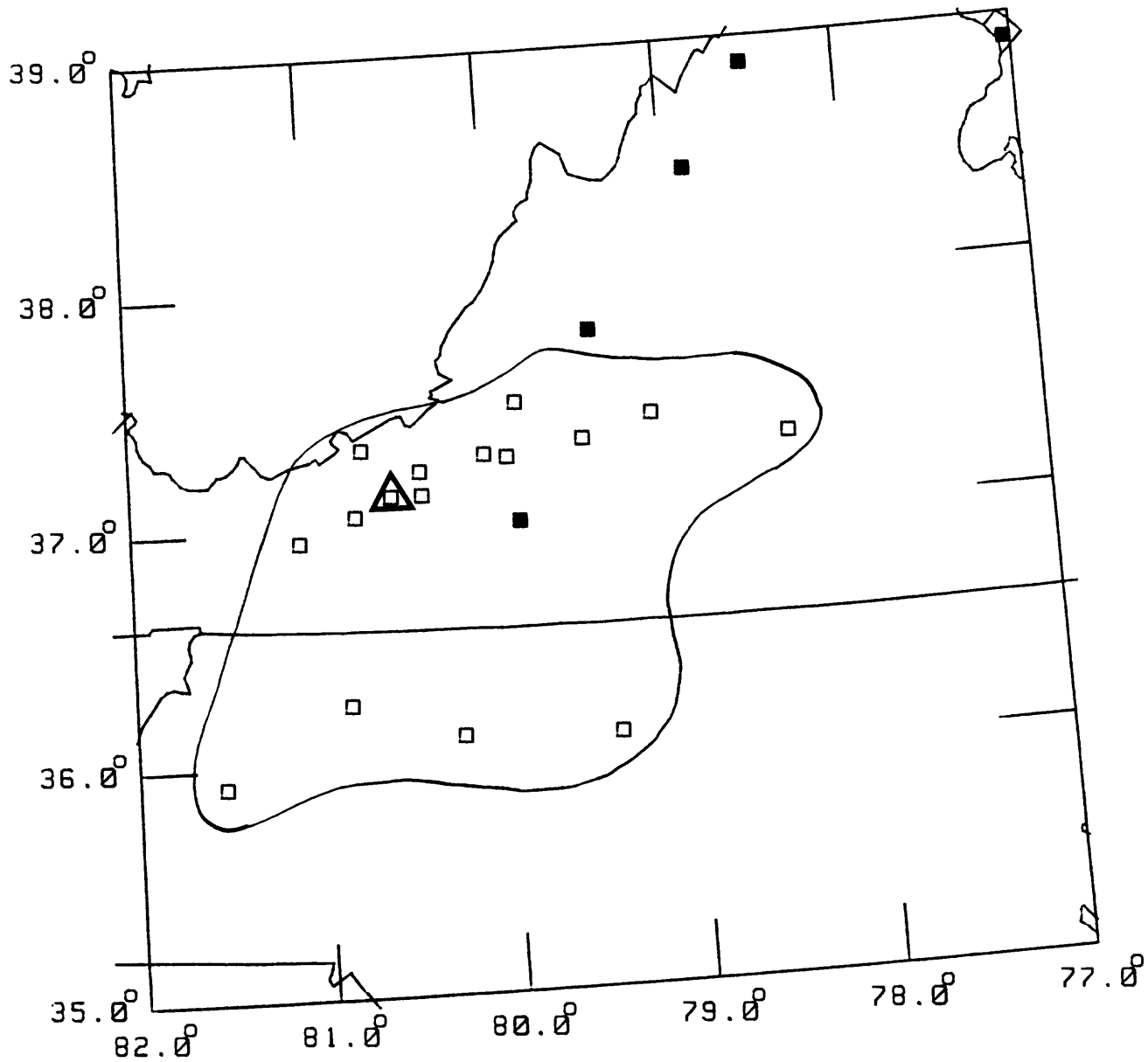
0 15
MILES

2 Dec 1892



0 30
MILES

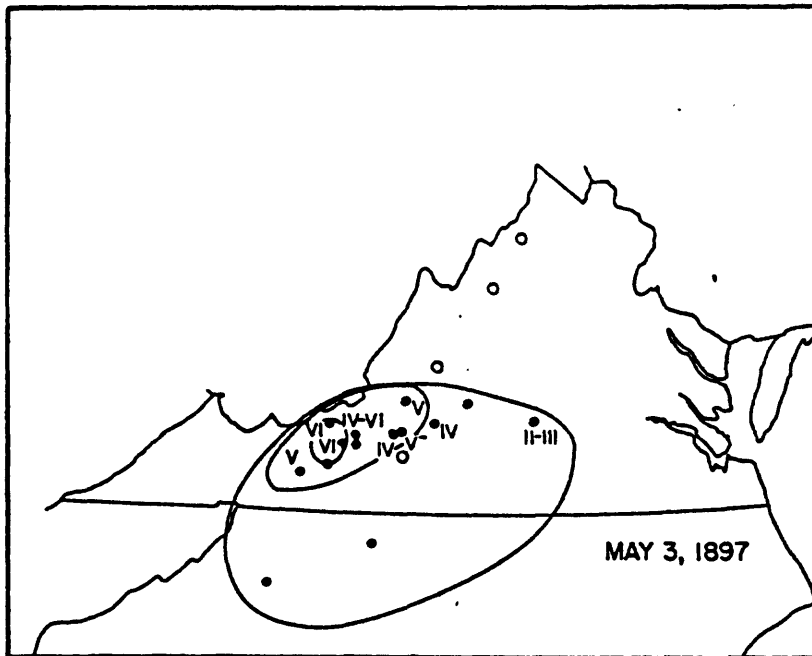
3 May 1897

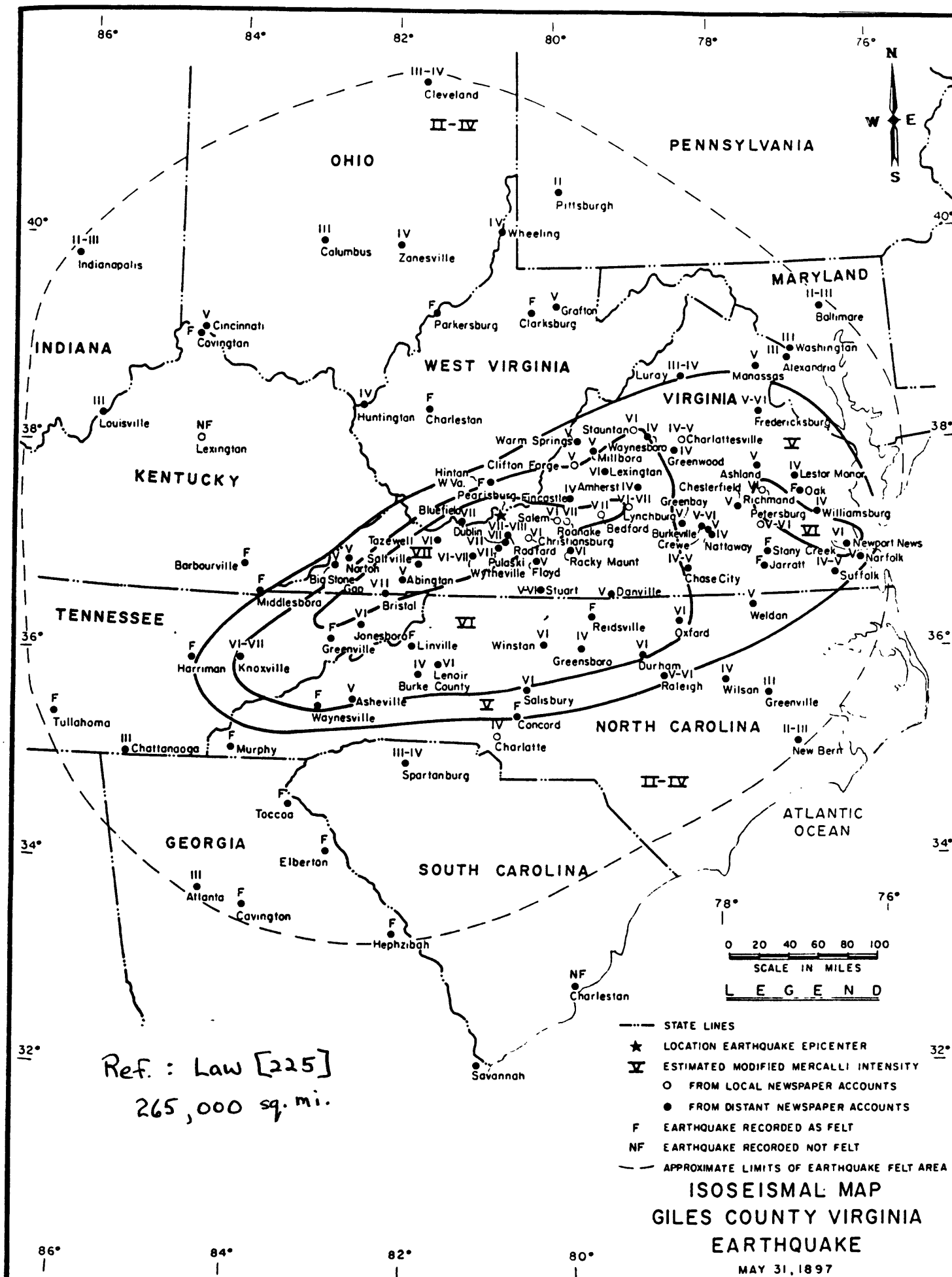


A horizontal line segment with a vertical tick mark at the left end labeled '0' and another vertical tick mark at the right end labeled '50'. Below the line segment, the word 'MILES' is written in capital letters.

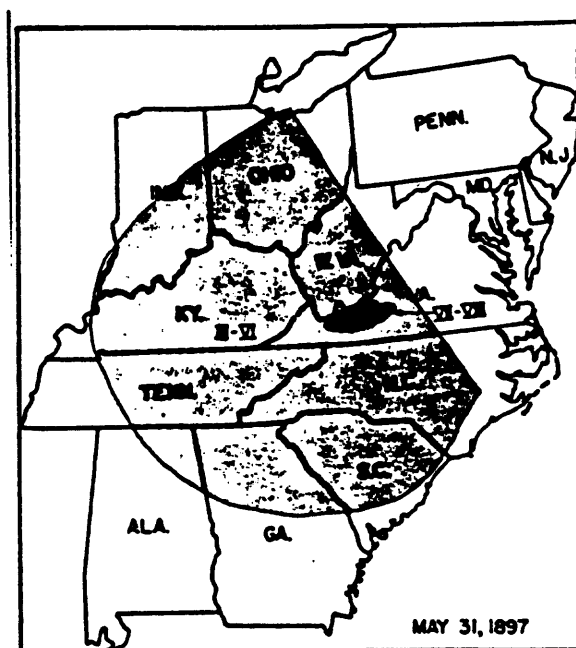
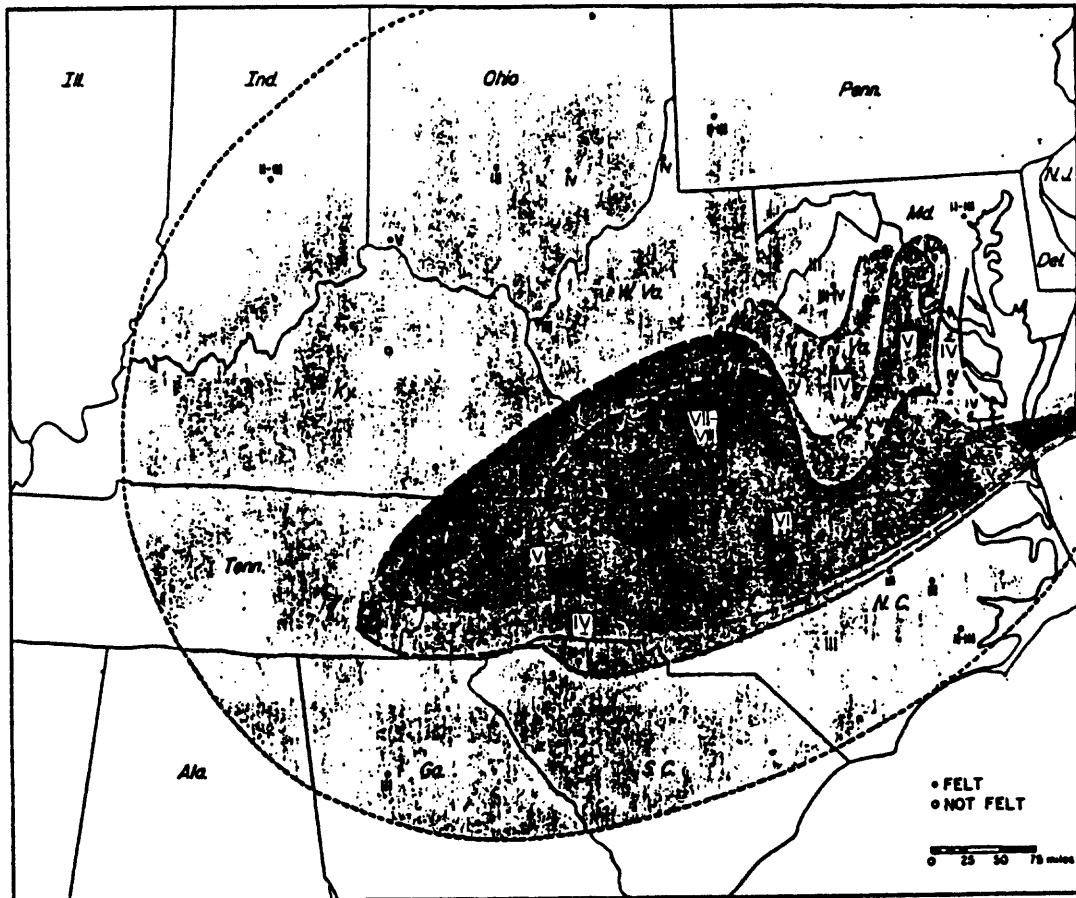
EARTHQUAKE OF MAY 3, 1897, PULASKI, VIRGINIA,
(MONDAY, 1218 Hrs.), FELT AREA: 29,000 SQ. MI.,
(150,000 SQ. MI., BOLLINGER, 1969)

Ref. : Hopper [210]



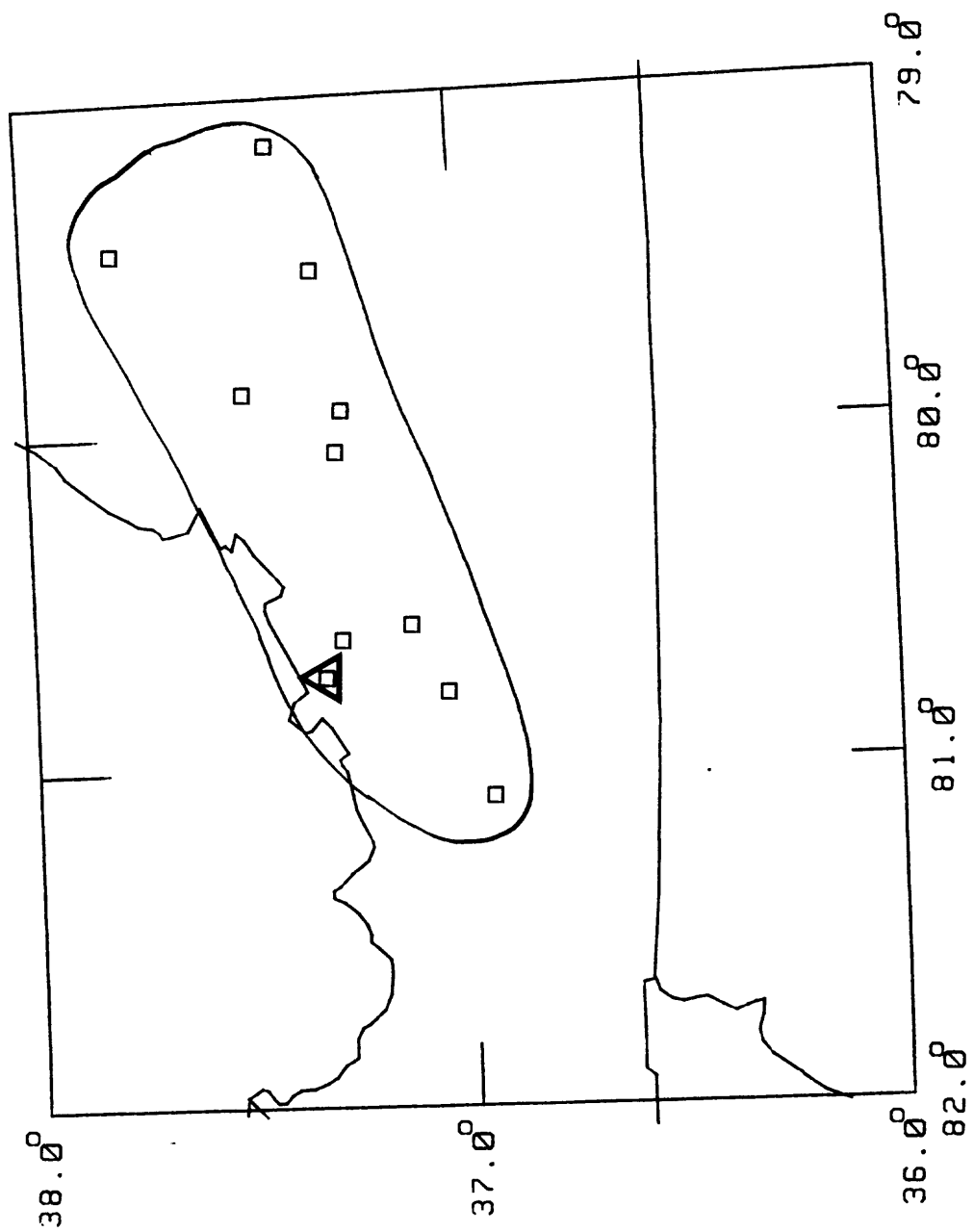


Earthquake of May 31, 1897, Giles County, Virginia
 (Monday, 1358 Hrs.), Felt Area: 280,000 sq. mi. Ref.: Hopper [210]



Ref.: Bollinger (1973)

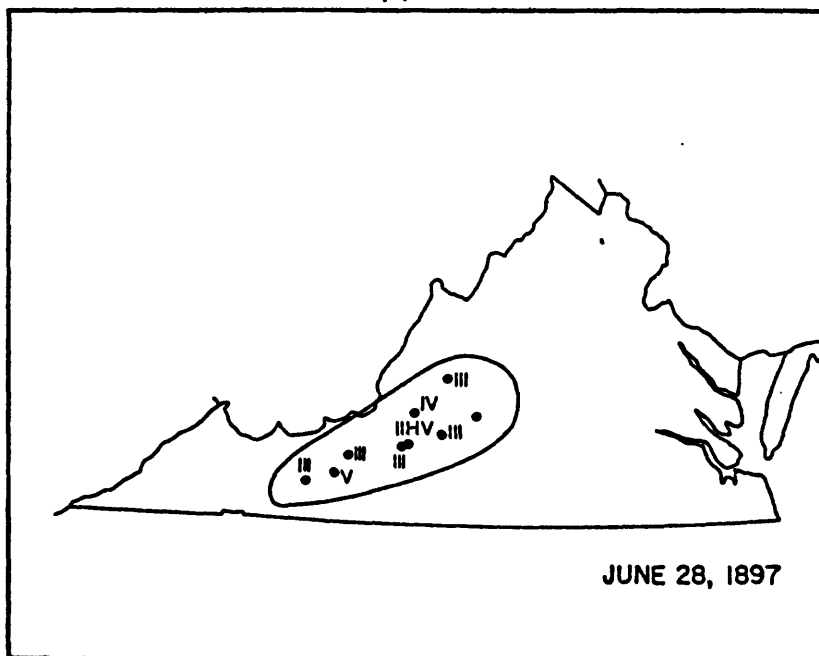
29 Jun 1897



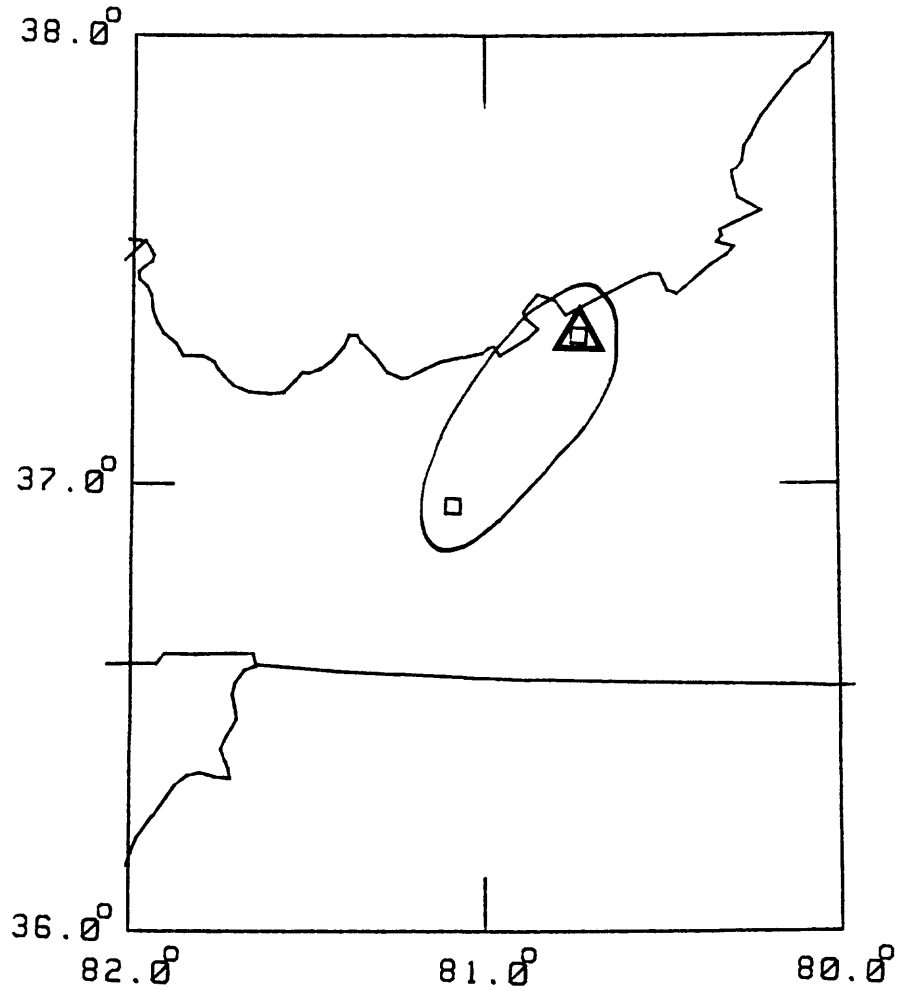
0 30
MILES

EARTHQUAKE OF JUNE 28, 1897, ROANOKE, VIRGINIA,
(MONDAY 23:30 Hrs.), FELT AREA: 9,500 SQ. MI.

Ref. : Hopper [210]

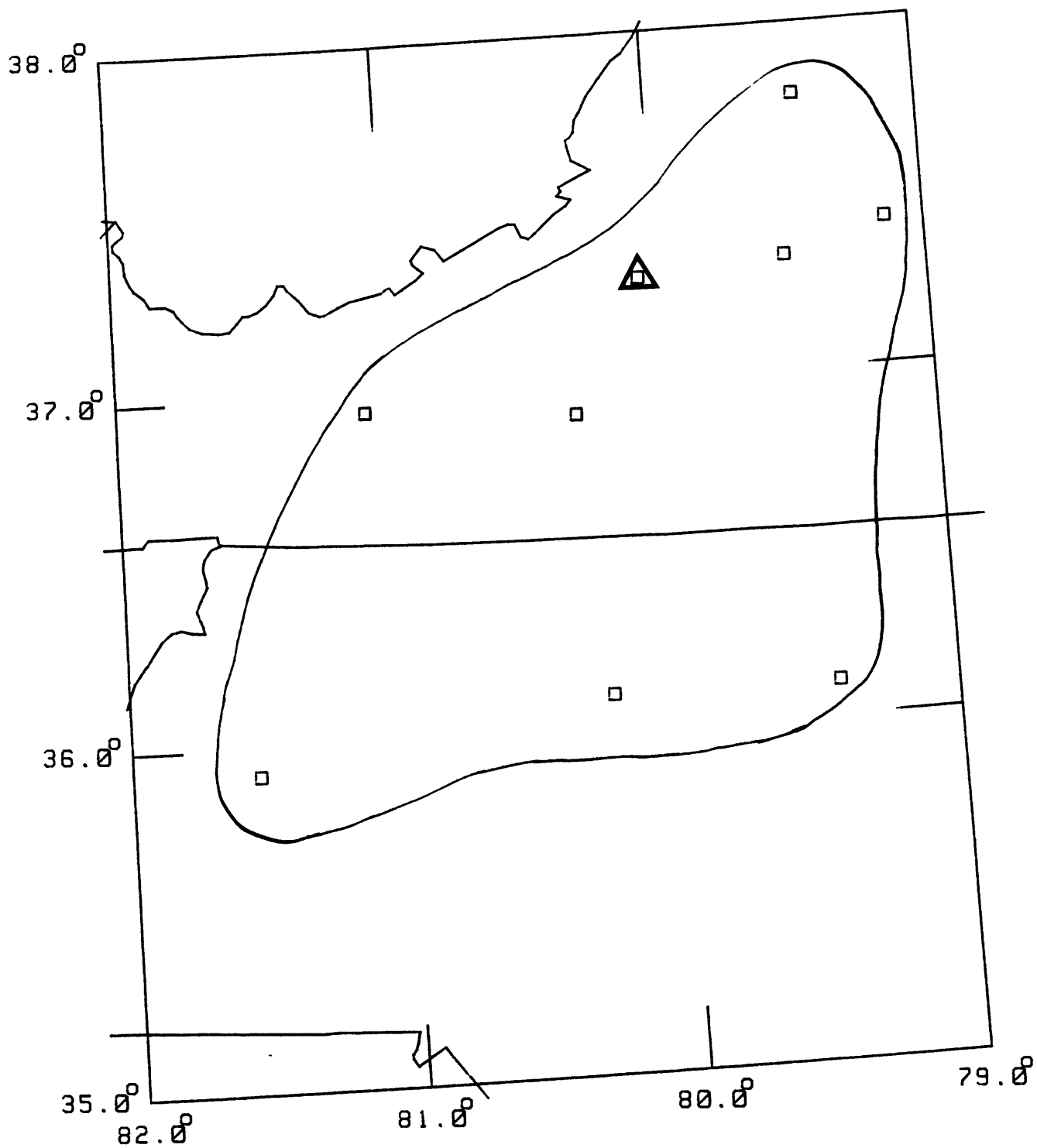


3 Sep 1897



0 30
MILES

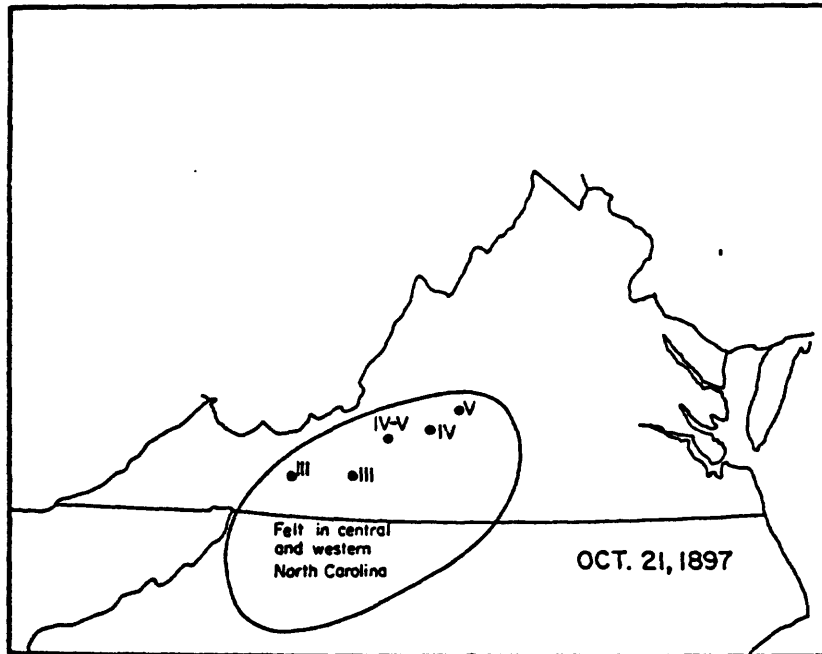
22 Oct 1897



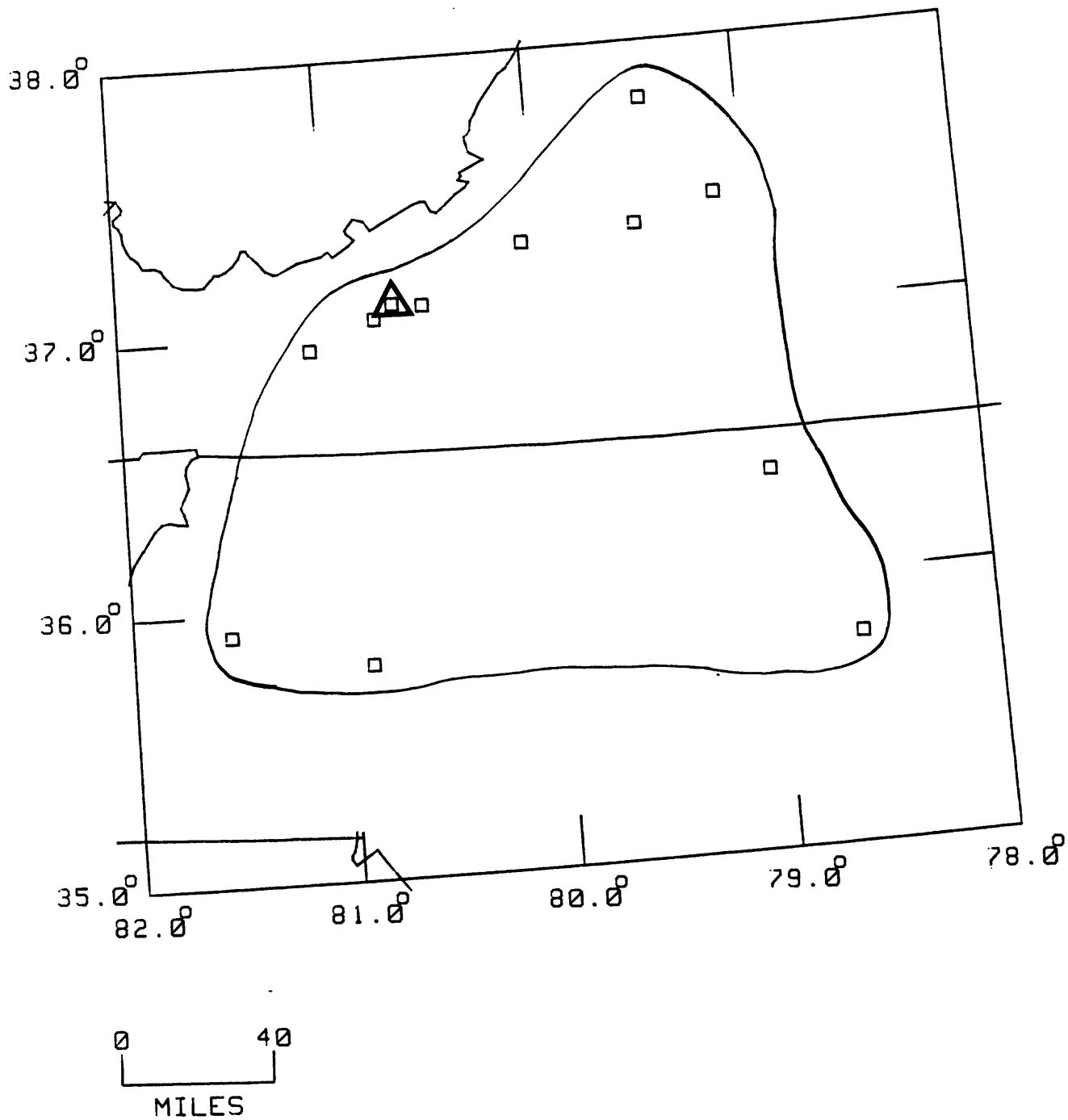
0 30
MILES

EARTHQUAKE OF OCTOBER 21, 1897, WYTHEVILLE, VIRGINIA,
(THURSDAY, 2220 Hrs.), FELT AREA: 23,000 SQ. MI.
(20,000 SQ. MI., BOLLINGER, 1969)

Ref. : Hopper [210]

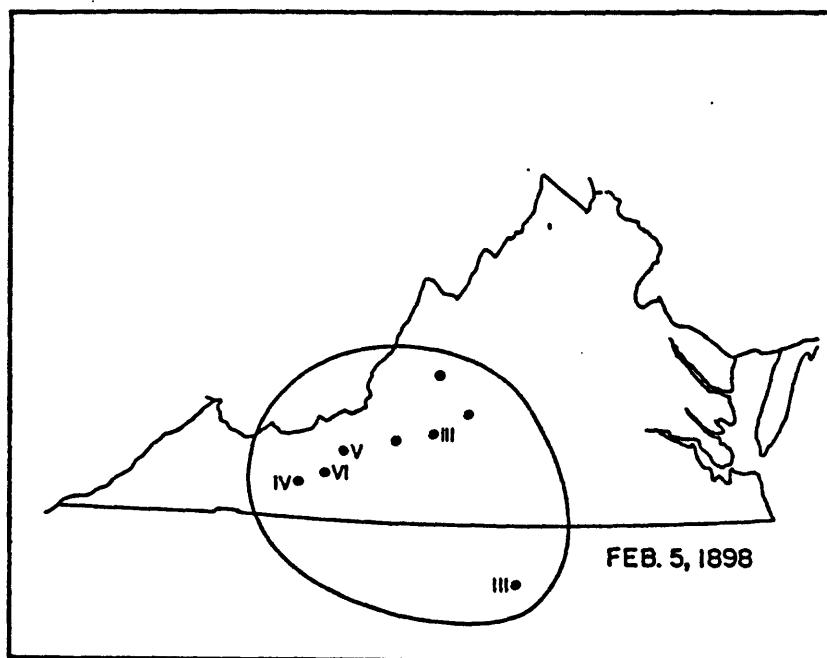


5 Feb 1898

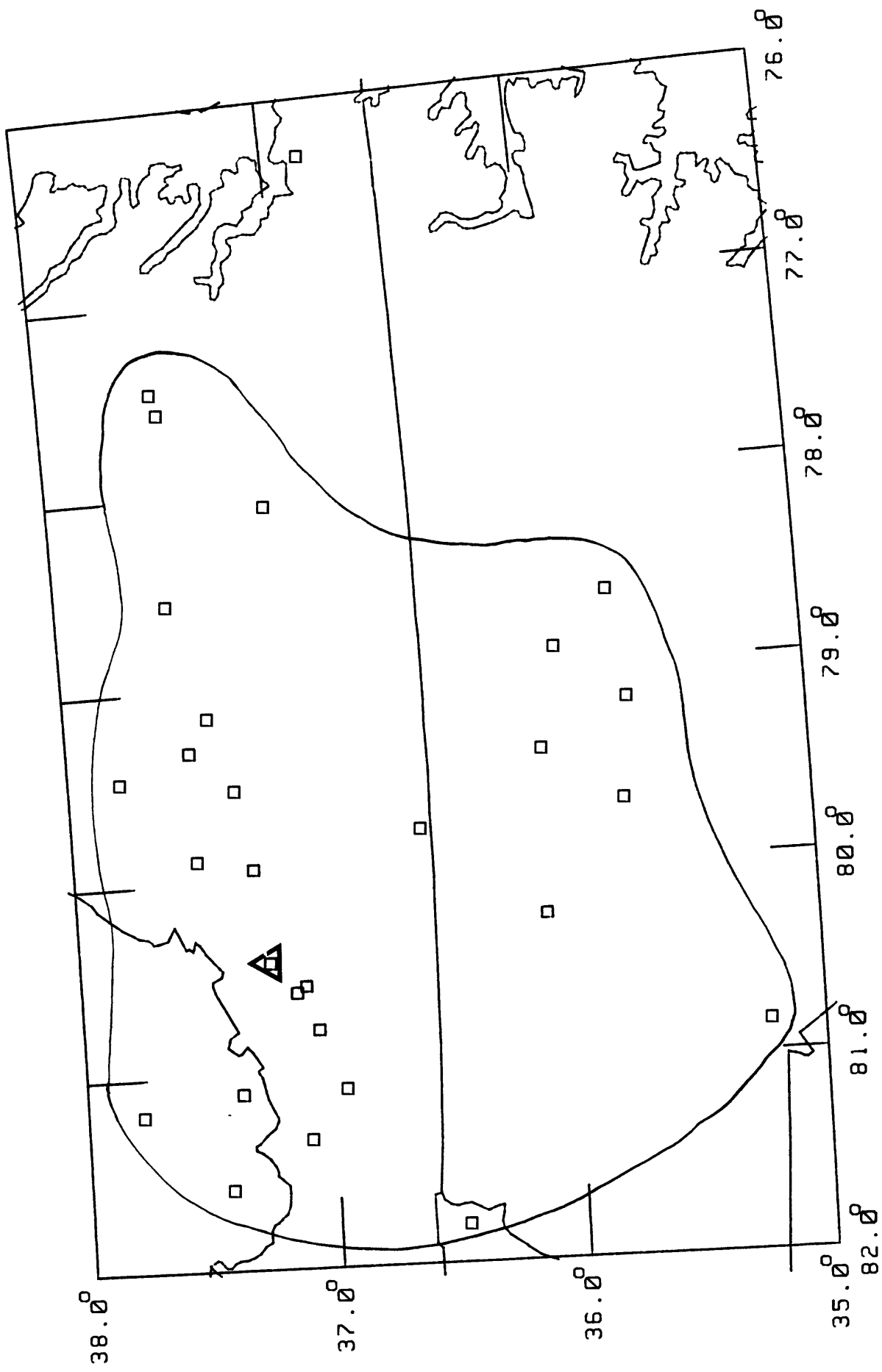


EARTHQUAKE OF FEBRUARY 5, 1898,
PULASKI-WYTHEVILLE, VIRGINIA, (SATURDAY, 1500 Hrs.)
FELT AREA: 34,000 SQ. MI.

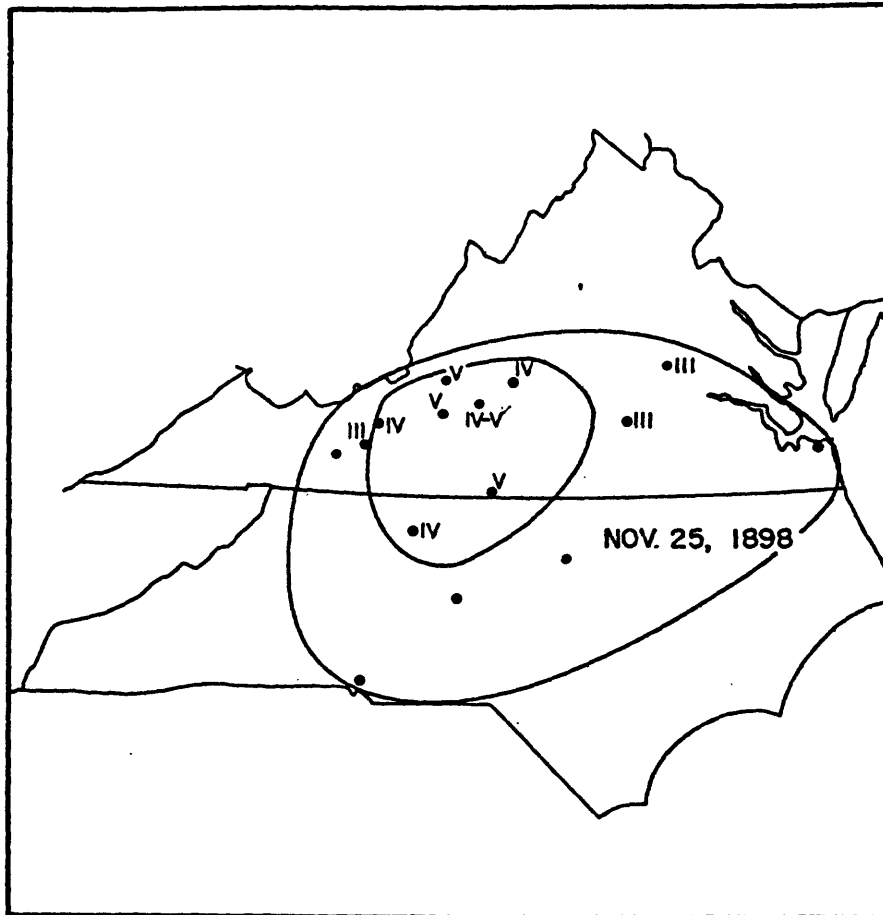
Ref. : Hopper [210]



25 Nov 1898

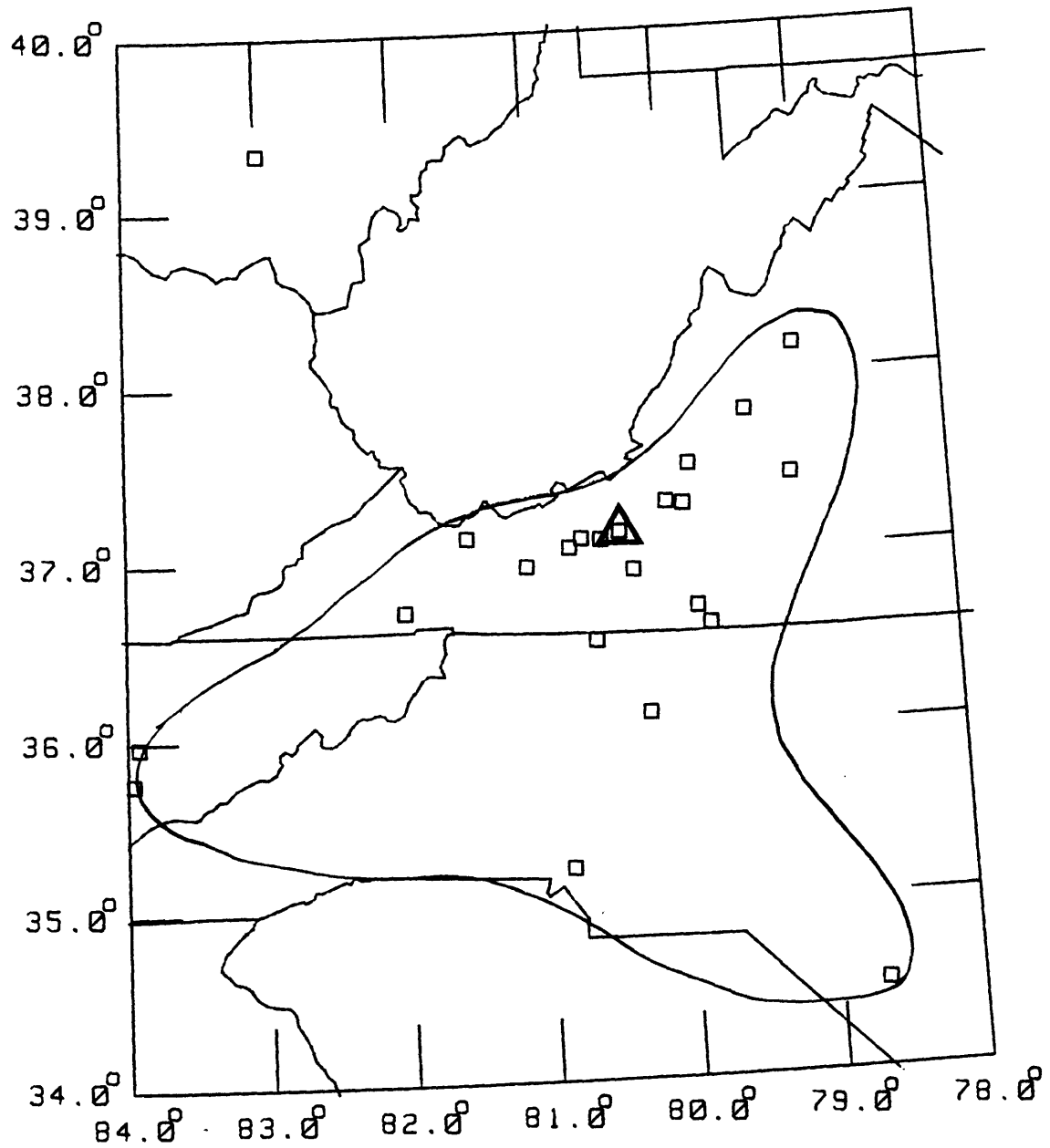


EARTHQUAKE OF NOVEMBER 25, 1898,
PULASKI-WYTHEVILLE (FRIDAY, 1500 Hrs.),
FELT AREA: 65,000 SQ. MI.



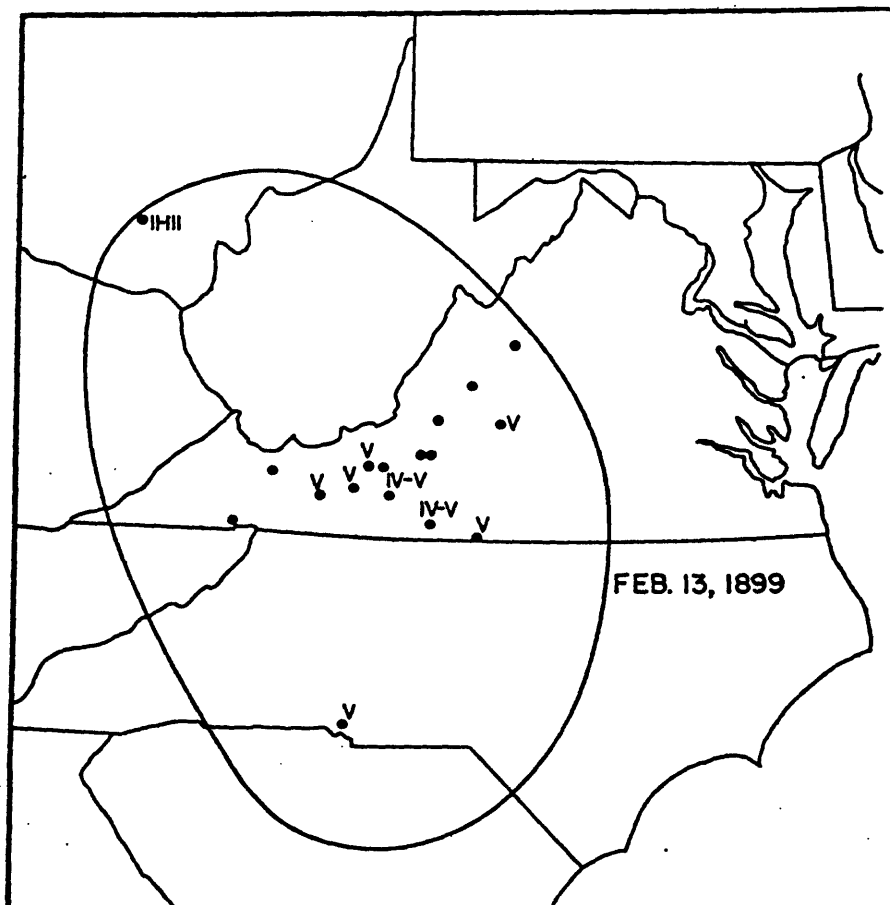
Ref. : Hopper [210]

13 Feb 1899



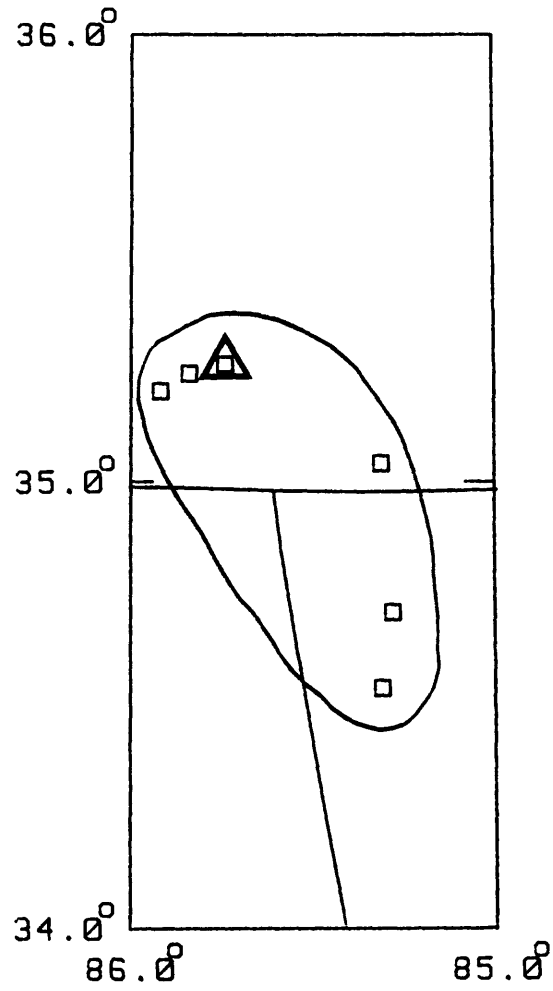
0 70
MILES

EARTHQUAKE OF FEBRUARY 13, 1899,
LYNCHBURG, VIRGINIA, (MONDAY, 0430 Hrs.),
FELT AREA: 115,000 SQ. MI., (30,000 SQ. MI., BOLLINGER, 1969)



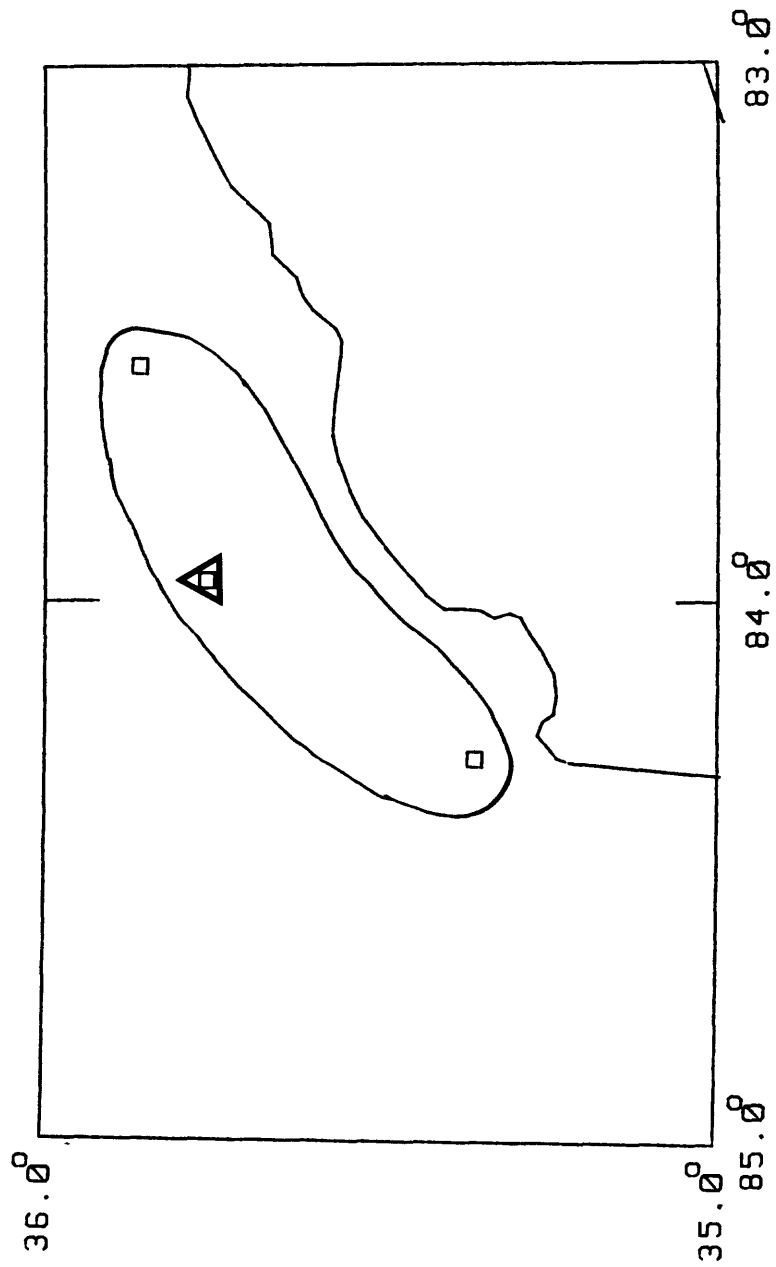
Ref. : Hopper [210]

18 Oct 1902

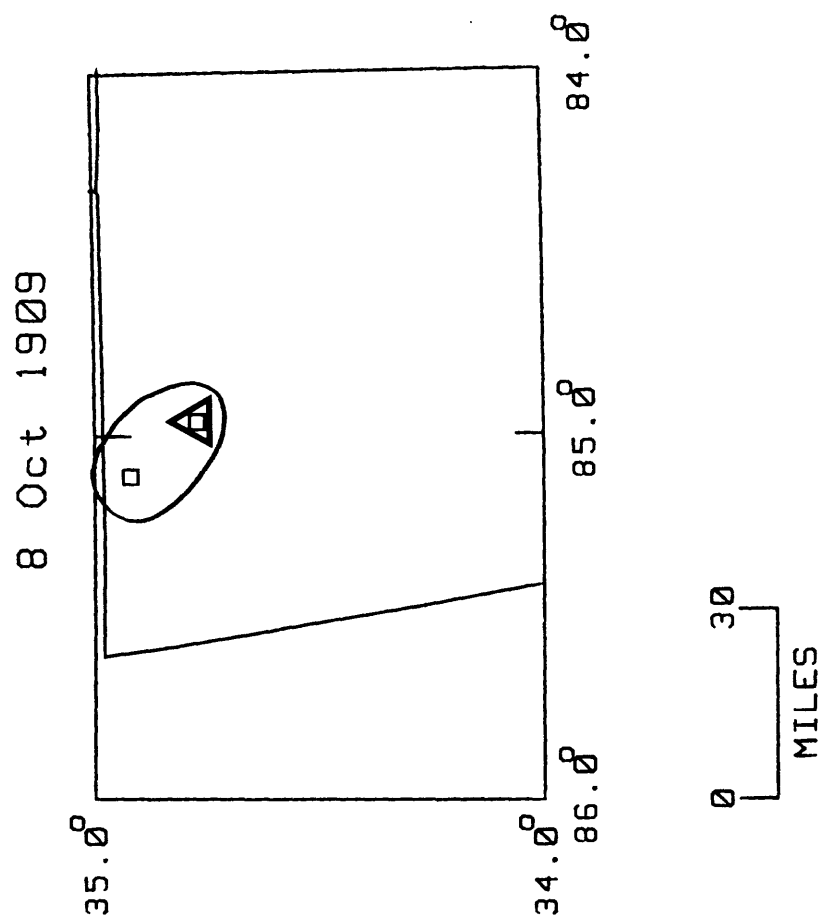


0 30
MILES

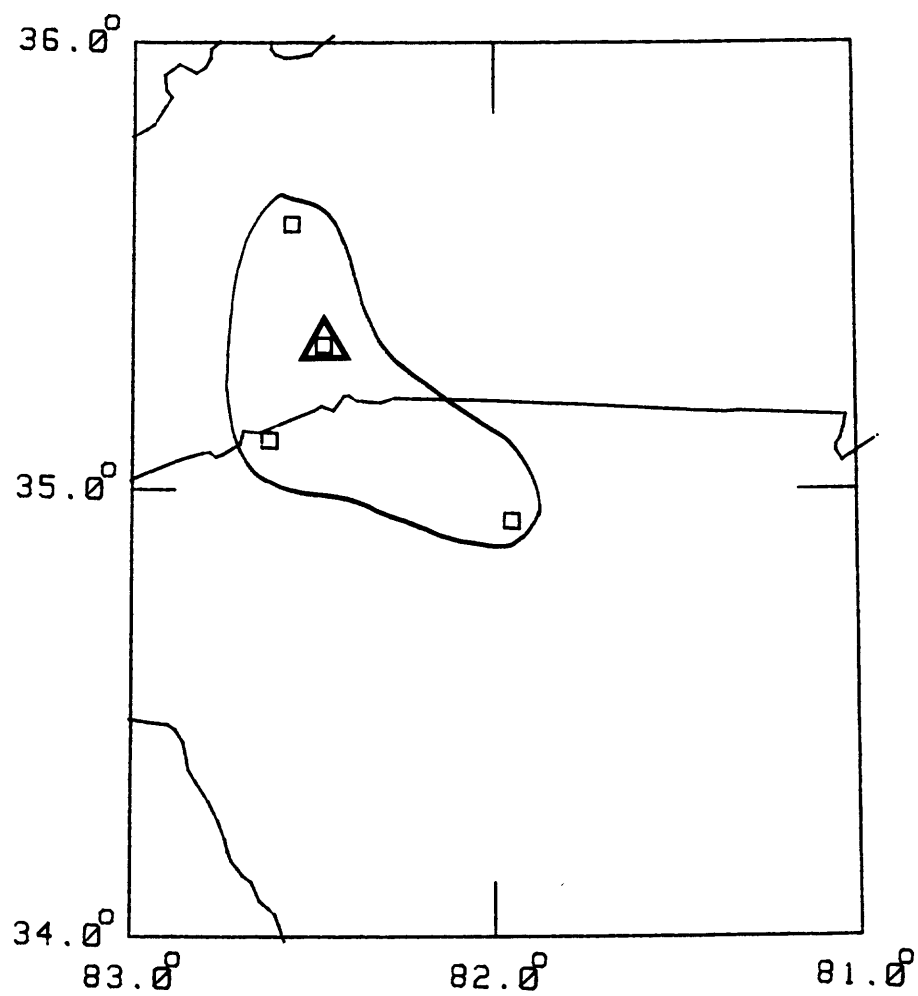
5 Mar 1904



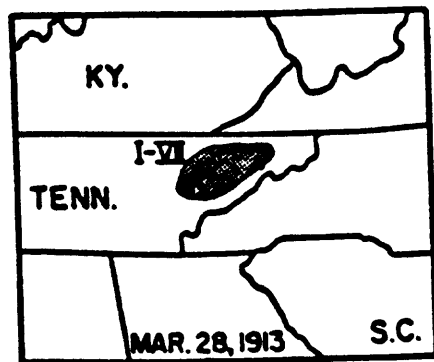
0 20
MILES



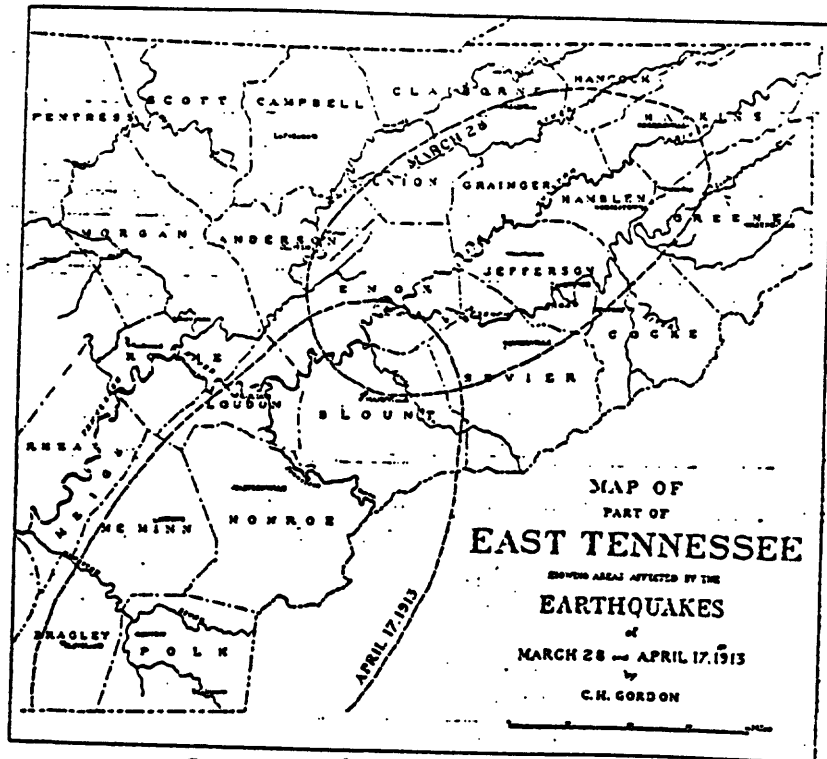
22 Apr 1911



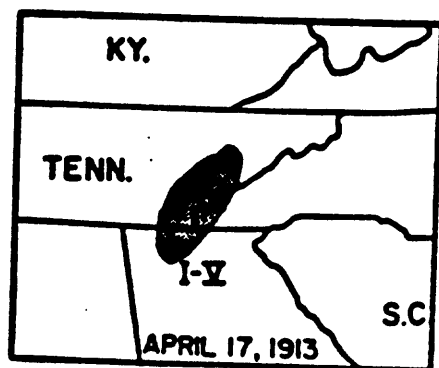
0 30
MILES



Ref. : Bollinger (1973) .

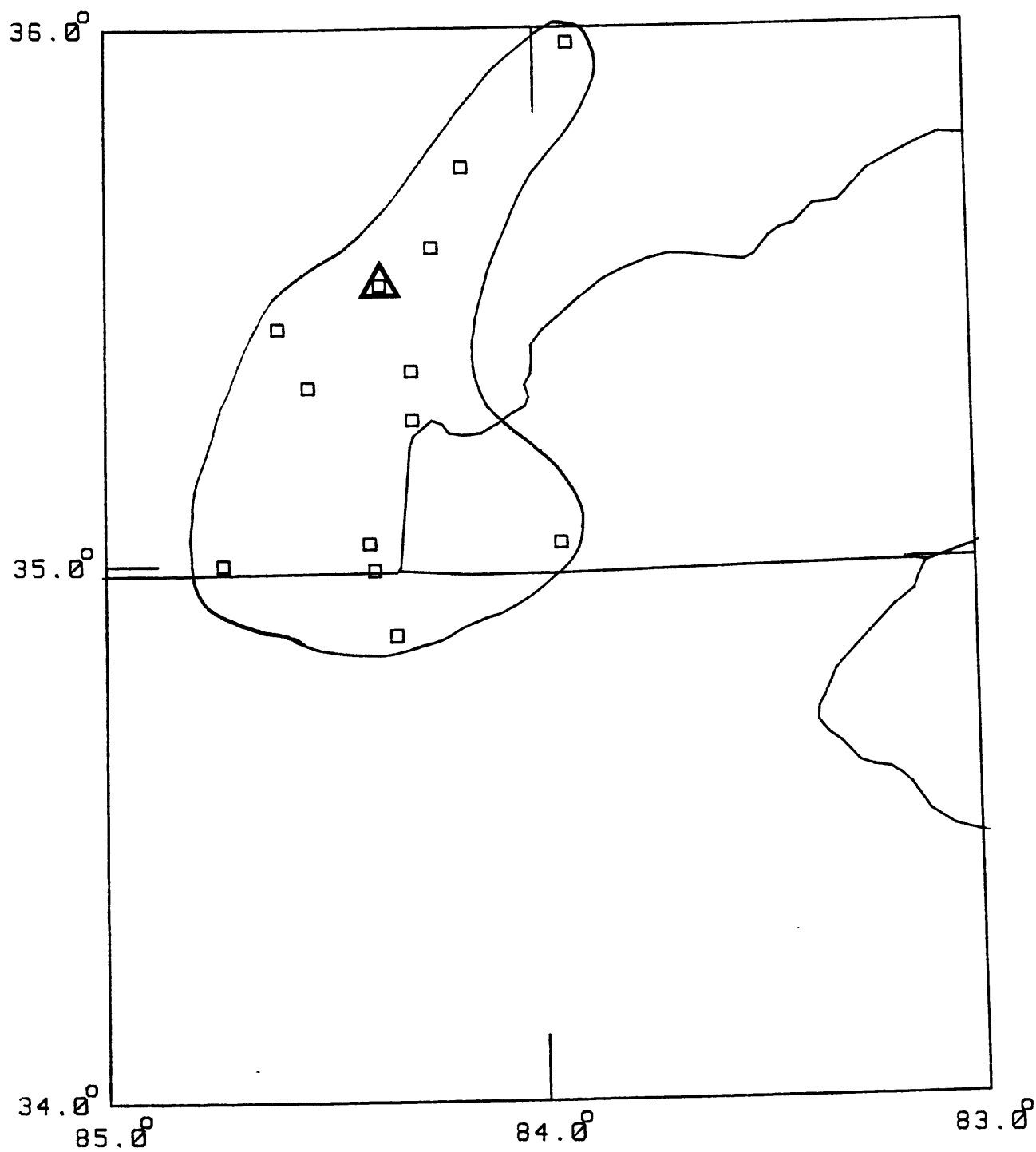


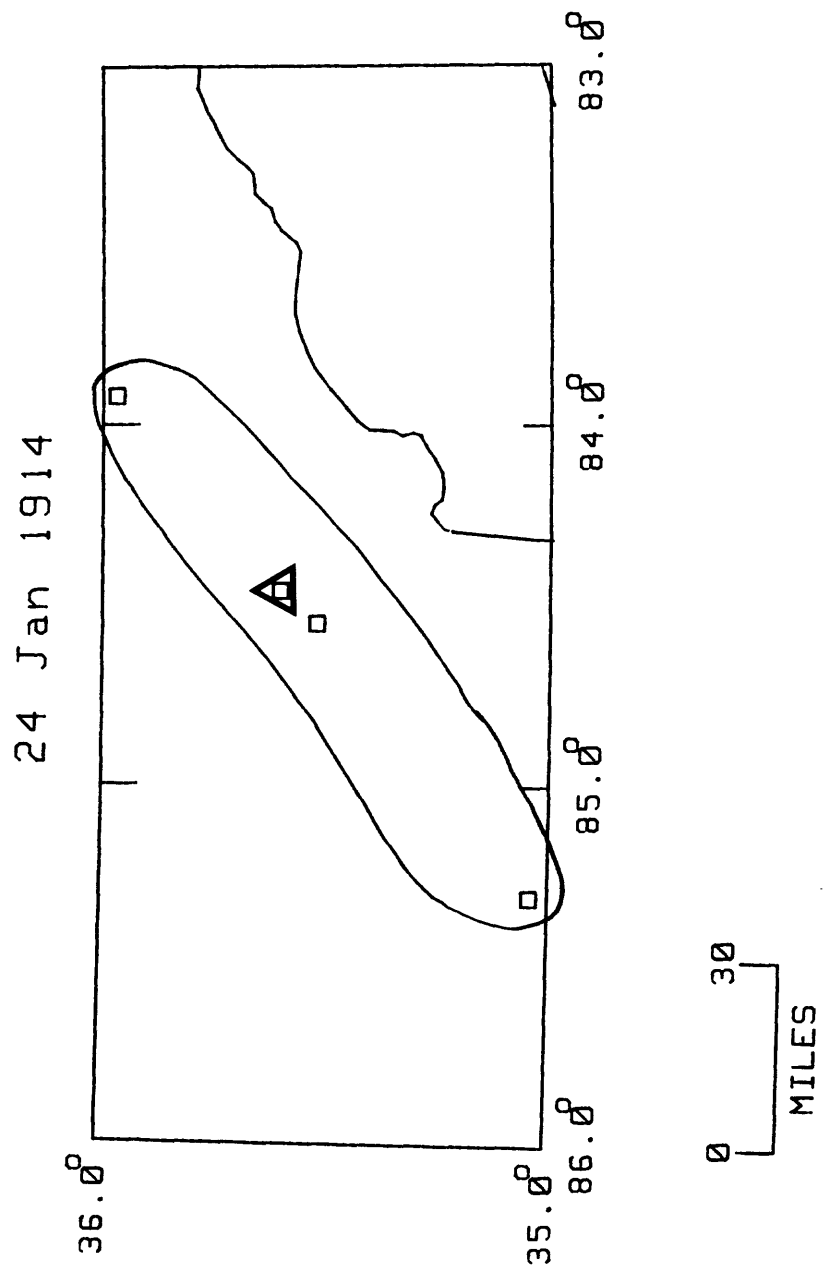
Ref. : Gordon [170]



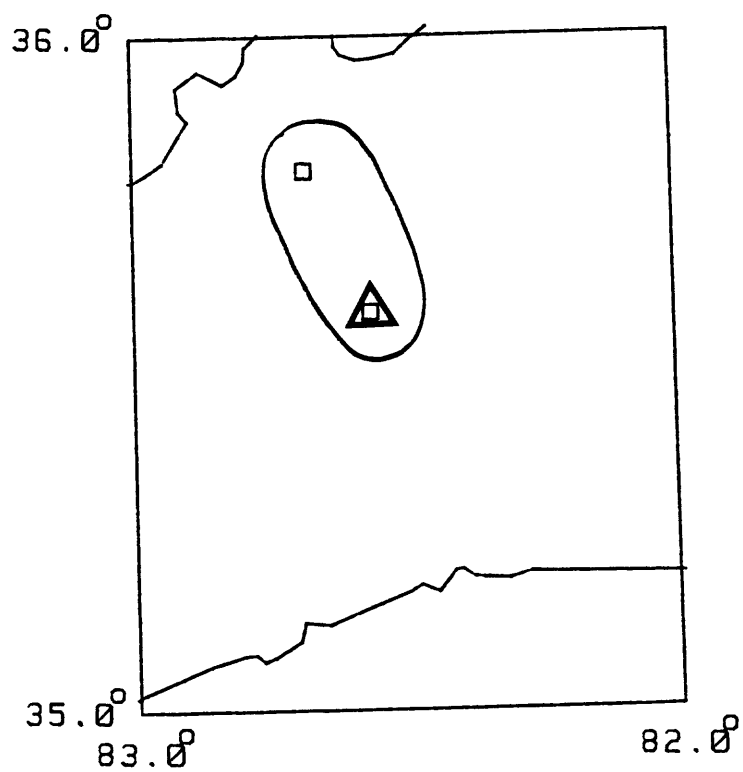
Ref. : Bollinger (1973)

17 Apr 1913





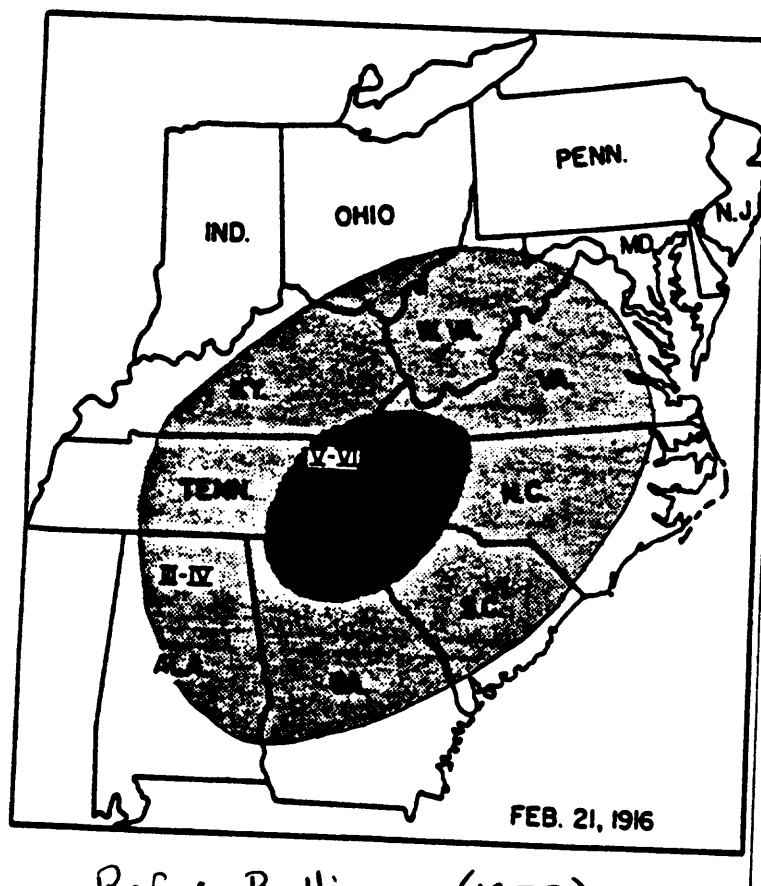
29 Oct 1915



0 20
MILES

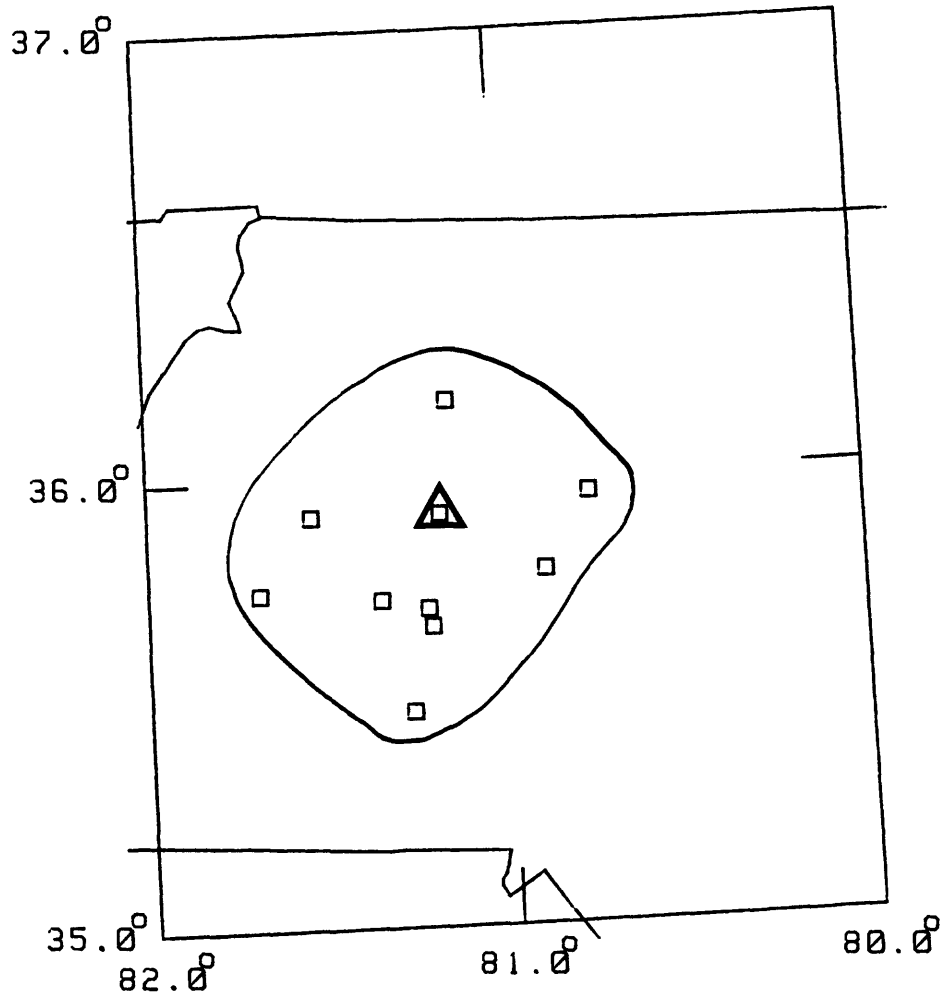
120
MILES





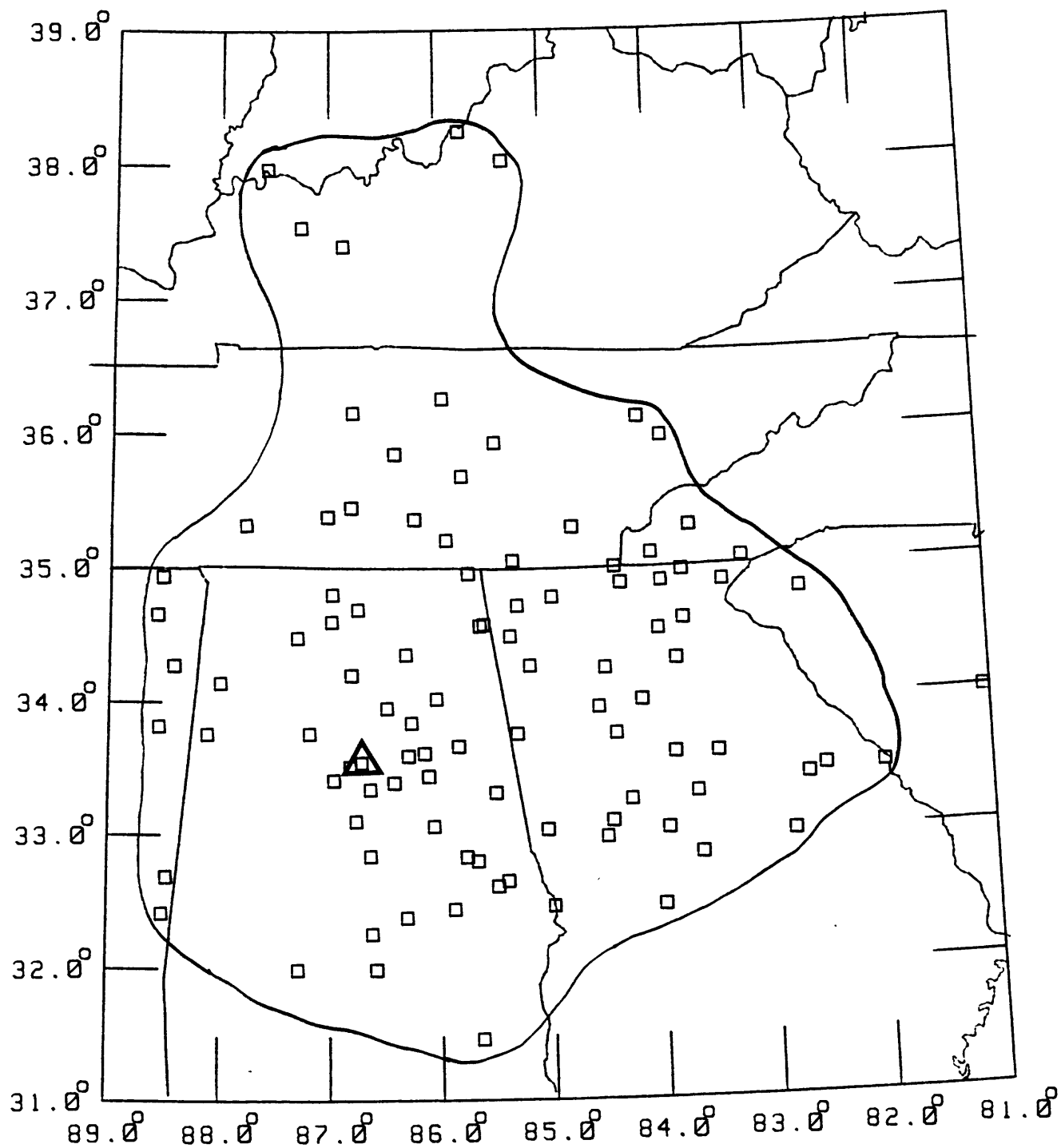
Ref. : Bollinger (1973)

26 Aug 1916



0 30
MILES

18 Oct 1916



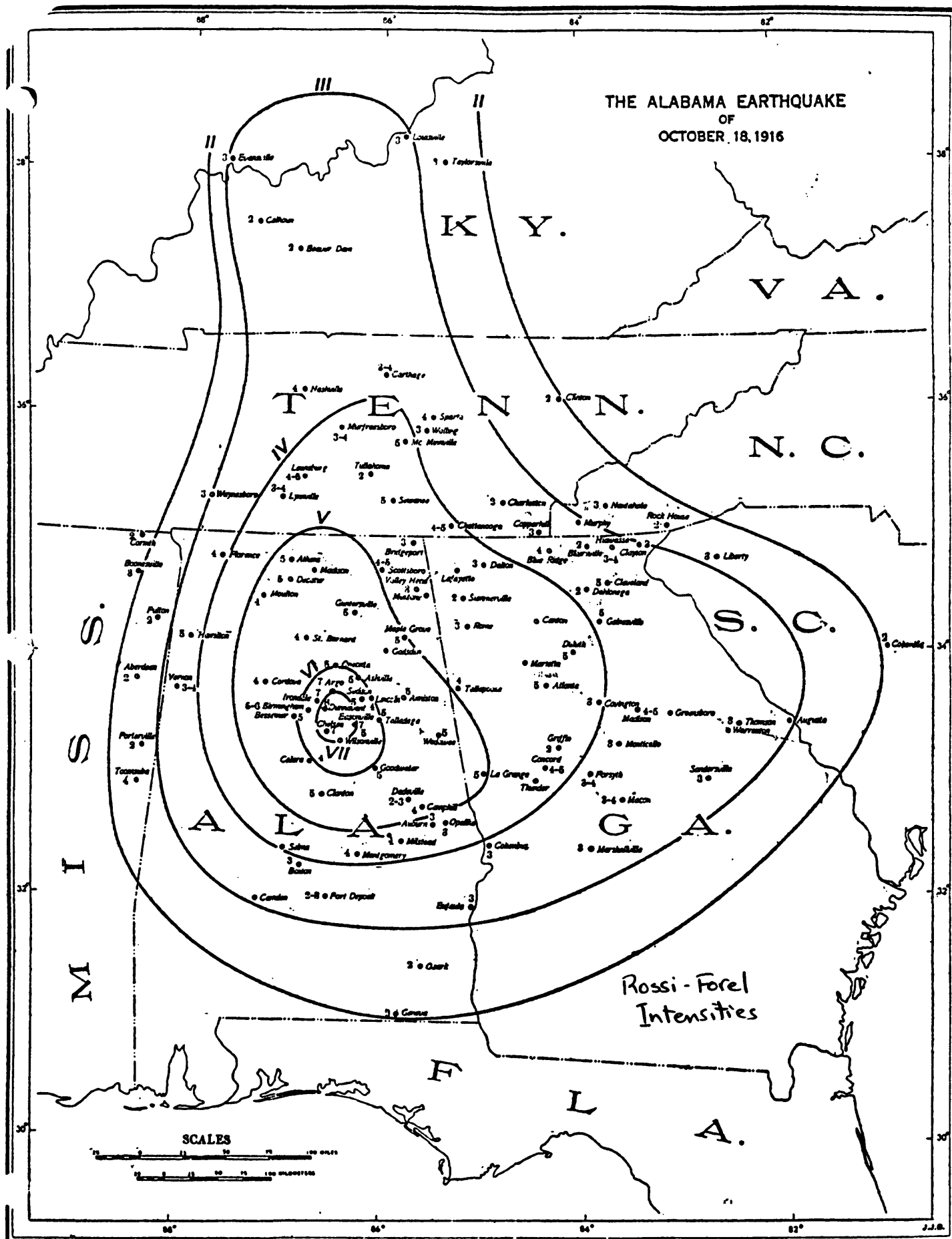
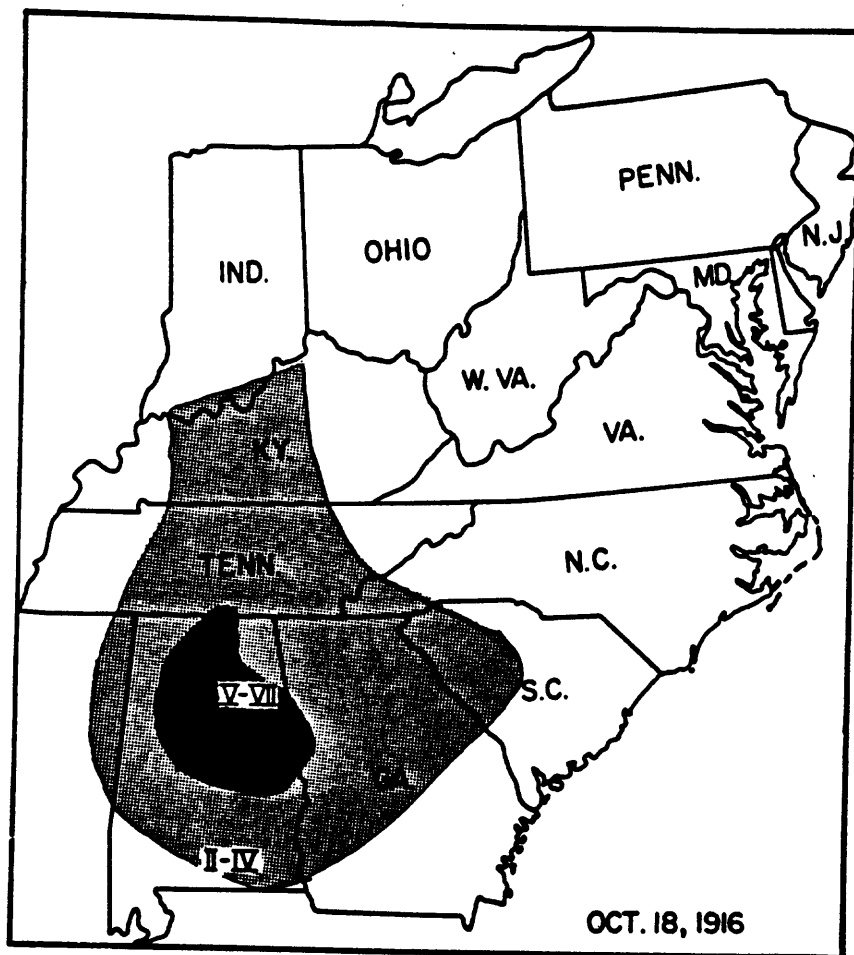


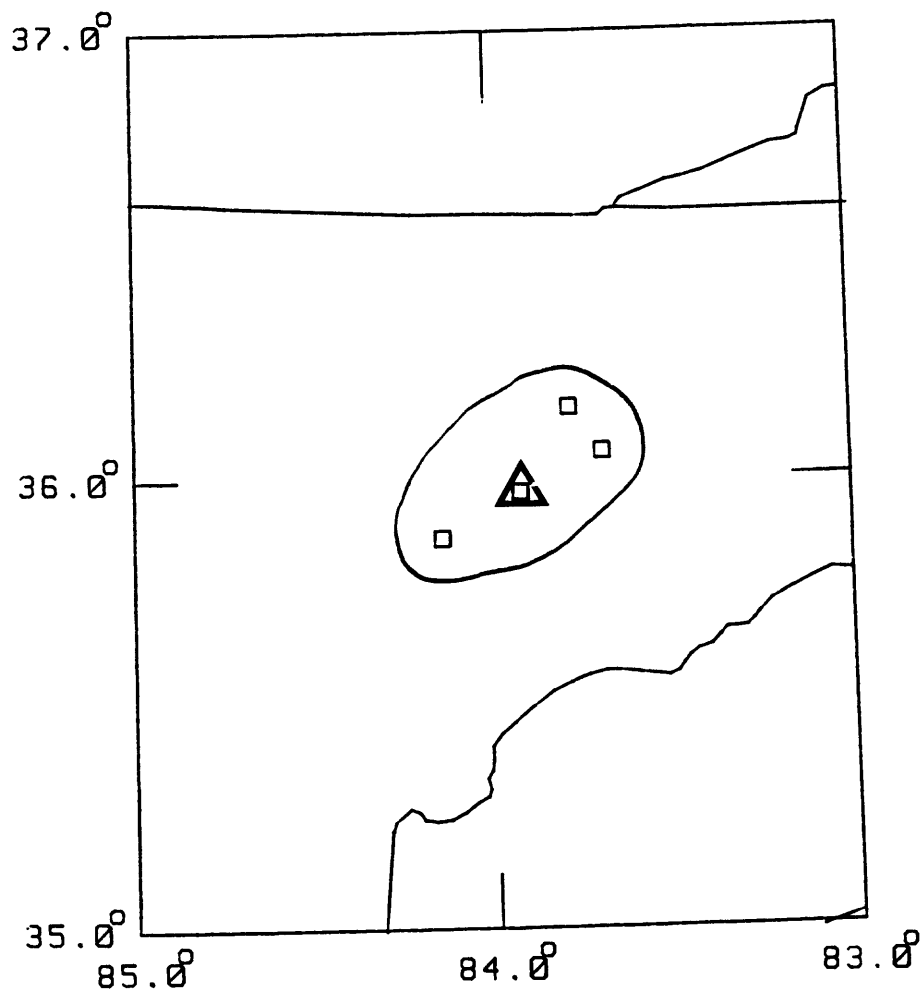
FIG. 1.—Isosismals of the Alabama earthquake of October 18, 1916.

Ref. : Finch [140]

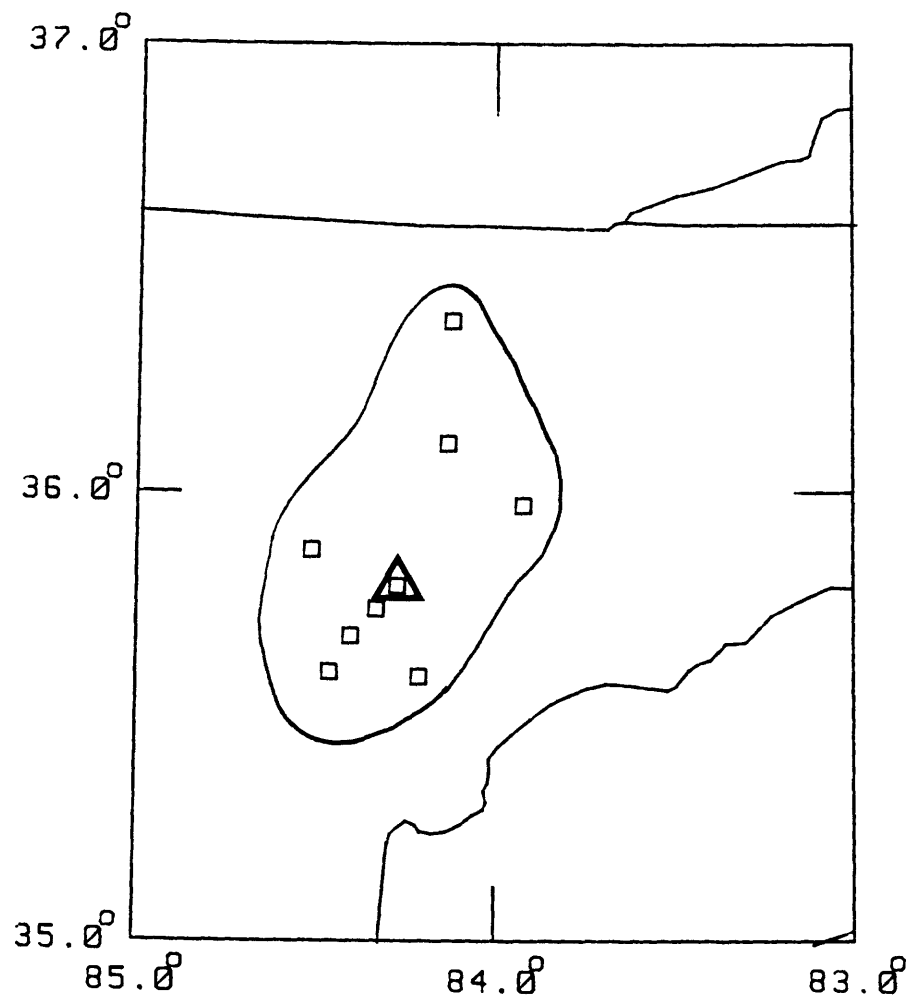


Ref. : Bollinger (1973)

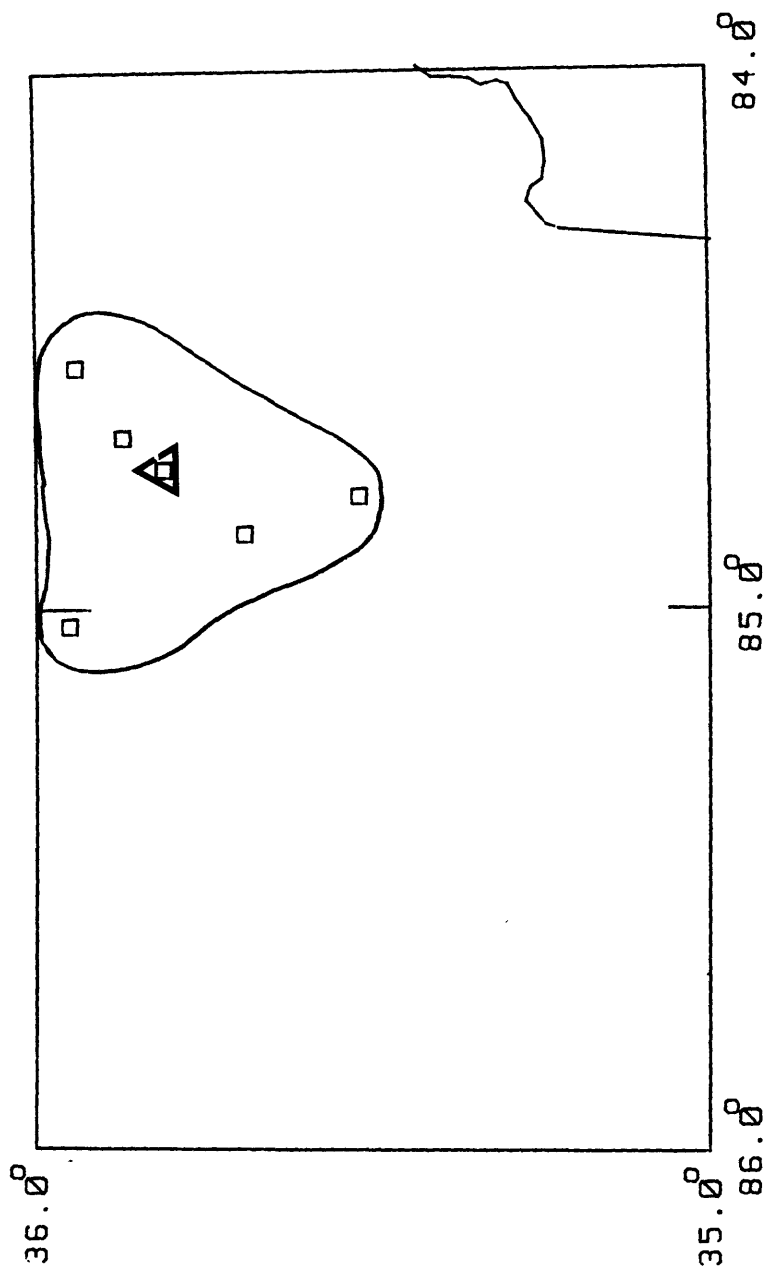
17 Jan 1918



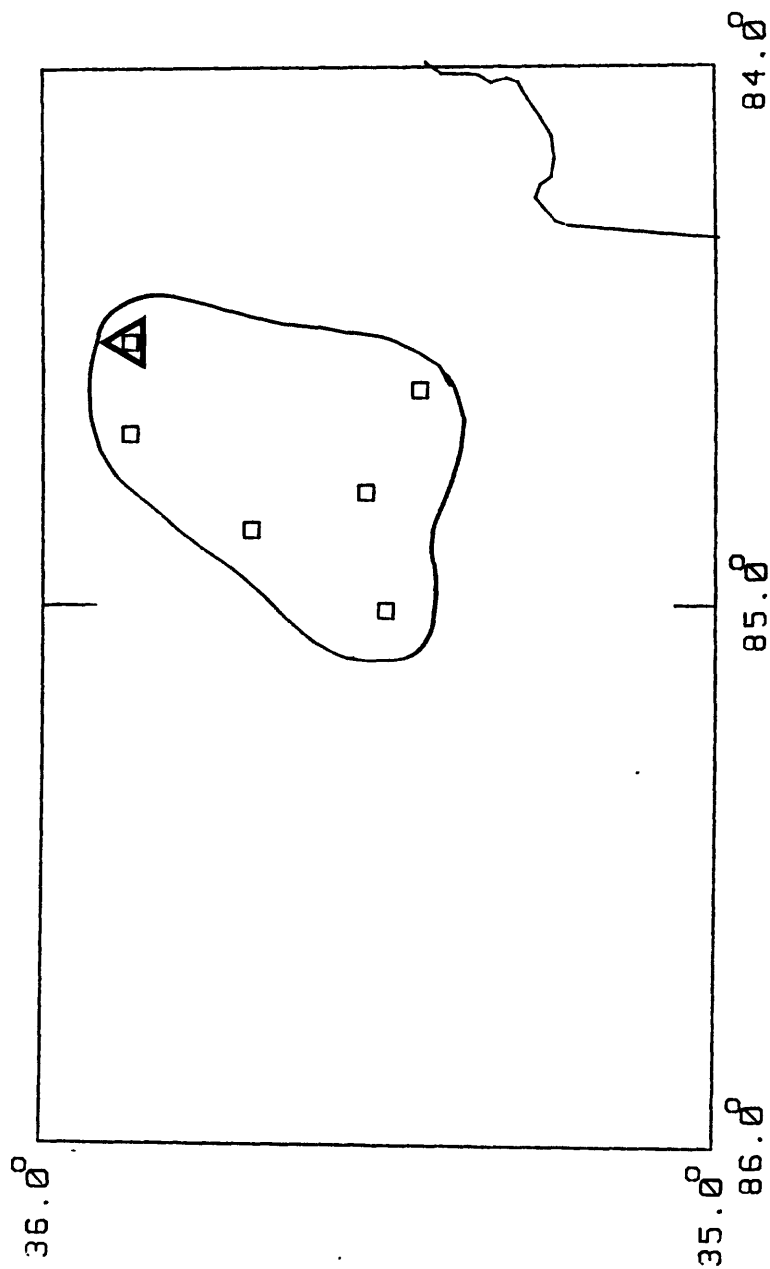
0 30
MILES



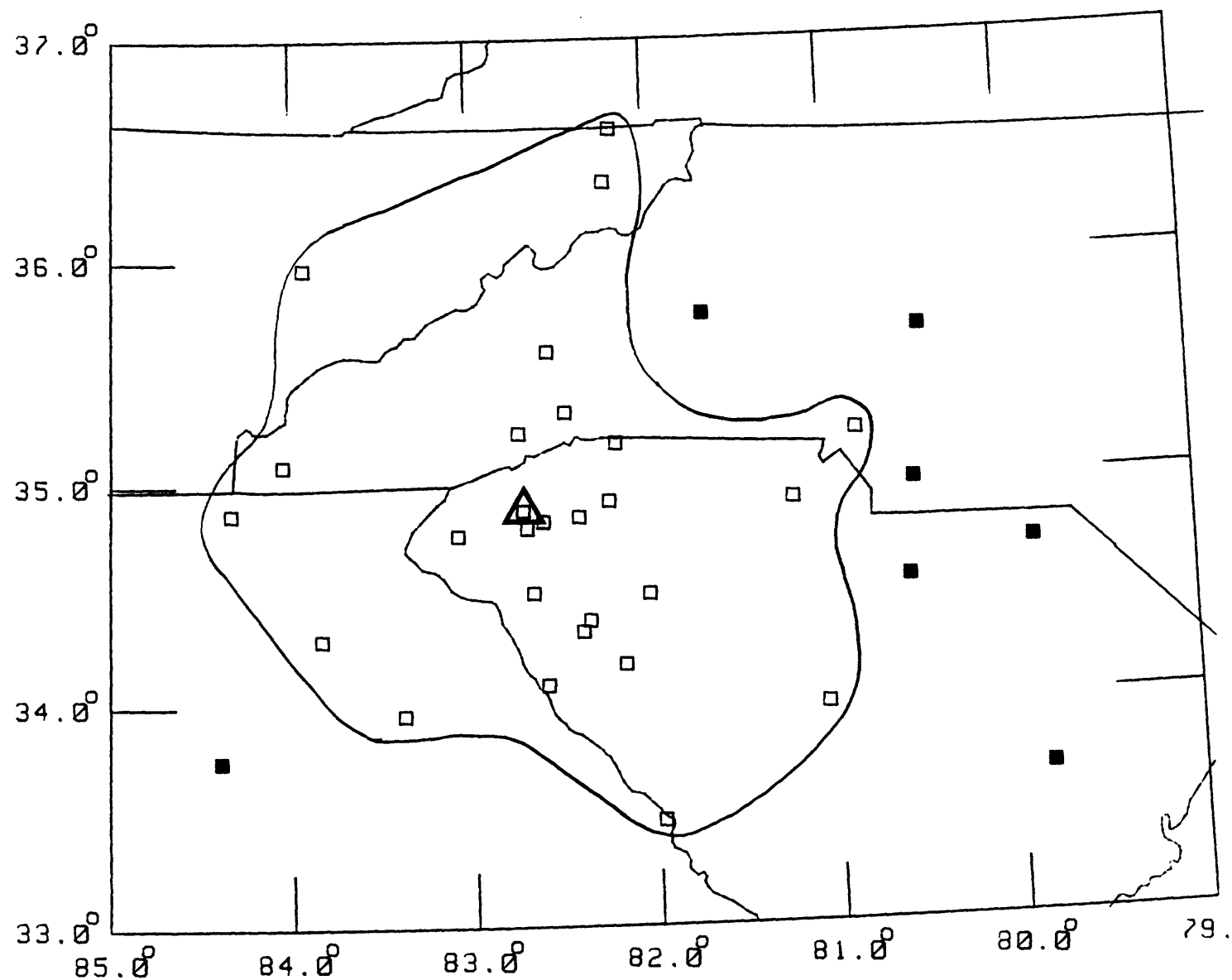
24 Dec 1920



15 Dec 1921



20 Oct 1924



0 50
MILES

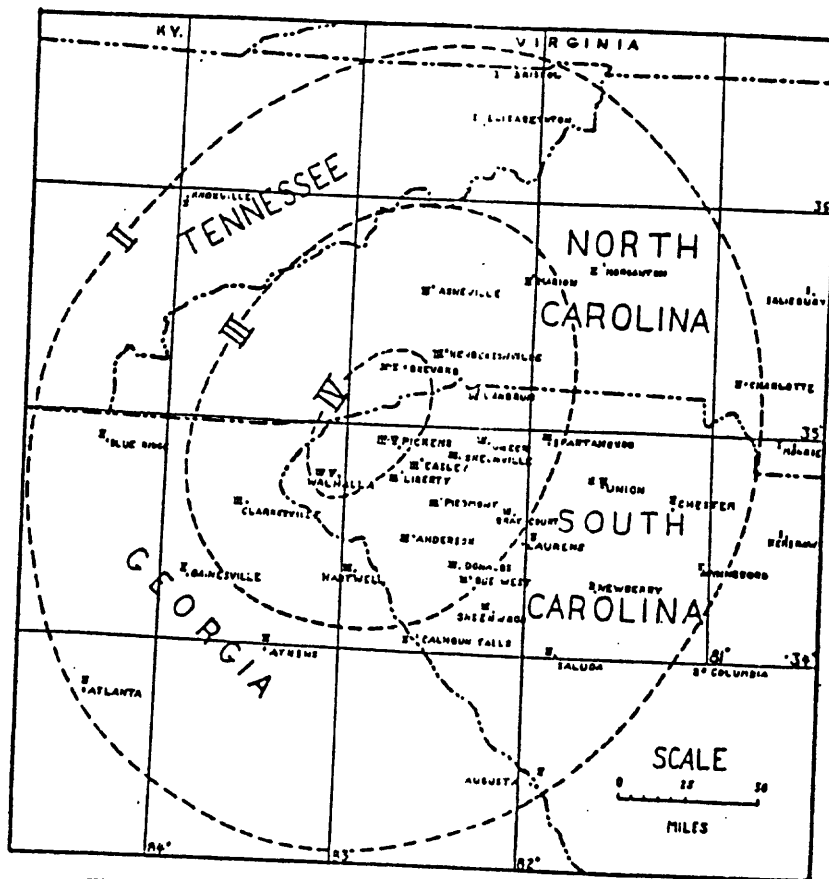
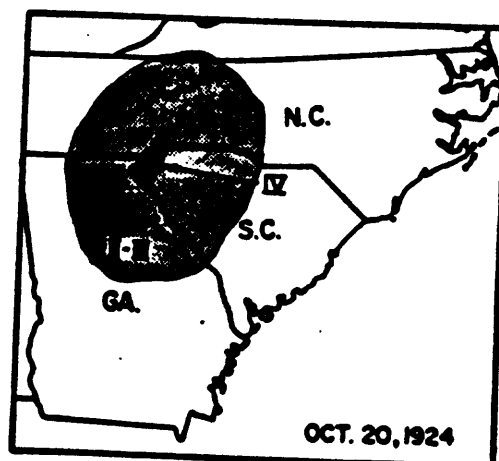


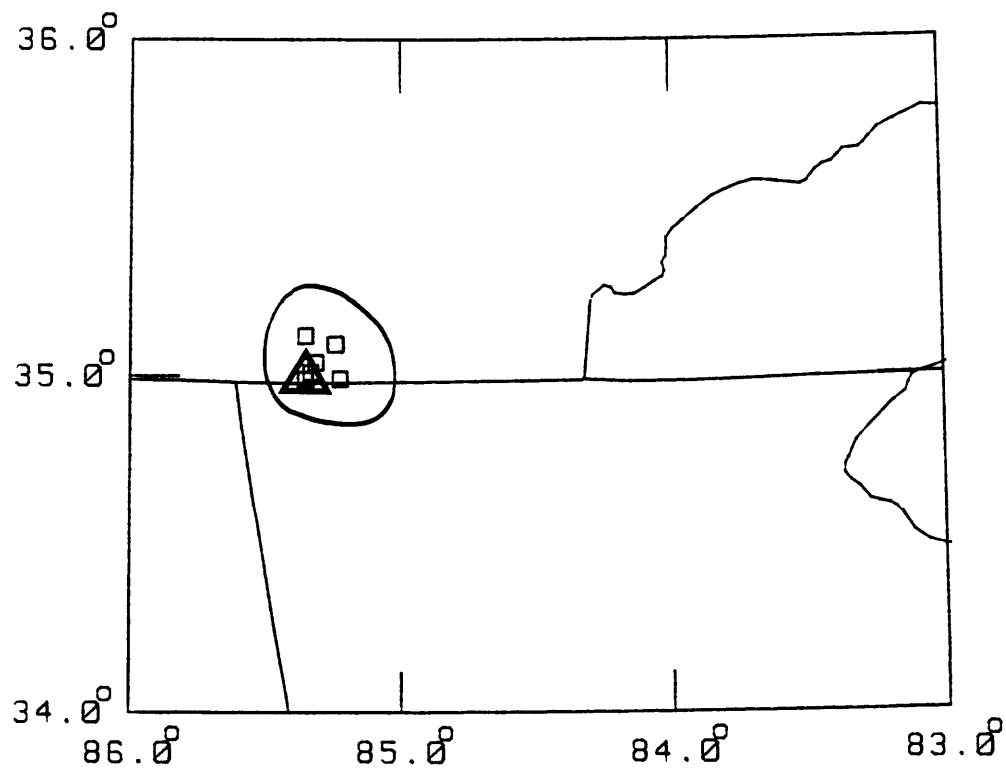
Fig. 1. Isoseismals of the Southern Appalachian earthquake of October 20, 1924. Rossi-Forrel scale

Ref. : Neumann [300] 56,000 sq. mi.



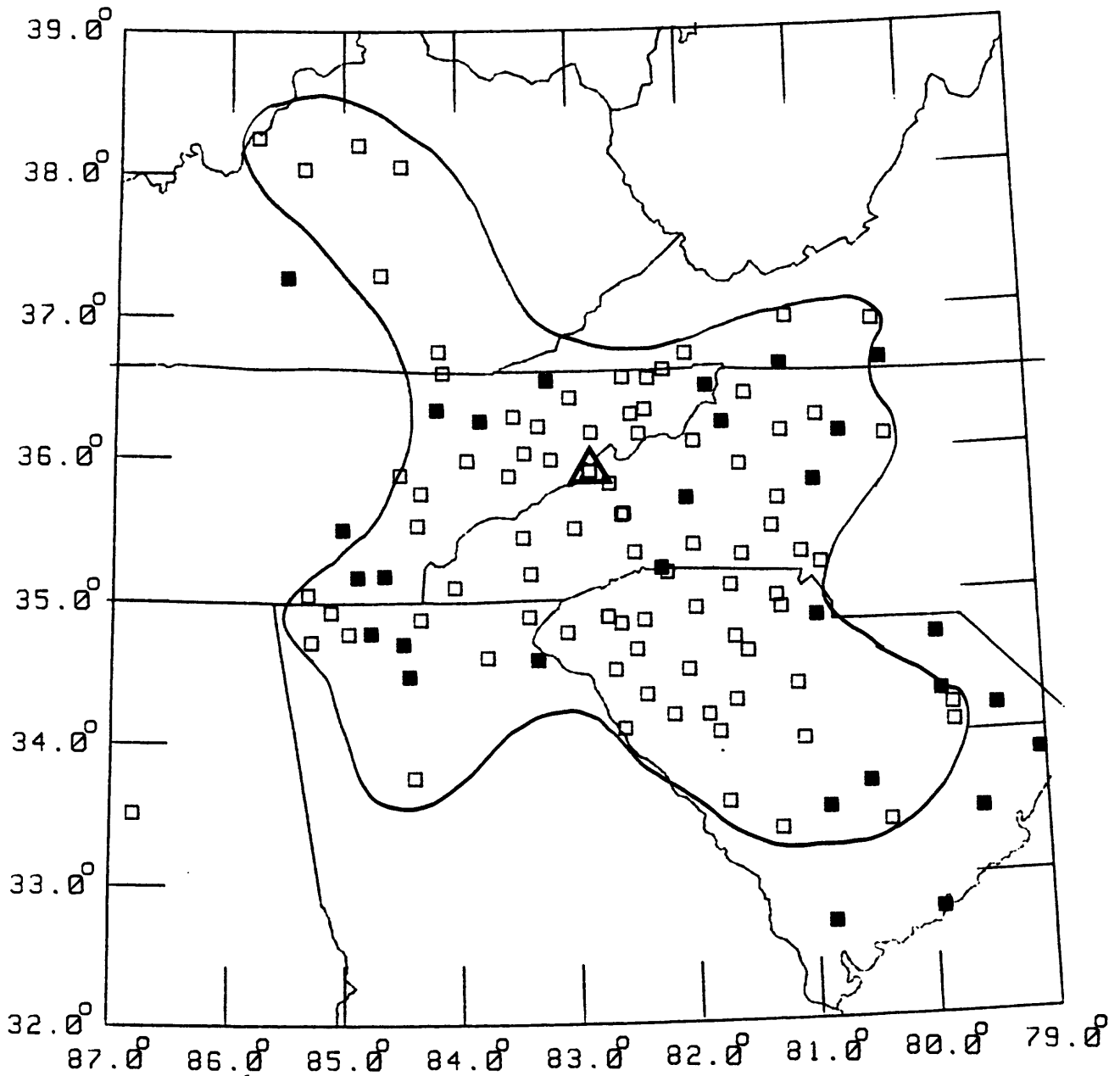
Ref. : Bollinger (1973)

8 Oct 1927

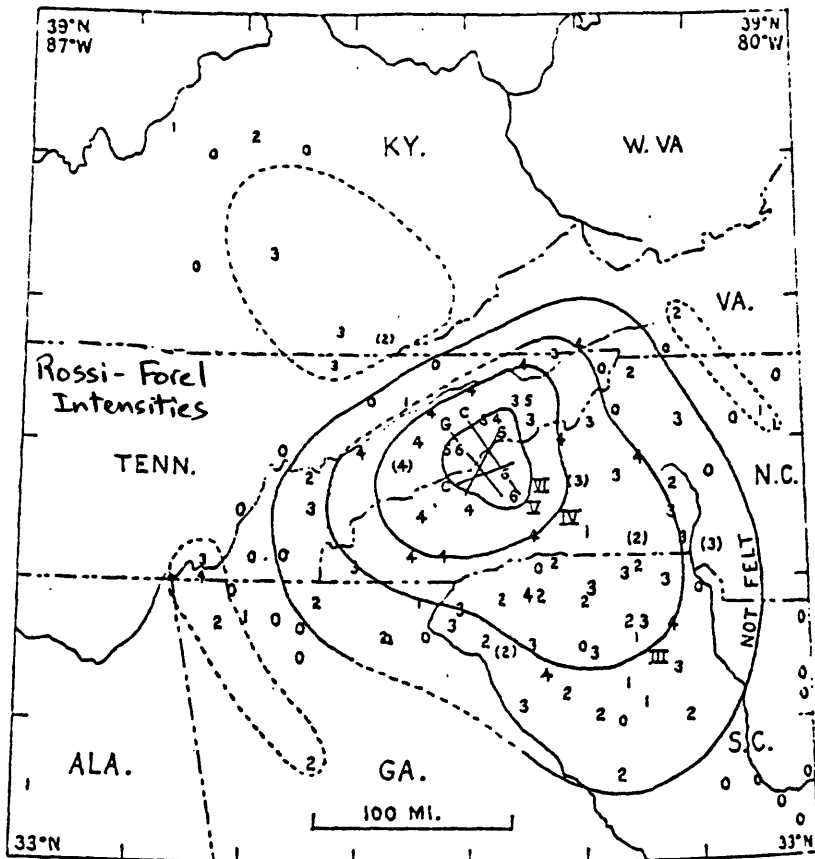


0 40
MILES

3 Nov 1928

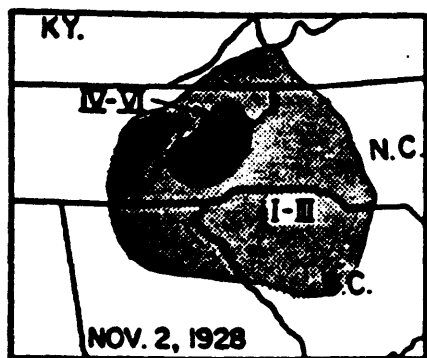


0 80
MILES



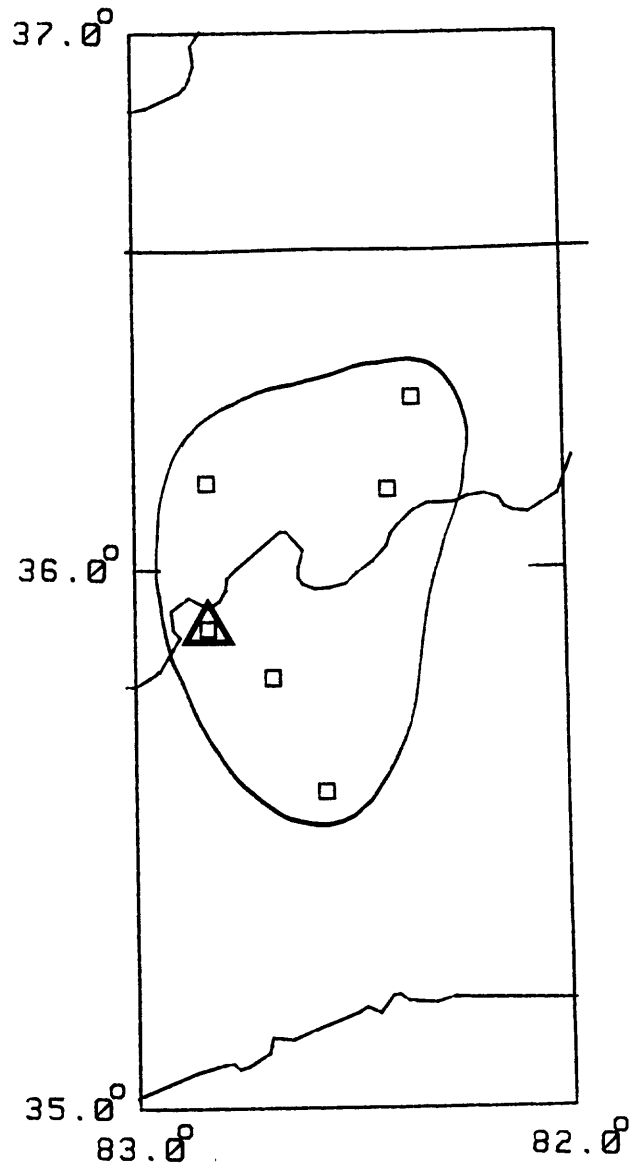
Isoseismal map for the southern Appalachian earthquake of November 2, 1928

Ref. : Neumann [301] 40,000 sq. mi.



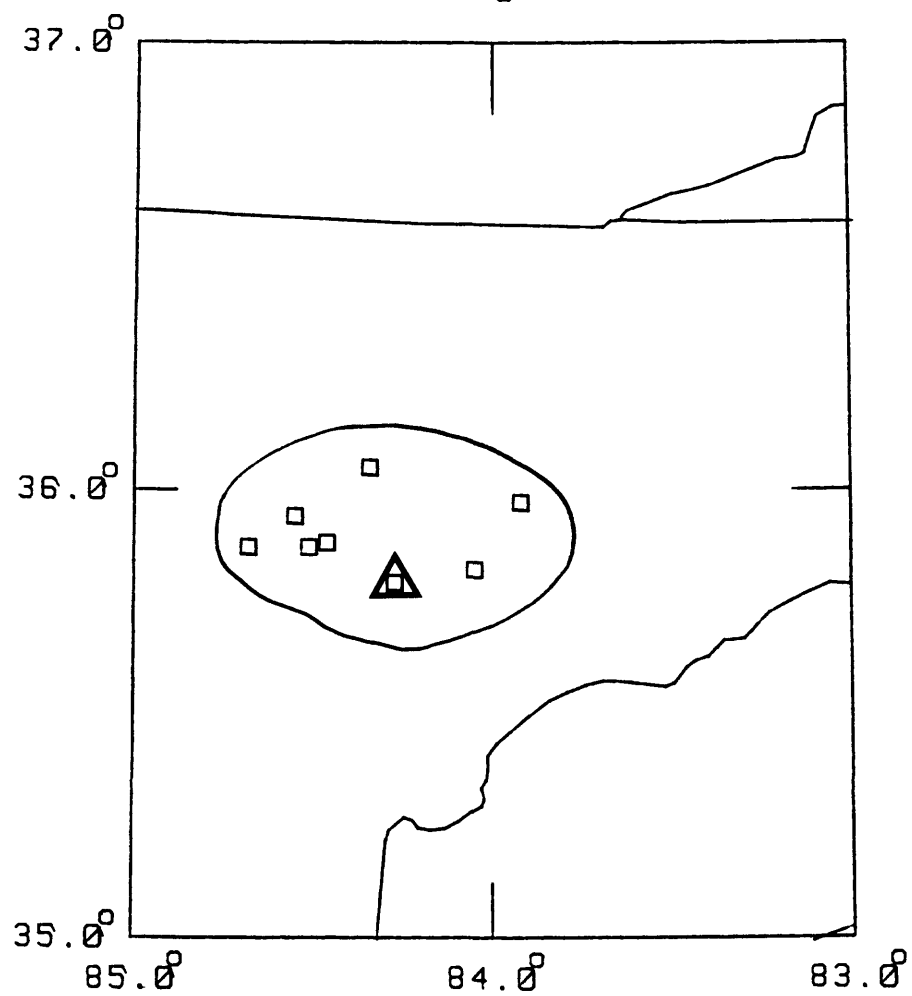
Ref. : Bollinger (1973)

20 Nov 1928

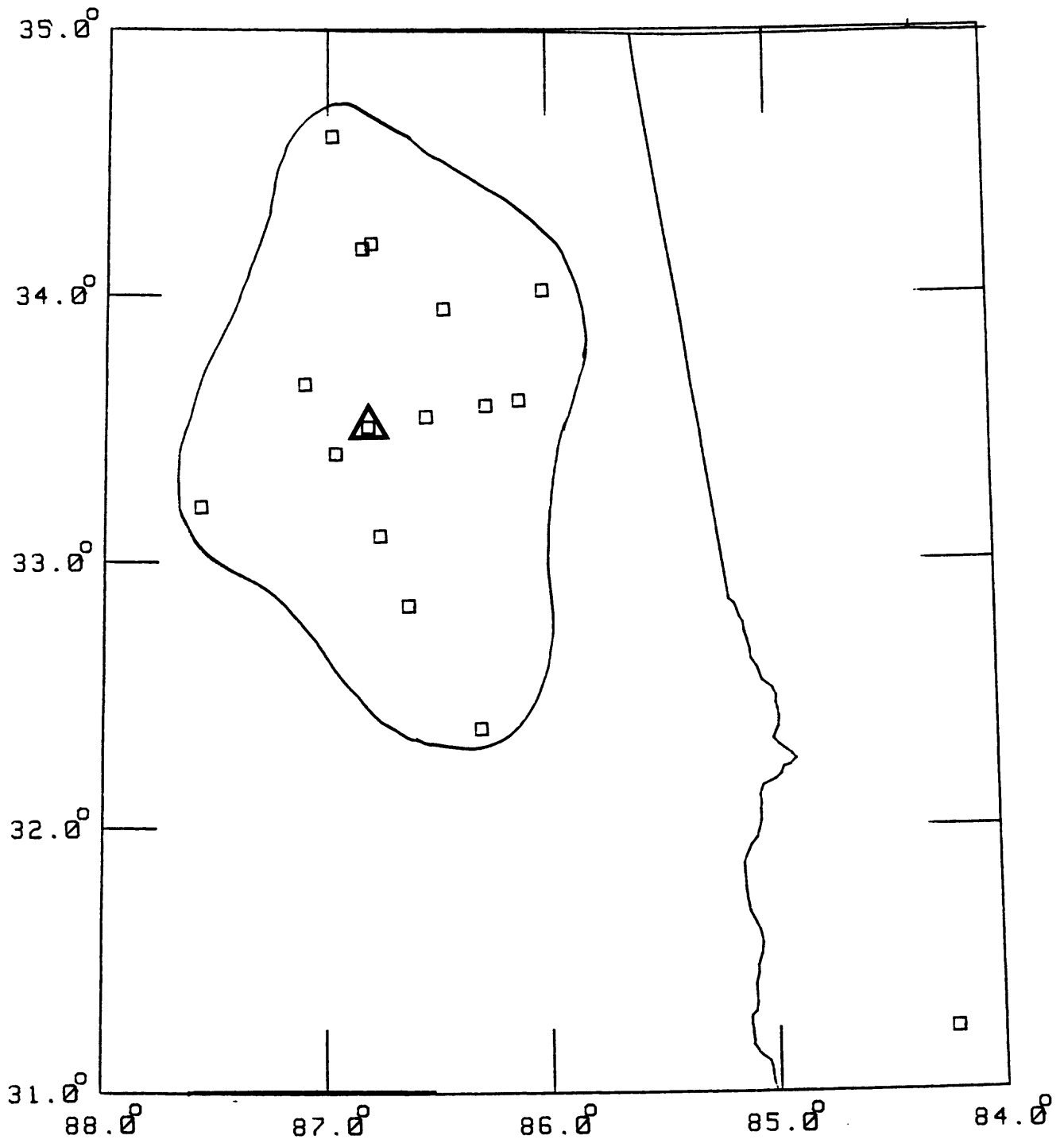


0 25
MILES

30 Aug 1930

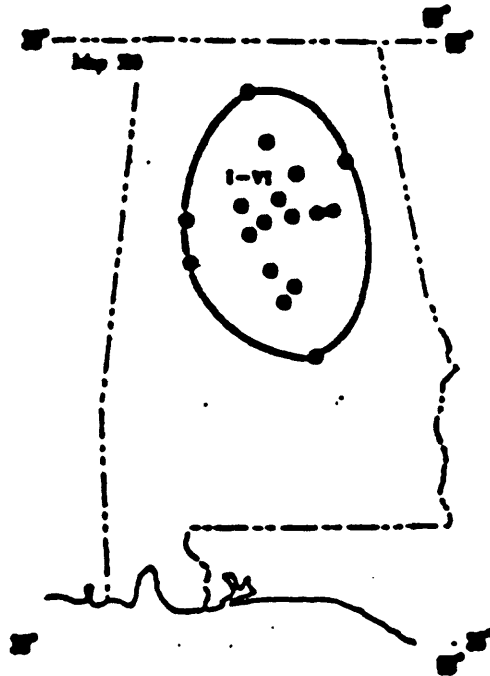


5 May 1931

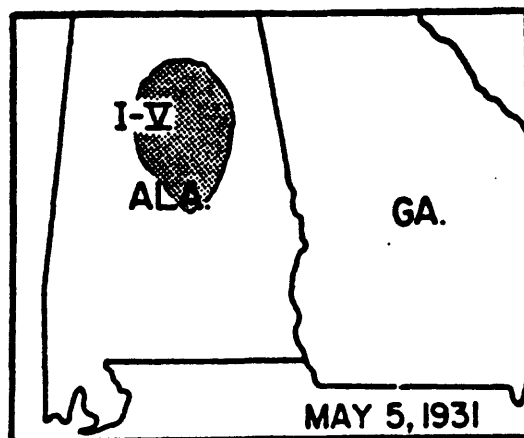


0 40
MILES

May 5, 1931

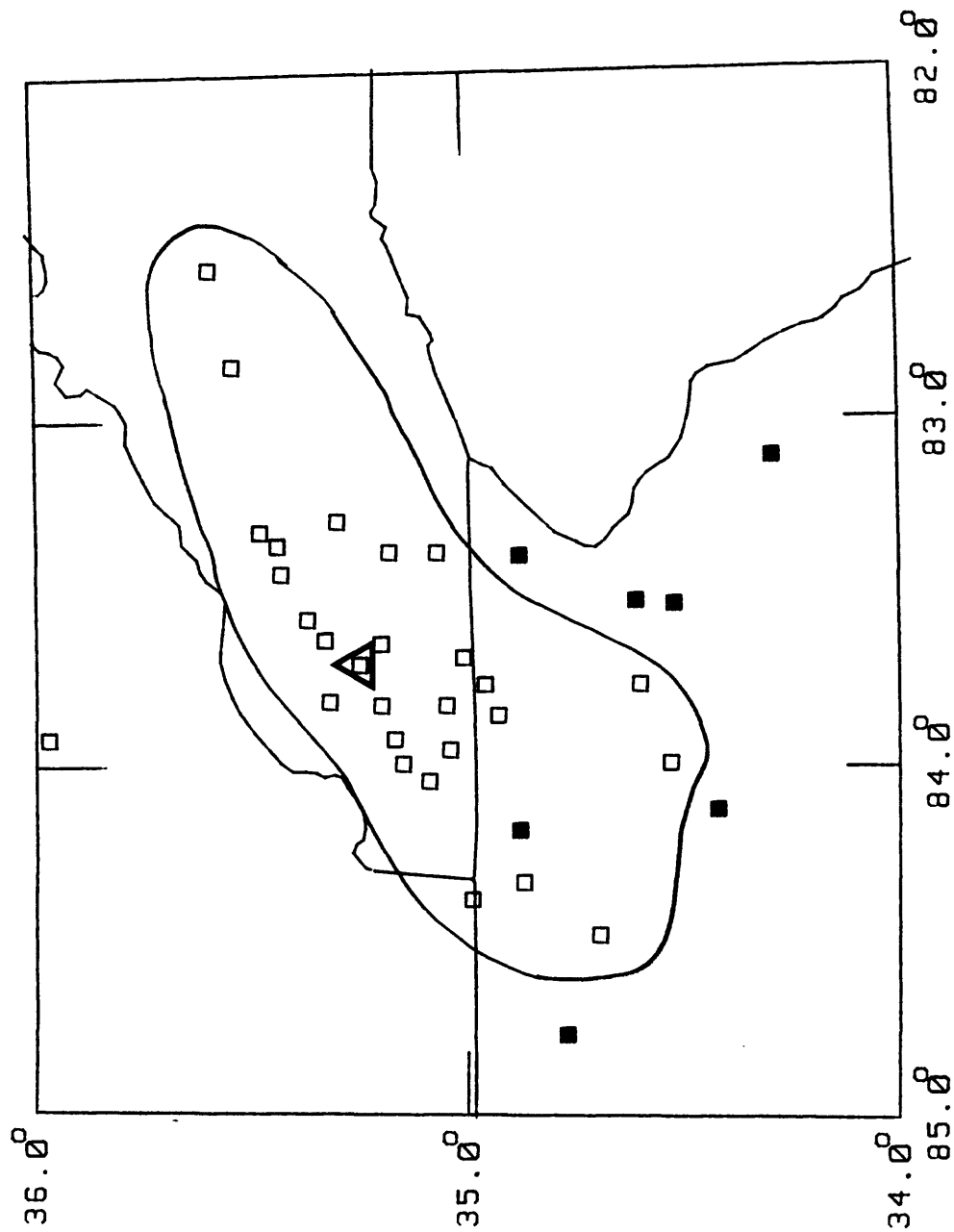


Ref. : Docekal [100]
12,000 sq. mi.

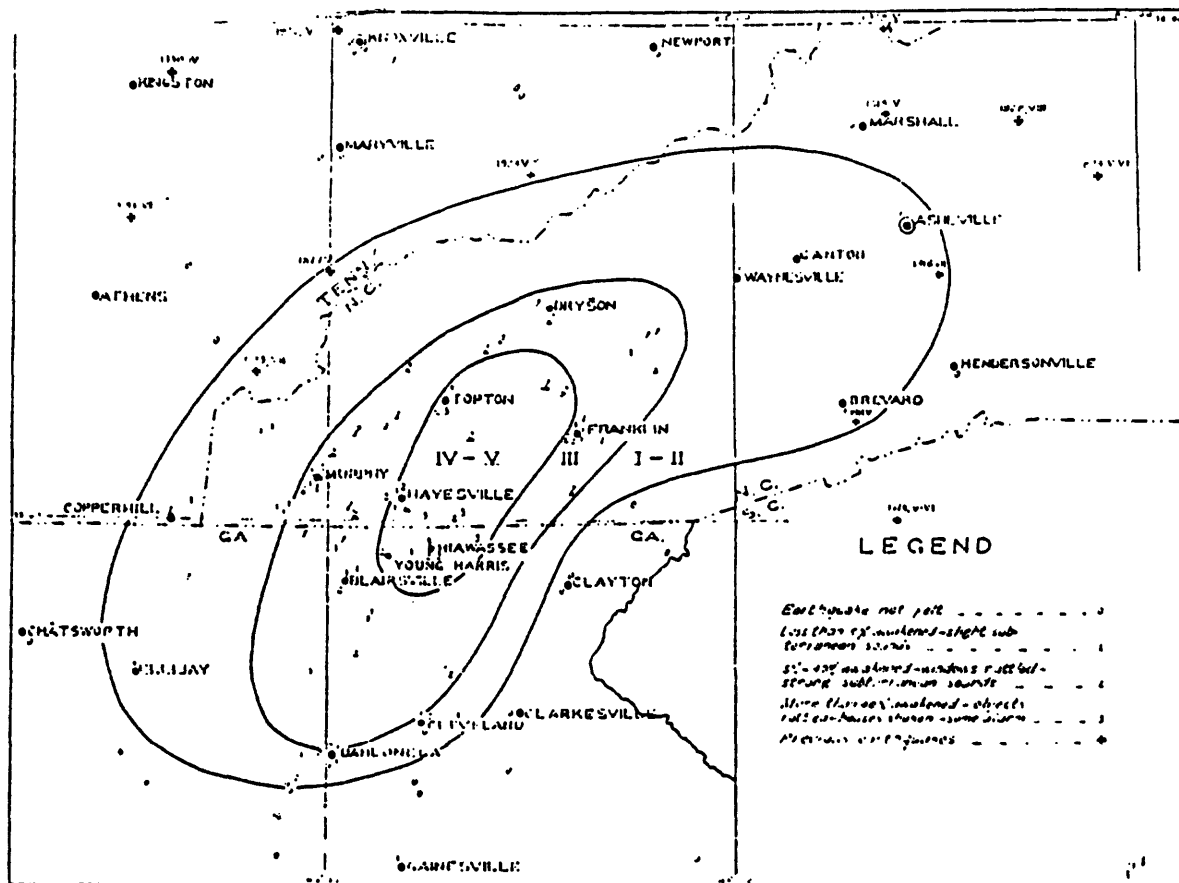


Ref. : Bollinger (1973)

1 Jan 1935



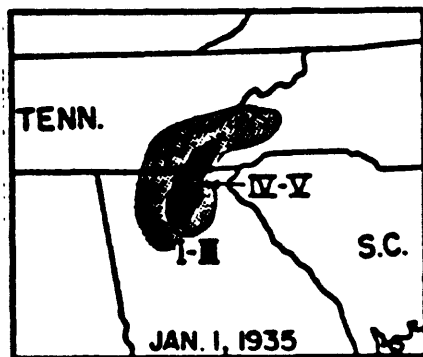
0 30
MILES



Map of the Southern Appalachian earthquake of January 1, 1935, showing intensities based on reports obtained by interview (upright figures), by correspondence (oblique figures), and by the United States Coast and Geologic Survey (enclined figures). Roman figures indicate intensity according to the Wood-Neumann scale. All previous earthquakes in the area are shown, with their date and intensity.

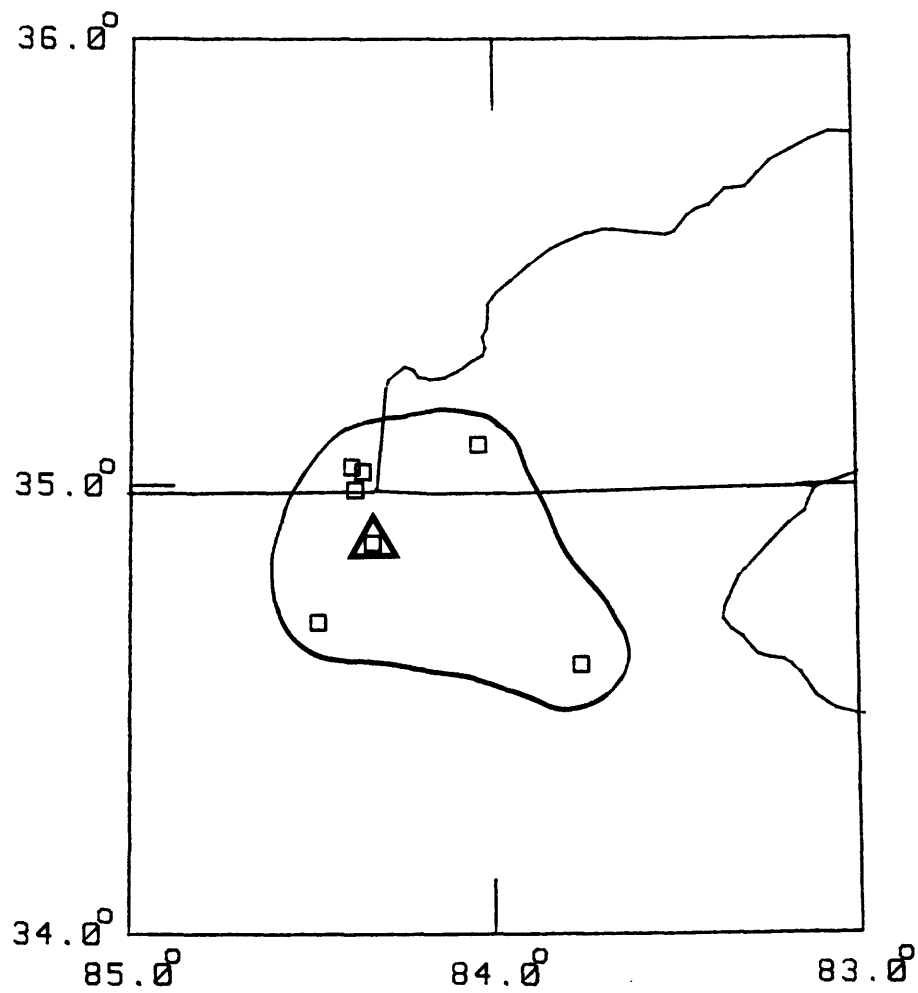
Ref. : Crickmay [90]

6725 sq. mi.



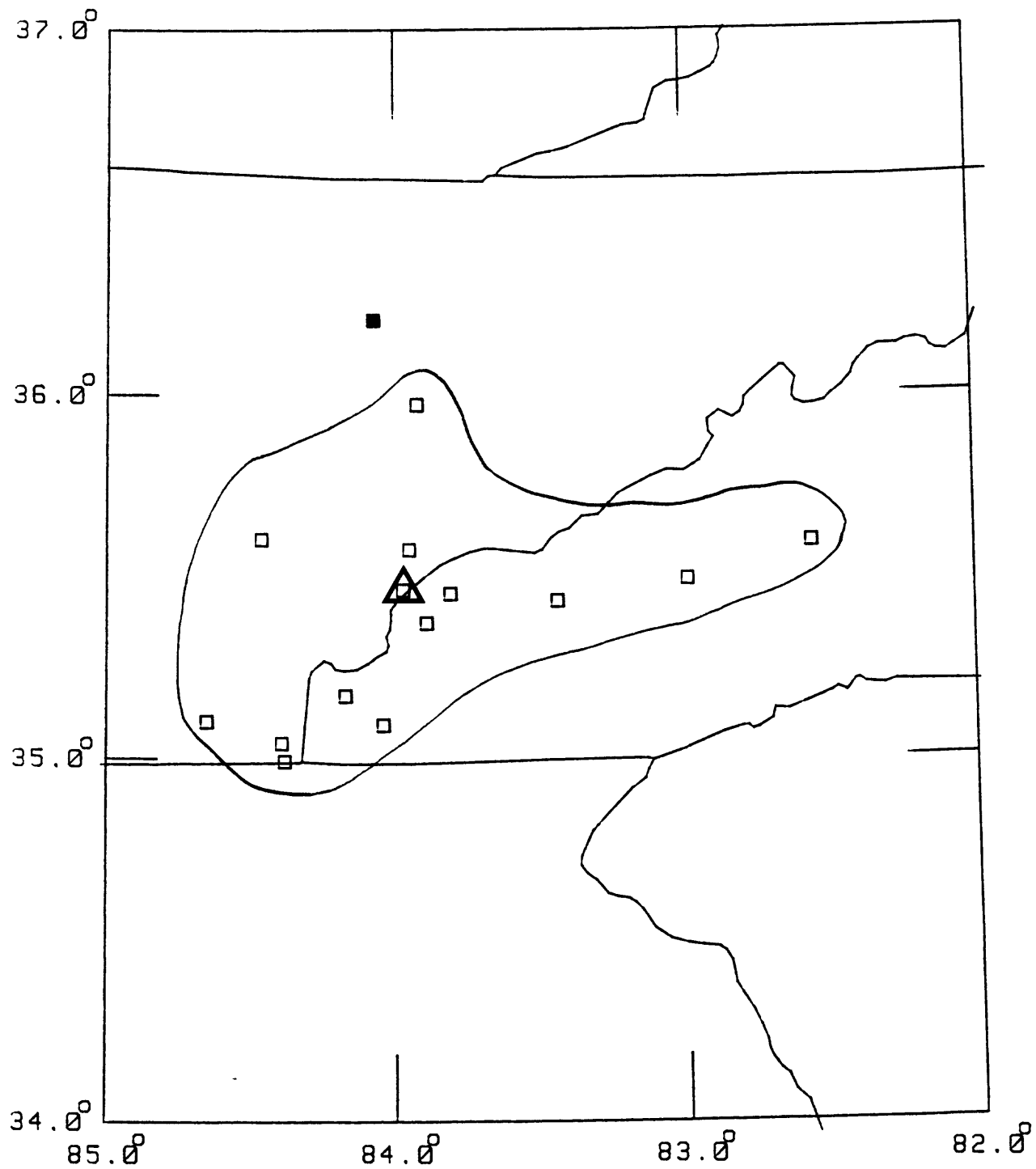
Ref. : Bollinger (1973)

1 Jan 1936



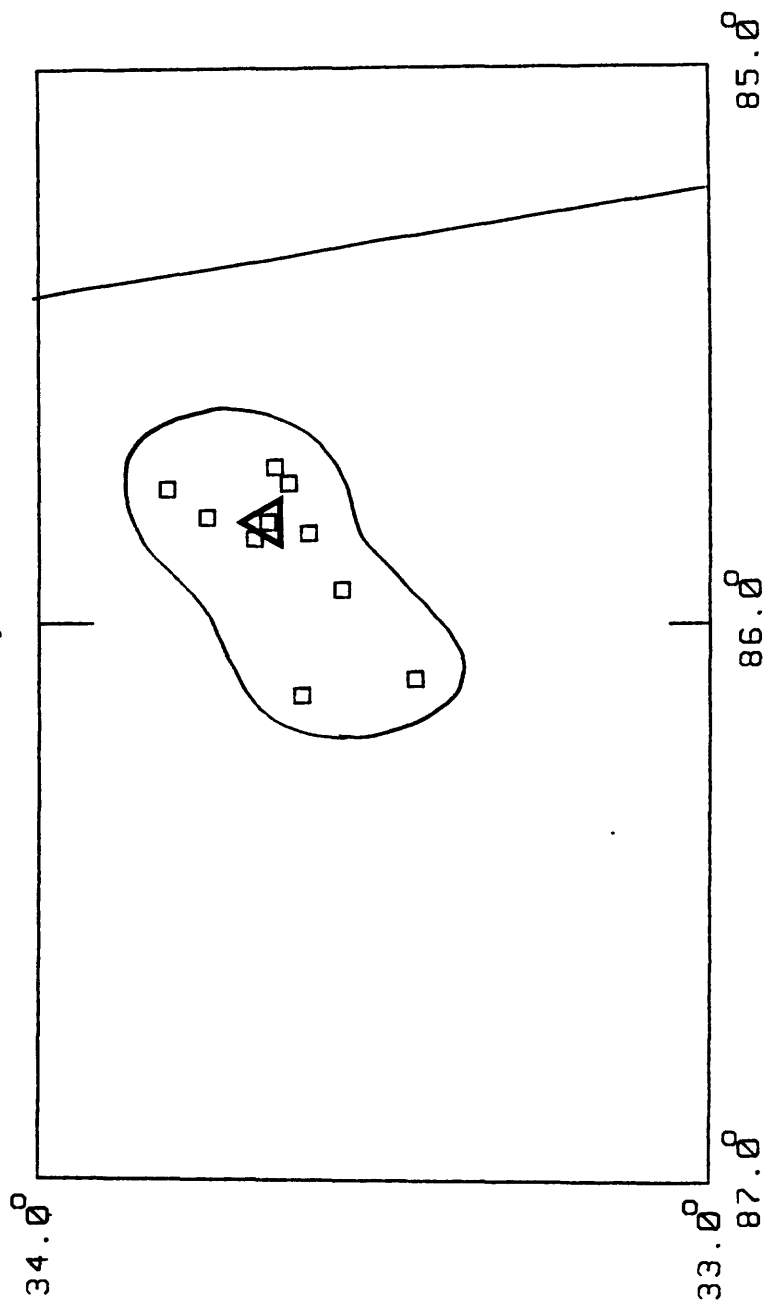
0 30
MILES

31 Mar 1938

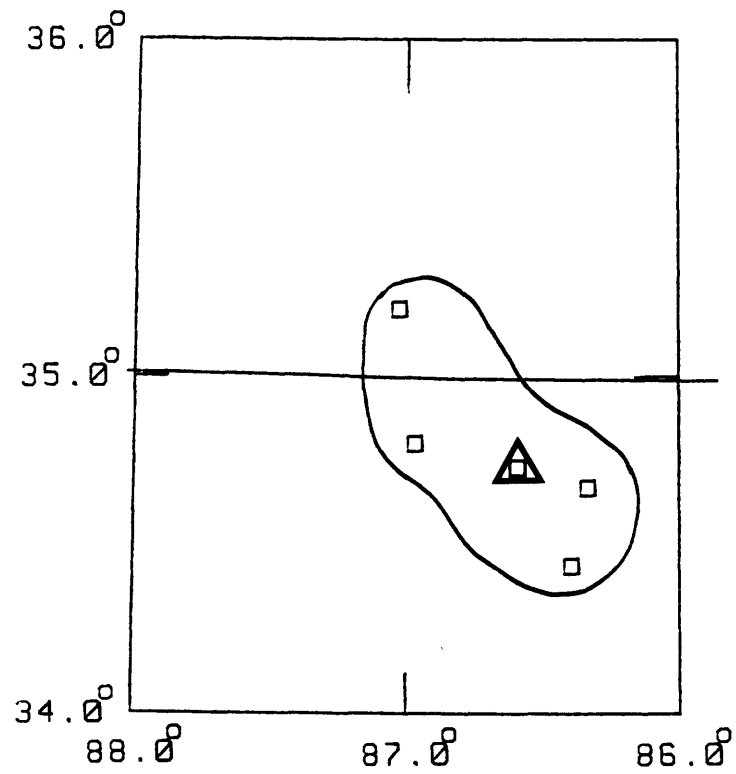


0 30
MILES

5 May 1939

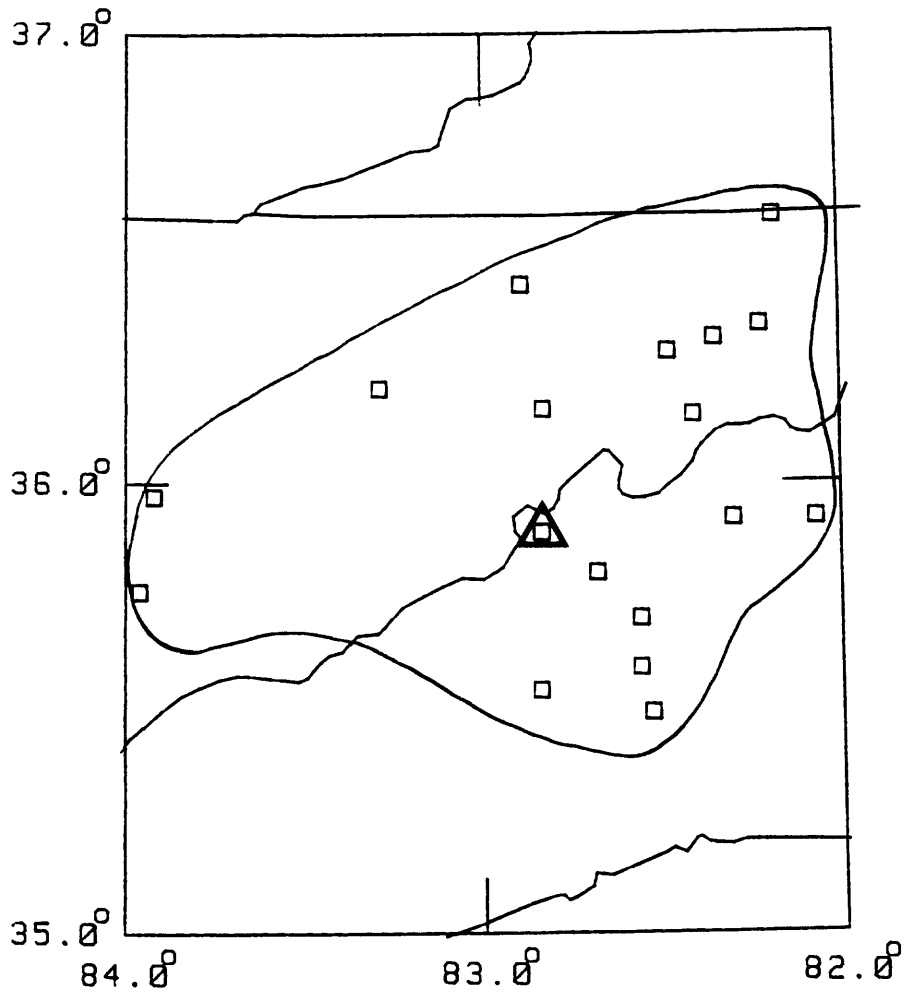


24 Jun 1939



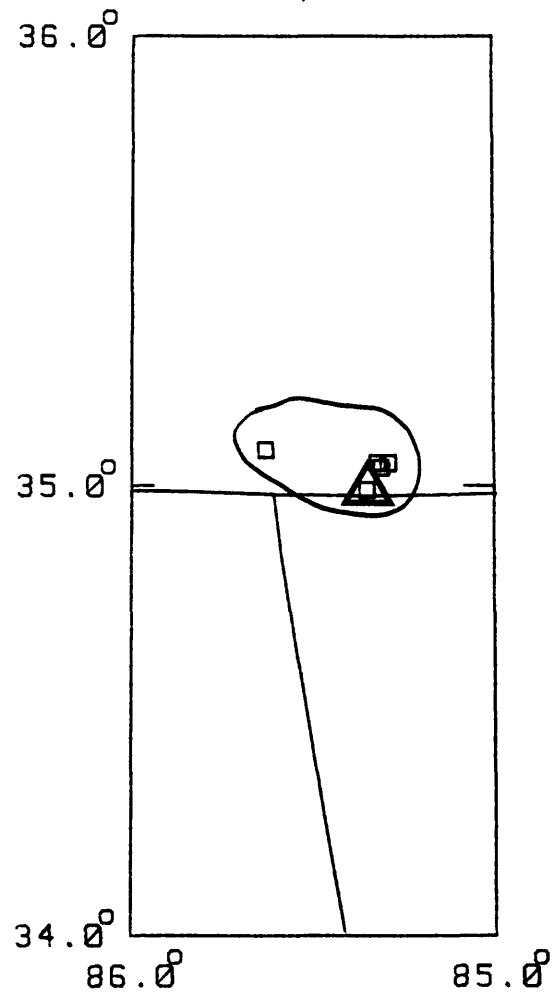
0 40
MILES

25 Dec 1940



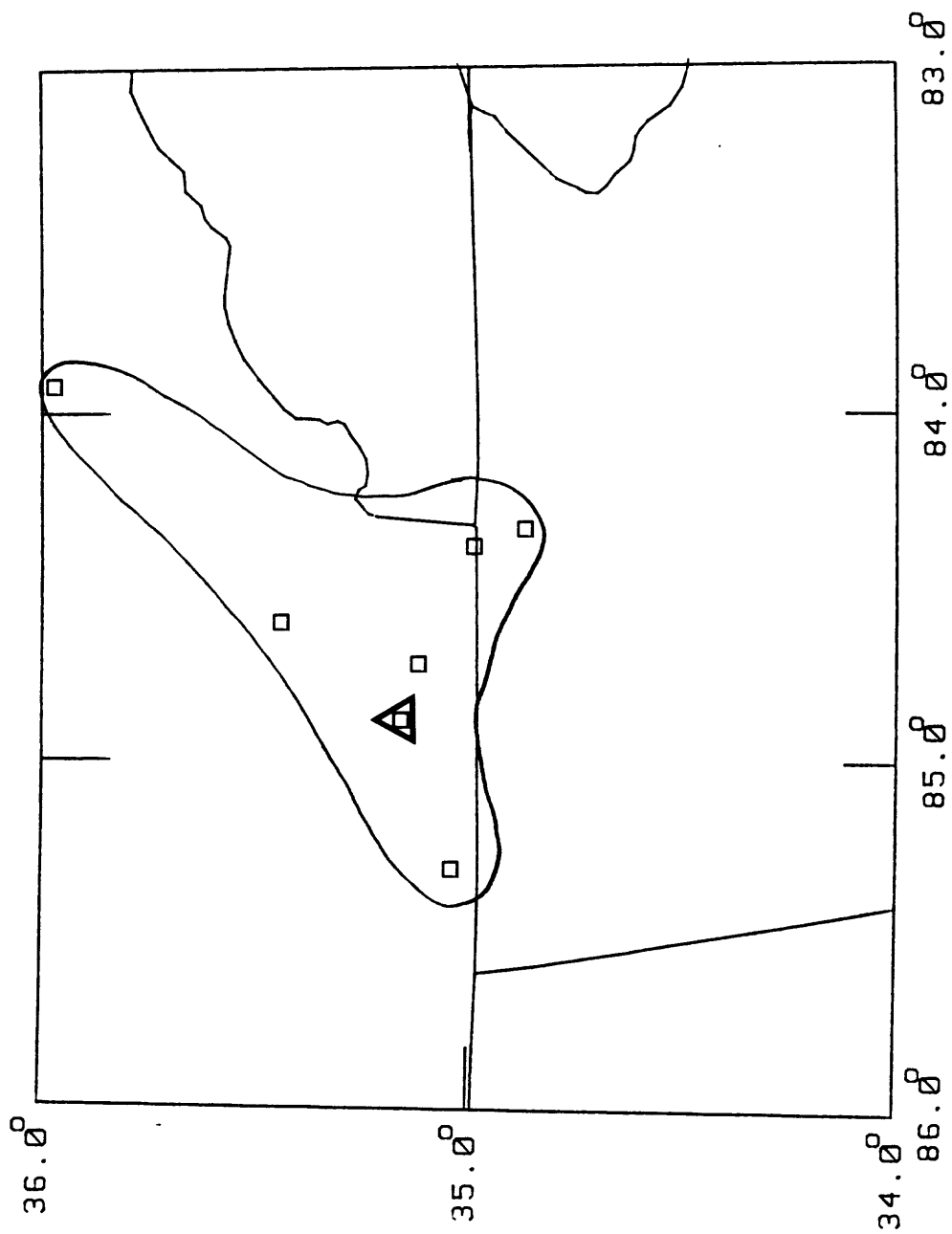
0 30
MILES

8 Sep 1941



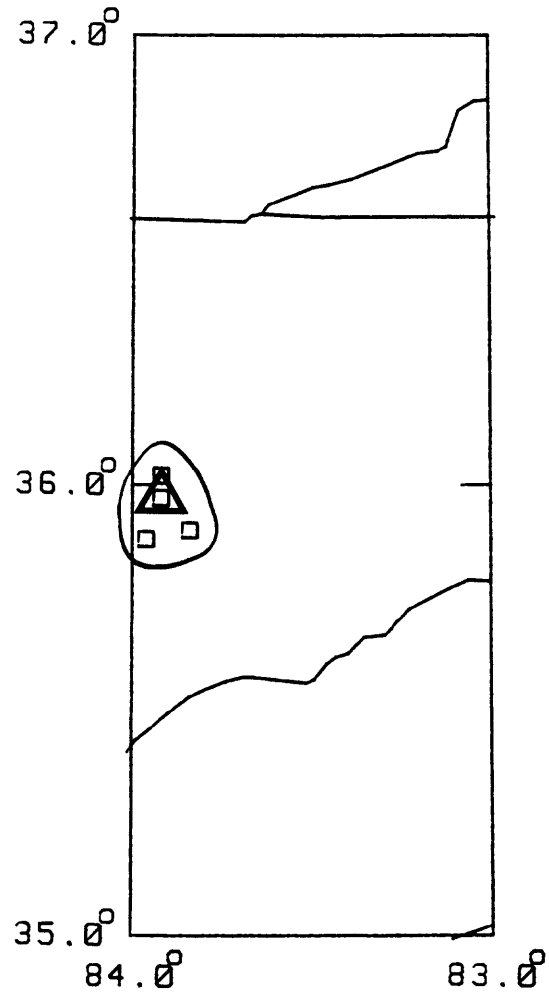
0 30
MILES

14 Jun 1945



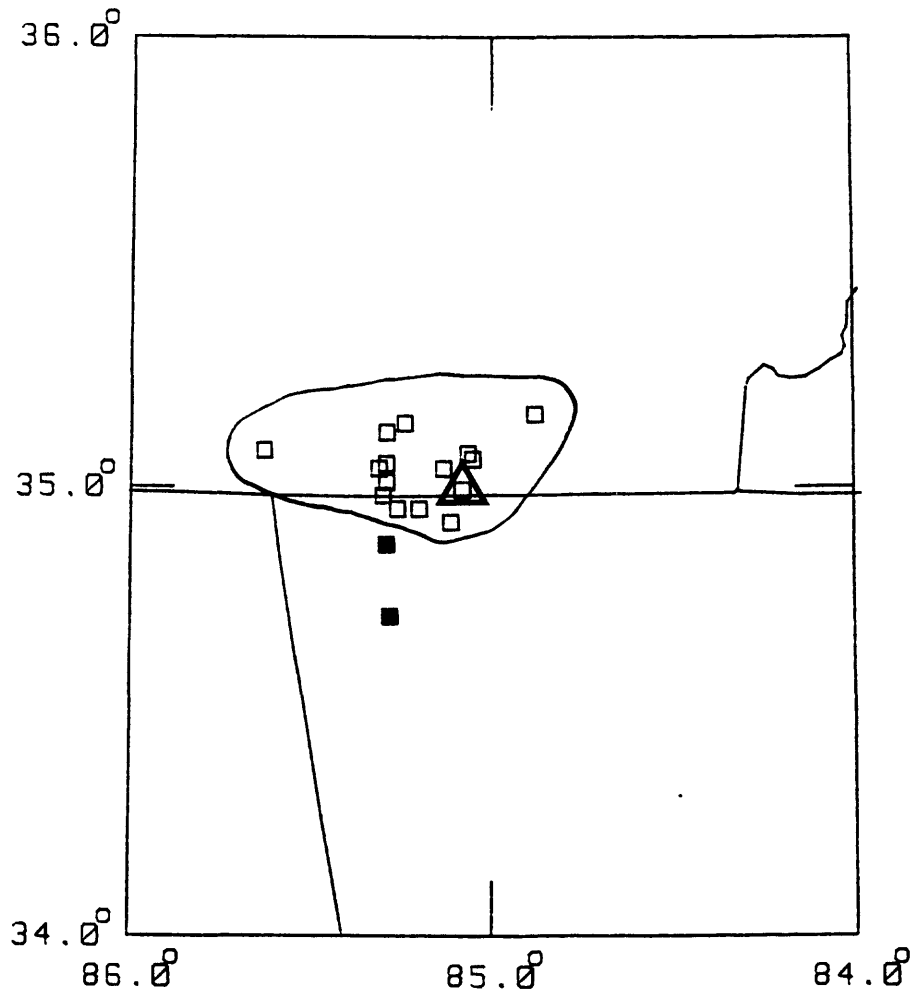
0 30
MILES

6 Jun 1947



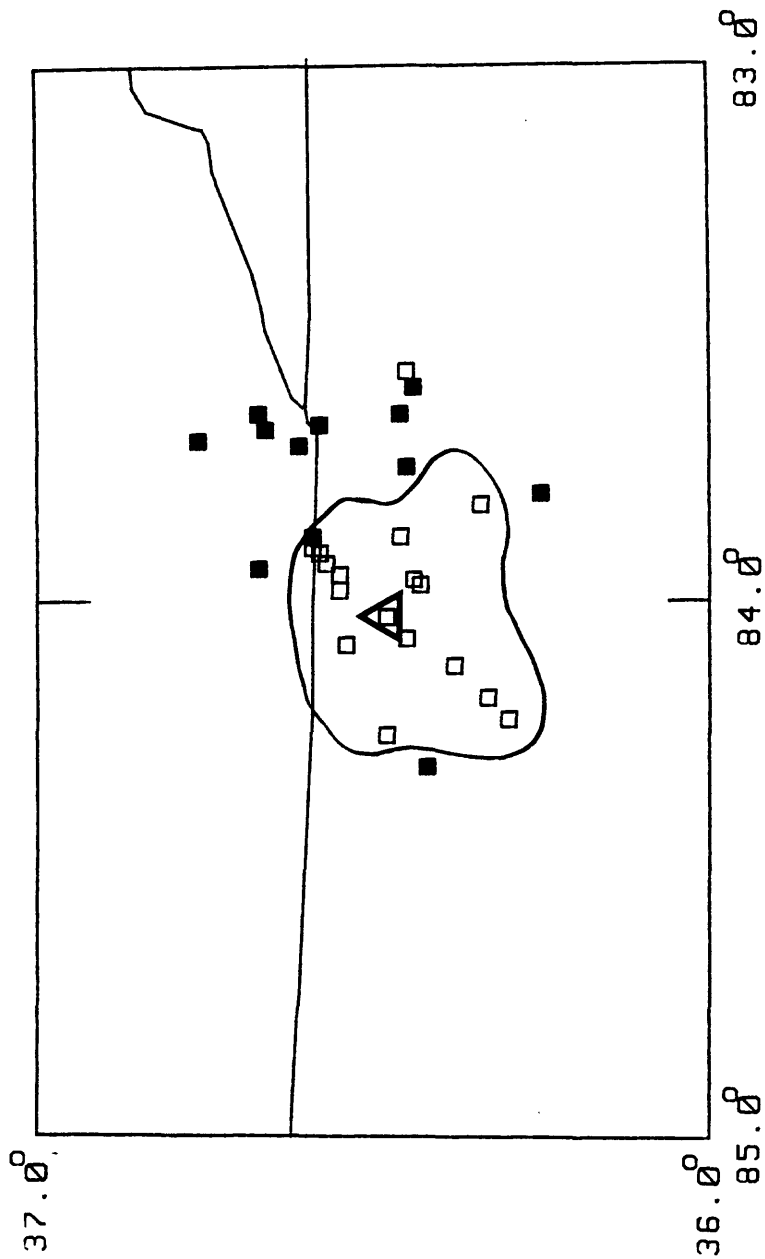
0 30
MILES

28 Dec 1947



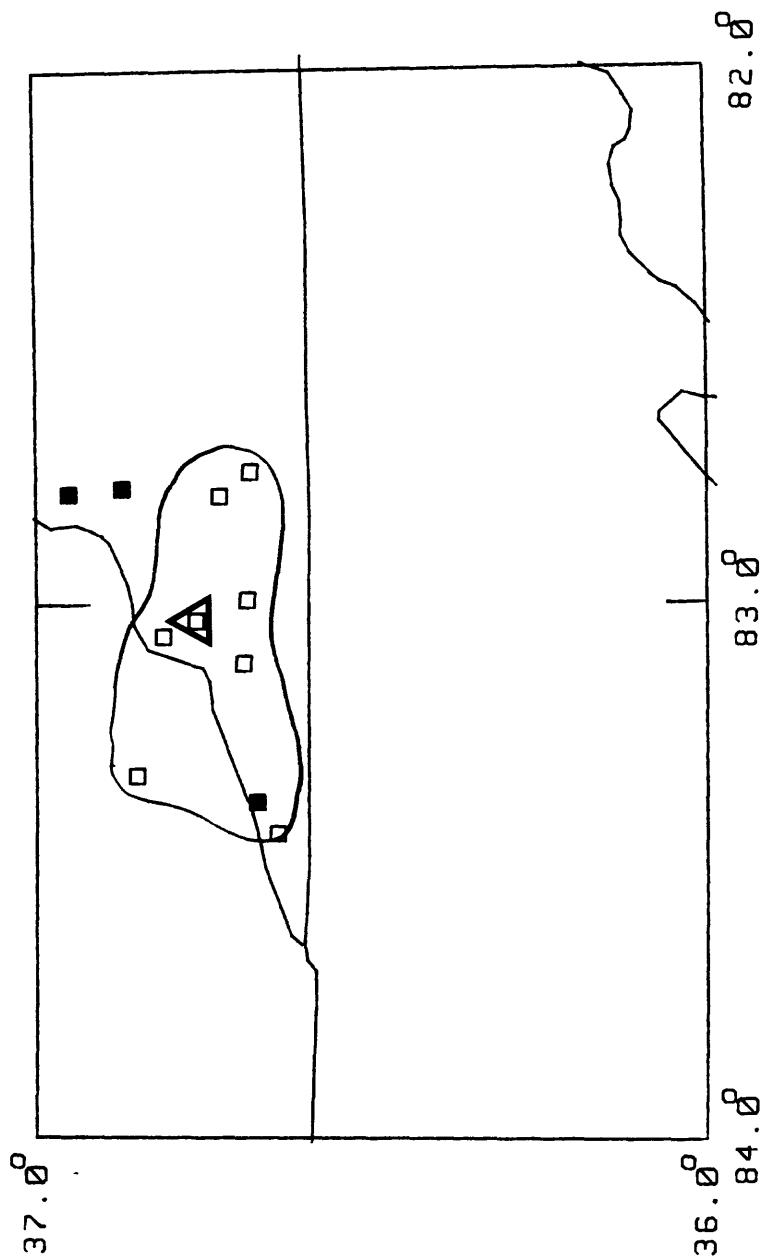
0 30
MILES

10 Feb 1948



0 20
MILES

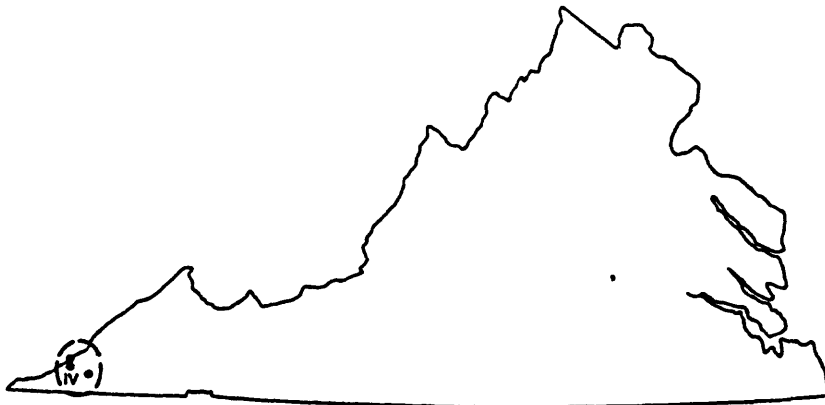
17 Sep 1949



0 20
MILES

Earthquake of September 17, 1949, Lee County,
Virginia, (Sat. 0430 Hrs.)

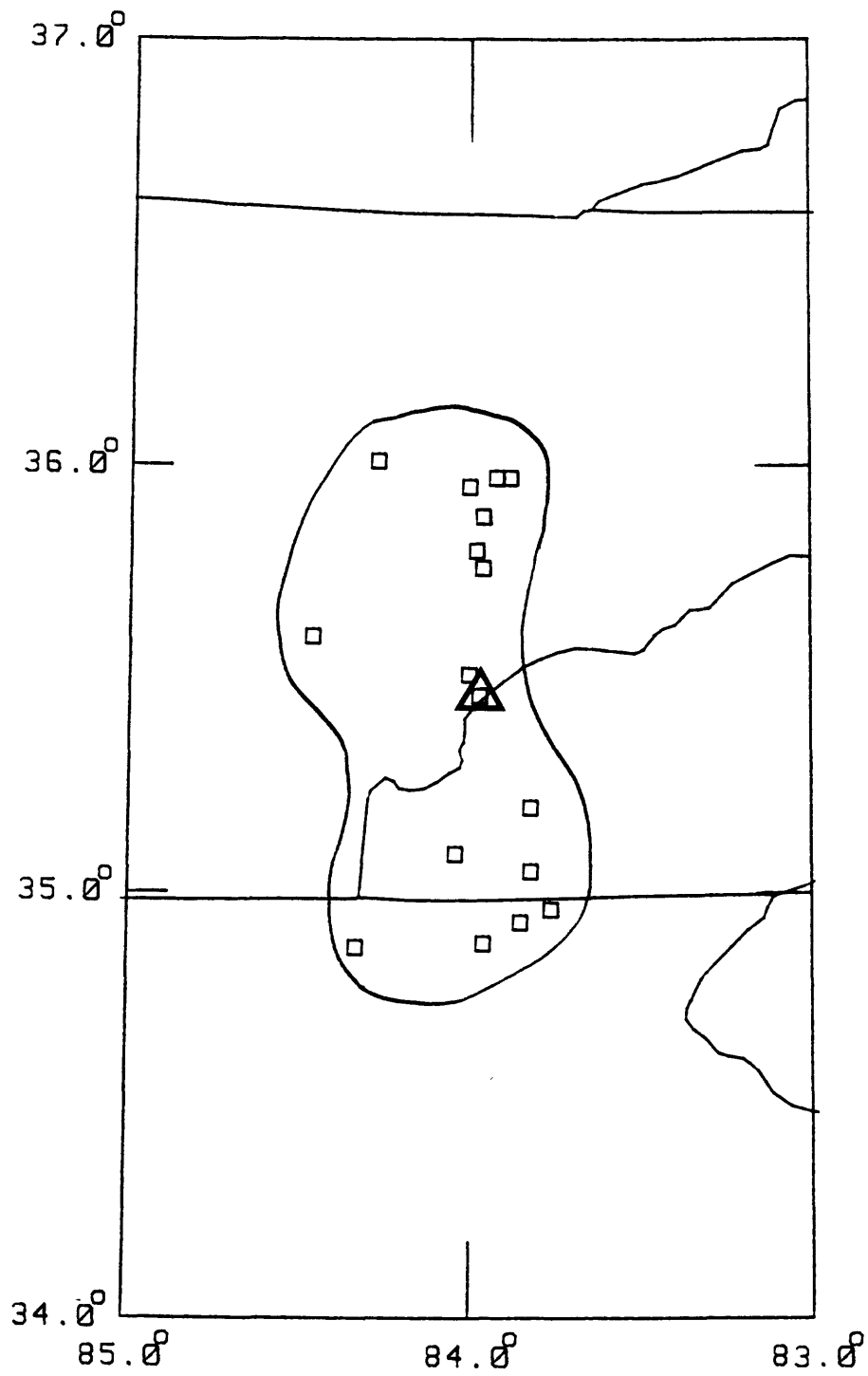
Felt Area : 700 sq. mi.



SEPT. 17, 1949

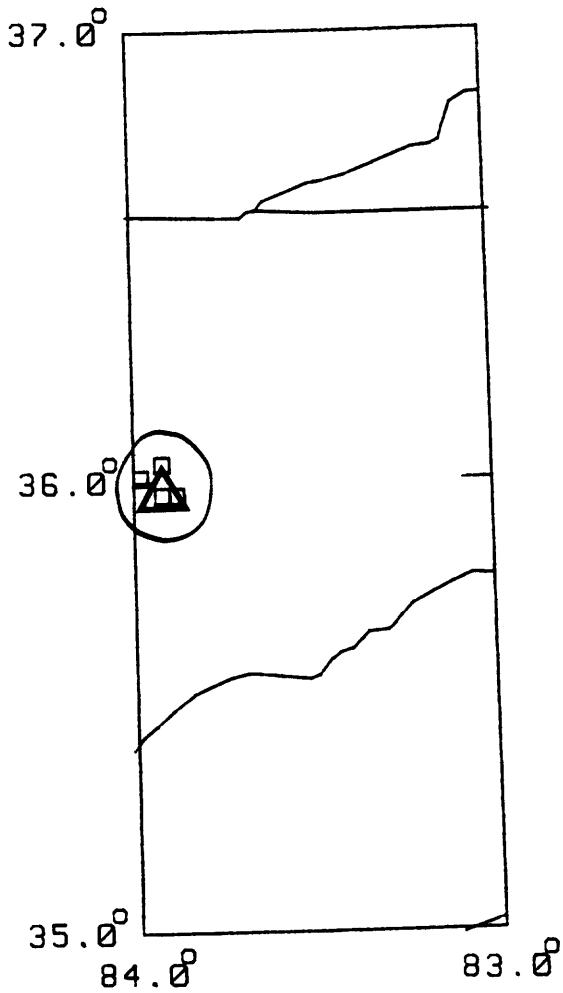
Ref. : Bollinger [35]

19 Jun 1950

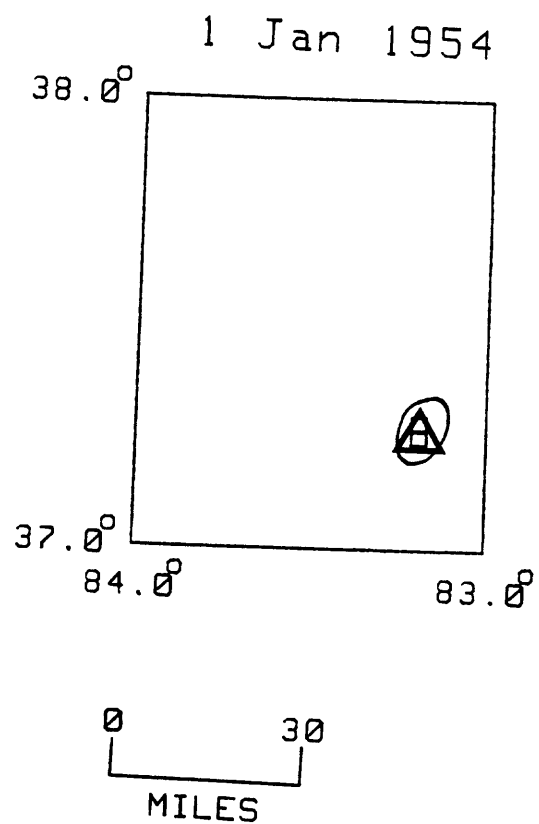
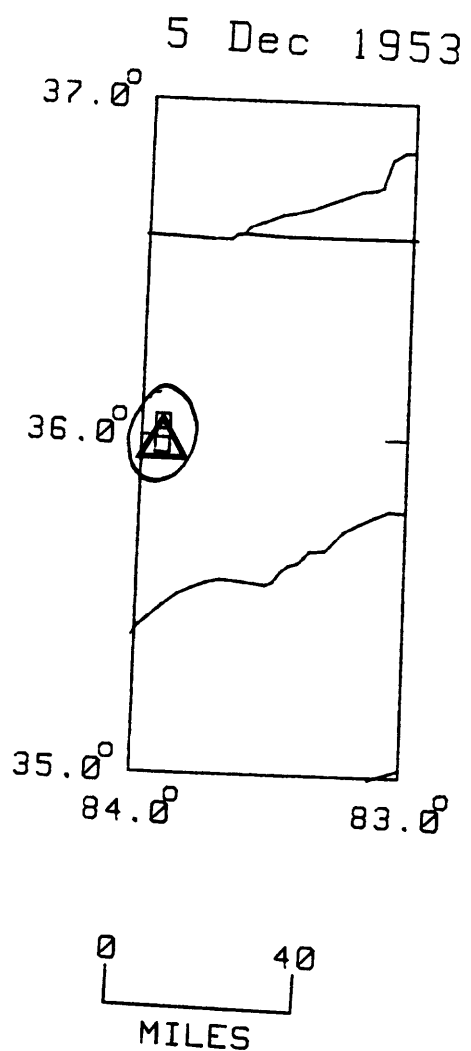


0 30
MILES

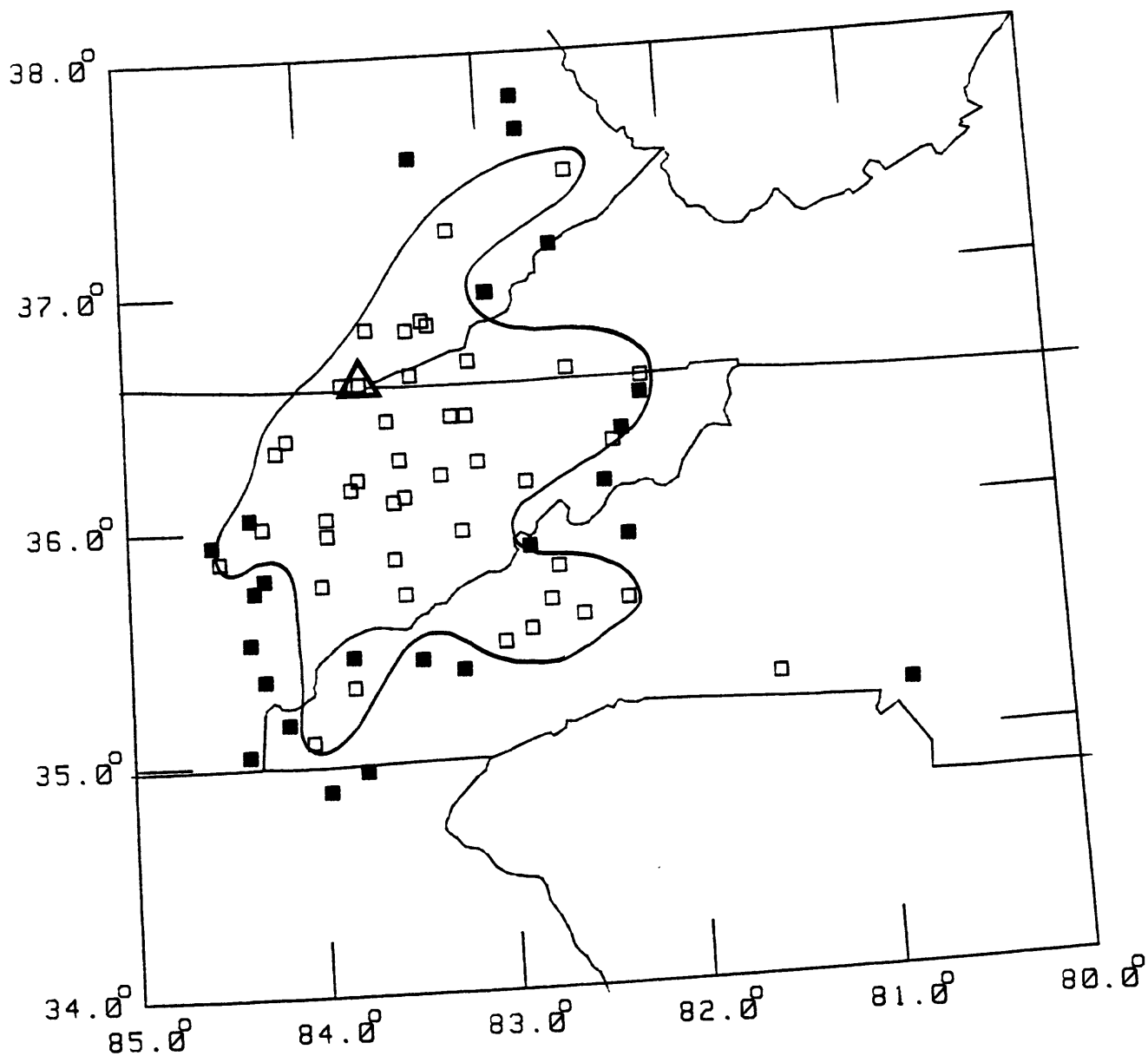
10 Nov 1953



A horizontal line segment with a vertical tick mark at the left end labeled '0' and a vertical tick mark at the right end labeled '30'. Below the line segment, the word 'MILES' is written in capital letters.

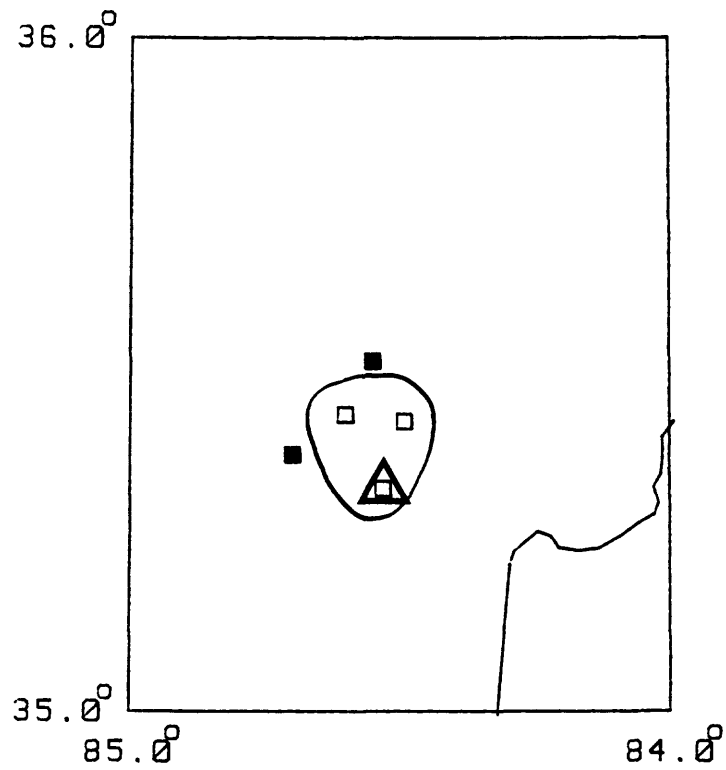


2 Jan 1954



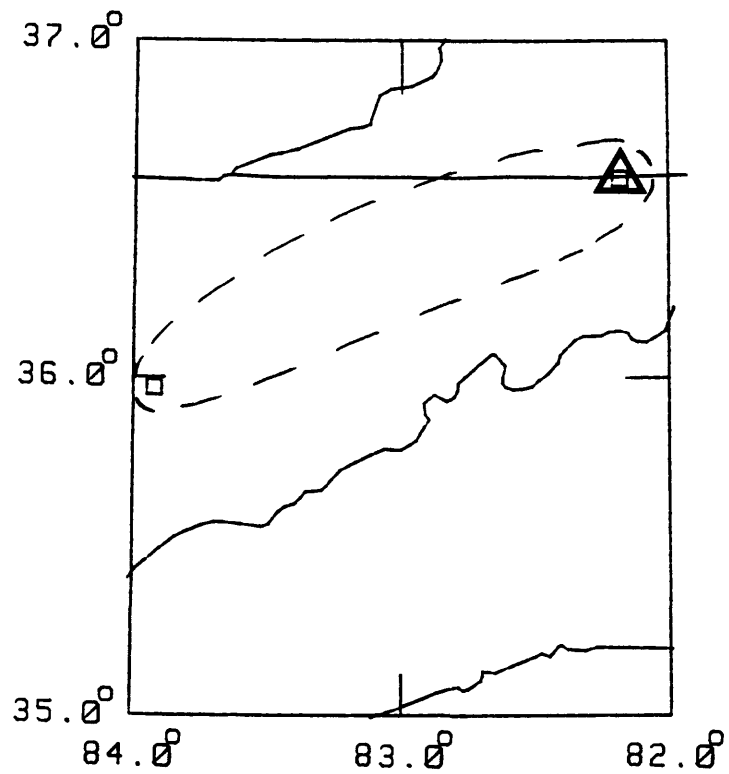
0 50
MILES

23 Jan 1954

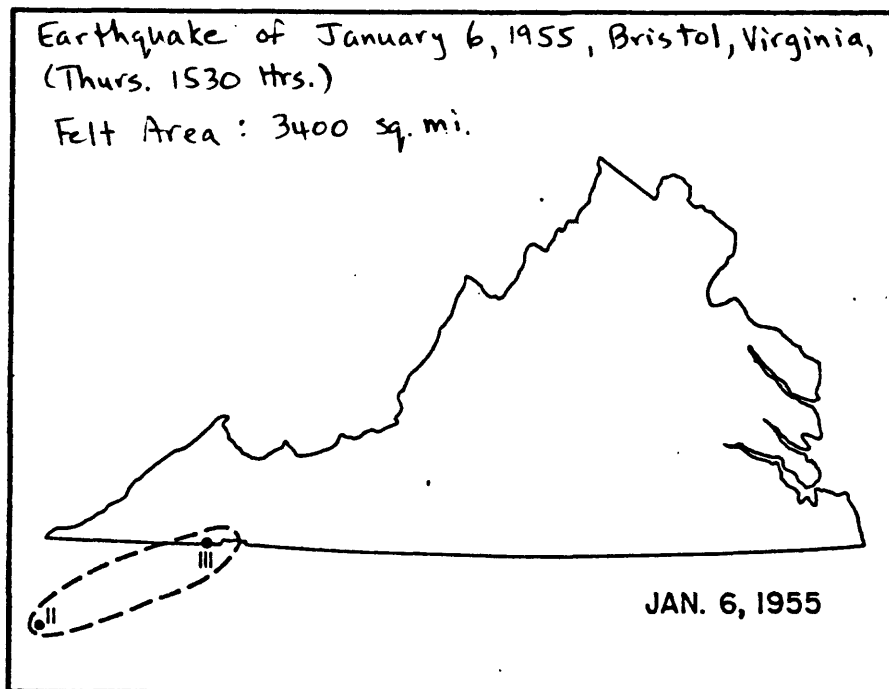


0 20
MILES

6 Jan 1955

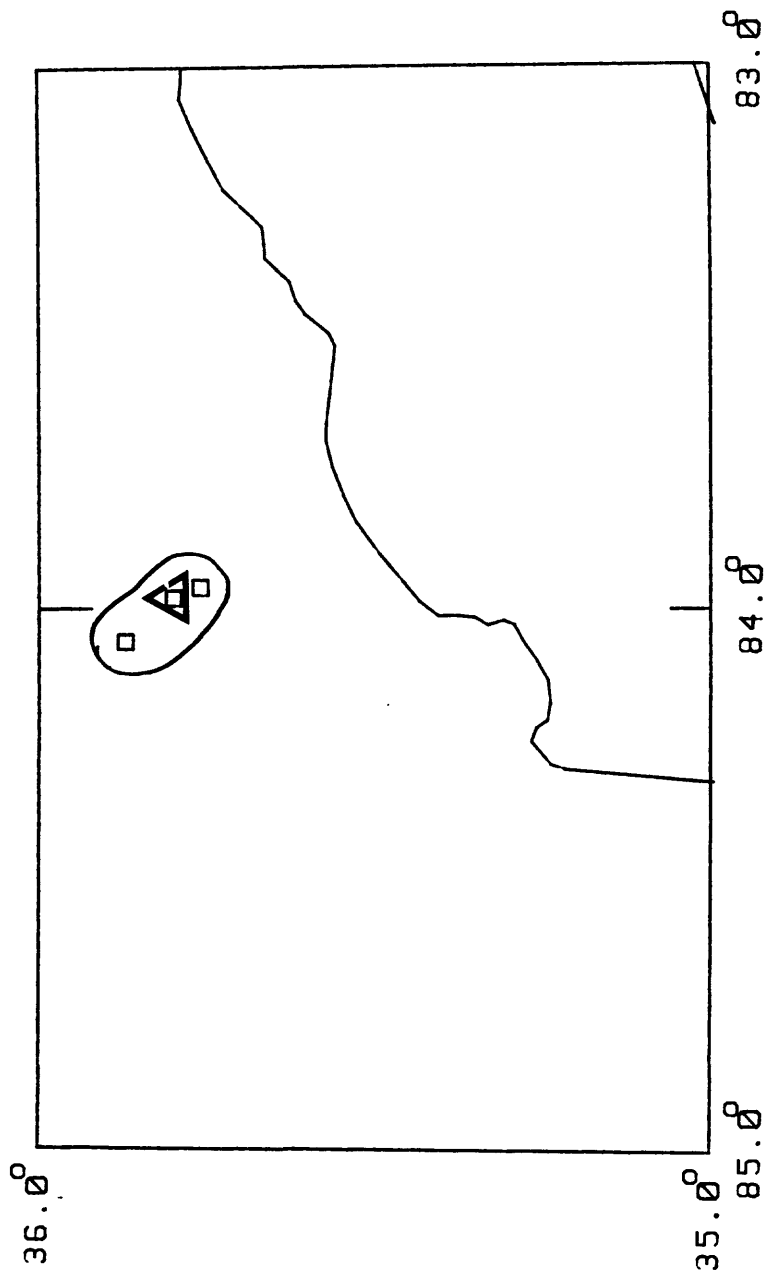


0 40
MILES

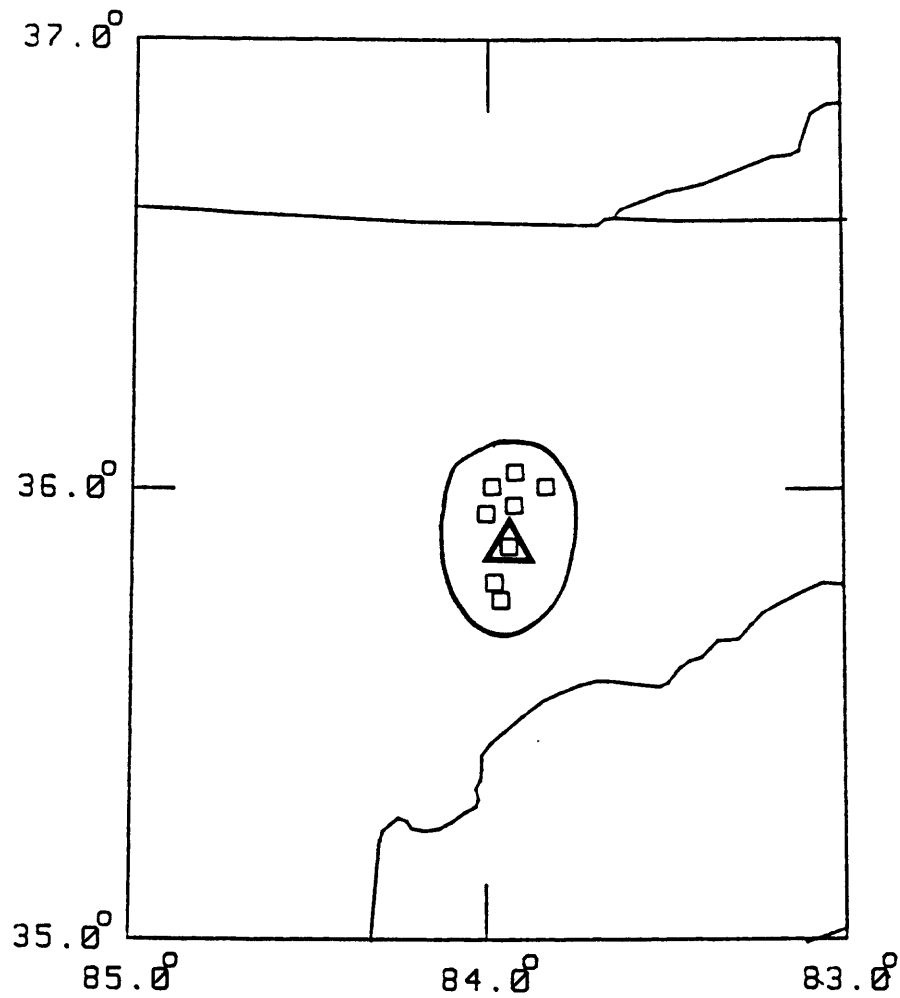


Ref. : Bollinger [35]

12 Jan 1955

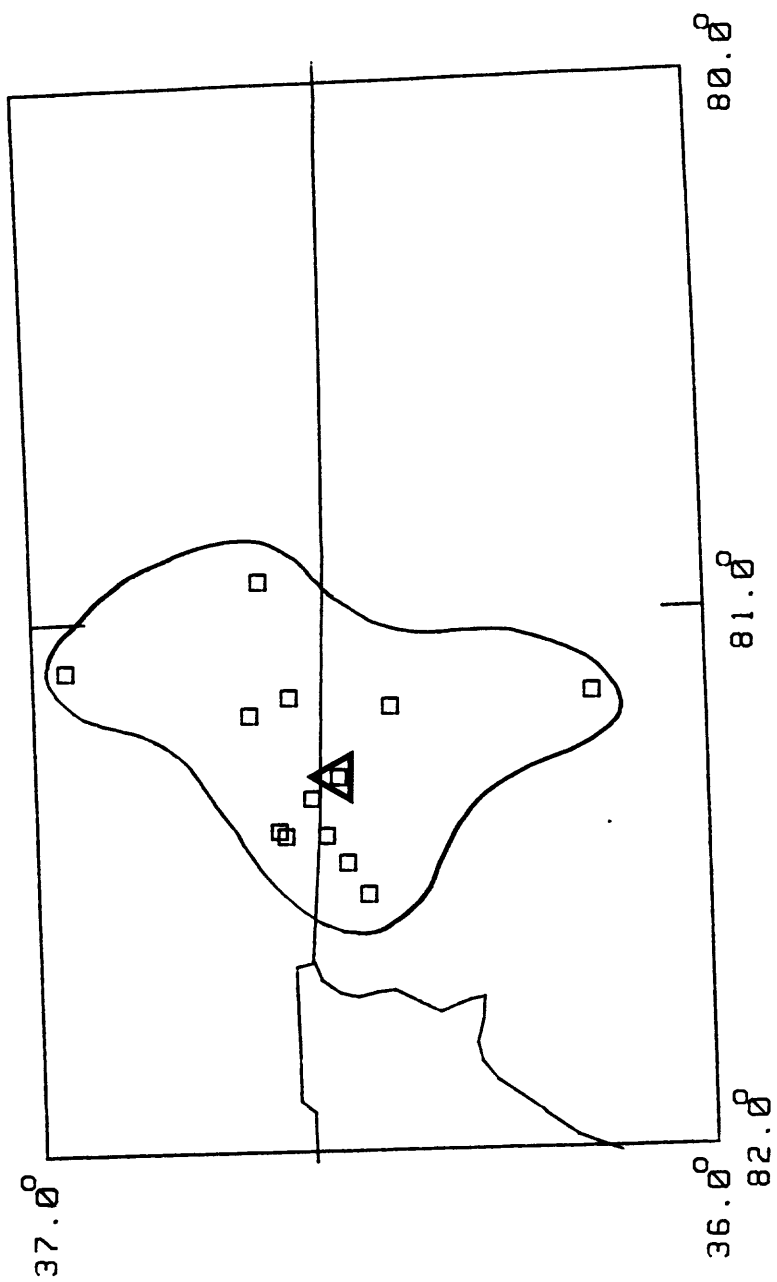


25 Jan 1955

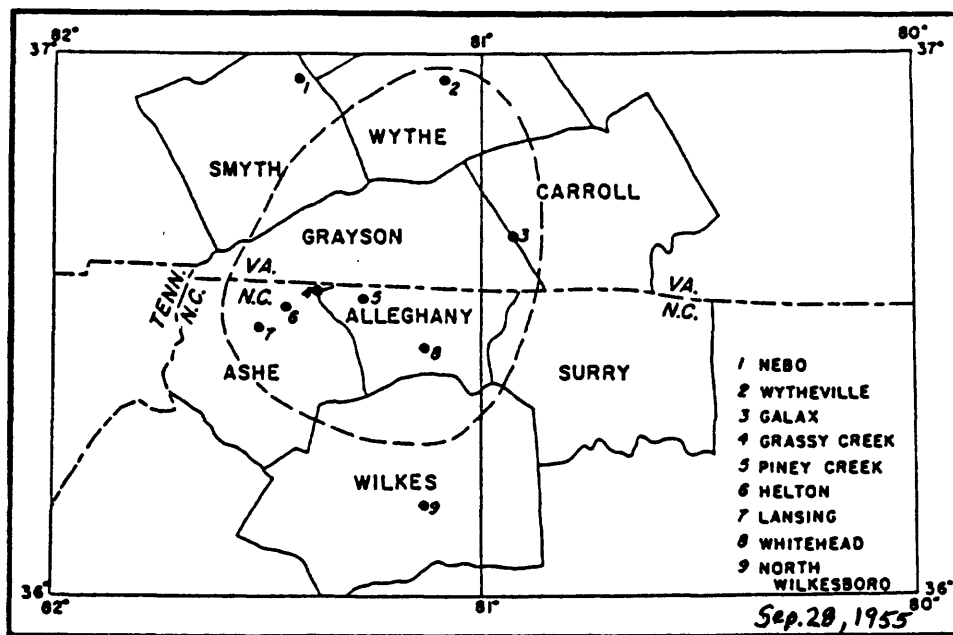


0 30
MILES

28 Sep 1955

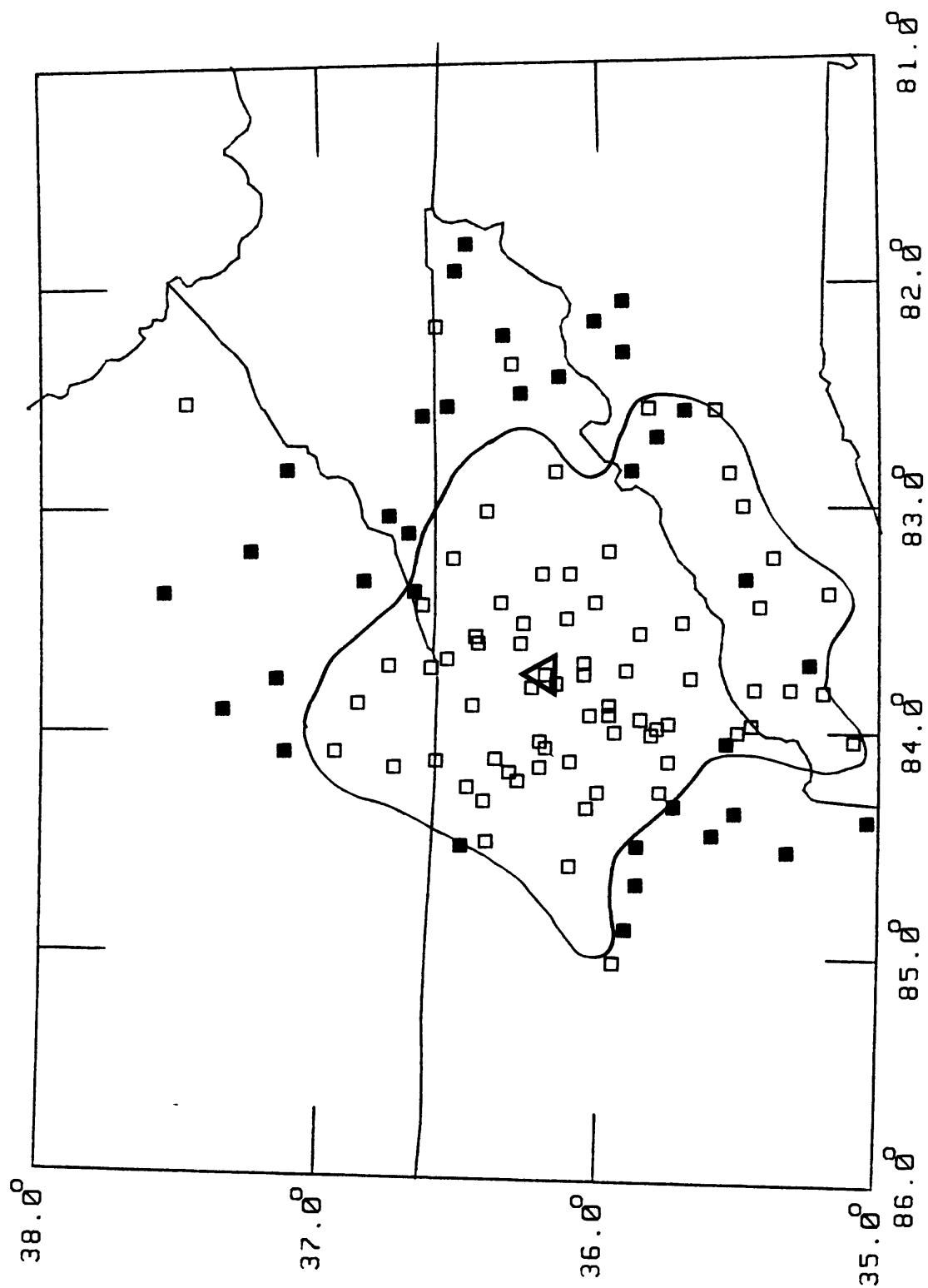


0 20
MILES

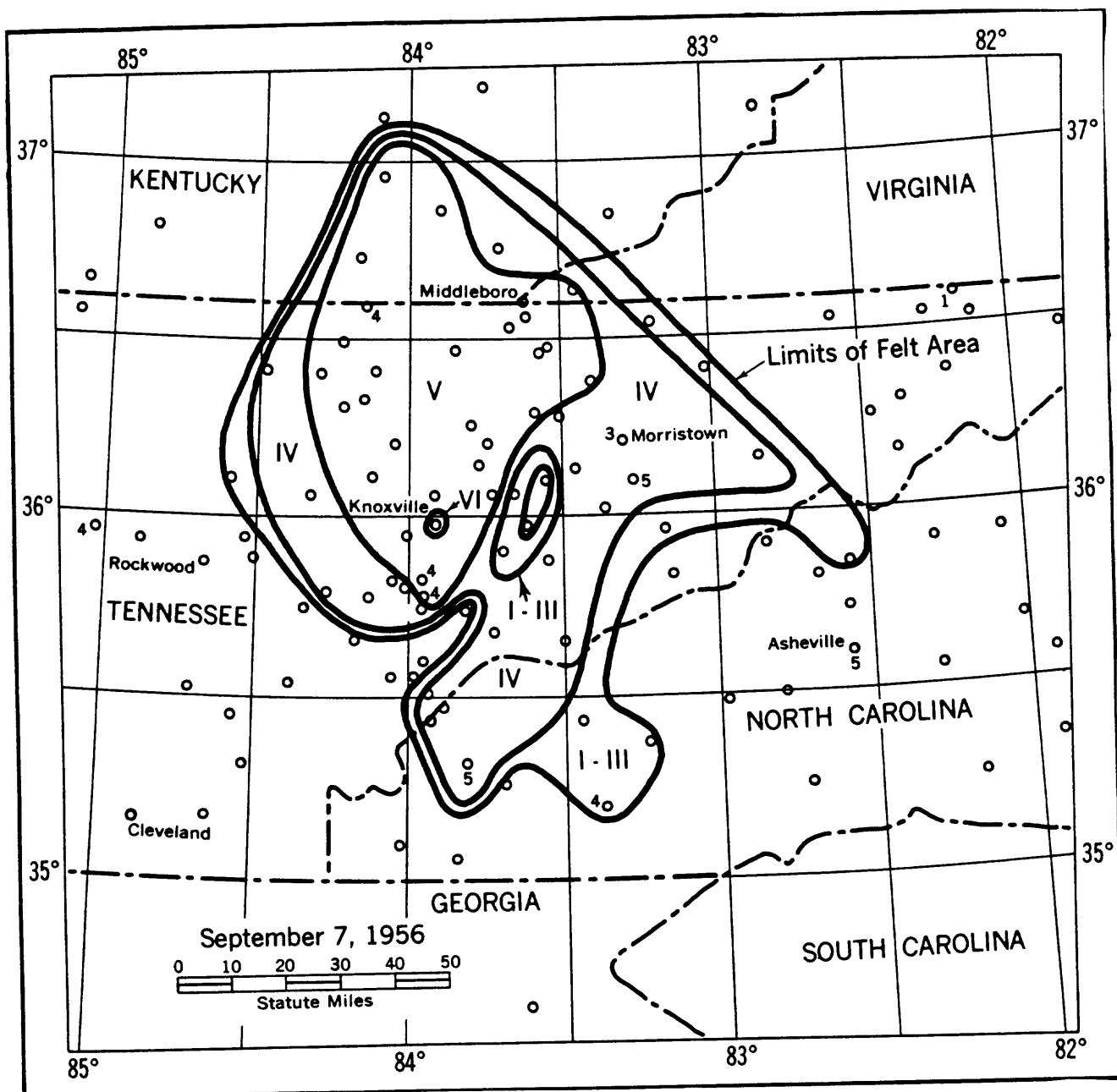


Southern Appalachian Earthquake of Sept. 28, 1955
 Ref.: MacCarthy [240] 1700 sq. mi.

7 Sep 1956

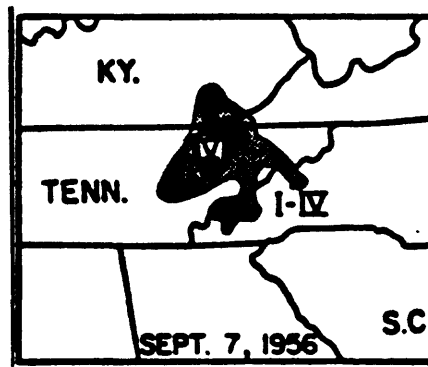


0 40
MILES



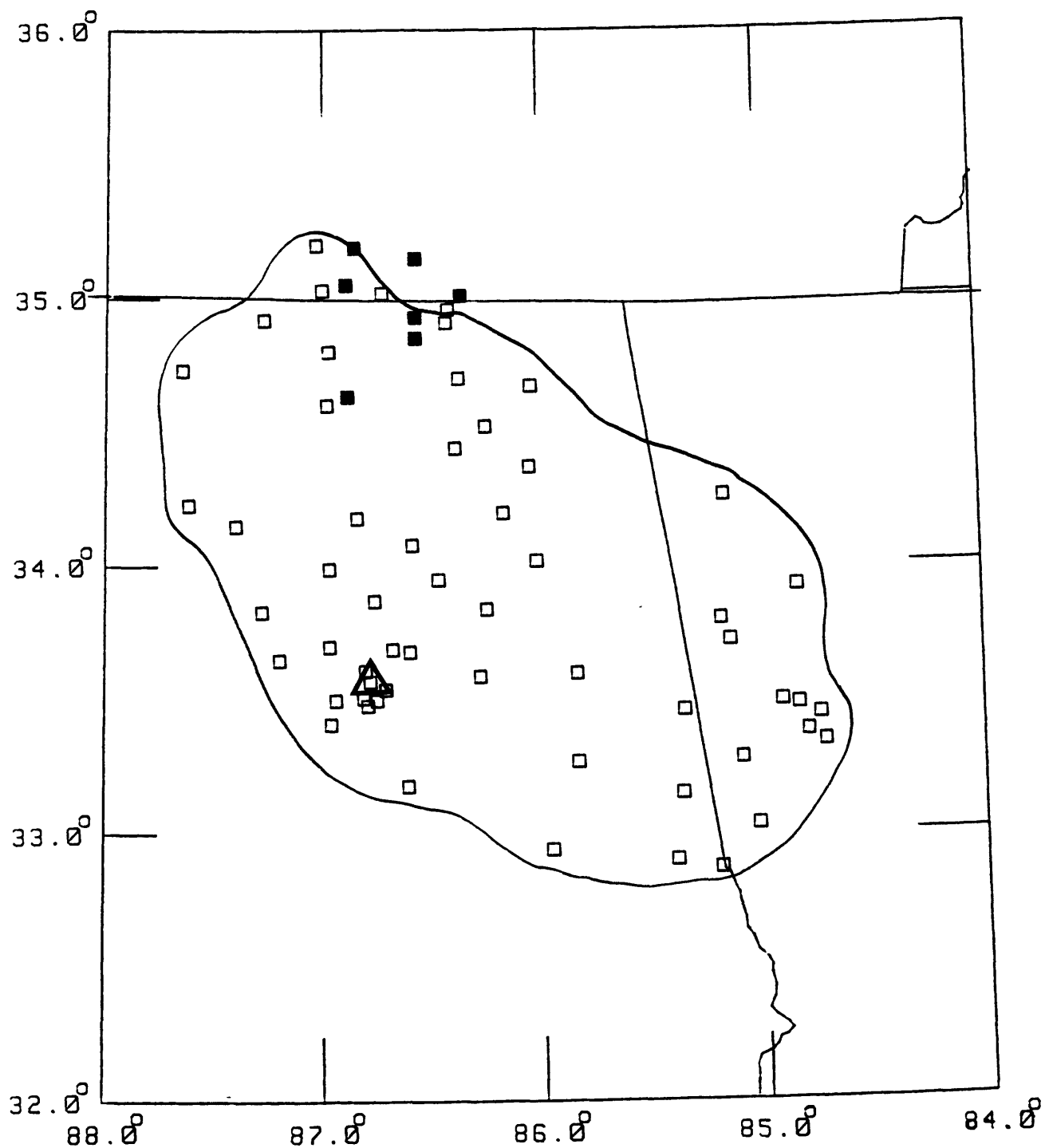
Ref. : USEQ [395]

September 7, 19 56
 35.5N-84.0W
 Near Maryville, Tn.
 13:49:20 GMT
 21,500 sq. km.
 Max. Int. VI

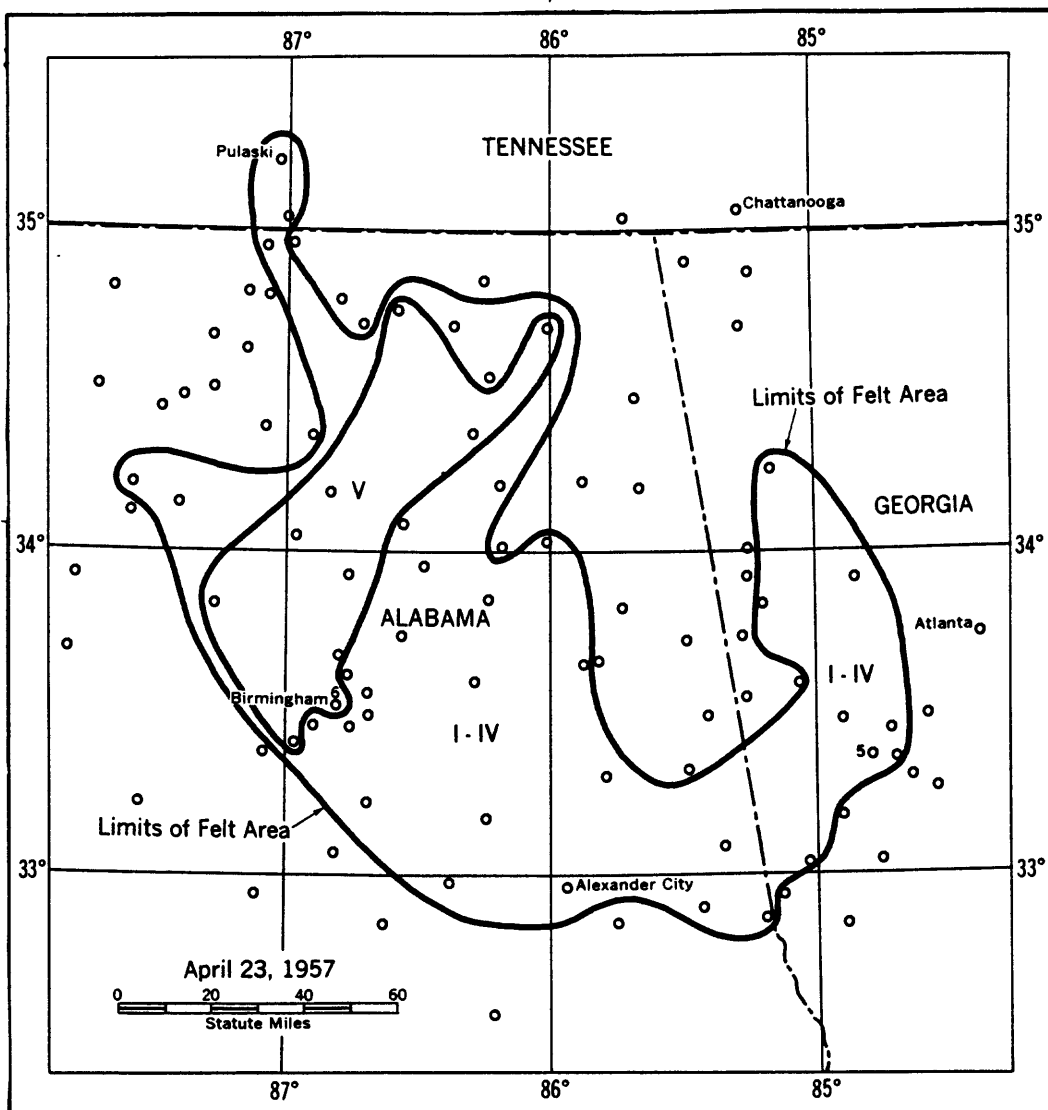


Ref.: Bollinger (1973)

23 Apr 1957

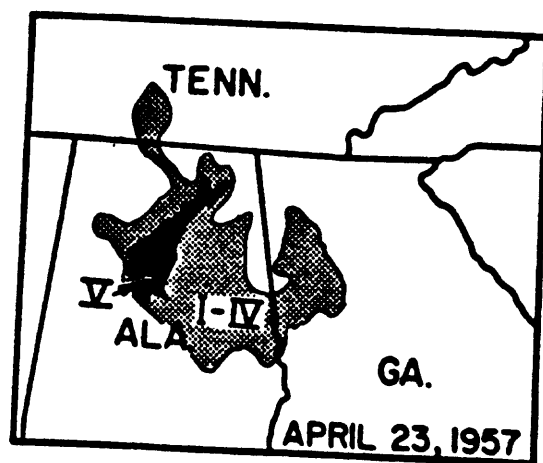


0 40
MILES



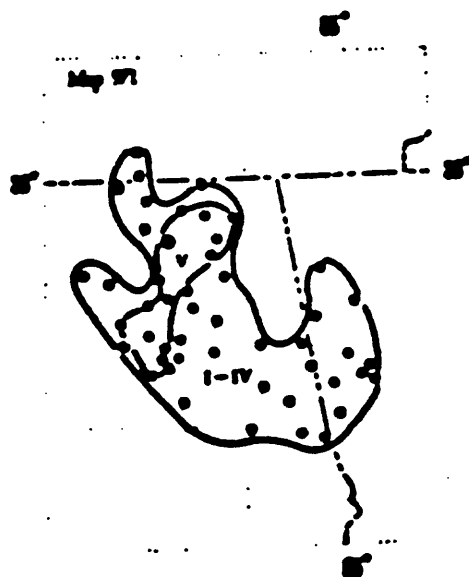
Ref. : USEQ [395]

April 23, 1957
 34.5N-86.8W
 Near Huntsville, Ala.
 9:23:39 GMT
 29,700 sq. km.
 Max. Int. VI



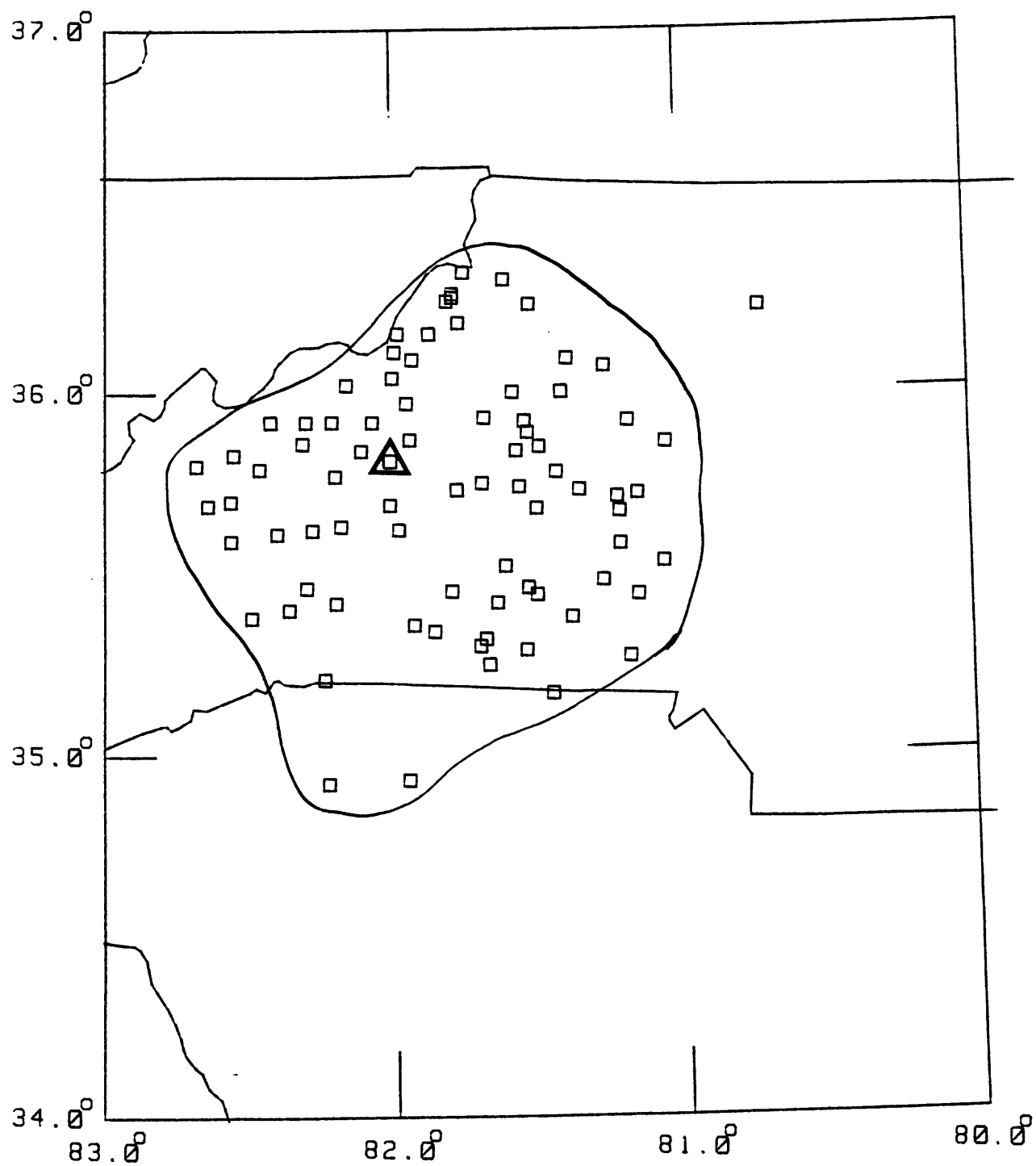
Ref. : Bollinger (1973)

April 23, 1957

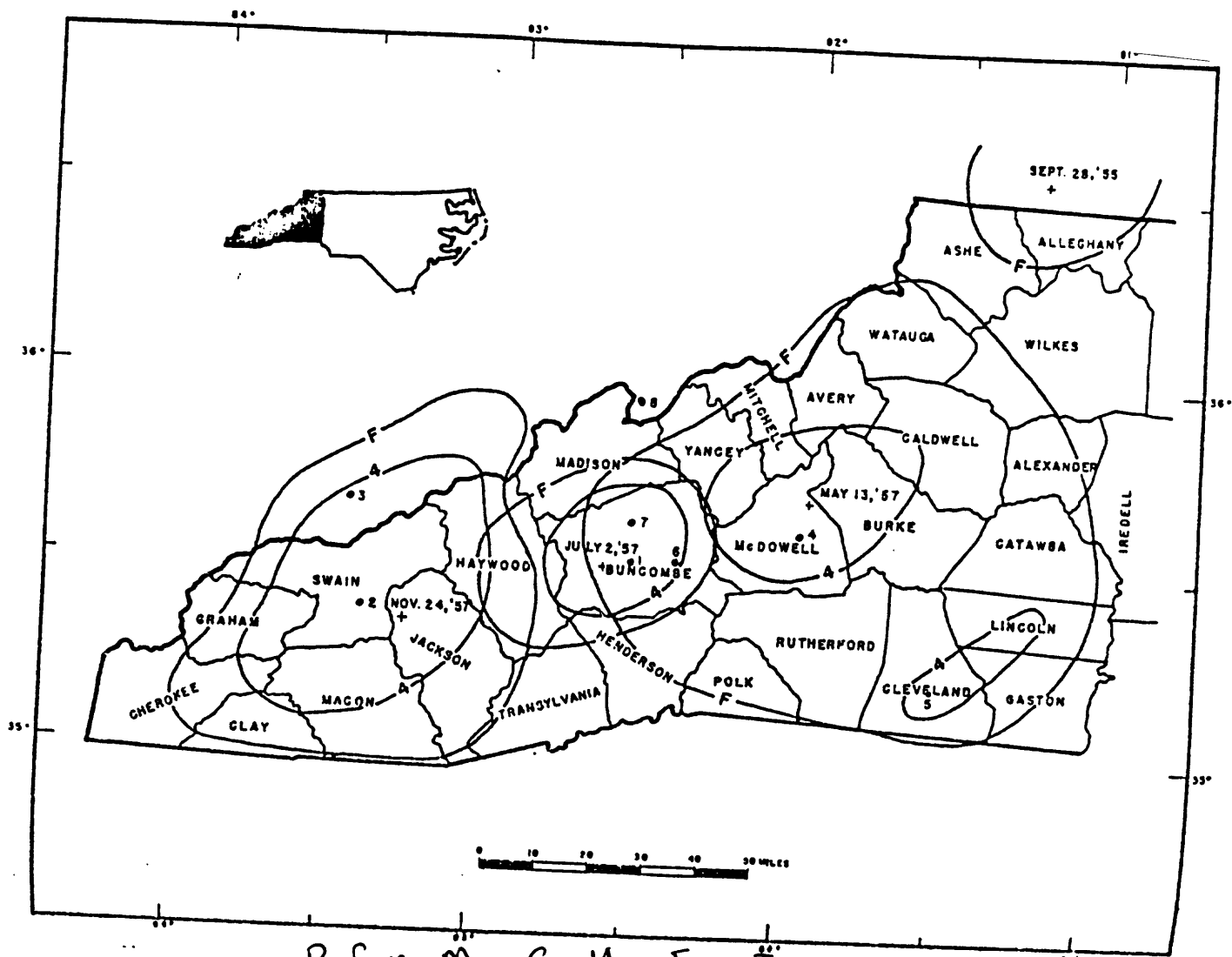


Ref. : Docekal [100]
11,500 sq. mi.

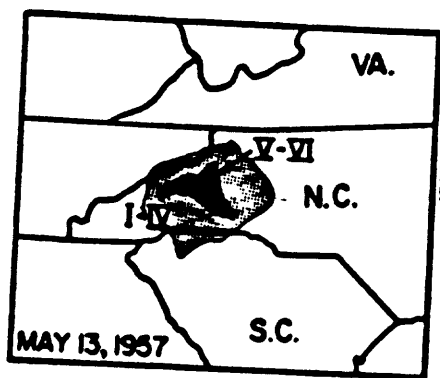
13 May 1957



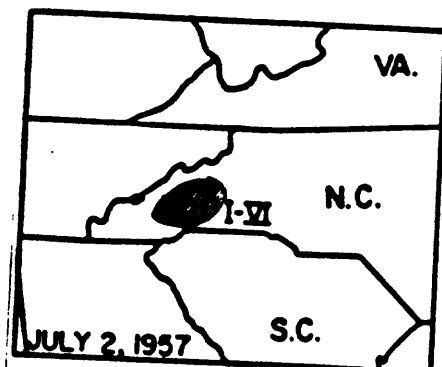
0 30
MILES



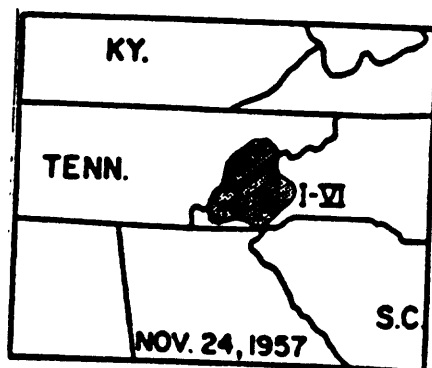
Ref.: MacCarthy [245]



Ref.: Bollinger (1973)

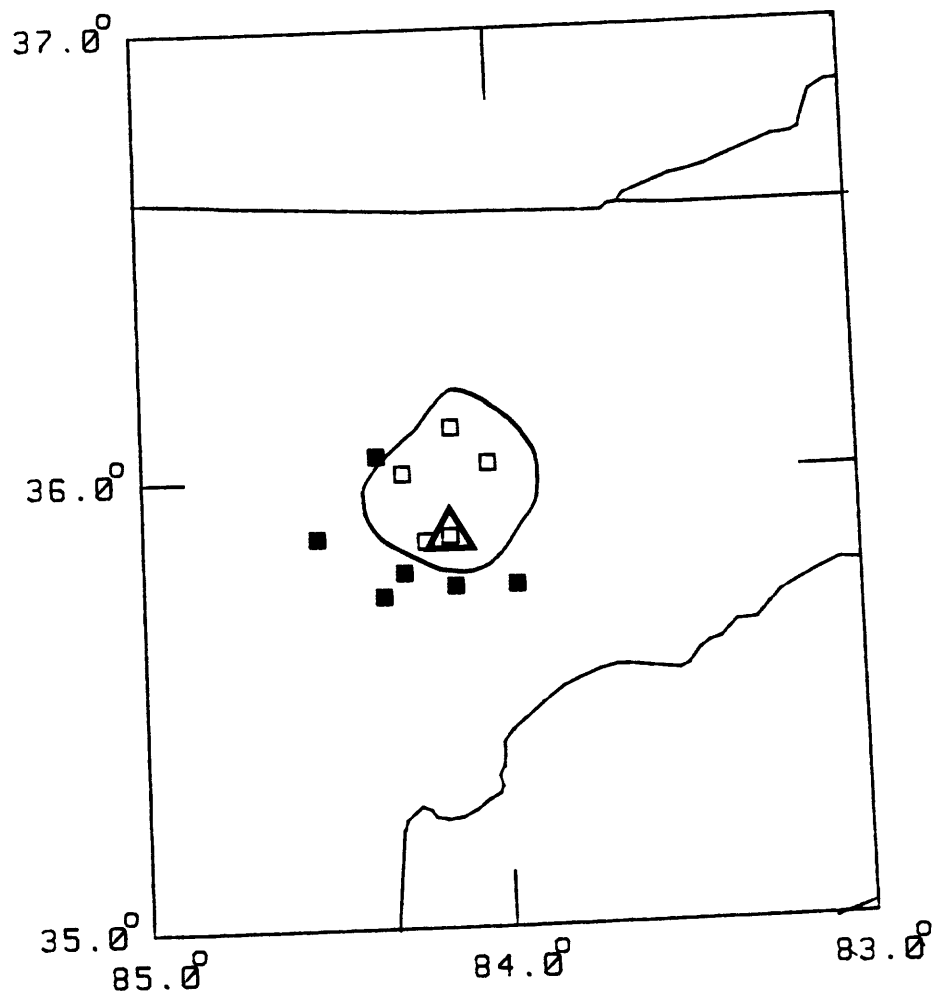


Ref.: Bollinger (1973)

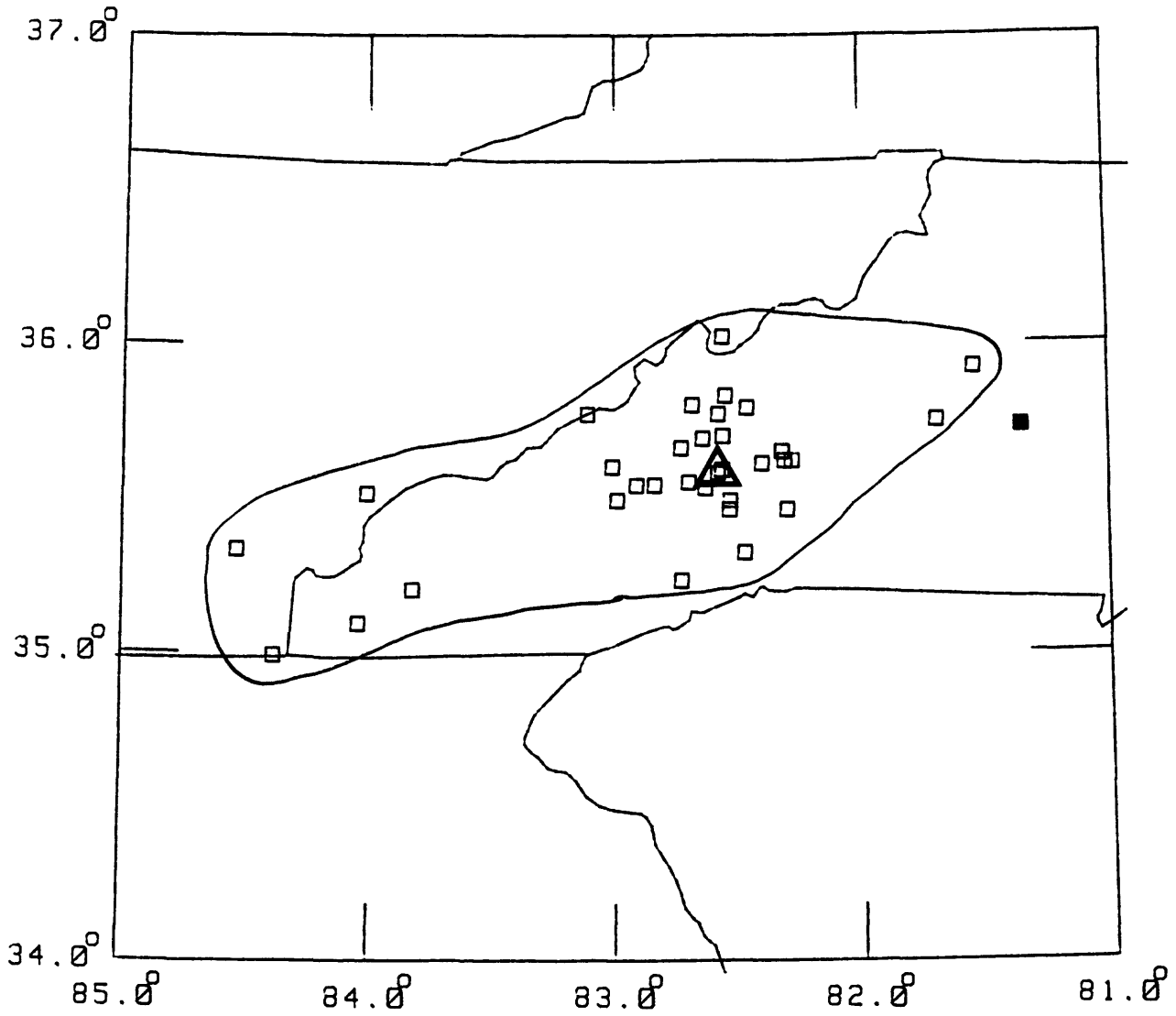


Ref.: Bollinger (1973)

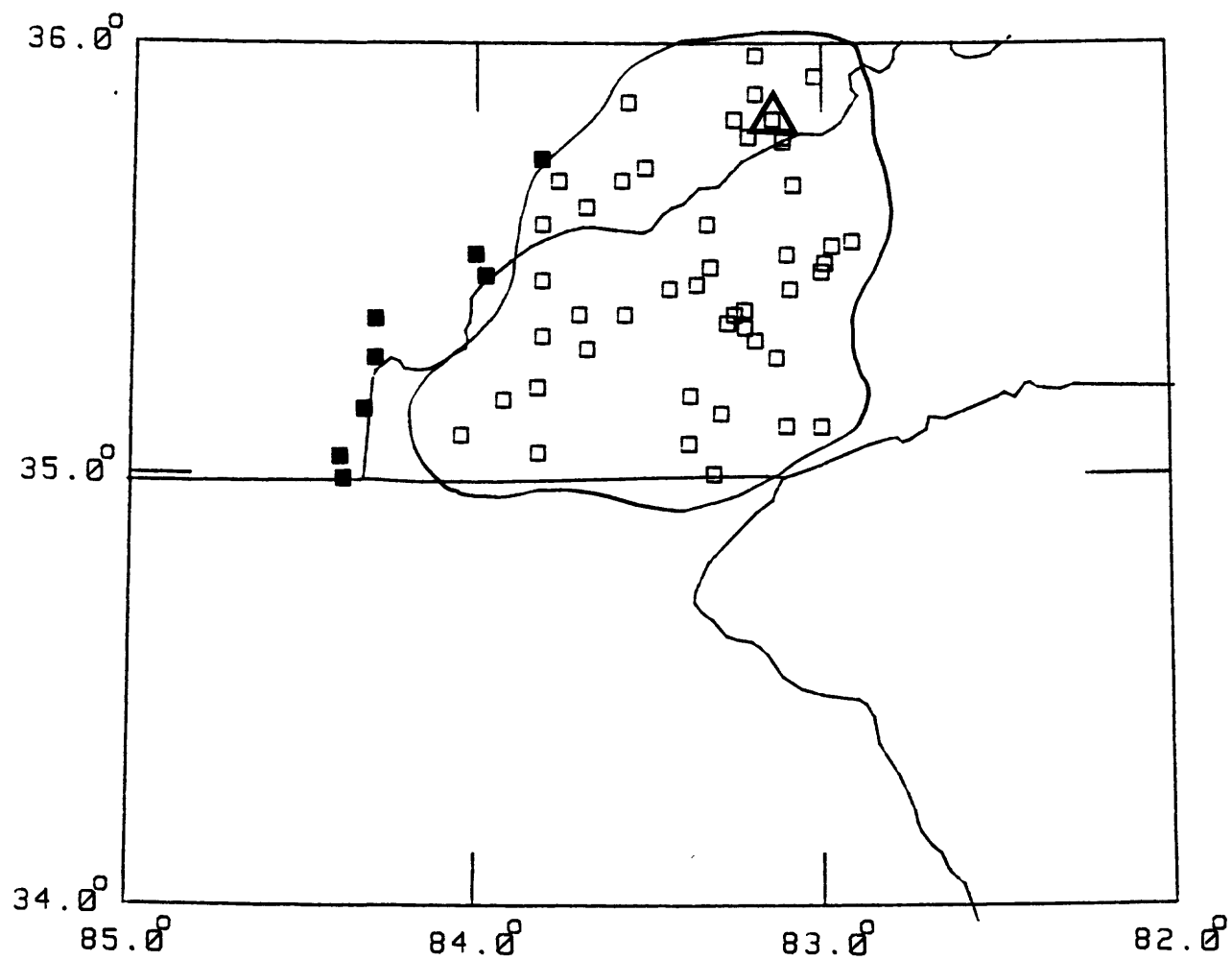
23 Jun 1957



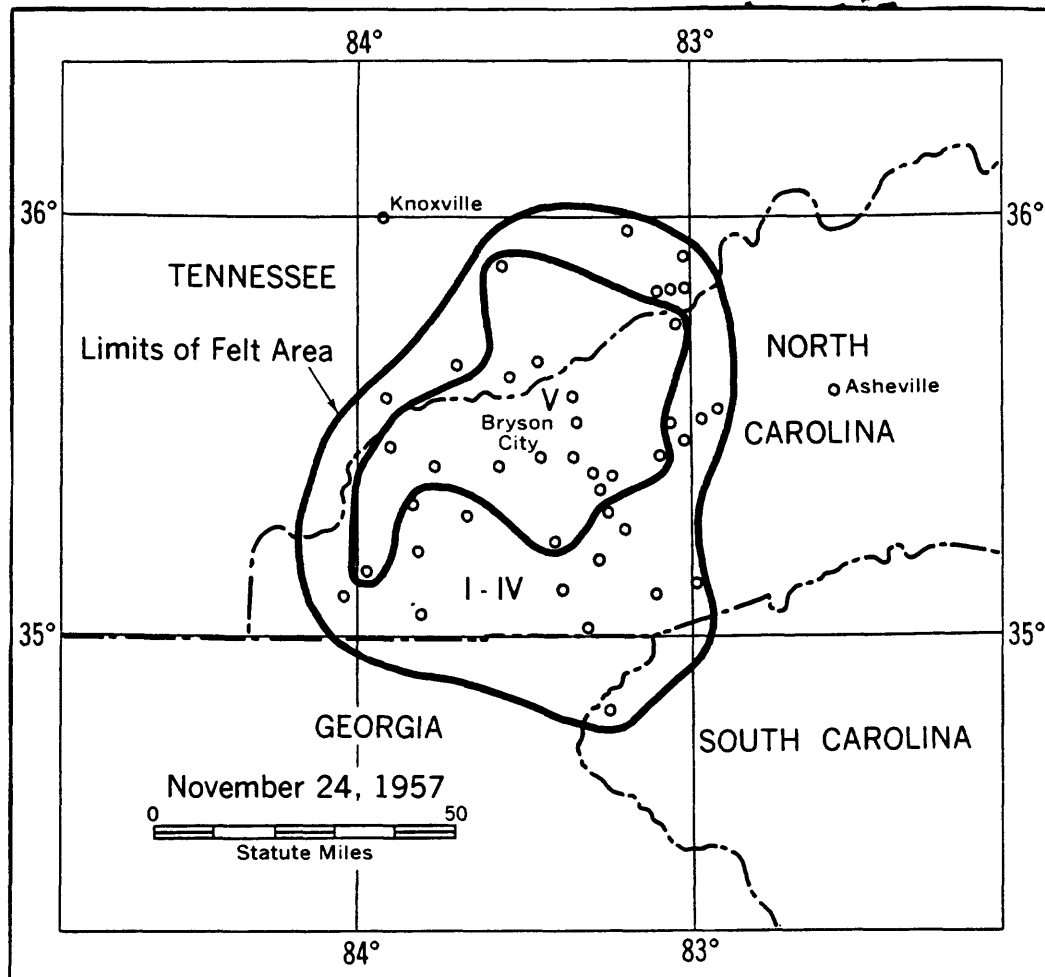
2 Jul 1957



24 Nov 1957



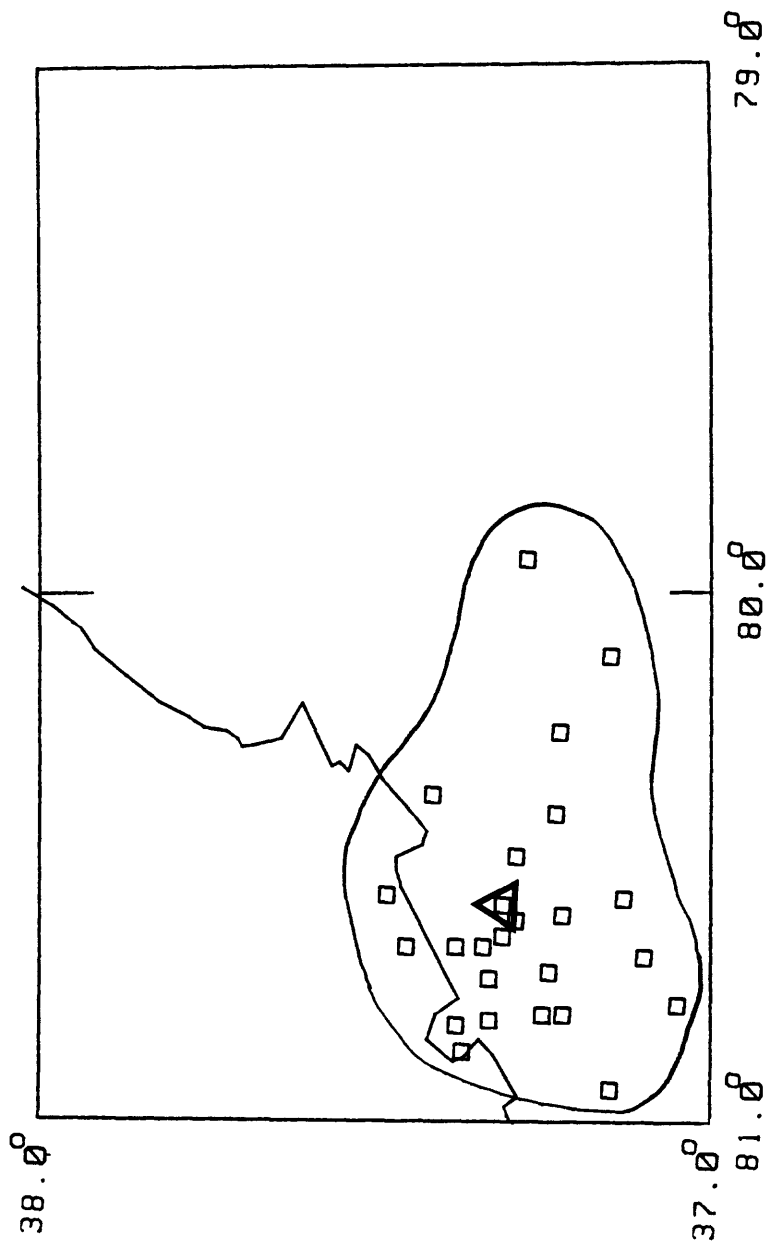
0 30
MILES



Ref. : USEQ [395]

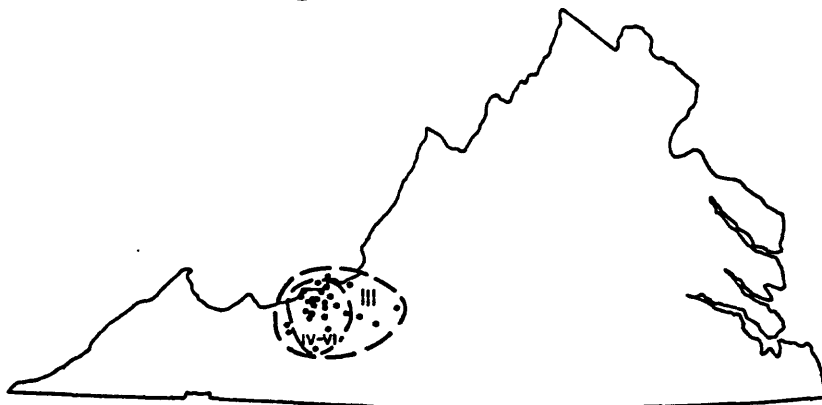
November 24, 1957
 35.4N-83.8
 Near Bryson City, N.C.
 20:06:47 GMT
 10,600 sq. km.
 Max. Int. V-VI

23 Apr 1959



0 20
MILES

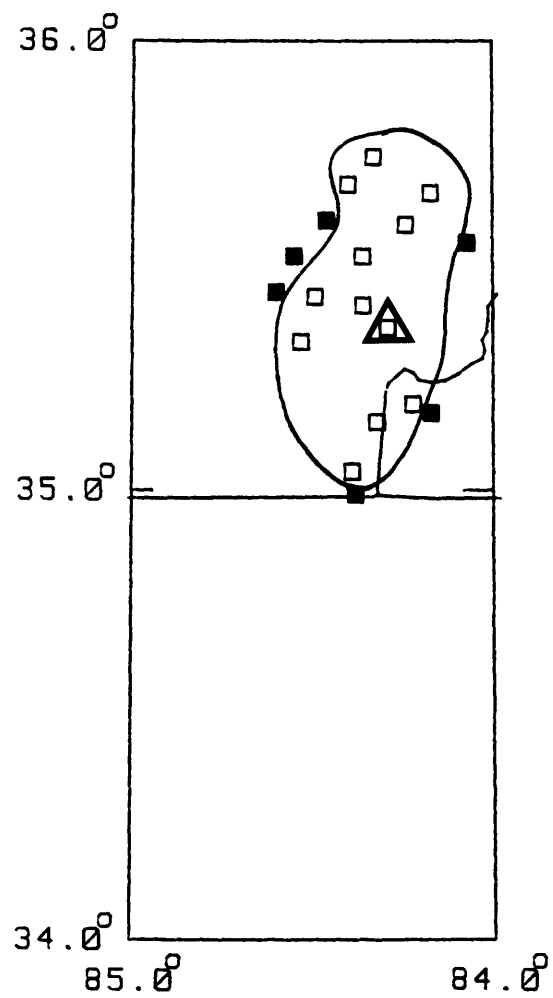
Earthquake of April 23, 1959, Giles County, Virginia,
(Thurs. 1559 Hrs.) Felt Area : 3000 sq. mi.
(1100 sq. mi., Eppley, 1965)



APRIL 23, 1959

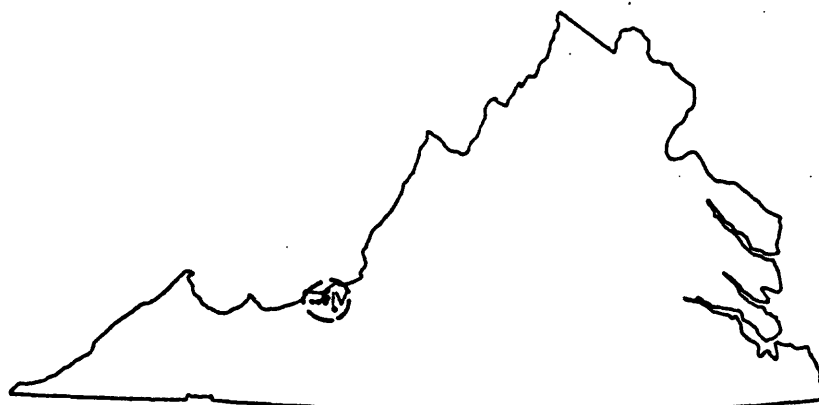
Ref. : Bollinger [35]

13 Jun 1959



0 30
MILES

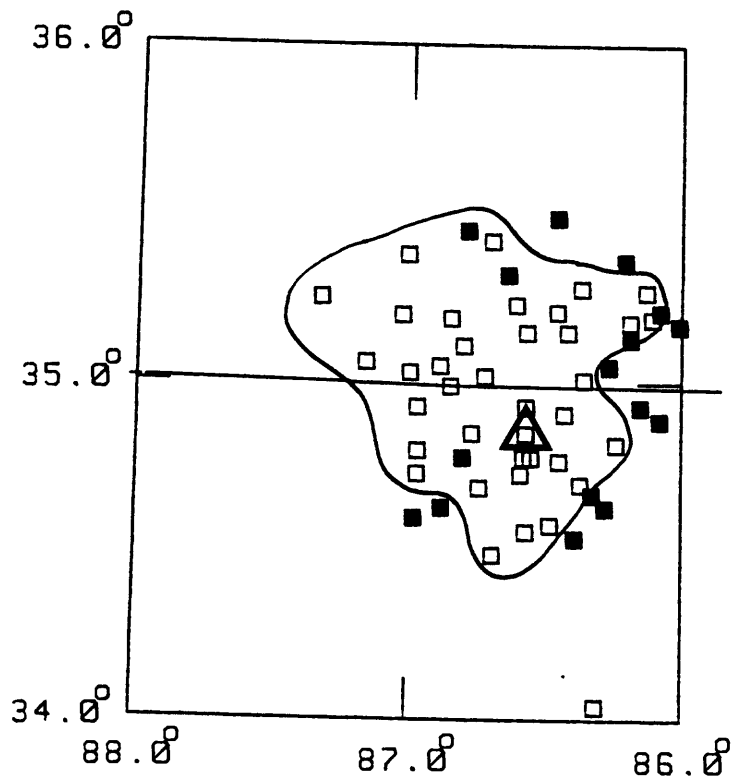
Earthquake of July 7, 1959, Giles County, Virginia,
(Tues. 1820 Hrs.) Felt Area: 500 sq. mi.



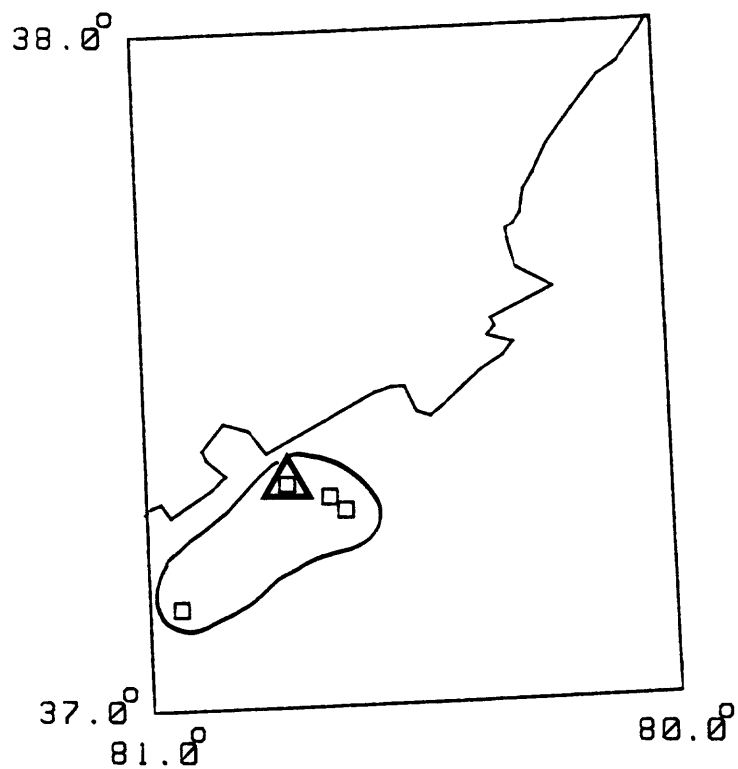
JULY. 7, 1959

Ref. : Bollinger [35]

12 Aug 1959

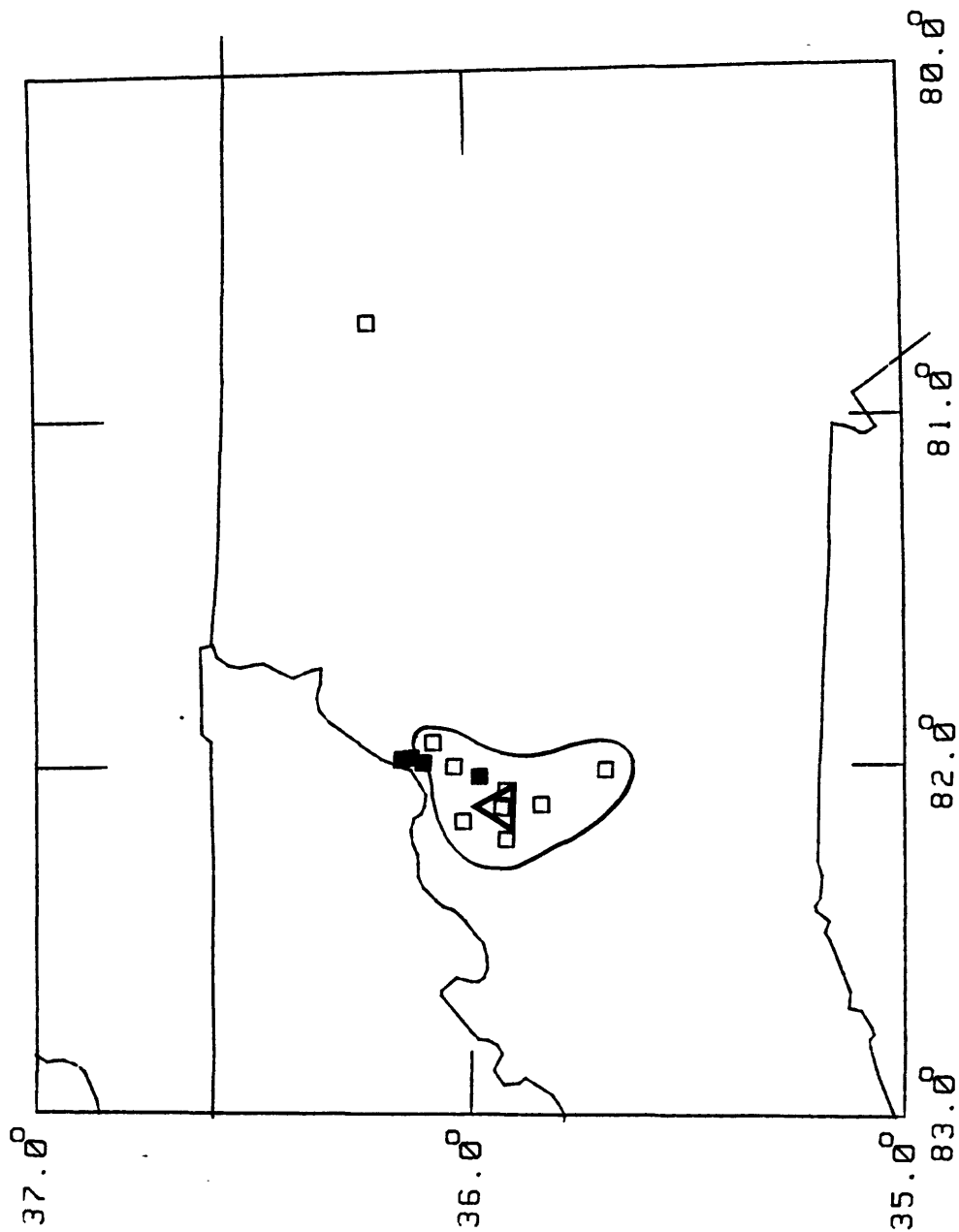


21 Aug 1959

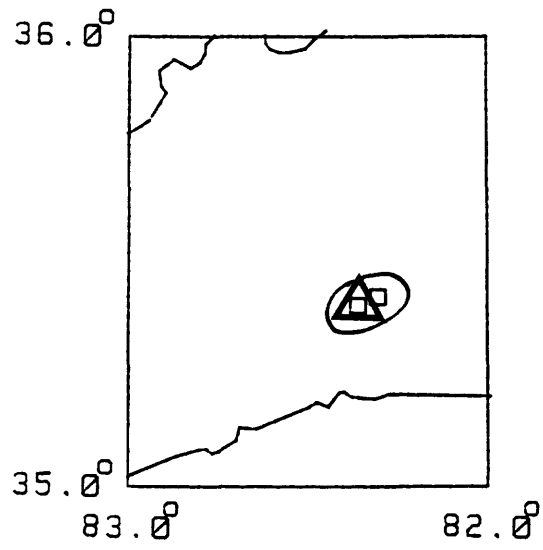


0 20
MILES

3 Jan 1960

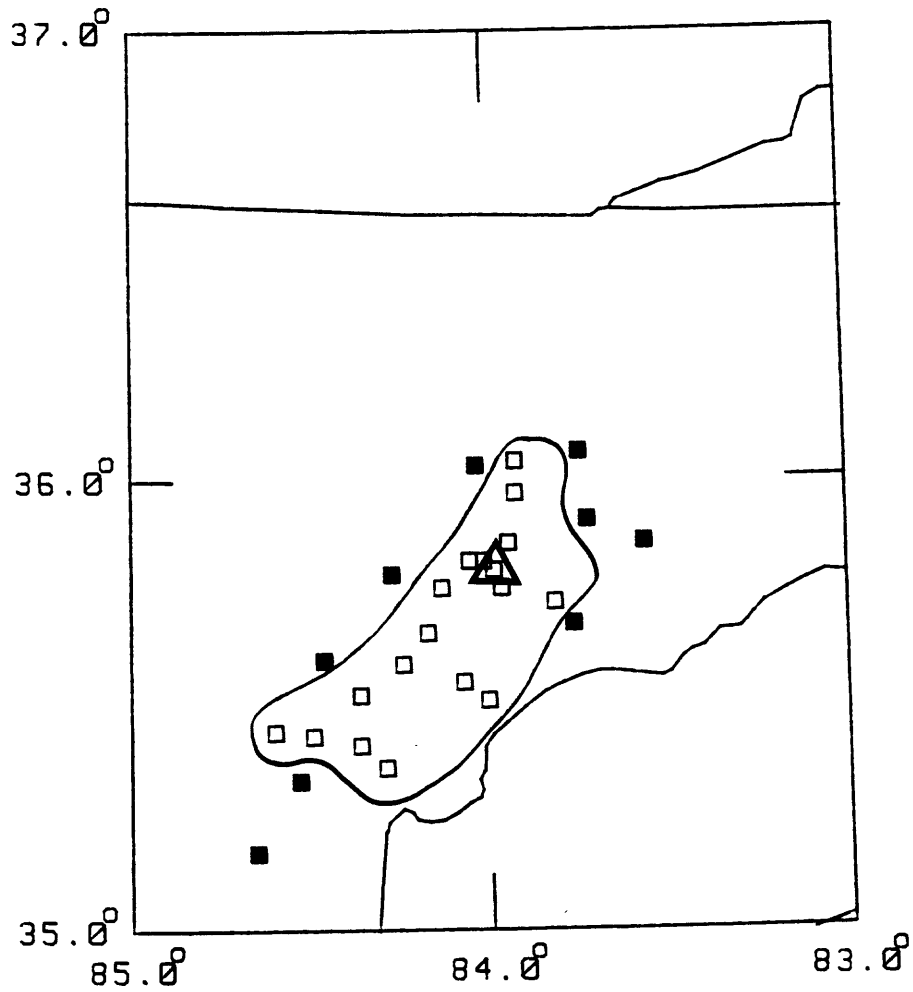


9 Feb 1960

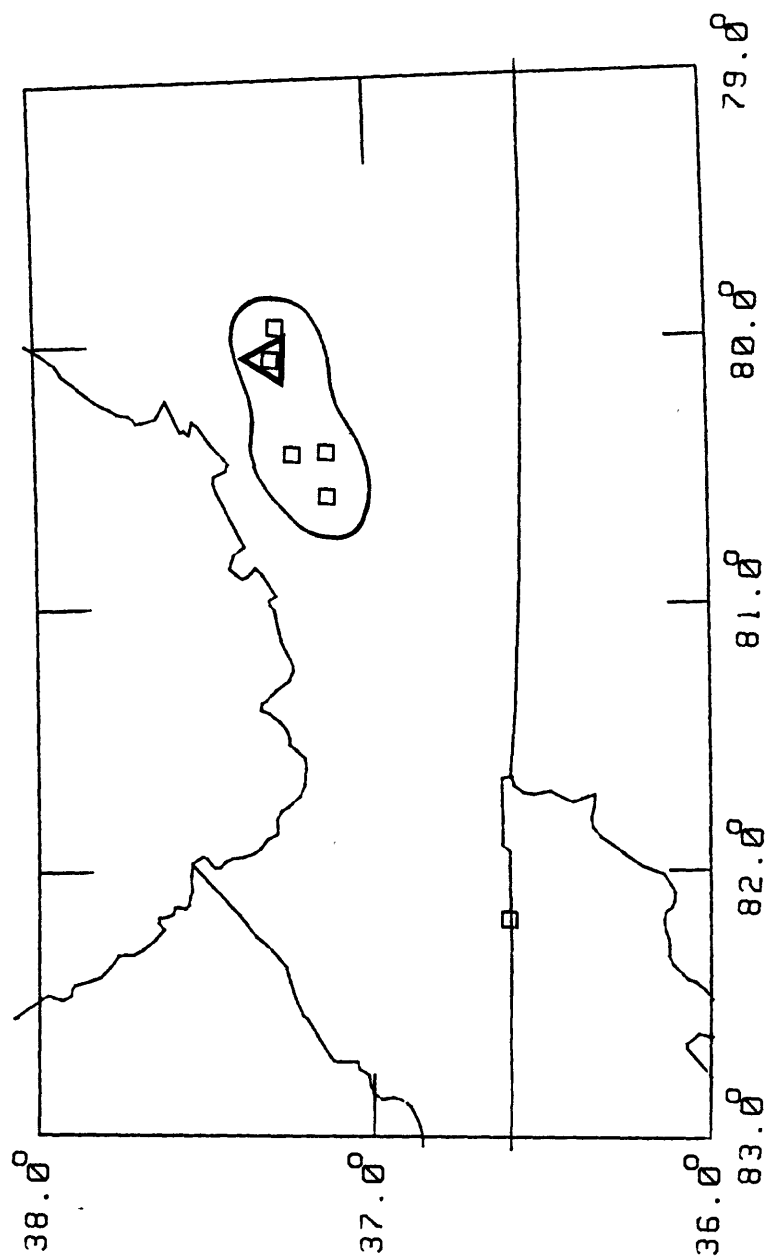


0 30
MILES

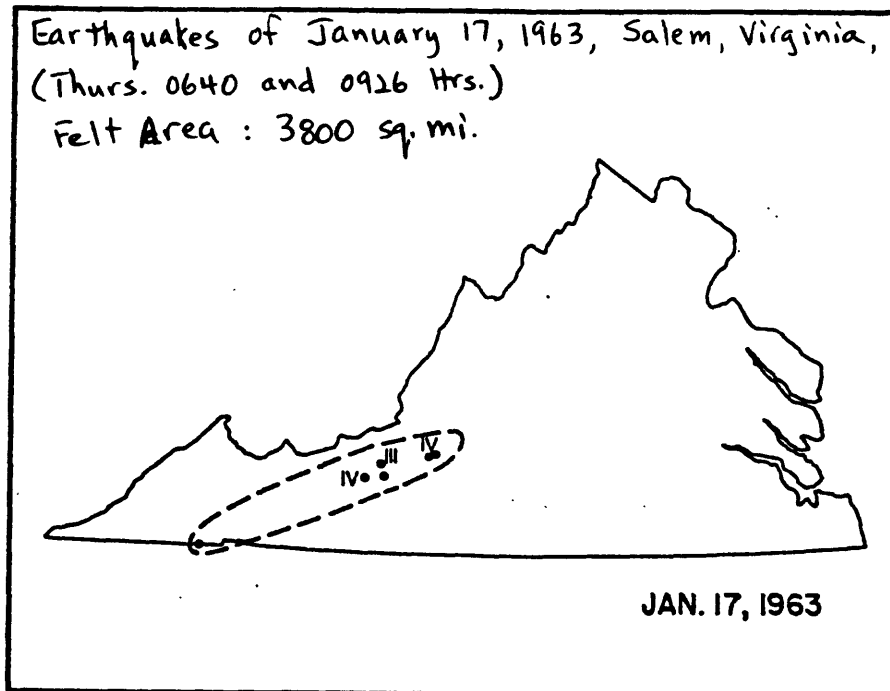
15 Apr 1960



17 Jan 1963

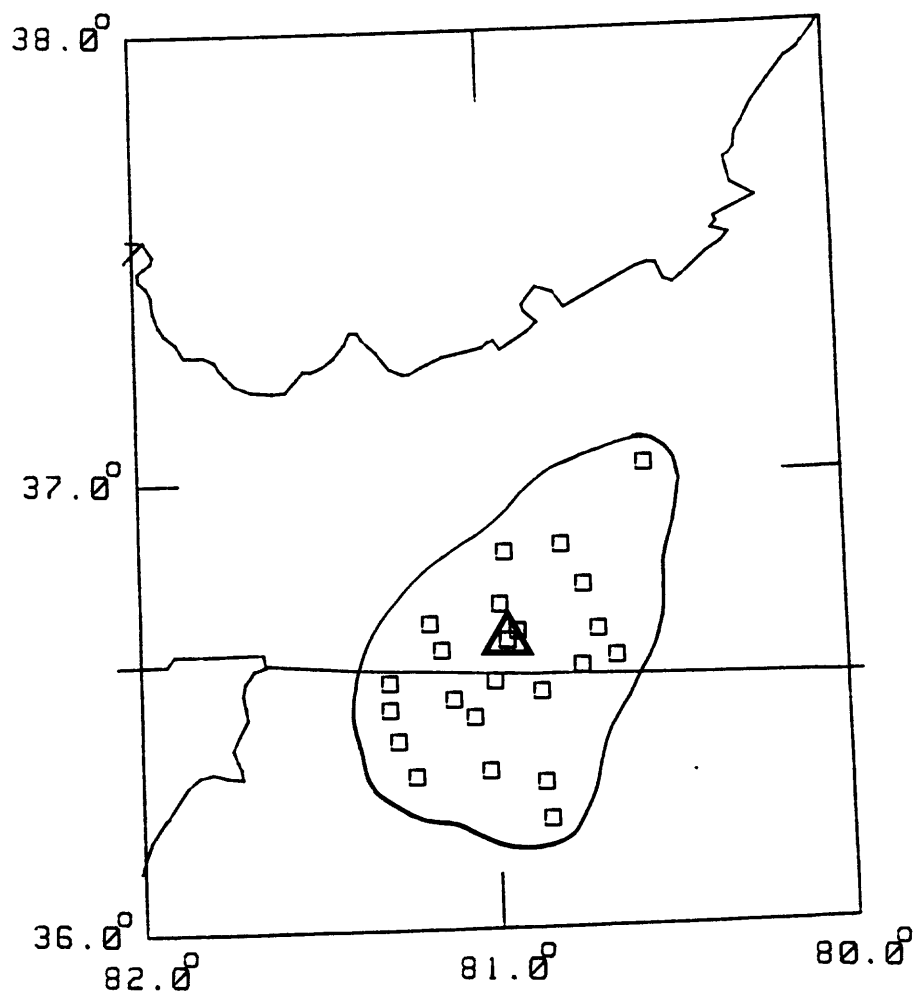


0 40
MILES



Ref. : Bollinger [35]

28 Oct 1963



0 30
MILES

241

THE BLUE RIDGE EARTHQUAKE

Oct. 28, 1963

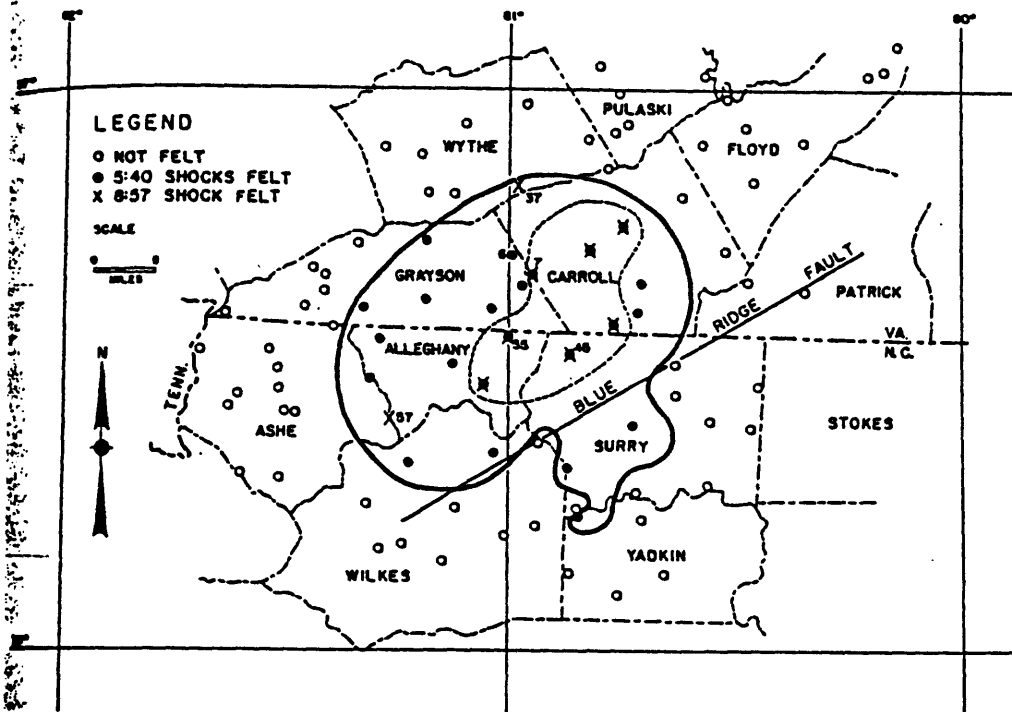
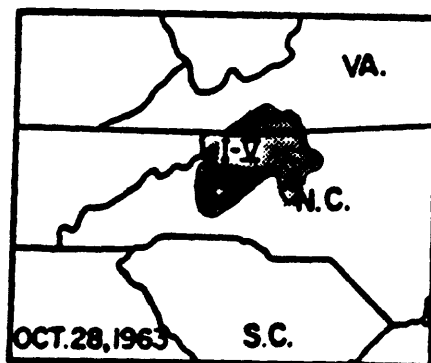


FIG. 1. Map of earthquake area.

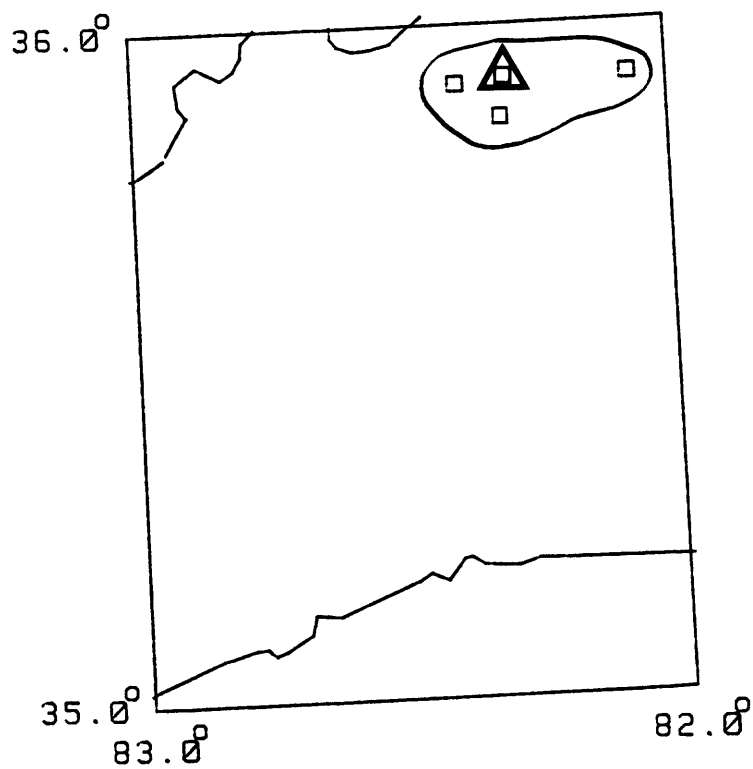
Oct 28, 1963

Ref. : MacCarthy [246]



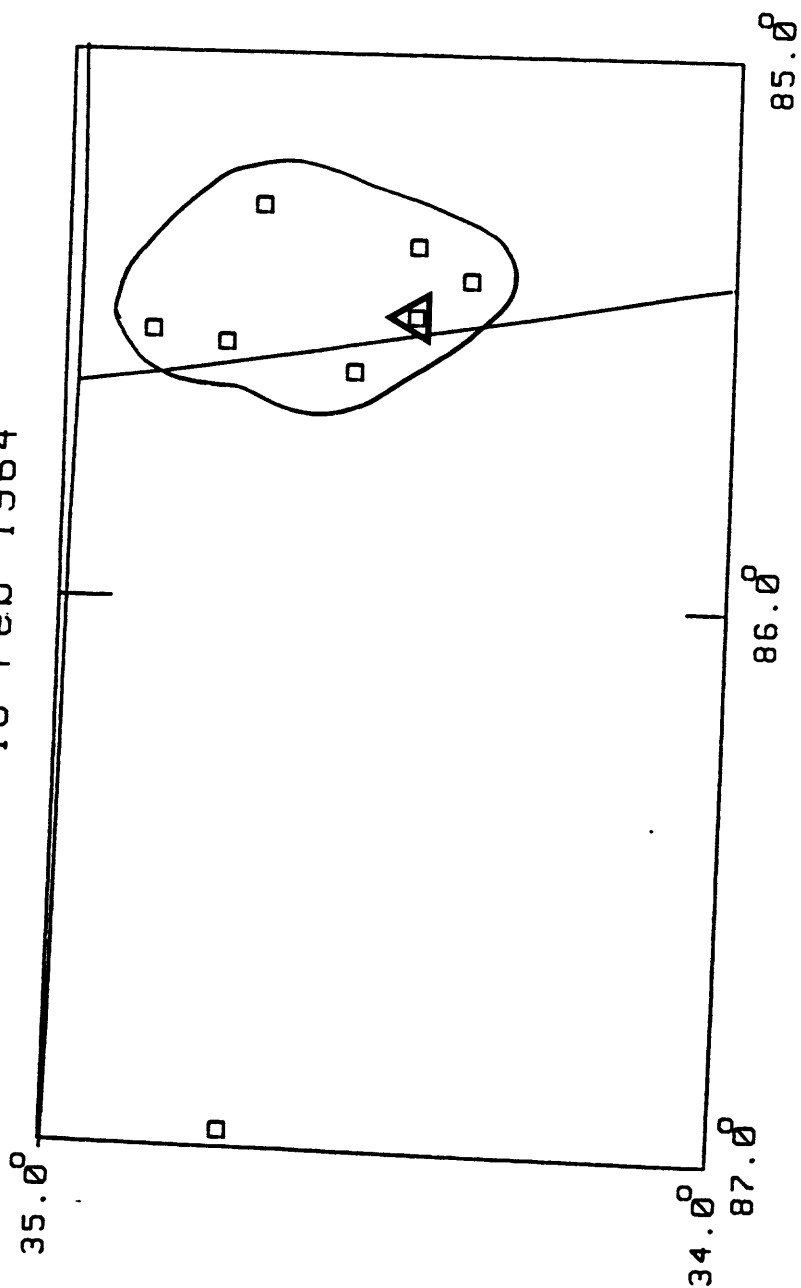
Ref. : Bollinger (1973)

20 Jan 1964

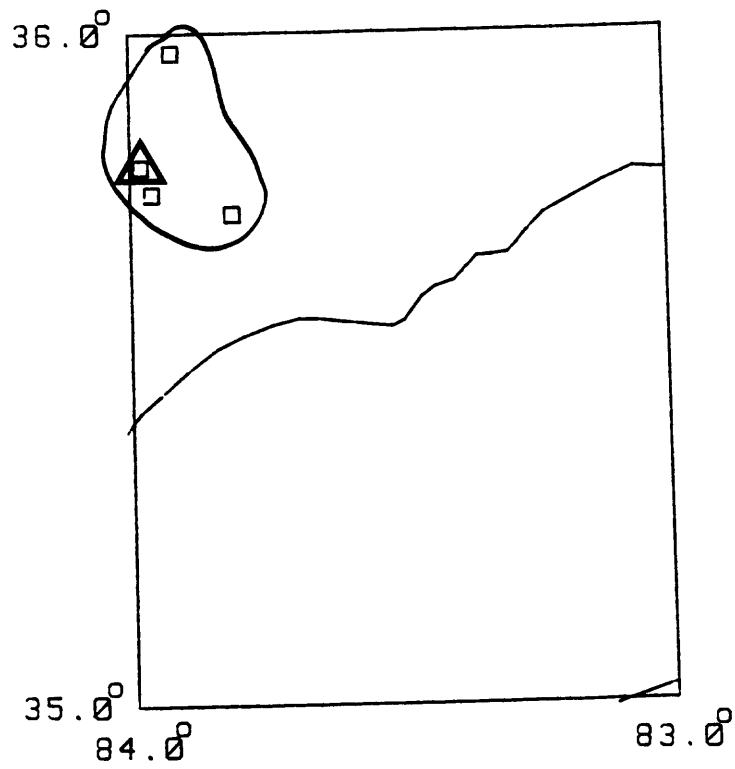


0 20
MILES

18 Feb 1964

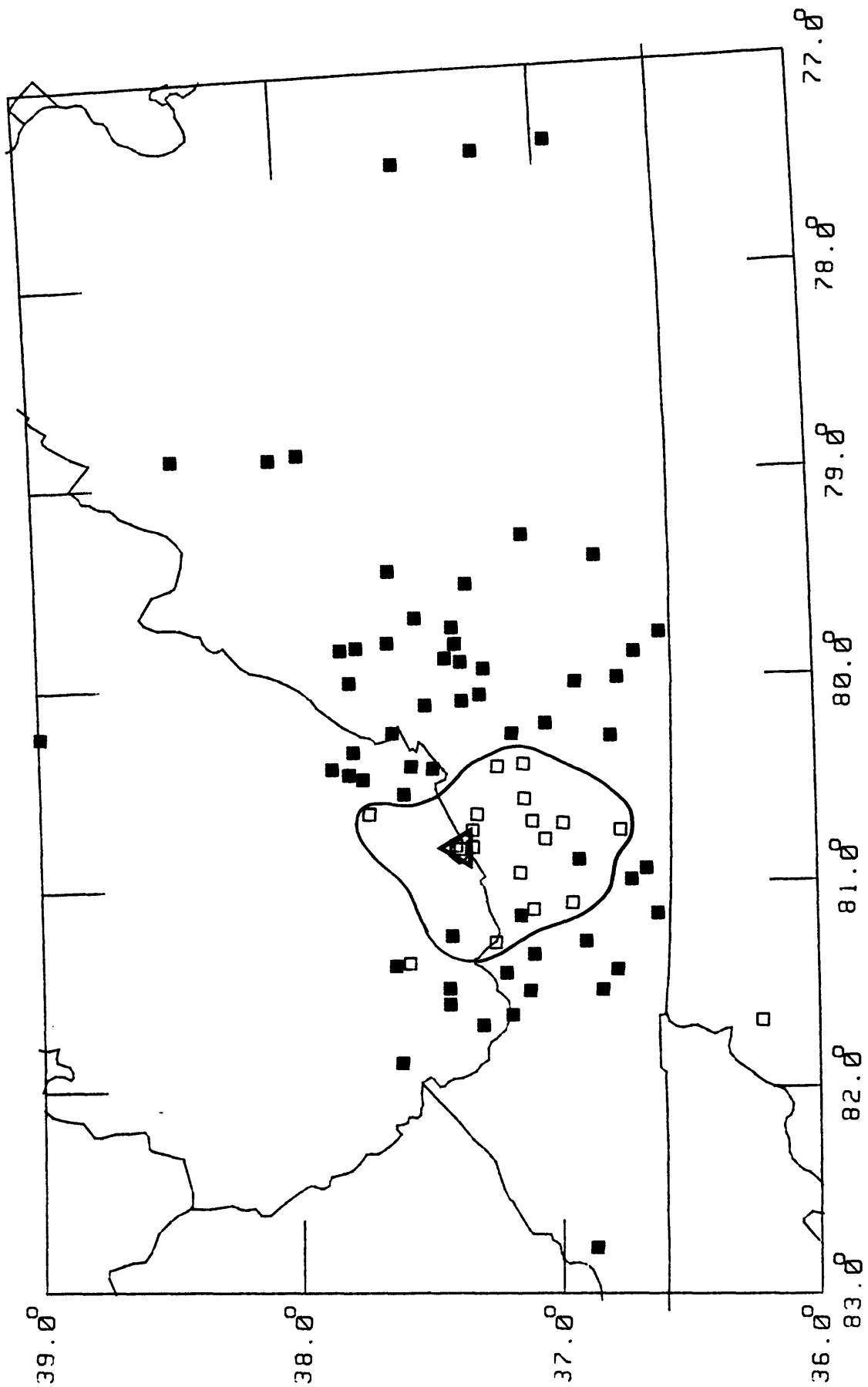


24 Aug 1966

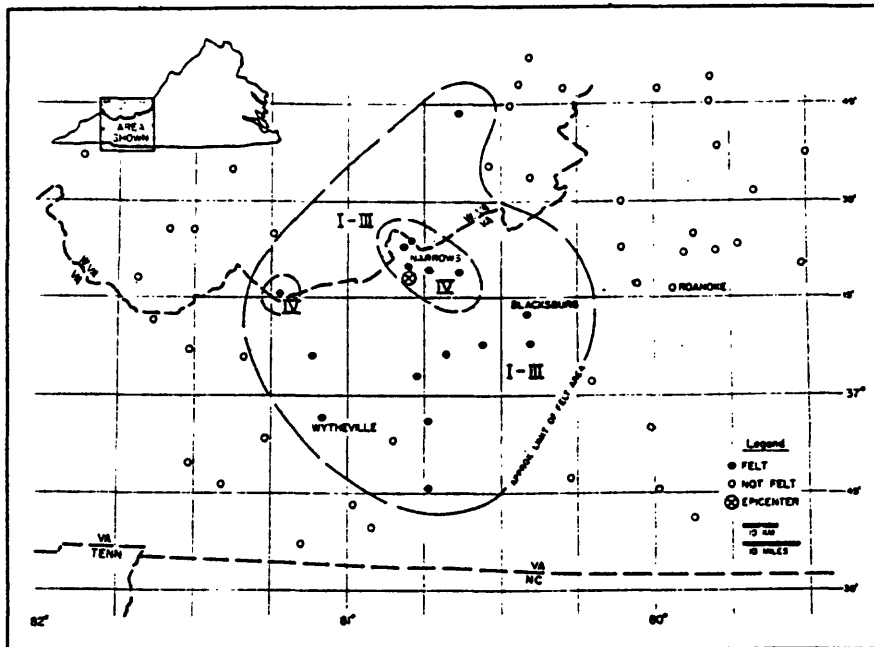


0 20
MILES

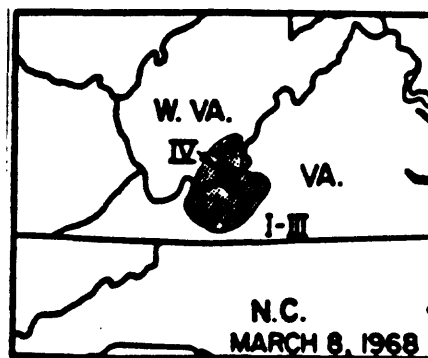
8 Mar 1968



Earthquake of March 8, 1968, Narrows,
Virginia, (Fri. 0038 Hrs.) Felt Area: 3200 sq. mi.

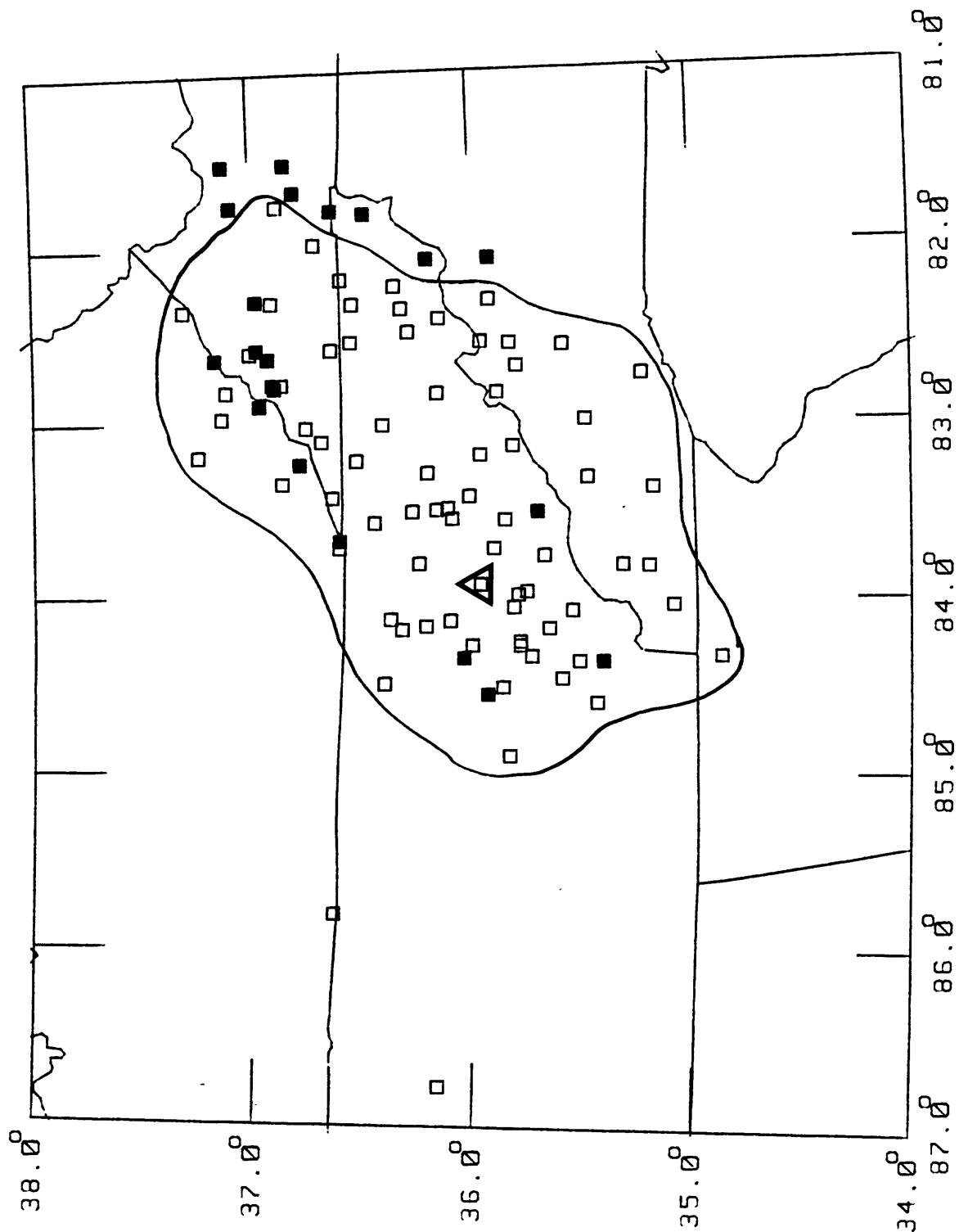


Ref. : Bollinger [35]



Ref. : Bollinger (1973)

13 Jul 1969



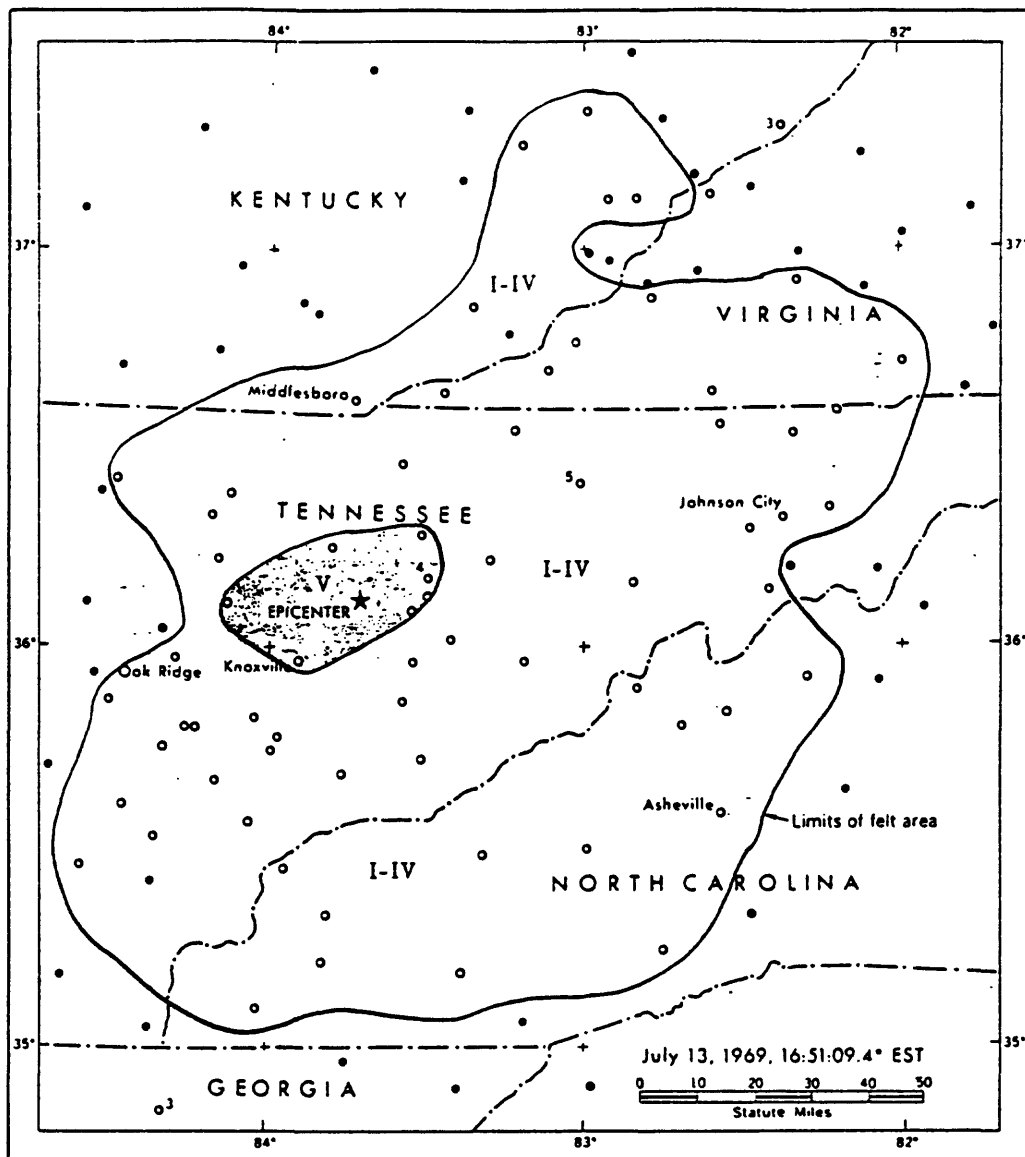
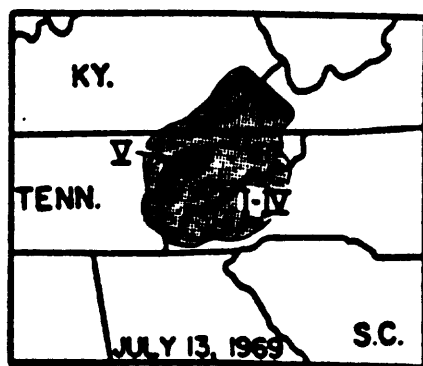


FIGURE 3.—Area affected by eastern Tennessee earthquake of July 13.

Re-drawn from USEQ [395]

Ref. : Bollinger (1973)



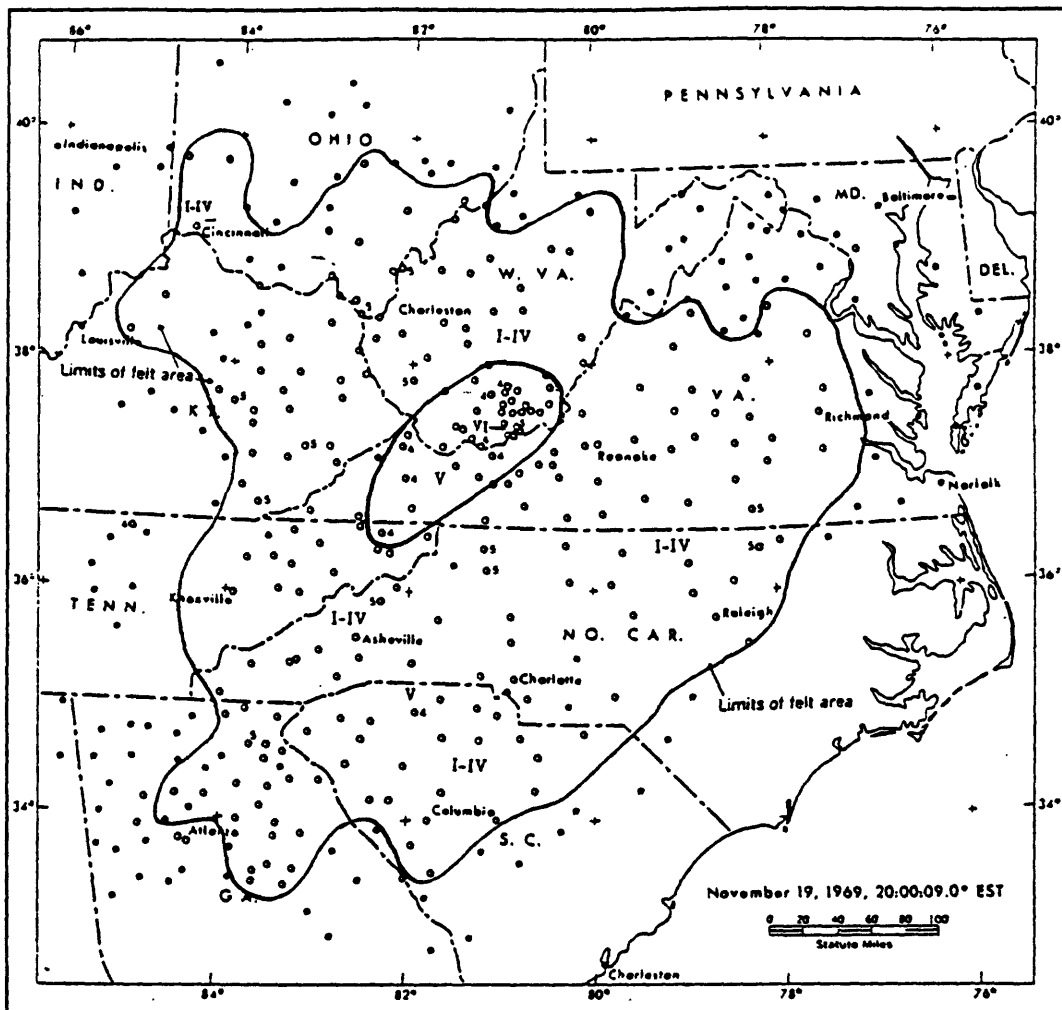
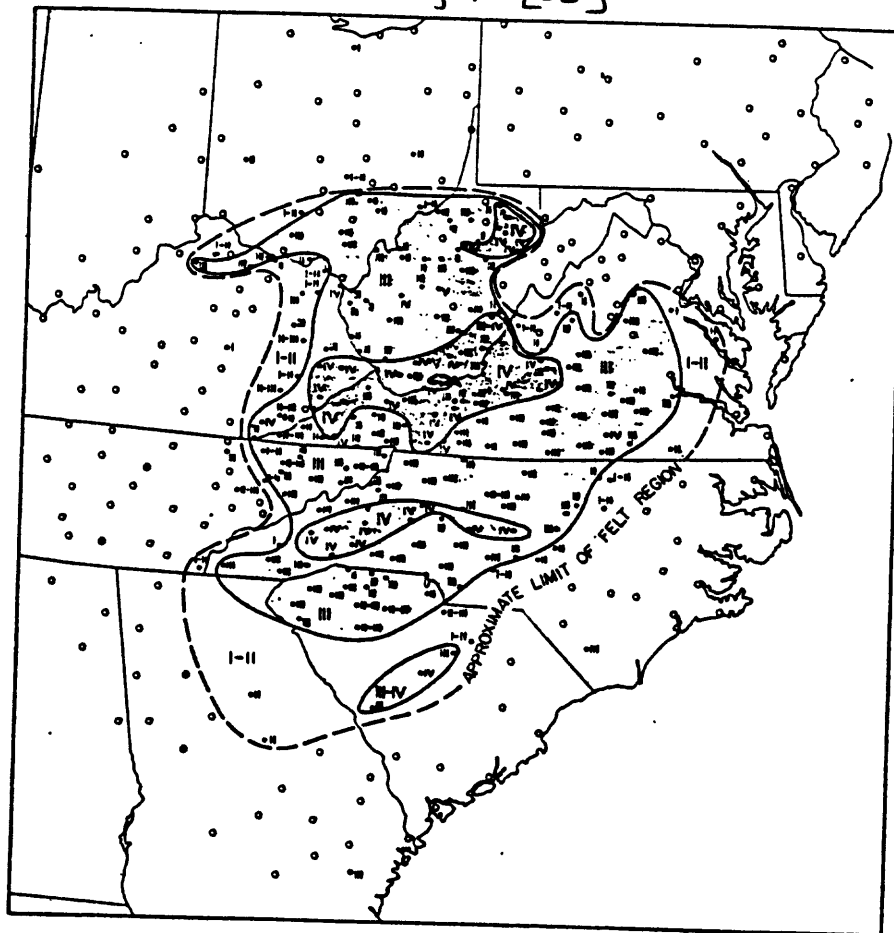


FIGURE 4.—Area affected by West Virginia earthquake of November 19.

Re-drawn from USEQ [395]

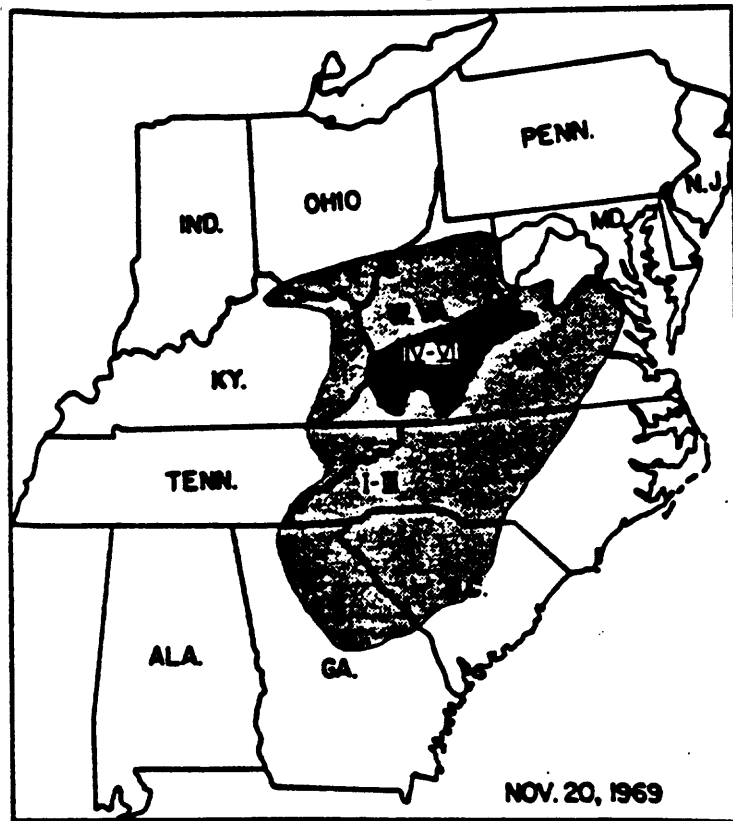
322,000 sq. km.

Ref. : Bollinger [35]

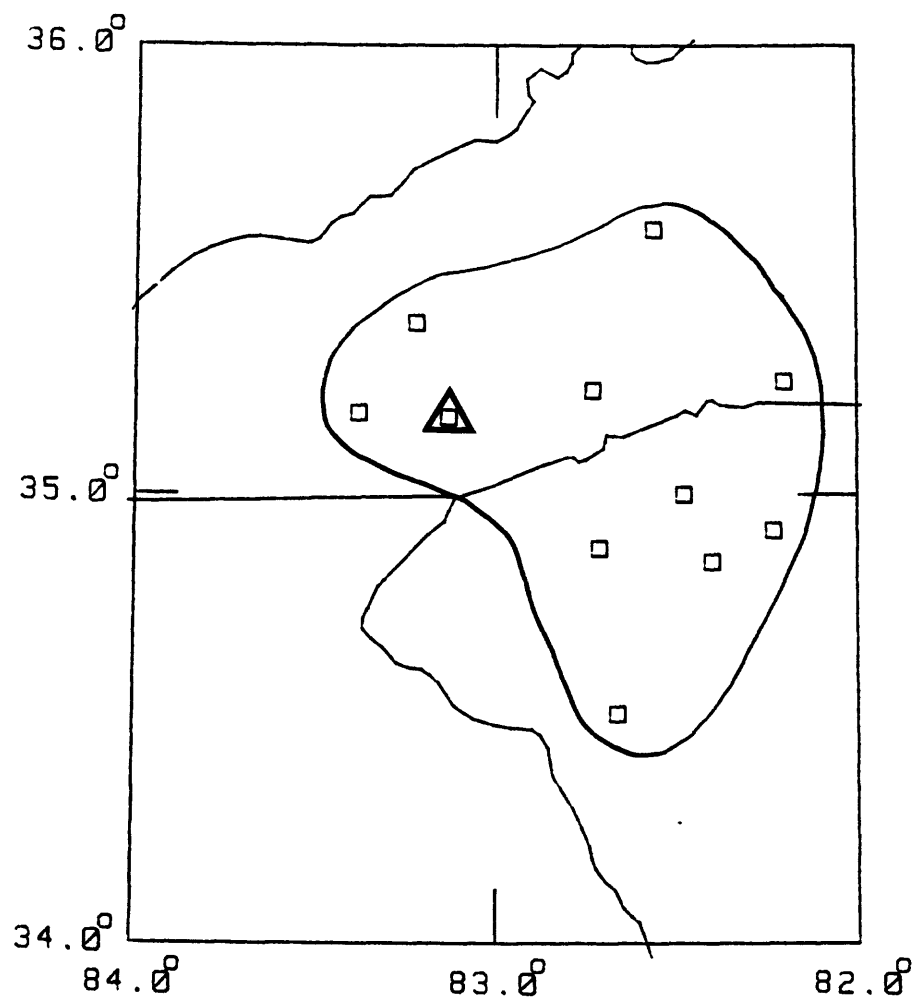


Earthquake of Nov. 19, 1969
Elgood, WV (Wed. 2000 Hrs.)
Felt Area : 125,000 sq. mi.
(100,000 sq. mi., USE, 1969)

Ref. : Bollinger (1973)

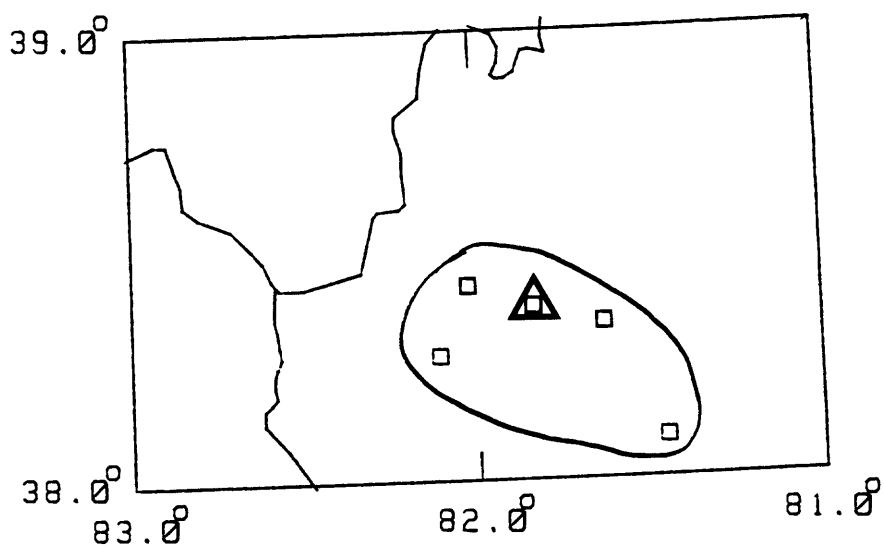


13 Dec 1969



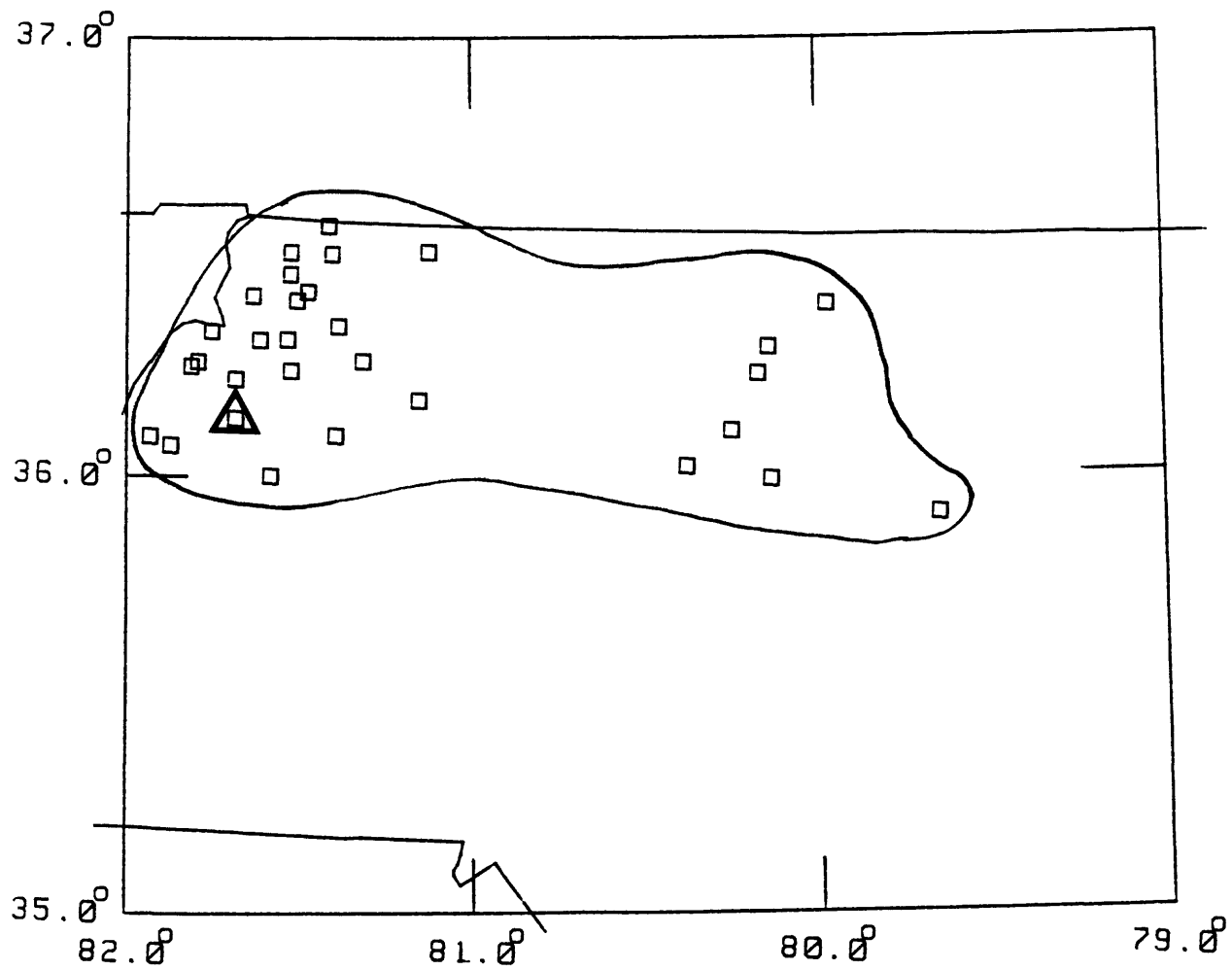
0 30
MILES

11 Aug 1970

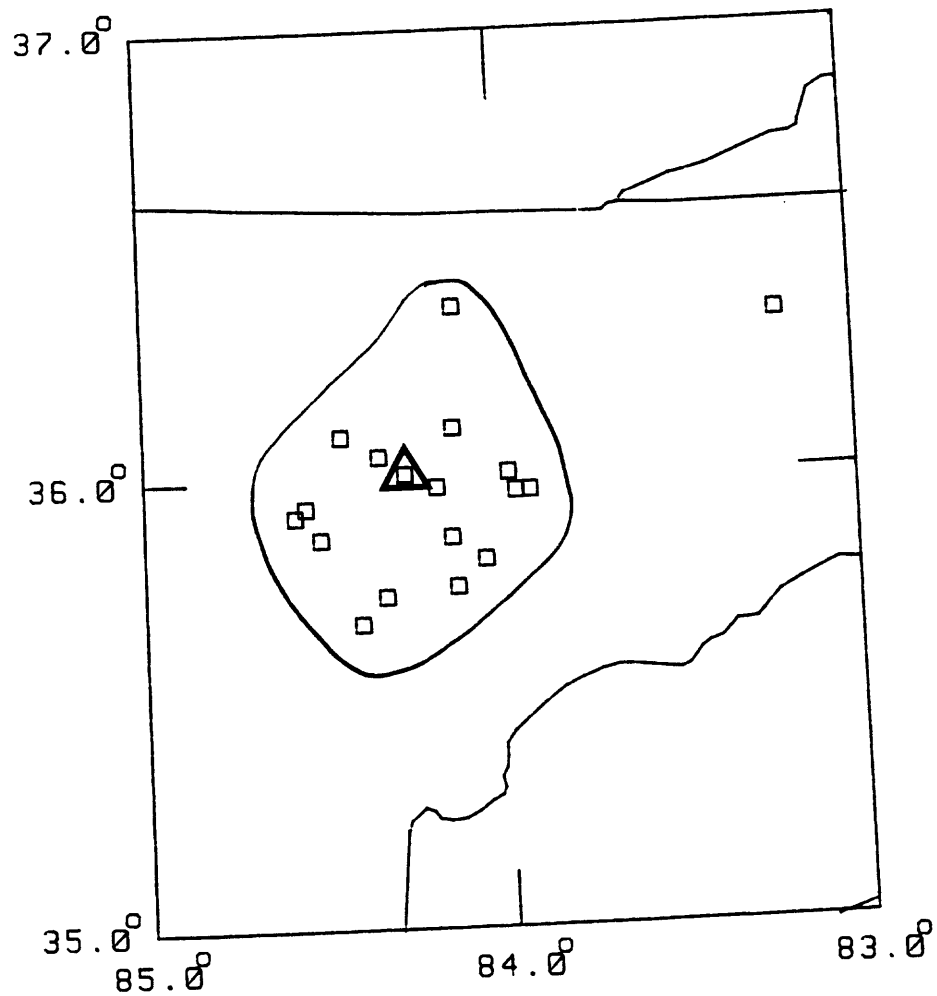


0 30
MILES

10 Sep 1970

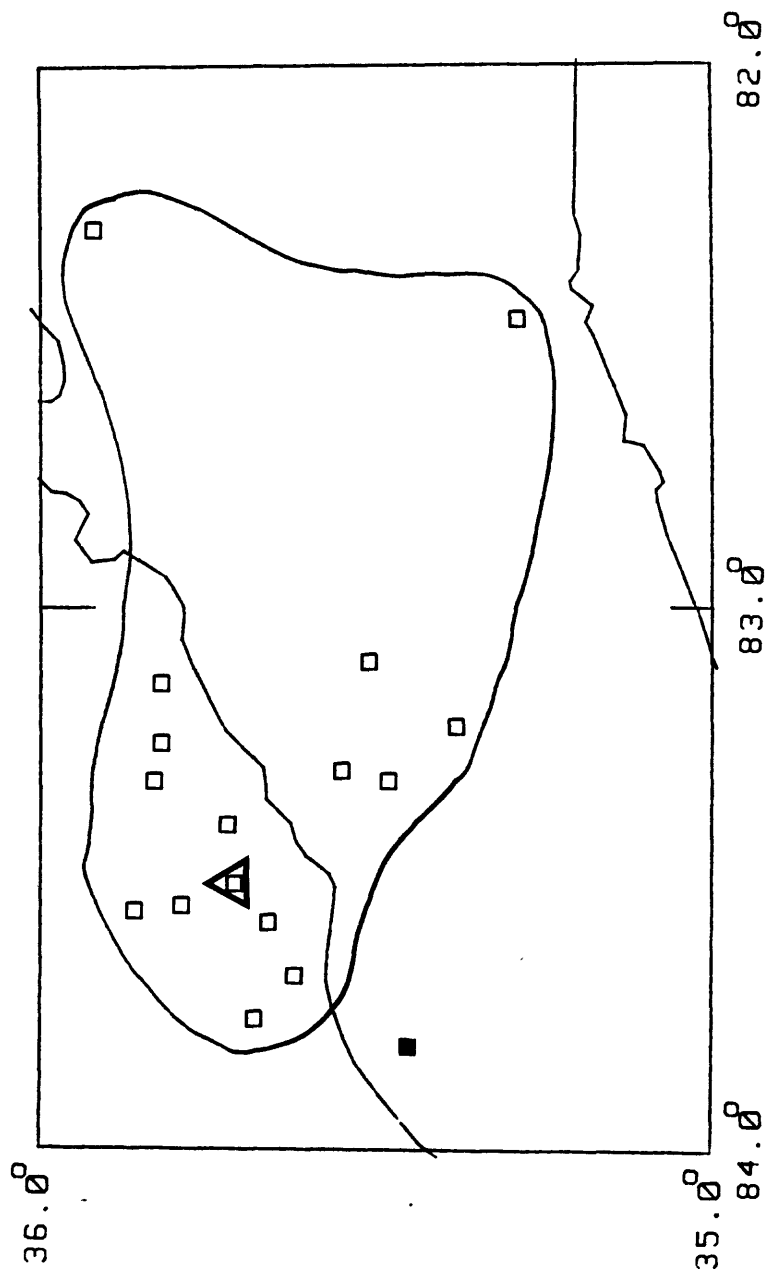


13 Jul 1971



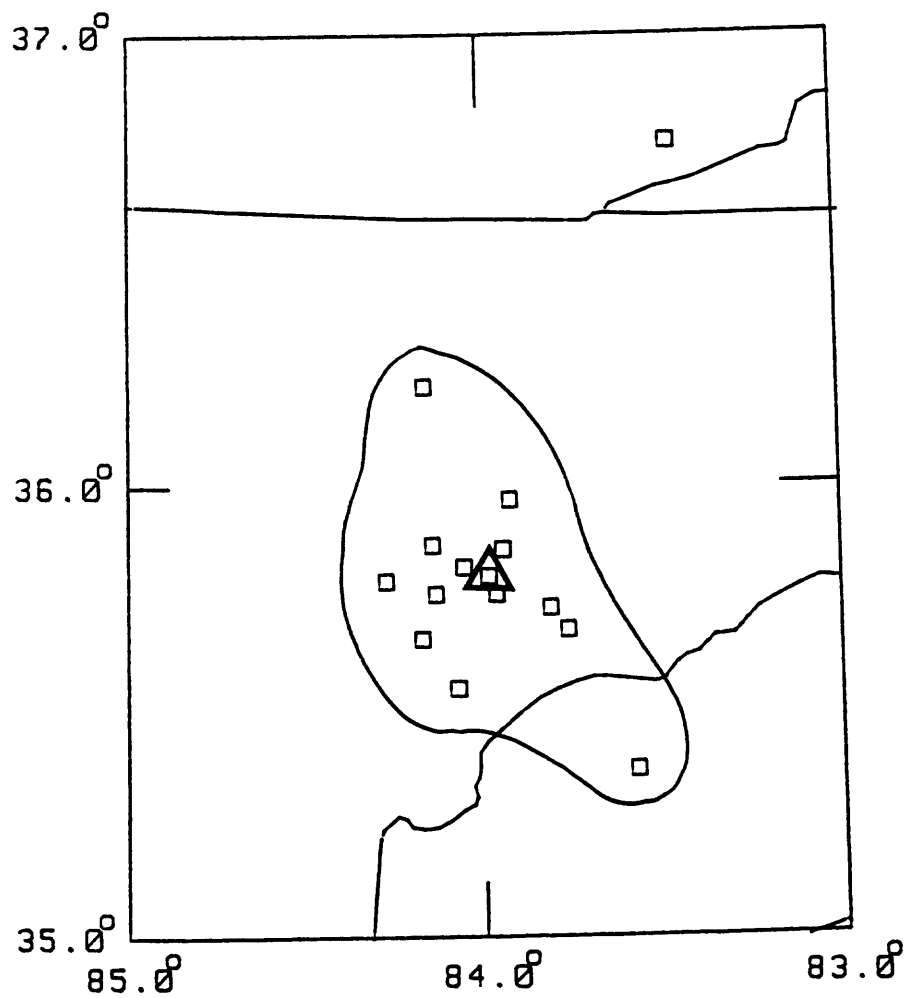
0 30
MILES

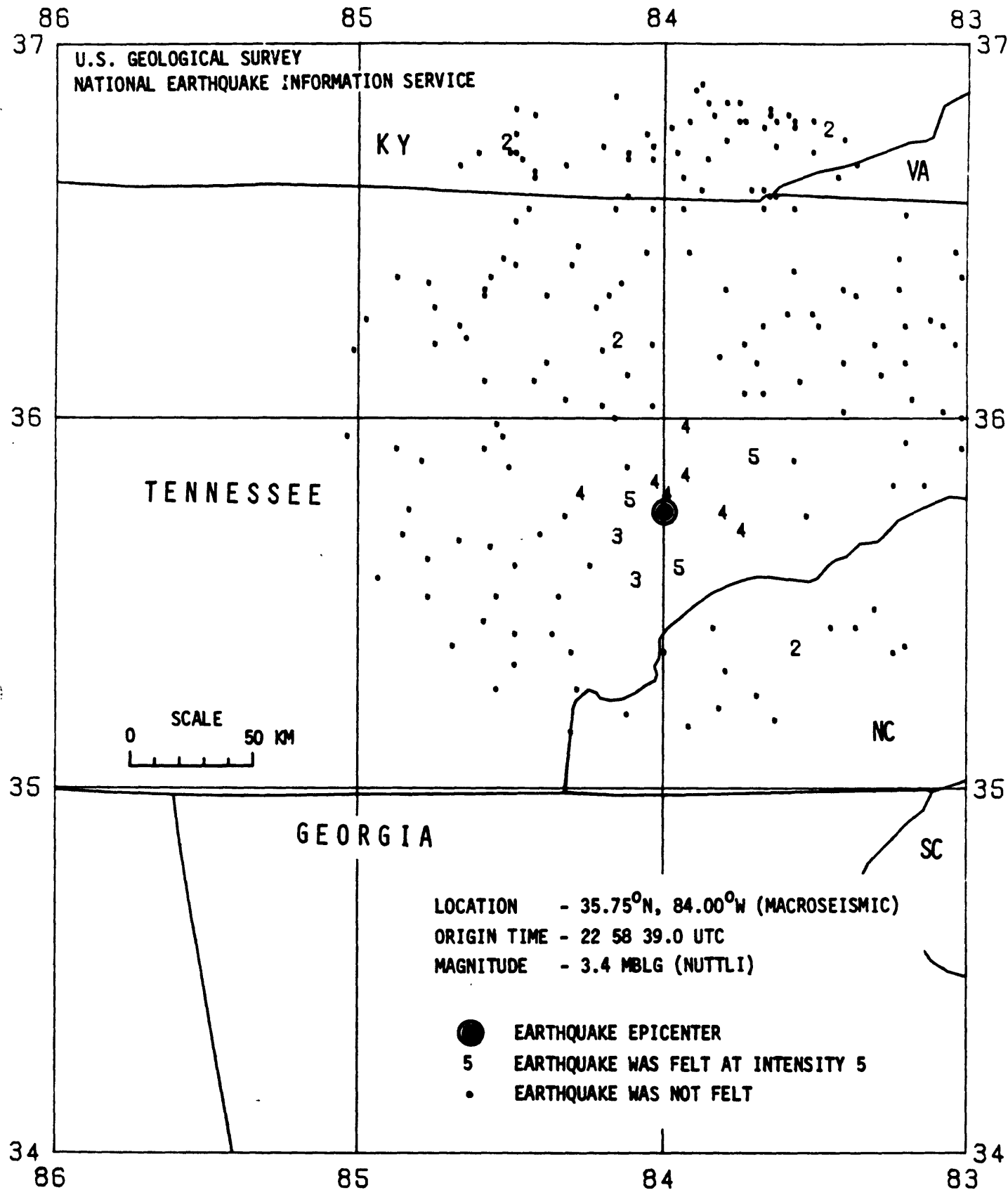
9 Oct 1971



0 20
MILES

30 Oct 1973





AREA AFFECTED BY TENNESSEE EARTHQUAKE OF OCTOBER 30, 1973

INTENSITY INTERPRETATION BY NINA SCOTT
MAP COMPILED BY C. W. STOVER

Ref : USEQ [395]
169

October 30, 1973
35.8N-84.0W
Maryville, Tr
22:58:39.0 GMT
3.4 Mb
33 km.
Max. Int. IV-

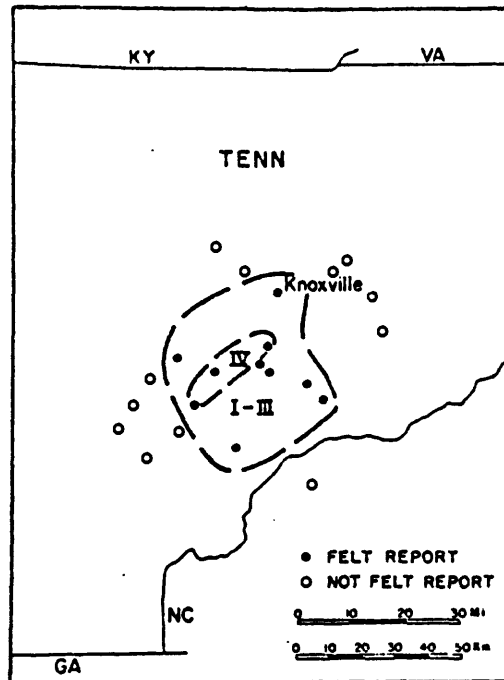
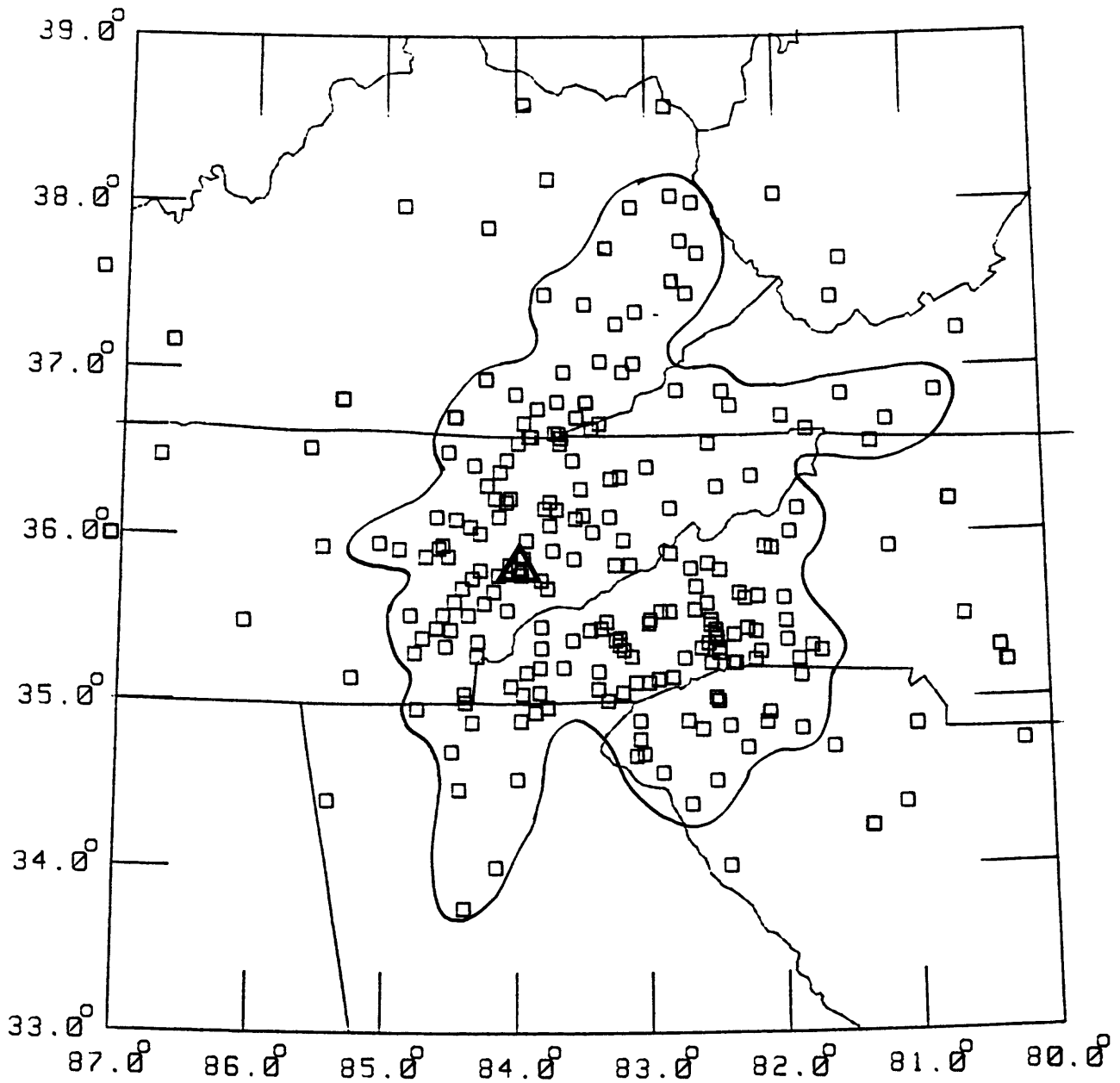
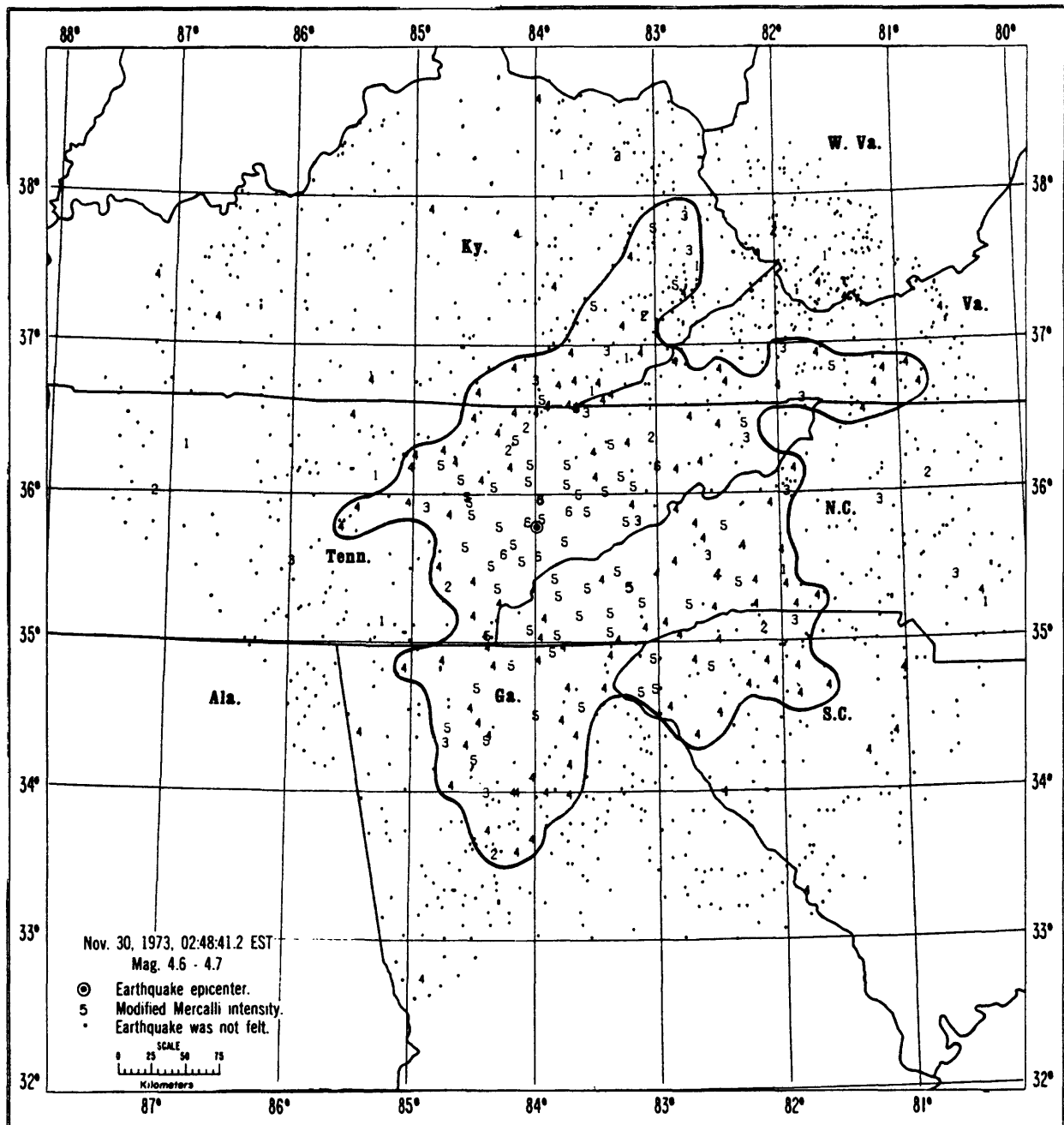


FIG. 3. Isoseismal map for the foreshock ($m_b = 3.4$) of October 30, 1973.

Ref: Bollinger [37]

30 Nov 1973





Re-drawn from USEQ [395]
98,000 sq. km.

November 30, 1973
38.5N-84.0W
Maryville, Tn.
7:48:41.2 GMT
4.5Mb
65,000 sq. km. 172
3 km.
Max. Int. VI

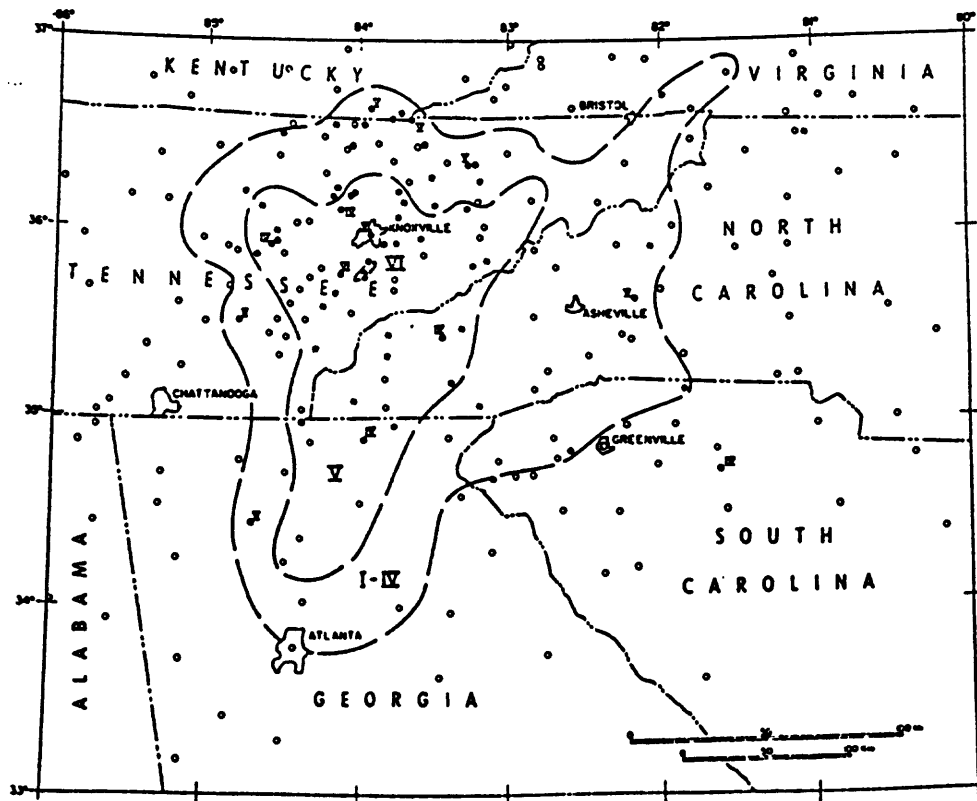


FIG. 4. Isoseismal map for the main shock ($m_b = 4.6$) of November 30, 1973—O felt reports and C not felt reports. Intensities differing from the contoured values are indicated at appropriate locations by small roman numerals.

Ref. : Bollinger [37]

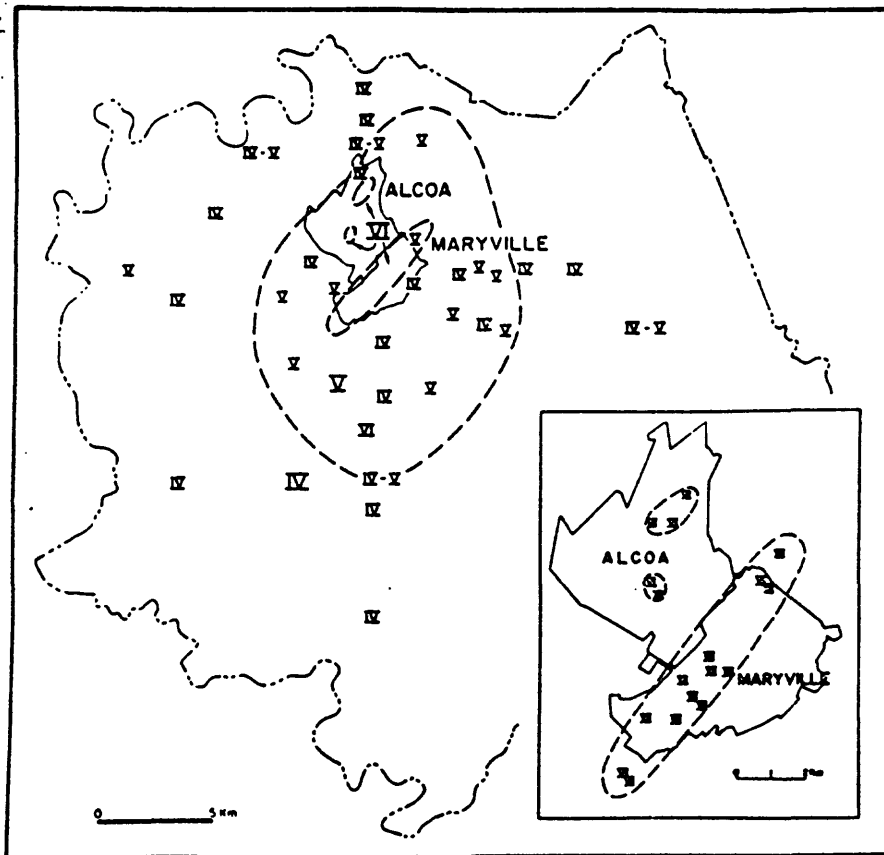
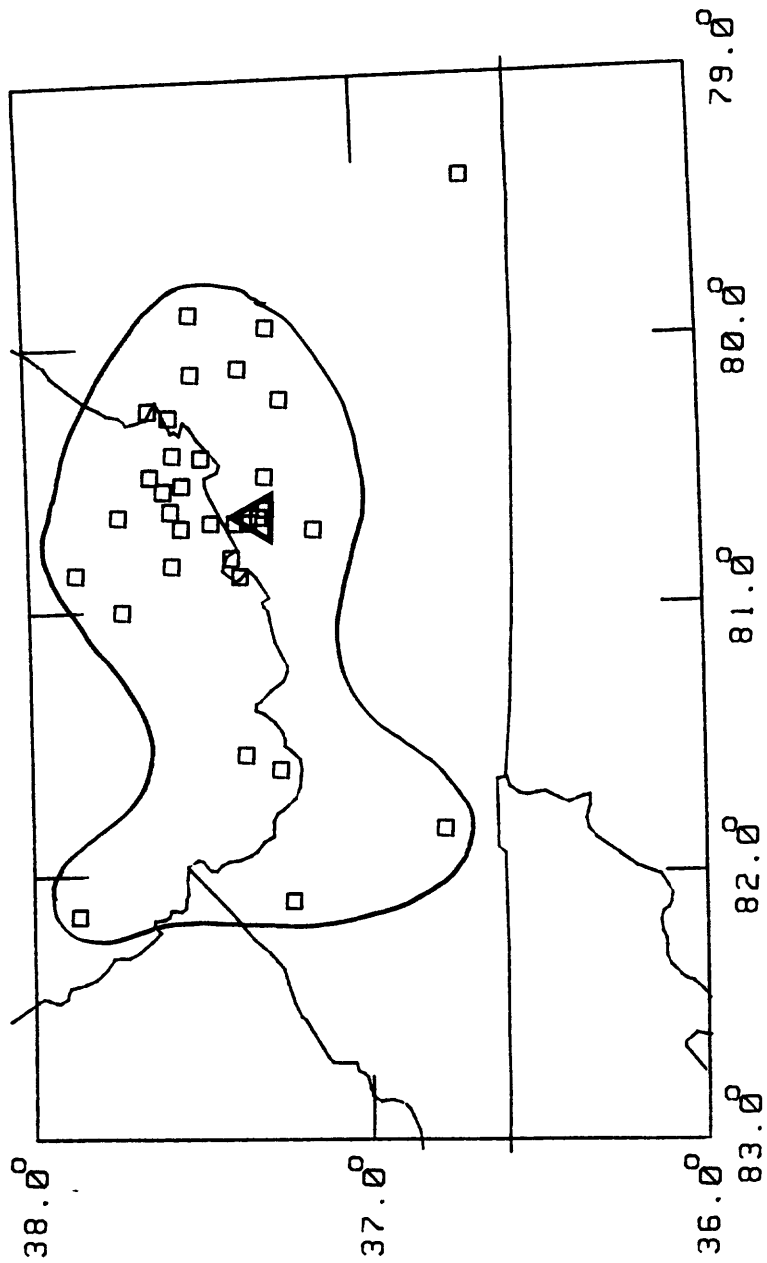


FIG. 5. Detailed isoseismal maps for the main shock ($m_b = 4.6$) of November 30, 1973, for Blount County and for the Alcoa-Maryville area (*inset*).

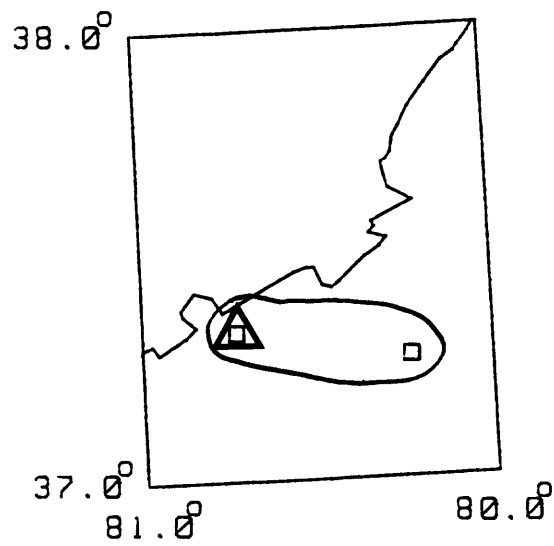
Ref. : Bollinger [37]

30 May 1974



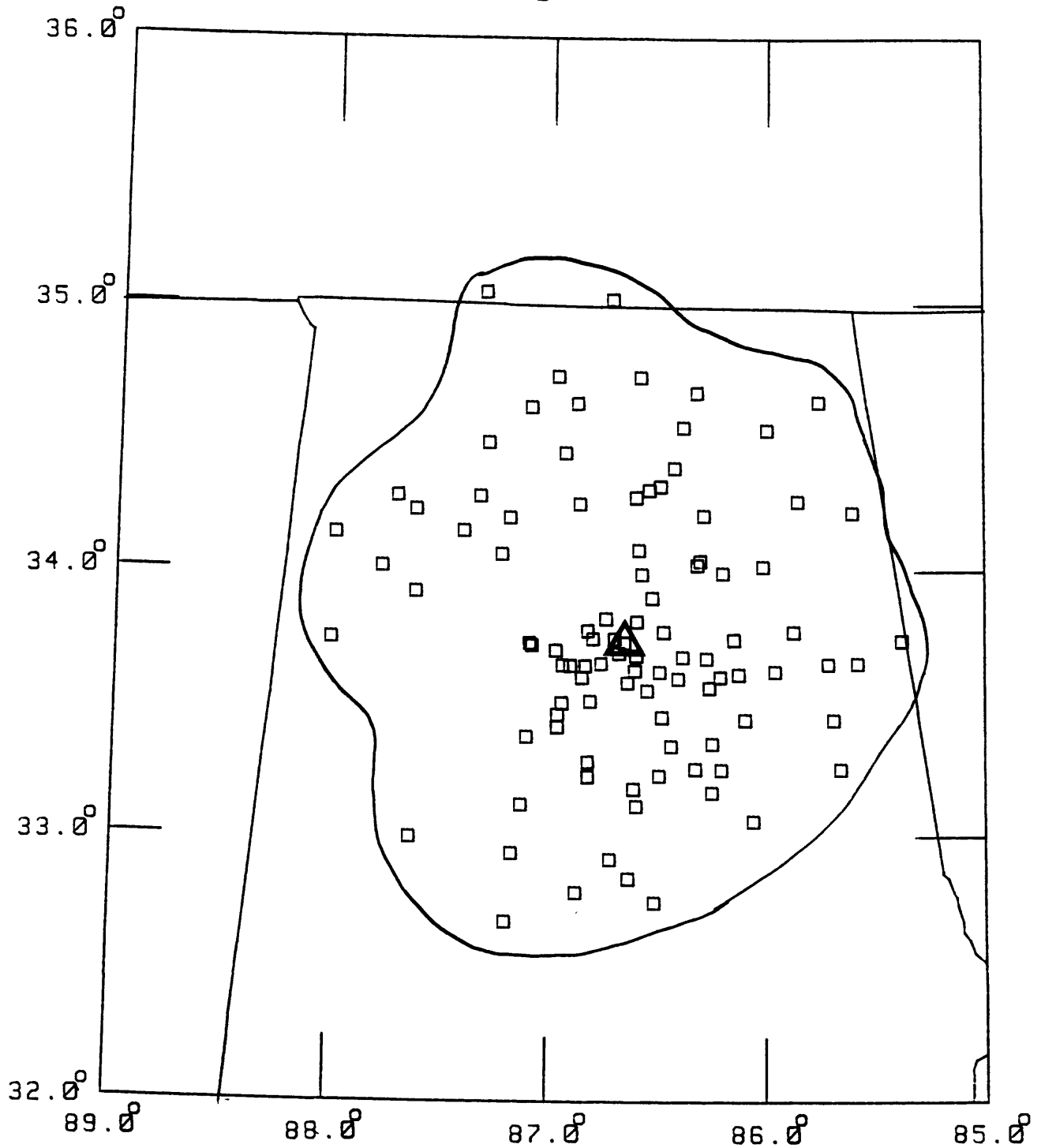
0 40
MILES

7 Mar 1975



0 30
MILES

29 Aug 1975



0 40
MILES

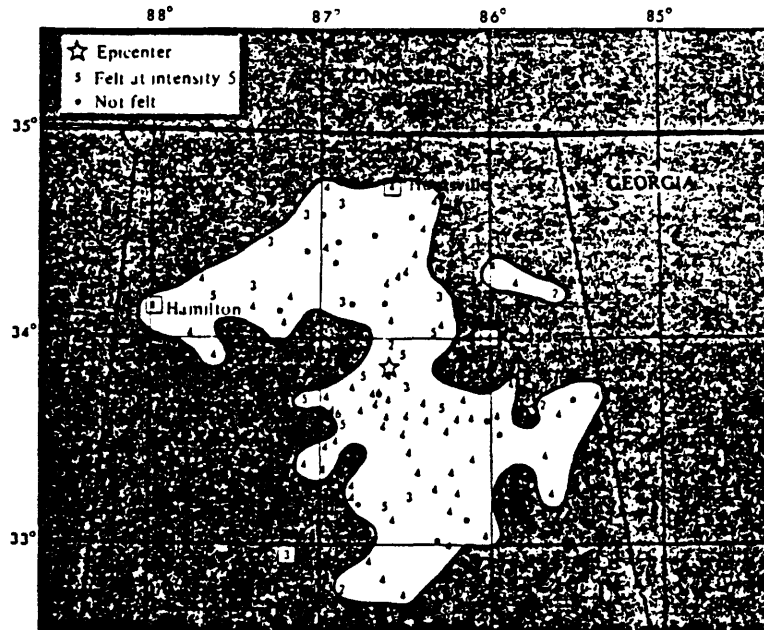
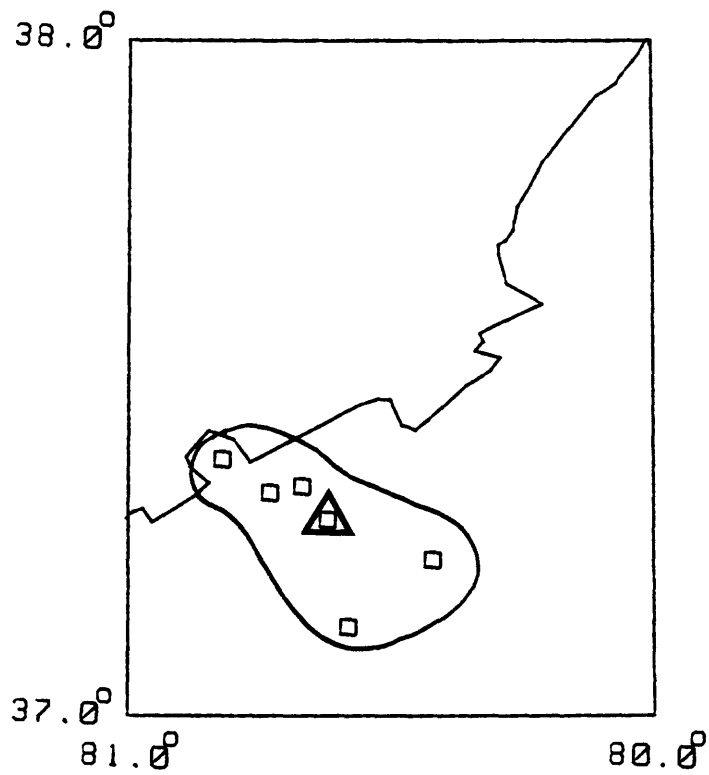


Figure 4. Area affected by Alabama earthquake of August 28, 1975

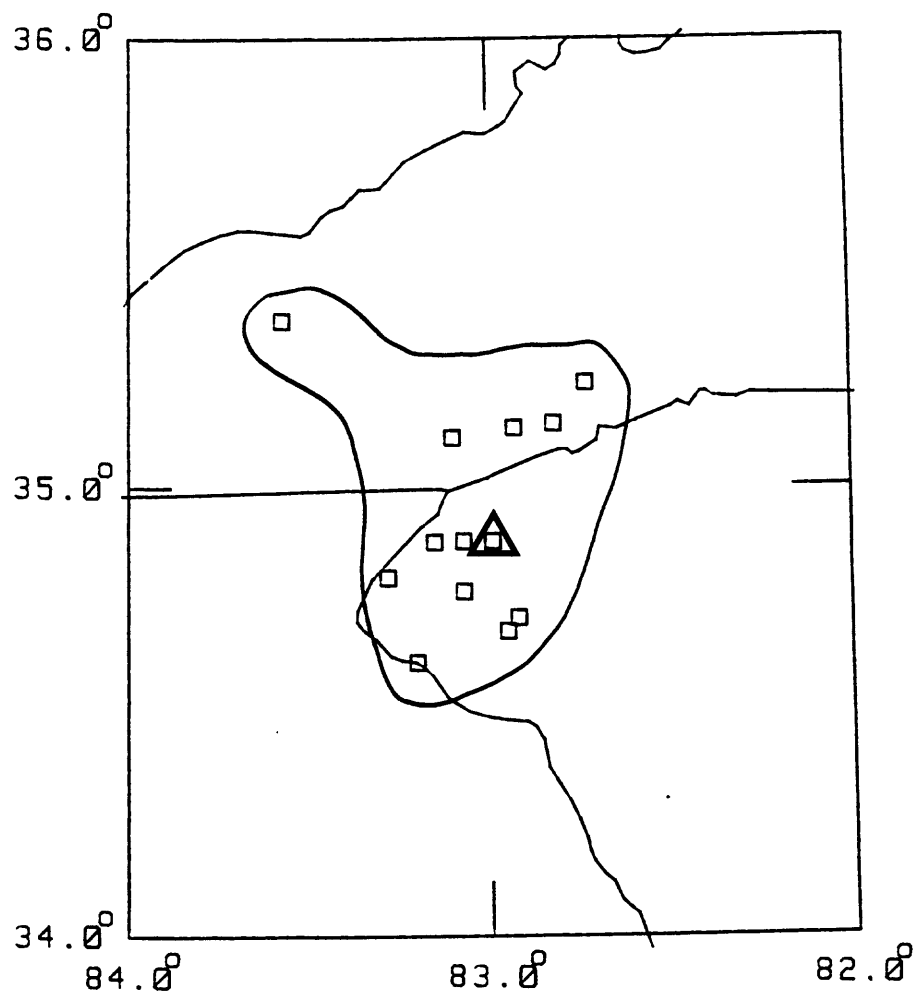
Ref. : USEQ [395]

11 Nov 1975



0 20
MILES

25 Nov 1975



0 30
MILES

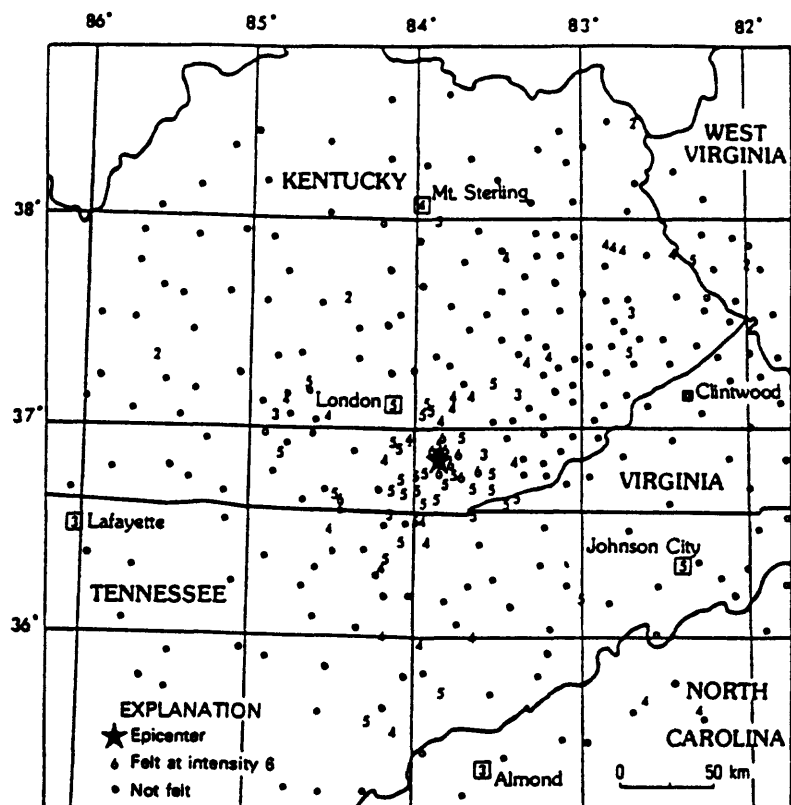
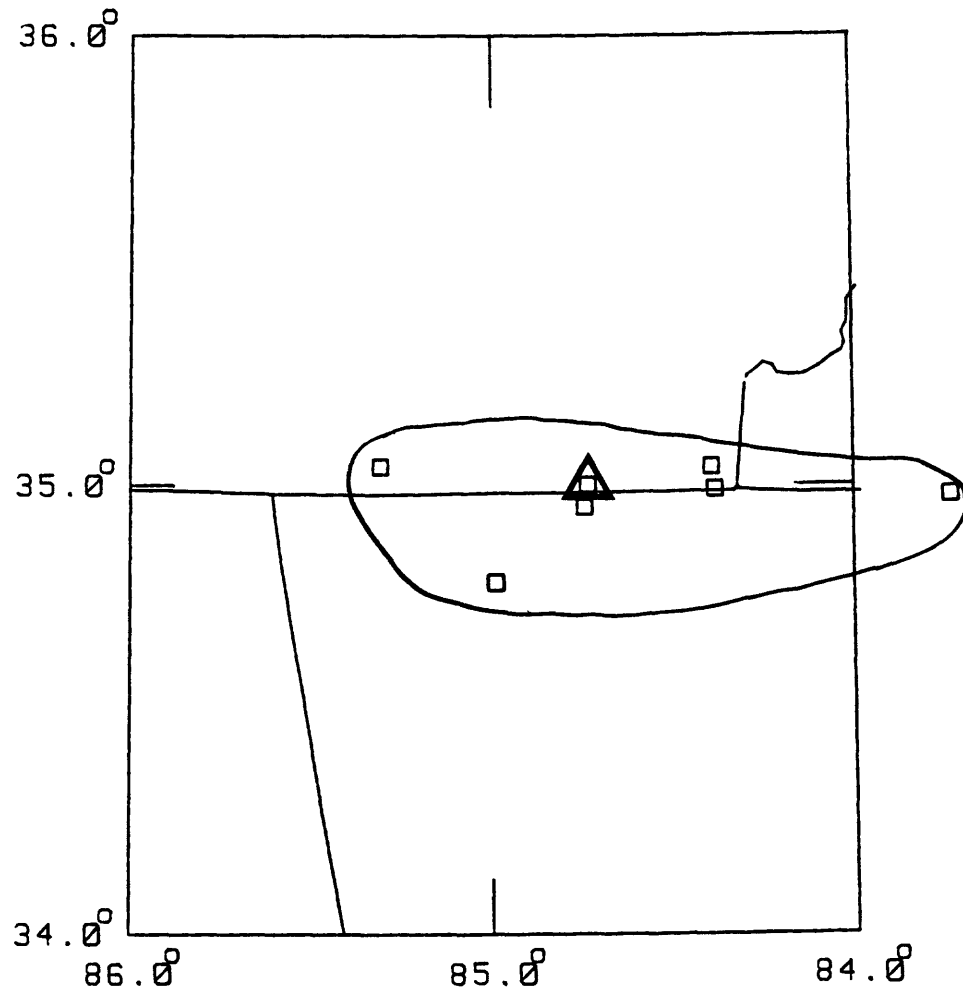


Figure 13 --Area affected by eastern Kentucky earthquake of January 19, 1976

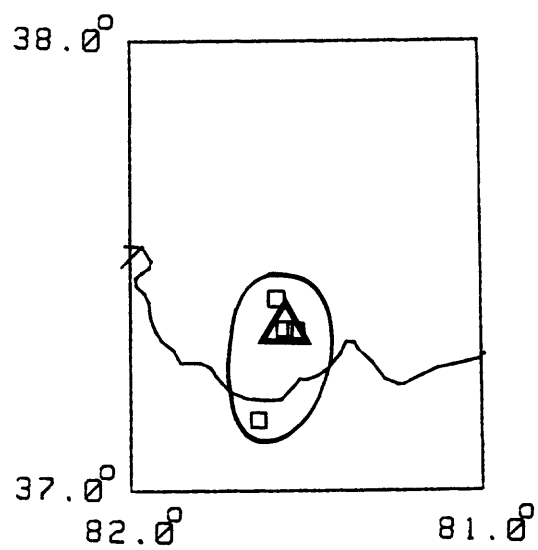
Ref. : USEQ [395]

4 Feb 1976



0 30
MILES

19 Jun 1976



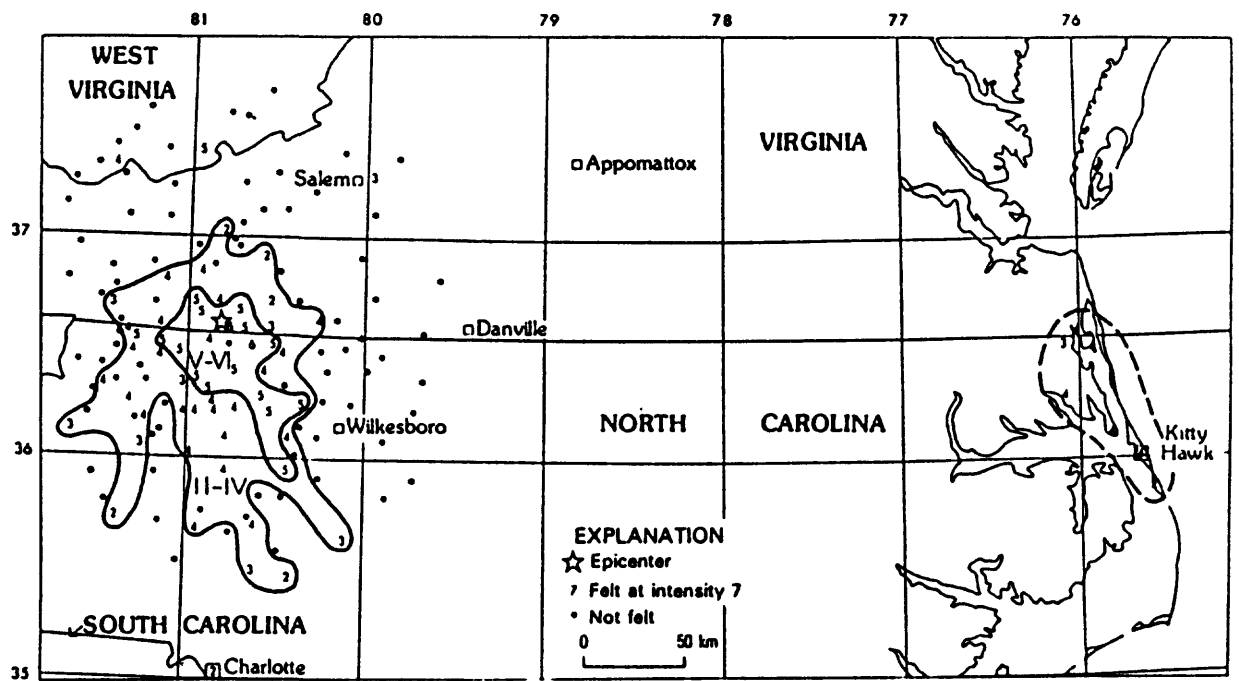


Figure 17.--Area affected by Virginia-North Carolina border earthquake of September 13, 1976

Ref. : USEQ [395]

I. TEIC	1776	NOV 5	p.m.	35.4	83.0	Richland Balsam, NC	IV
Location: Felt in Jackson Co., NC between the Tuckasegee River and Richland Creek; Richland Balsam (elev. 6540 ft) is the highest peak in that area.							
Intensity: Severe shock							
II. TVA [380]	1776	NOV 5	p.m.	35.4	83.2	Jackson Co., NC	V
A. Moneymaker [281]							
B. Templeton [370]							
	1776	NOV 5		35.3	83.2	Jackson Co., west NC	
1. McClain, unpub (1978)							
2. McClain [260]							
3. Moneymaker [281]							
4. TVA, unpub (1977)							
IV. McClain [260]	1776	NOV 6		35.0	83.0	Jackson Co., NC	IV-V
A. Moneymaker [281]							
V. Bollinger [33]	1776	NOV 5-6	p.m.	35.3	83.2	Jackson Co., NC	IV-V
A. MacCarthy [241]							
B. McClain [260]							
C. Moneymaker [281]							
VI. Moneymaker [281]	1776	NOV 5-6	p.m.			Western NC	IV-V

An earthquake was felt on the night of November 5, 1776, by a company of soldiers under Captain William Moore. In his report to General Rutherford, Captain Moore reported: "That night we lay upon a prodigious Mountain where we had a severe shock of an earthquake which surprised our men very much." The "prodigious Mountain" mentioned in this account is in Jackson County, between the Tuckasegee River and Richland Creek, a tributary of Pigeon River.

A. North Carolina Colonial Records (Saunders and Weeks, 1886-1914)

VIII. MacCarthy [241] 1776 NOV 5-6 p.m. Jackson Co., NC IV-V

"That night we lay upon a prodigious mountain where we had a severe shock of an earthquake, which surprised our men very much." (Report of Captain William Moore to General Rutherford of his command during the expedition against the Cherokees. In Col. Recs. X, p. 897.) According to Berlen C. Moneymaker, Chief Geologist, TVA, who called my attention to this, the "prodigious mountain" is in Jackson County, between the Tuckasegee River and Richland Creek, which latter is a tributary to the Pigeon River. Moneymaker estimates the intensity as four to five on the Wood-Neumann scale.

A. North Carolina Colonial Records (Saunders and Weeks, 1886-1914)

B. Moneymaker (personal communication)

III

I. TEIC

1825

Location: Wilkesboro, NC

Intensity: "Something of a shock"

II. TVA [380]

1825 or 1826

A. MacCarthy [242] 1825 or 1826

" . . . Something of a shock was felt at Wilkesborough, a year or two ago." [from account of May 11, 1827 event]
 1. Star (5/31/27), Raleigh, NC

Wilkesboro, NC

81.2

36.2

IV

Wilkesboro, NC

81.2

36.2

Wilkesboro, NC

I. TEIC 1827 MAY 11 p.m. 36.2 81.2 Wilkesboro, NC 1800 IV

Location: Wilkesboro, NC

Intensity: Severe shock, doors and windows shaken, water in river seen to have tremulous motion.

Extent: Reported felt at 2 locations in NC.; map; 1800 sq. km.

II. TVA [380] 1827 MAY 11 36.2 81.2 Wilkesboro, NC IV

A. MacCarthy [242] 1827 MAY 11 Wilkesboro, NC

"We learn...that a pretty severe shock of an earthquake was felt at Wilkesborough (in this State) on Friday, the 11st inst. The doors and windows of the houses were sensibly shaken; and the water in the river was seen to have a tremulous motion. Something of a shock was felt at Wilkesborough, a year or two ago." Star (Raleigh), (May 31, 1827). No other reference to this shock has been found.

1. Star (5/31/27), Raleigh, NC

B. Templeton [370] 1827 MAY 11 36.2 81.2 Wilkesboro, NC IV

1. Bollinger [33]

2. TVA unpub. (1977)

V. Bollinger [33] 1827 MAY 11 36.2 81.2 Wilkesboro, NC

A. MacCarthy [242]

VIII. MacCarthy [241] 1825 NOV 11 p.m. Winston-Salem, NC area

Felt in the Winston-Salem area.

"May 12: Last night several persons living in and outside the town felt a slight earthquake shock." (Mor. Recs. 8, p. 3781; Bethabara Diary). No other mention of this earthquake has been found.

A. Moravian Records (Rights, 1922-24)

I. TEIC	1829	35.2	83.8	Andrews, NC	
Location:	Cherokee Co., NC, somewhere along the present Cherokee-Clay Co. border, not far from 35.2, 83.8				
Intensity:	"The Valley River Mountain was left open for a considerable distance during a violent shaking of the earth".				
Comment:	This is one of several NC events described by Clingman, and by others, as having had significant, but very local, effects; the most notable being the series of events reported from Stone Mt. near McDowell Co. in 1874; such effects on the occasion of a demonstrably large event might justify the high intensity (X-XI) that could be assigned according to the Wood-Neumann Scale.				
II. TVA [380]	1829	35.2	83.8	Andrews, NC	IV
A. MacCarthy [241]					
B. Ferguson [150]	1829			Cherokee Co., NC	
C. Templeton [370]	1829	35.0	84.0	Cherokee Co., NC	
1. Bollinger [33]					
V. Bollinger [33]		35	84	Cherokee Co., NC	
1. MacCarthy [241]					
VIII. MacCarthy [241]	1829	35.2	83.8	Cherokee Co., NC	

*1829 (?). Cherokee County, NC. A.J.S. 109 (1875), p. 57, quoting a paper by the Hon. Thomas L. Clingman in the Western Expositor [original paper not seen] says: "In the county of Cherokee, in the year 1829 or thereabouts, the Valley River Mountain was cleft open for a considerable distance during a violent shaking of the earth in that vicinity. The chasm, though partially filled up, is represented as still visible." This locality seems to have been south of Andrews, somewhere along the present Cherokee-Clay county border, not far from 35 10' N., 83 50' W. While it is just possible that this reference is to the March 9, 1828, earthquake, the localized effects described render this supposition very unlikely.

A. Anonymous [10]

1. Hon. Thomas L. Clingman, Western Expositor (No date)

I. TEIC	1836	MAY 7	36.0	83.9	Knoxville, TN	III
Location: Knoxville, TN						
Intensity: Experienced a shock						
II. TVA [380]	1836	MAY 7	36.0	83.9	Knoxville, TN	IV
A. Moneymaker [283]	1836	MAY 7			Knoxville, TN	
	1836	MAY 7			Knoxville, TN	

[In an account of the Kingston, Jamaica earthquake of May 7, 1836, the following statement appears]: "A similar shock, it may be recalled, was experienced at Knoxville, Tennessee on the same day."

1. Niles Weekly Register, June 18, 1836, p. 266.

I. TEIC	1844	JUN	35.4	83.4	Bryson City, NC
Location:	Between the Tuckasegee River and Cowee Mt.; 20 miles from Waynesville near the three-way corner of present Macon, Swain and Jackson Counties; this location is near Bryson City, NC.				

Intensity: Ground shaken violently, fresh chasm, 2 or 3 feet wide, which extended more than a mile; heard, but not felt in Waynesville, NC, some 20 miles away.

II. TVA [380]	1844 or 1845	JUN	35.2	83.1	Jackson Co., NC
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A. McCarthy [241]	
B. Ferguson [150]	1844 or Jackson Co., NC

C. Bollinger [33]				
D. Templeton [370]	1844	JUN	35.4	83.4

1. Bollinger [33]			
V. Bollinger [33]	1844 or 1845	35.4	83.4
			Macon Co., NC

A. MacCarthy [241]	1844 or JUN	Jackson Co., NC
VIII. MacCarthy [241]	1845	

*1844 or 1845: June, Jackson County. A.J.S. 109 (1875), p. 57, quoting a paper by the Hon. Thomas L. Clingman in the Western Expositor [original paper not seen] writes: "In my former publication [letter to the National Intelligencer Oct. 8, 1848]...

I was soon informed that three or four years previously [previous to 1848?], in the southern part of Macon County, between the Tuckasegee River and the Cowee Mountain, the ground was shaken violently for several minutes. A few days afterward some persons discovered a fresh chasm, two or three feet wide, which extended more than a mile. This was in the month of June...." In his Intelligencer letter of 1848 Clingman mentions that these shocks were heard, but not felt, "in the town of Waynesville, some twenty miles off." This epicenter appears to have been located near what is now the three-way corner of Macon, Swain, and Jackson counties, the latter two not having been created at the time. It was probably in what is now Jackson County, and much less likely in what is now Swain County. It could not have been in the present Macon County, since it is said to have been located east of the Cowee Mountains, which now form the eastern boundary of Macon County. No mention of this earthquake has been found in any available contemporary newspapers.

A. Anonymous [10]

In my former publication, it was suggested that if the phenomena at this point were due to volcanic action, similar disturbances would be noticed at other localities in the Alleghany range. I was soon informed that three or four years previously, in the southeastern part of Macon County, between the Tuckasegee River and the Cowee Mountain, the ground was shaken violently for several minutes. A few days afterward some persons discovered a fresh chasm, two or three feet wide, which extended more than a mile. This was in the month of June, and they said the leaves and branches of timber immediately above the chasm, in places, presented the appearance of having been scorched. Though I was not able to visit the place, yet from the character of my informants I do not doubt but that the facts were as above stated.

1. Hon T.L. Clingman, Western Expositor (No date)

I. TELC 1844 NOV 28 13:00 35.8 84.0 Maryville, TN 2900 VI

Location: Damage in Knoxville and Blount Co.; felt southward to Athens - probably closer to Maryville than Knoxville; intensity; location

Intensity: @ Knoxville, bricks were thrown from top of chimney and one, apparently firmly built, brick chimney was "thrown down"; bricks displaced from chimneys and houses in Blount Co.

Extent: Eastern TN; map; 2900 sq. km.

II. TVA [380]	1844	NOV 28	13:00	36.0	83.9	Knoxville, TN	VI
A. Nuttli [310]	1844	NOV 28	13:00	36.0	83.9	Knoxville, TN	VI
B. Moneymaker [290]	1844	NOV 28	07:00 a.m.			Knoxville, TN	
C. Templeton [370]	1844	NOV 28		36.0	84.0	Knoxville, TN	VI

1. Bollinger [33]

2. McClain, unpub., (1978)

3. McClain [260]

1. Diary: January 1842 to September 1849, kept by Drury Paine Amstrong

"At a few minutes after 7 o'clock there occurred such a shock of an earthquake that the whole house vibrated to and fro; the windows rattled, the crockery in the press rattled, and there fell from the top of a chimney on my house, in consequence of the shaking and jarring, ten whole bricks and several pieces. The shake was accompanied by a considerable sound which resembled distant thunder, apparently came from a western direction and passed to the east. The shocks were sufficiently long for me to rise and pass out of the house, lest it should fall."

2. Knoxville Register (12/4/44), Knoxville, TN

"Earthquake. A severe shock of an earthquake was felt in this vicinity on Thursday morning last, the 29th ult*. It commenced at about 7 o'clock, and continued with considerable violence for the space of several seconds accompanied with a loud report resembling that produced by a heavy ordnance at a distance which was succeeded by a strong and deep rumbling noise similar to that produced by a heavily loaded wagon crossing a bridge. The shock was the most severe we have ever experienced."

In one instance, an apparently firmly built brick chimney was thrown down by it in this county; and in this and the adjoining county of Blount bricks were in several cases displaced from chimneys and houses. The motion appeared to be both perpendicular and horizontal and the closest observers imagine that the shock must have come from the southwest. It is probable that it was not felt west of the Cumberland Mountains as we have Sparta, Lebanon, Nashville, and Franklin papers published subsequent to the occurrence which make no mention of it. The Athens, Tennessee Republican speaks of it as having been felt very sensibly in that place." *According to my perpetual calendars, Thursday was the 28th.

- a. Various news accounts
- b. Republican (no date), Athens, TN

III. USGS [390]

A. EOHUS [123]	No account			
B. EOHUS [121]	1844	NOV 28	07:00	36.0 84.0 Knoxville, TN VI

Bricks fell from chimney. Windows and dishes rattled; sounds like distant thunder.

1. Moneymaker [282] - [No mention of this event in Moneymakers file for the KY list]

C. EOHUS [120]	1844	NOV 28	07:00	36.0 84.0 Knoxville, TN VI
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Bricks fell from chimney. Windows and dishes rattled; sounds like distant thunder.

1. Moneymaker [282] - No mention of this event in Moneymakers file for the KY list]

IV. McClain [260]	1844	NOV 28	12:00	36.0 84.0 Knoxville, TN VI
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A. EOHUS [121]

B. Moneymaker [281] [No mention of this event in published listing]

V. Bollinger [33]	1844	NOV 28	07:00	36.0 84.0 Knoxville, TN VI
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A. EOHUS [120]

B. McClain [260]

C. Moneymaker [281]

VI

Knoxville, TN

83.9

36.0

NOV 28

1844

IX. Varma [400]

A. Moneymaker [282]

I. TELC	1848	35.5	82.2	Stone Mt., NC
Location: "Earthquakes" referred to as having originated in McDowell Co., NC at Bald Mt., or "Rumbling Bald" most probably originated at, or near Stone Mt. which is on the boundary between Buncombe and Rutherford Cos., not far from McDowell Co.; see discussion Dupre [110] for Feb. 22, 1874 event.				
Intensity: No indication				
Comment: The only reference found for this event is Ferguson [150] with no indication as to what their reference is; Anonymous [10], article in the American Journal of Science (1875) refers to a report by T.L. Clingman who visited the "area" in 1848, the original piece published in the <u>Western Expositor</u> (No date) was not available for review.				
II. TVA [380]	1848	35.7	82.0	McDowell Co., NC
A. Ferguson [150]	1848			McDowell Co., NC

IV

I. TEIC 1851 AUG 11 01:55 35.6 82.6 Asheville, NC V

Location: Asheville, NC

Intensity: Severe shock, house jarred, chair and "many other things moved".

II. TVA [380] 1851 AUG 11 01:55 35.6 82.6 Asheville, NC IV

A. MacCarthy [242] 1851 AUG 10 8:55 p.m. Asheville, NC

"On Sunday evening last at 5 minutes before 9, a severe shock of earthquake was felt in this place, accompanied by a loud noise, which lasted 20 seconds...We were sensibly moved in our chair, our house jarred, and many things in it moved so as to cause considerable noise."

1. Carolina Watchman (8/21/51), Salisbury, NC

a. Asheville Messenger (date unknown), Asheville, NC

B. Templeton [370] 1851 AUG 11 35.6 82.6 Asheville, NC IV

1. Bollinger [33]

2. TVA, unpub., (1977)

V. Bollinger [33] 1851 AUG 10 20:55 35.6 82.6 Asheville, NC

A. MacCarthy [242]

I. TEIC 1852 APR 29 18:00 36.7 82.0 Abingdon, VA 274,000 VII

Location: McCarthy [241] suggests the epicenter is near where TN, VA, and NC come to a point; if Merriam's [270] report of an event felt at Abingdon on May 3 is correct - could be A/S and indicate this epicenter at least nearby Abingdon.

Intensity: Tops of chimneys shaken off @Buckingham Court House, VA; chimney damaged - thrown down near Wytheville, VA; furniture rocked and a brick thrown from one chimney in Davie Co., NC; @Staunton, VA, furniture rocked, a chimney "thrown down"; @Scottsville, VA, boats in the canal were tossed to and fro.

Extent: Felt from Maryland to eastern TN, Ohio to NC Piedmont; map; 274,000 sq. km.

II. TVA [380] 1852 APR 29 17:51 36.6 80.9 Southwest VA VI

A. McCarthy [241]

B. Hopper [210] 1852 APR 29 13:00 VA-NC-TN 420,000

Abingdon, VA--Felt. (MacCarthy, 1963);

Alexandria, VA--Felt. (MacCarthy, 1963);

Emory and Henry College (Southwest of Marion, VA)--Felt so sensibly that one professor left the building for safety and a student lying on his bed called to his friend to stop shaking the bed. (DD 5/6/52) (IV);

Fincastle, VA--Felt. (MacCarthy, 1963);

Fredericksburg, Va--Felt. (MacCarthy, 1963);

Lynchburg, VA--Shook the walls of houses and rattled china and window glass (RE 5/11/52) (IV);

"A distinct rolling motion, similar to the one of December last (Dec. 22, 1875), though not quite so severe, and did not last as long. The prisms in our lamps...rattled as if struck together by hand." (DD 1/8/76);

Petersburg, VA--Felt. (MacCarthy, 1963);

Richmond, VA--Shock of an earthquake experienced by many. "In certain quiet locations the noise and shock were so sensibly heard and felt as to give rise to considerable alarm." (DD 4/30/52) (III-IV);

Felt, but not by all;

Staunton, VA--Shock "lasted nearly a minute, and some houses were so violently shaken that the occupants made a precipitate retreat." (RE 5/11/52) (V+)

"A shaking or jarring as of the whole house was most sensibly felt, accompanied by loud rattling of the tin roof...like the pounding of an immense weight (as of a battering ram) on the roof, jarring by quick blows the whole building, which is a large one of brick." Duration about ten seconds. "Beyond compare more formidable" than the earthquake of December 22, 1875, when "only the windows of our house rattled violently, but not the walls, furniture, or floor sensibly--that is to say, on the first floor. Above stairs...the shaking of the house was plainly felt." In a hardware store trace-chains hanging on one wall oscillated with a pendulum-like motion of considerable sweep, and on a wall at a right angle to the first, broadaxes, suspended by twine, flapped rapidly and noisily against the wall. (DD 1/18/76);

Wytheville, Va--A chimney thrown down. (Eppley 1965) (VI);

Furniture rocked and one chimney "thrown down." (MacCarthy, 1963)

Washington, DC--Very perceptibly and generally felt." The vibrations continued three or four seconds. (NI 4/30/52);

Five smart shocks, followed by a strong smell of sulphur. "The Clerks of the Interior (located in Winder's building) ran out in great alarm; and in some places private business was interrupted." (N&PH 5/3/52);

Washington Observatory reported two distinct shocks at intervals of one second starting at 12:51. After two minutes, three more shocks in quick succession, of still greater violence. Followed by a strong smell of sulphur. "The officers then came outside of the building and remarked that no smell of any kind was perceivable in the atmosphere." Shocks "plainly felt in various parts of the city." (RW&PA 5/4/52) (V) [sic];

Annapolis, MD--Felt. (MacCarthy, 1963);

Baltimore, MD--"Perceptible." (NI 4/30/52);

"Sensibly felt by a large number of persons. Many of the houses trembled to their foundations, causing considerable alarm." Correspondent thought it was only heavy rumbling of a carriage over the pavement. (NI 5/1/52) (IV-V);

"Slight shock of an earthquake." (LV 5/3/52);

Baltimore County, MD--Felt. (NI 5/1/52);

Frederick City, MD--Felt. (NI 5/1/52);

Rockville, MD--Felt. (MacCarthy, 1963);

Albany, NY--Felt by only one man who was lying down and felt himself rolled backwards and forwards for six or eight seconds and saw his coat swinging on the wall where it was hanging. This account in a letter to the editor after accounts from elsewhere had appeared in Albany papers. MacCarthy notes "this account should be suspect." (MacCarthy, 1963) (I-II ?)

New York, NY--Felt. (MacCarthy, 1963);

Charlotte, NC--Felt. (MacCarthy, 1963);

Davie County, NC--Furniture rocked. One chimney damaged--it lost a brick which "rolled down the road." (MacCarthy, 1963). (VI);

Greensborough, NC--"Jarring undulatory motion was distinctly felt during four or five seconds shaking the windows and rocking the furniture in the houses." (RE 5/11/52) (IV-V);

Hillsboro, NC--Felt. (Eppley, 1965);

Lincolnton, NC--Felt. (MacCarthy, 1963);

Milton, NC--Felt. (Eppley, 1965);

Raleigh, NC--Felt "with greater violence" than in Washington, DC (NI 4/30/52);

Felt quite sensibly...A great shaking of doors and windows...and much excitement among the people." (DD 5/1/52;

"Shook the doors and windows violently, and caused a general excitement throughout." (N&PH 5/3/52);

"Severe shock of an earthquake...shaking violently the doors and windows, and causing quite an excitement throughout town." (RW&PA 5/4/52) (V);

Salem, NC--Felt. (MacCarthy, 1963);

Salisbury, NC--Felt. (MacCarthy, 1963);

Gallipolis, Ohio--Felt slightly, but "caused about thirty feet of the river bank, extending near half a square, to slide off." (MacCarthy, 1963) (III ?);

Philadelphia, PA--Felt. (MacCarthy, 1963);

Extent:

Generally felt in Virginia, Maryland, North Carolina, Southeastern Ohio, Southeastern Pennsylvania, epicenter near where Virginia, Tennessee, and North Carolina come to a common point. New York to North Carolina and Atlantic Coastal Plain to Ohio. Reported as rather severe in extreme southwest Virginia and in northern North Carolina, and in the "Cumberland Mountains of Tennessee." Elsewhere moderate. Epicenter probably in southwest Virginia, rather than nearer to the center of the disturbed area. (MacCarthy, 1963);

1. MacCarthy [243] 1852 APR 29 1:00 p.m. SW VA 485,000 VI

The 1852 earthquake occurred about 1 p.m. on April 29, although Brigham, again followed by all later authorities, gives the date erroneously as the 30th. Reports have been found from some twenty-five different localities, ranging from New York City and (perhaps) Albany on the north, southward to Charlotte, North Carolina, and westward to Gallipolis, Ohio.

It was reported as rather severe in the extreme southwestern Virginia and in northern North Carolina, and in the "Cumberland Mountains of Tennessee." Elsewhere it appears to have had only very moderate effects. A smooth curve drawn so as to include all the points from which reports have been found--except for Albany--forms a distinct oval, elongated in a northeast-southwest direction, and including about 187,000 square miles (see figure 2).

Nowhere except in southwestern Virginia and northern North Carolina do we find reports indicating anything more than a very moderate shaking. In this particular area, however, there was some alarm, furniture is reported to have been "rocked," and two chimneys--one in Davie County, N.C. and one near Wytheville, Va., are said to have been damaged. The former lost a brick which, in the words of a contemporary account, "rolled down the road," while the latter is said to have been "thrown down." As well as can be determined from the available data, the epicenter was probably in southwestern Virginia, rather than nearer to the center of the disturbed area.

The following item (4) comes from Gallipolis, Ohio, the most western point from which it seems to have been reported:

"The shock of earthquake on the 29th ult., was slightly felt at Gallipolis, in Ohio, but, slight as it was, caused about thirty feet of the river bank, extending near half a square, to slide off."

At Albany, N.Y., apparently the most northerly point where it was noticed, the earthquake is described in the following words (5):

"...I was lying, Thursday afternoon, on my side on a hard surface: head to the west...face to the south. Suddenly I felt myself rolling backward to the North until I made an angle with the horizon of at least forty-five degrees; then rolled back as far in the other direction, and kept rolling back and forth less and less during six or eight seconds...At the same time I saw a coat of mine hanging against the wall in front of me swinging out at least four inches from its usual position, and continue swinging as I rolled, until, like myself, it was still...."

Although this is a very graphic description, this account should be suspect, since only this one man appears to have reported the shock in Albany, and his "letter to the editor" was written after accounts from elsewhere had appeared in the Albany newspapers. The shock was, however, definitely felt, although rather weakly, in New York City and in Philadelphia.

It would appear that the maximum intensity of this earthquake nowhere exceeded VI on the Modified Mercalli scale, despite the rather wide area over which it was felt.

Scientists at the Smithsonian Institution became interested in this earthquake, and a formal questionnaire was circulated. This questionnaire was reproduced in several of the more important newspapers of the day.

a. Brigham [50]

April 30 in the afternoon, a shock was felt in the Eastern States but principally at Washington and Baltimore.

b. Greensborough Patriot (5/22/52), Greensborough, NC

c. Evening Journal (5/1/52), Albany, NY

d. MacCarthy [243]

2. Bollinger [31] 1852 APR 29 13:00 36.6 81.6 VA-NC-TN 485,000 VI

a. EQHUS [121]

b. MacCarthy [243]

c. MacCarthy [244]

3. Daily Dispatch (1/8,1/18/76), Richmond, VA

4. Daily Dispatch (4/30,5/1,5/6/52), Richmond VA

5. Richmond Enquirer (5/11/52), Richmond, VA

6. EQHUS [121]

7. National Intelligencer (4/30, 5/1/52), Washington, DC

8. Norfolk and Portsmouth Herald (5/3/52), Norfolk, VA

9. Richmond Whig and Public Advertiser (5/4/52), Richmond, VA

10. Lynchburg Virginian (5/3/52), Lynchburg, VA

C. Merriam [270]

April 29: Severe shock of Earthquake at Raleigh, NC at 12:45 p.m.; two shocks at Washington City; slight shock at Baltimore and Frederick, MD, Brooklyn, L.I.; four shocks at the U.S. Arsenal, near Philadelphia, PA at 1 p.m., also at Lynchburg and Stauton, VA, and Greensboro, NC. A smart shock felt in the Valley of the Cumberland (Tenn.) Mountains.

D. EQHUS [120]

E. Templeton [370]	1852	APR 29	36.6	81.6	VA-NC-TN Region	VI
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1. Bollinger [33]

2. McClain, unpub., (1978)

3. McClain [260]

III. USGS [390]

A. EQHUS [123]	1852	APR 30	p.m.	Washington, DC - Baltimore, MD
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Shock felt at Washington and Baltimore

1. Brigham [50]

B. EQHUS [121]	1852	APR 29	13:00	Probably VA	389,000	VI
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Felt from Washington, D.C. and Baltimore, Md. on the north to Raleigh, Greensboro, Hillsboro, and Milton, NC on the south. Hollow rumbling noise reported. Chimney reported thrown down near Wytheville, Va.

1. Brigham [50]

2. MacCarthy [241]

3. MacCarthy [244]

C. EQHUS [120] 1852 APR 29 13:00 Probably VA 420,000 VI

Probably Virginia. Felt from Washington, D.C. and Baltimore, Md. on the north to Raleigh, Greensboro, Hillsboro, and Milton, N.C., on the south. Some ran from offices in great alarm in the District of Columbia. chimneys were thrown down near Wytheville, Va. Tops of chimneys were shaken off at Buckingham Court House, Va. At Staunton, Va., shock lasted nearly a minute; houses were so violently shaken that "many [people] made a precipitate retreat." Much alarm in Richmond. At Scottsville, VA, in Albermarle County, boats lying in the canal were tossed to and fro. Every house in the town was shaken.

1. Brigham [50]

2. MacCarthy [243]

3. MacCarthy [241]

4. MacCarthy [244]

5. Hopper [210]

IV. McClain [260] 1852 APR 29 18:00 36.6 81.6 VA-NC-TN 389,000 VI

A. EQHUS [121]

B. Moneymaker [281] [no account for this event found]

C. MacCarthy [243]

V. Bollinger [33] 1852 APR 29 13:00 36.6 81.6 VA-NC-TN 420,000 VI

A. Bollinger [31]

B. Hopper [210]

C. MacCarthy [244]

D. EQHUS [120]

E. MacCarthy [243]

VIII.(a) MacCarthy [241] 1852 APR 29 13:00 Probably in VA

1852: April 29, shortly before 1300 hrs. Reported from Raleigh, Greensboro, Hillsboro, and Milton in North Carolina. Epicenter probably in Virginia. "In p.m. in Washington and Baltimore, April 30, 1852." (E. Hist.) [The correct date, as given in contemporary newspapers, is April 29.] "Earthquake--The shock of an earthquake was very sensibly felt by several persons at Raleigh, in this place [Hillsboro], and at Greensborough, on Thursday last the 29th ultimo, a little before one o'clock p.m. The Greensborough Patriot describes it as a undulatory motion, shaking the window sashes and rocking the furniture in the houses, and continuing four or five seconds, accompanied with a hollow rumbling noise. This description corresponds with the sensations felt here by the many persons who observed it."

A. EOHUS [123]

B. Hillsborough Recorder (5/5/52), Hillsborough, NC

1. Greensborough Patriot (No date), Greensborough, NC

VIII.(b) MacCarthy [244] 1852 APR 29 01:00 p.m. 485,000 VI

1852: April 29: shortly after 1 p.m. A rather severe earthquake which was generally felt in Virginia, Maryland, and North Carolina as well as in southwestern Ohio and southeastern Pennsylvania. It has been described by MacCarthy (1967) and is found in various seismic catalogues, although most authorities, following the erroneous data given by Brigham (1871) date it as of the thirteenth. Its epicenter was apparently not far from where Virginia, Tennessee, and North Carolina come to a common point. It was quite severe in this area; a chimney near Wytheville was thrown down. It was felt over an area of about 187,000 square miles, which included all of Virginia. Although it affected such a wide area, its maximum intensity does not appear to have been much greater than VI.

A. MacCarthy [243]

B. Brigham [50]

IX. Varma [400] 1852 APR 29 VA VI

A. MacCarthy [241]

B. MacCarthy [244]

I. TEIC 1852 MAY 3 08:00 36.7 82.0 Abingdon, VA III

Location: Abingdon, VA

Intensity: Slight shock

Comment: A/S to event April 29, 1852?

II. TVA [380] 1852 MAY 3 08:00 36.7 82.0 Abingdon, VA IV

No mention of this event found in the Abingdon Democrat [see MacCarthy [310], description of the September 18, 1852 event], MacCarthy [310] suggests Merriam may have been in error.

A. Merriam [270] 1852 MAY 3 3:00 a.m. Abingdon, VA

Slight shock of earthquake at Abingdon, VA, from N.E. to S.W. at 3 a.m.

B. Templeton [370] 1852 MAY 3 36.7 82.0 Abingdon, VA II-III

1. Bollinger [33]

2. TVA, unpub., (1977)

V. Bollinger [33] 1852 MAY 3 03:00 36.7 82.0 Abingdon (?), VA

A. Bollinger [31] [same as above]

1. MacCarthy [244]

B. MacCarthy [244]

VIII. MacCarthy [244] 1852 MAY 3 3:00 a.m. Abingdon, VA

Merriam states that there was a slight shock reported from Abingdon, Va., at this time, and that the apparent motion was from northeast to southwest. No other mention of this shock has been found.

A. Merriam [270]

I. TEIC 1854 FEB 13 00:00 37.2 83.8 Manchester, KY III

Location: Manchester, KY

Intensity: Felt

Extent: Felt for "25 miles around"; Docekal [100] calculates 2000 sq. mi. (5200 sq. km.) using 25 mile radius.

Comment: 3 events @ 00:00, 06:00 & 11:00

II. TVA [380] 1854 FEB 13 00:00; 37.2 83.8 Manchester, KY IV
06:00 &
11:00

A. Nuttli [310] 1854 FEB 12 & 13 37.2 83.8 Manchester, KY III-IV

B. Collins [80] 1854 FEB 12 6:00 p.m. Manchester, KY

"Three earthquake shocks, at 6 p.m., at midnight, and at 5 next a.m., at Manchester, and for 25 miles around."

C. Docekal [100]

D. Templeton [370] 1854 FEB 12 37.2 83.8 Manchester, KY III-IV

Three shocks reported.

1. TVA, unpub., (1977)

IX. Varma [400] 1854 FEB 12 37.2 83.8 Manchester, KY III+

Felt radius = 41 km

A. Collins [80]

B. Moneymaker [282] [Quotes Collins [80] directly]

1. Collins [80]

X. Docekal [100] 1854 FEB 18:00 & 24:00 37.2 83.8 Manchester, KY 5200 III-IV

FEB 13 05:00

Three shocks were felt in an area with a 25 mile radius centered at Manchester, Kentucky.

A. Collins [80]

B. Moneymaker [282]

I. TEIC 1854 NOV 22 21:00 37.1 81.5 Tazewell, VA III

Location: Tazewell, VA

Intensity: Felt by several

II. TVA [380] 1854 NOV 22 21:00 37.1 81.5 Tazewell, VA IV

A. Hopper [210] 1854 NOV 22 16:00 Tazewell Co., Va III

Tazewell County, VA - Wednesday about 4 p.m. "a slight shock of an earthquake" felt in several parts of the county. A few persons in town were aware of it. Workmen on the Cumberland Gap Road "felt it so sensibly as to be thrown into considerable consternation." Not powerful enough to be noticed everywhere in the county. (RE 12/1/54) (III)

1. Richmond Enquirer (12/1/54), Richmond, VA

B. MacCarthy [244]

C. Templeton [370] 1854 NOV 22 37.1 81.5 Tazewell City, VA III

1. Bollinger [33]

2. McClain, unpub., (1978)

IV. McClain [260] 1854 NOV 22 21:00 37.1 81.5 Tazewell City, VA

A. Bollinger [31] 1854 NOV 22 16:00 37.1 81.5 Tazewell Co., VA

1. MacCarthy [244]

V. Bollinger [33] 1854 NOV 22 16:00 37.1 81.5 Tazewell Co., VA III

A. Bollinger [28]

B. Hopper [210]

C. MacCarthy [244]

VIII. McCarthy [244] 1854 NOV 22 4 p.m. Tazewell Co., VA

Merriam lists this event as "In several parts of Tazewell County, Va., at about 4 p.m." The Tazewell County Advocate, as quoted by the Richmond Semi-weekly Examiner (Dec. 5) says: "A slight shock of an earthquake was felt in several parts of Tazewell County, and probably extended over the whole, though not sufficiently powerful to arrest attention everywhere. Some hands engaged in repairing the Cumberland Gap road felt it so sensibly as to be thrown into considerable consternation. A few persons about town were also aware of it."

A. Merriam [270]

B. Richmond Semi-Weekly Examiner (12/5/54), Richmond, VA

1. Tazewell County Advocate (No date), Tazewell, VA

I. TEIC 1857 DEC 11 03:00 37.8 80.4 Lewisburg, WV III

Location: Lewisburg, WV

Intensity: Slight shock

II. TVA [380] 1857 DEC 10 37.8 80.4 Lewisburg, WV IV

A. MacCarthy [244]

B. Templeton [370] 1857 DEC 10 37.8 80.4 Lewisburg, WV

Possible landslide.

1. Bollinger [33]

VIII. MacCarthy [244] 1857 DEC 10 Lewisburg, WV

10:00 p.m.

1857: Dec. 10: circa 10 p.m. The National Intelligencer (Dec. 14) says: "A slight shock of an earthquake was felt in Lewisburg, Greenbrier County, W. Va., about 10 o'clock on Thursday night. The same moment a very large landslide took place on the Greenbrier River, near Edgar's mill. . ." It would appear that either an earthquake triggered off the slide or the jar of a large landslide, caused by other factors, was reported as an earthquake. No other mention of this event has been found.

A. National Intelligencer (12/14/57)

I. TEIC 1859 MAR 22 37.1 81.5 Jeffersonville, VA IV

Location: Jeffersonville, VA

Intensity: Houses jarred, queensware and window sash rattled.

II. TVA [380] 1859 MAR 22 37.1 81.5 Tazewell, VA IV

A. MacCarthy [244]

B. Templeton [370] 1859 MAR 22 37.2 81.5 Tazewell City, VA

1. Bollinger[40]

2. McClain [260]

3. TVA, unpub., (1977)

IV. McClain [260] 1859 MAR 22 37.2 81.5 Tazewell City, VA

A. Bollinger [31] 1859 MAR 22 37.2 81.5 Tazewell Co., VA

1. MacCarthy [244]

V. Bollinger [33] 1859 MAR 22 37.2 81.5 Tazewell Co., VA

A. Bollinger [31]

B. MacCarthy [244]

VIII. MacCarthy [244] 1859 MAR 22 Jeffersonville, Tazewell Co., VA

The National Intelligencer (April 6) reports that "The shock of an earthquake was felt at Jeffersonville, Tazewell County, VA, on the 22nd ultimo. A heavy rumbling sound, easily distinguishable from thunder was, several seconds after, followed by a distinct jarring of houses, rattling of queensware and window sash." This is the only notice of this event which has been found.

A. National Intelligencer (4/6/59), Wash., DC

I. TELC 1861 AUG 31 10:22 36.2 81.2 Wilkesboro, NC 586,000 VI

Location: Wilkesboro, NC; greatest reported intensity; near center of affected area.

Intensity: @ Wilkesboro, NC, bricks were shaken from chimneys, doors jarred open and clocks stopped; sleepers were awakened in Cincinnati, OH, Knoxville, TN and Louisville, KY

Extent: Ohio-Indiana border area to South Carolina coast, Washington, DC to southwestern Georgia; map; 586,000 sq. km.

II. TVA [380] 1861 AUG 31 10:22 36.2 81.2 Wilkesboro, NC VI

A. Hopper [210] 1861 AUG 31 05:22 VA 780,000

Richmond, VA—"Some time during the war, I think it was in the winter of 1862-'3 or 1863-'4, there was an earthquake shock experienced here. I think there was no shaking of houses, but the noise was if anything, more fearful than that of December last." [earthquake of Dec. 22, 1875]. [Questionable reference to this earthquake.] (RD 1/10/76) (III ?);

Washington, DC—"Two marked shocks, each a succession of long waves of slight elevation, apparently proceeding from south to north." Perhaps five seconds between the shocks; each lasted six or seven seconds. Accompanied by a rumbling noise. Sufficiently severe "to jar the furniture of the chamber." Sound lasted some seconds after tremor had ceased. Felt at 5:22. Unmistakeably an earthquake (DNI 9/3/61) (V);

Atlanta, GA--Felt. (MacCarthy, 1963);

Augusta, GA--Felt. (MacCarthy, 1963);

Columbus, GA--Felt. (Eppley, 1965);

Milledgeville, GA--Felt. (MacCarthy, 1963);

Louisville, KY--Felt. Eppley, 1965);

Charlotte, NC--Felt (Eppley, 1965);

Fayetteville, NC--Felt. (MacCarthy, 1963);

Greensboro, NC--Felt. (MacCarthy, 1963);

Nanthala Mountains, NC (Macon County)--Shock was "preceeded and accompanied by a very loud noise, as of the running of a tornado through the mountains." (MacCarthy, 1963) (IV ?);

Wilkesboro, NC--Bricks shaken from chimneys. (Eppley, 1965);

"Bricks were shaken from chimneys, doors jarred open, clocks stopped." The most severe effects for this earthquake VI MM. (MacCarthy, 1964) (VI+);

Wilmington, NC--Felt. (Eppley, 1965);

Winston-Salem, NC--Felt. (MacCarthy, 1964);

Cincinnati, OH--Felt. (DNI 9/3/61);

Earthquake felt at Branch Hills in Miami Valley at 5:12. So severe as to shake the house, causing the windows to rattle, and wake the sleepers by the motion of their beds. Another less violent tremor a few seconds after the end of the first the whole lasting a minute or more. Also felt at College Hill seven miles northwest of Cincinnati and at Glendale fifteen miles north where the shock was preceded by a heavy rumbling. Shook the beds, made the windows rattle, and "was very distinctly felt and heard." A vibration and a rumbling on Mt. Rogers in the northeastern part of the city. (DD 9/6/61) (IV);

Charleston, SC--Felt. (Eppley, 1965);

Columbia, SC--Felt. (MacCarthy, 1963);

Greenwood, SC--Felt. (MacCarthy, 1963);

Winnsboro, SC--Felt. (MacCarthy, 1963);

Gallatin, TN--Felt. (Eppley, 1965);

Knoxville, TN--Thought it was a distant explosion. (DD 9/6/61);

People startled by "a heavy shock of an earthquake." Accompanied by a rumbling noise. A shaking of the houses "to a degree that in some places caused uncomfortable apprehensions." Woke the sleeping soldiers in the camps.

One who was lying on the ground here at Camp Cummings felt three distinct oscillations. Severest ever felt here. Lasted from a half to two minutes--no agreement. Some in Knoxville say they saw the motion of the earth. (LDV 9/4/61) (IV);

Rutledge, TN--Felt. (MacCarthy, 1963);

Extent

"The earthquake last Saturday was felt throughout the south according to our exchanges." (DD 9/6/61);

Note: This implies it was felt in Virginia although there are no accounts found. (MacCarthy, 1964);

Felt along Atlantic coast from Washington, DC to Charleston, SC and westward to Cincinnati, Ohio, Louisville, KY, Gallatin, TN, and Columbus, GA. (Eppley, 1965) Epicenter probably in western North Carolina or in extreme southwestern Virginia. (MacCarthy, 1963). "Lack of Virginia mention may perhaps be ascribed to the fact that the Civil War had just gotten well under way, and there was rather heavy fighting in Virginia at this time." Maximum intensity in epicentral area V to VI.;

Maryland to Georgia - Alabama border. Coaster [sic] Plain to Ohio. (MacCarthy, 1963).

1. Richmond Dispatch (1/10/76), Richmond, VA.
2. Daily National Intelligencer (9/3/61), Washington, DC
3. MacCarthy [243]

The 1861 earthquake occurred about 5 a.m. on August 31. It was felt along the Atlantic Coast from Washington southward to Charleston, S.C., and westward to Cincinnati, Ohio, Louisville, Ky., Gallatin, Th., and Columbus, Ga. it appears to have affected an area of between 280,000 and 320,000 square miles (see figure 3), although nowhere was any particular damage reported. Reports from about 25 different localities have been found.

Although felt at points north, west, and south of Virginia, curiously enough no specific statement that is [sic] was actually felt within the borders of that state has been found, although such remarks as the following, from the Richmond Daily Dispatch (Sept. 6), certainly imply that it was so felt:

"The earthquake on Saturday last was observed throughout the South, according to our exchanges."

In many places, including Washington D.C., there were two shocks, usually given as about 5 seconds apart—not five minutes as is stated in Earthquake History of the United States." Throughout most of the area where felt, it was strong enough to awaken people, and to make dishes, windows, and doors rattle smartly and even, as is reported from Cincinnati, to rock the beds. In many places loud roaring noises were heard. One account (6) from the "foot of the Nantahala mountains," in Macon County, NC, says that the shock was "preceded and accompanied by a very loud noise, as of the running of a tornado through the mountains."

The most severe effects described were at Wilkesboro, NC (7), where "bricks were shaken from the tops of chimneys; doors jarred open; clocks stopped. . . ." This would seem to make the maximum intensity about VI on the Modified Mercalli scale.

a. Daily Dispatch (9/6/61), Richmond, VA

b. EQHUS [123]

c. Weekly Observer (9/16/61), Fayetteville, NC

d. Semi-Weekly Register (9/7/61), Raleigh, NC

e. MacCarthy [243]

4. EQHUS [121]

5. MacCarthy [244]

6. Daily Dispatch (9/6/61), Richmond, VA

7. Lynchburg Daily Virginian (9/4/61), Lynchburg, VA

C. Moneymaker [282] 1861 AUG 31 5:00 a.m. Eastern USA

A strong earthquake felt along the eastern states from Wilmington, NC to Washington and at Raleigh, and Charlotte, NC, Knoxville, TN, and Cincinnati, Ohio and Louisville, (Ky).

Two distinct shocks were felt at Louisville and vicinity.

a. Louisville Courier Journal (No date), Louisville, KY

D. Moneymaker [290]

1. 1861 AUG 3 5:22 a.m. Washington, DC

Two shocks at Washington, D.C. at intervals of 5 minutes, lasting 10 seconds. Probably centered in Virginia. Felt at Charlotte, Raleigh, and Wilmington, N.C.

- a. Heck (1947)
- b. Brigham [50]
- c. MacCarthy [305]

2. 1861 AUG 31 5:00 a.m. Eastern US

"Earthquake--On Saturday morning, between four and five o'clock, about daylight, two quite distinct shocks of an earthquake were felt in this city and vicinity. They were severe enough to arouse persons from their sleep."

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- a. Louisville Daily Courier (9/2/61), Louisville, KY

3. 1861 AUG 31 5:22 a.m. SC

This Virginia earthquake was felt at Wilmington, N.C.

- a. Brigham [50]
- b. MacCarthy [305]

4. 1861 AUG 31 5:22 a.m. VA

Felt from Washington, D.C. to Wilmington, N.C. Probably centered in Virginia.

- a. Heck (194.7)
- b. Brigham [90]
- c. MacCarthy [305]

E. Templeton [370]

III. USGS [390]

A. EQHUS [122] 1861 AUG 31 05:22 38.8 77.0 Washington, DC V (RF)

Two shocks at Washingtn, DC, at intervals of 5 minutes, lasting 10 seconds.

1. Brigham [50]

August 31, at 5h 22m a.m., two shocks were felt at Washington, at an interval of about five seconds, and each lasted six or seven seconds. The direction seemed to be south to north, and they were felt at Cincinnati, Ohio.

B. EQHUS [121] 1861 AUG 31 05:22 Probably VA 780,000 VI

1861, August 31. Two shocks at Washington, D.C. at 5-second intervals. Felt along Atlantic coast from Washington, D.C. southward to Charleston, S.C. and westward to Cincinnati, Ohio; Louisville, Ky.; Gallatin, Tn.; and Columbus, Ga. Bricks were shaken from chimneys at Wilkesboro, NC. Also reported felt at Charlotte, Raleigh, and Wilmington, N.C.

1. Brigham [50]

2. MacCarthy [241]

3. MacCarthy [244]

C. EQHUS [120] 1861 AUG 31 05:22 Probably VA 780,000 VI

1861. August 31. Probably Virginia. Two shocks were felt at Washington, D.C., at 5-second intervals. Felt along the Atlantic coast from Washington, D.C., southward to Charleston, S.C., and Columbus, Ga., and westward to Cincinnati, Ohio, Louisville, Ky., and Gallatin, Tenn. Bricks were shaken from chimneys at Wilkesboro, N.C.

1. Brigham [50]

2. MacCarthy [243]

3. MacCarthy [241]

4. MacCarthy [244]

IV. McClain [260]	1861	AUG 31	10:22	36.6	78.5	VA	780,000	VI
A. EQHUS [121]								
B. Bollinger [31]	1861	AUG 31	05:22			VA	780,000	VI
1. [misreference]								
2. MacCarthy [243]								
3. MacCarthy [244]								
C. Moneymaker [281]								
D. MacCarthy [243]								
V. Bollinger [33]	1861	AUG 31	05:22			VA	780,000	VI
North Carolina event?								
A. Bollinger [31]								
B. EQHUS [120]								
C. MacCarthy [243]								
D. MacCarthy [244]								
VI. Moneymaker [281]	1861					Eastern TN		
A shock near Rutledge in Grainger County, Tennessee. The shock is described in a letter by S.J. Norton as "a great earthquake," but no details are given.								
A. Woollard [410]								
VII. Woollard [410]	1861			36.2	83.4	Near Rutledge, Grainger Co., TN		
A. S.J. Norton (written communication)								

VIII.(a) MacCarthy [241] 1861 AUG 31 05:00 V (RF)

1861: August 31, a little after 0500 hrs. Felt in Raleigh, Charlotte, Wilmington, and other places in North Carolina, according to available contemporary newspapers. "Two shocks at Washington, D.C., at intervals of 5 minutes, lasting 10 seconds." (E. Hist.) Intensity 5. This epicenter was probably somewhere in Virginia.

A. EOHUS [123]

VIII.(b) MacCarthy [244] 1861 AUG 31 5:00 a.m. 780,000 V-VI

1861: Aug. 31: circa 5 a.m. This shock affected about 300,000 square miles and was felt all along the Atlantic Coast from Washington, D.C., southward to Charleston, S.C., and westward to Cincinnati, Louisville, Gallatin, Tenn., and Columbus, Ga. It has been described by MacCarthy (1963). Curiously enough, although reports from more than twenty-five localities north, south, and west of Virginia have been found, no actual mention of effects in Virginia has been seen, although such remarks as the following

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Q

from the Richmond Daily Dispatch (Sept. 6) certainly imply that it was felt in the state: "The earthquake on Saturday last was observed throughout the South, according to our exchange." Lack of Virginia mention may perhaps be ascribed to the fact that the Civil War had just gotten well under way, and there was rather heavy fighting in Virginia at this time. The epicenter was probably in western North Carolina or in extreme southwestern Virginia. The most severe effects seem to have been reported from Wilkesboro, N.C., according to the Raleigh Semi-Weekly Register (Sept. 7), where "bricks were shaken from . . . chimneys; doors jarred open: clocks stopped. . . ." In many places, including Washington, two shocks were reported about 5 seconds (not 5 minutes, as stated in E. Hist.) apart. The maximum intensity in the epicentral area seems to have been V to VI.

A. MacCarthy [243]

B. Richmond Daily Dispatch (9/6/61), Richmond, VA

C. Semi-Weekly Register (9/7/61), Raleigh, NC

D. EOHUS [123]

IX. Varma [400] 1861 AUG 31 VA VI

A. MacCarthy [241]

B. MacCarthy [244]

I. TEIC 1874 FEB 22 35.5 82.2 Stone Mt., NC

Location: Stone Mt., NC; field investigation by Professor Warren Du Pre' of Wofford College, Spartanburg, SC

Intensity: Caused stout log buildings to shake violently; "cracks" in the rocks (?)

Extent: Local; events were sometimes perceptible at distances of 10-15 miles; area affected included portions of McDowell, Rutherford and Henderson Cos; MacCarthy [241] indicates felt over a 25-mile radius including Mt. Mitchell; another report extends the effects southeasterly to Rutherfordton; if all reports are considered, the largest of this series was probably felt over an area 4-5,000 sq. km.

Comment: This particular series of local disturbances apparently lasted several months, however, earthquakes from Rumbling Bald are catalogued as early as 1848 and periodically until 1884; most of the events referred to here are listed as having originated in McDowell Co - Professor Du Pre's [435] account of his field investigation concludes the origin to be on Stone Mt. instead; Ferguson [150] implies recent (~1974) visits were made to the area and that "huge relatively recent-looking splits in the mountains there that could have been due to this swarm" are present.

1. DuPre' [110]

ON A SERIES OF EARTHQUAKES IN NORTH CAROLINA, COMMENCING ON THE 10TH OF FEBRUARY, 1874

PROFESSOR WARREN DU PRE

The following is an extract from a letter of the 24th April, 1874, from Professor Du Pre to General Benjamin Alvord, U.S. Army:

"My visit to the mountains of North Carolina was undertaken to satisfy myself with respect to the numerous rumors which had reached us of the volcanic disturbances in that section of the country. I could spend but two days (19th and 20th March) in the investigation, but was quite diligent in collecting facts and in extending my explorations on horse and on foot so as to cover a distance of eighteen or twenty miles. I was soon convinced that the physical disturbances were real, but many of the rumors were false, and that the truth had been much exaggerated by the fears of the people. The explosive noises accompanying the shocks and the limited area of the disturbances are peculiarities worthy the attention of scientists, and demand a more thorough exploration. The inclosed is a hasty report of my trip, which I drew up to allay, if possible, the fears of the inhabitants of the district.

Stone Mountain, the site of the disturbances, like all the neighboring peaks, is composed chiefly of gneiss and granitic slates, and covered with a dense forest growth. In a direct line, it is about fourteen miles from Black Mountain, or "Mount Mitchell," the highest point in the United States east of the Rocky Mountains. It lies between Broad and Catawba Rivers, both of which point to Black Mountain, while on the northwest side of the Blue Ridge, the Swannanoah and Green Rivers, tributaries of the French Broad, have their sources near the Black Mountain. So many large rivers, on both sides of the Blue Ridge, heading up in this section, would indicate Black Mountain as the center of the volcanic force which lifted up these mountain-ridges. I expect to visit these mountains again in July, when I shall have more time to investigate this matter.*"

Extracts from report above referred to, dated Spartanburgh, S.C., March 28, 1874.

On Wednesday, the 18th of March, in company with Rev. R.C. Oliver, editor of the Orphans' Friend, Mr. McKenn Johnstone, civil engineer, and the senior class of Wofford College, I started for Hickory Nut Gap, for the purpose of making such personal observations as my limited time would permit, and of collecting and sifting all the testimony that I could gather from the inhabitants of the affected region. At Rutherfordton, we were joined by Capt. William Twitty, an educated gentlemen, who gave us much assistance in our explorations.

To understand the bearing of the facts and testimony upon the question whether these disturbances threaten a volcanic eruption, as a preliminary, I shall describe, as clearly as I can, the situation of this mountain. Five miles east of Hickory Nut Gap, lies this high mountain-ridge, bearing upon its back several peaks, the highest of which are called Bald, Stone, and Round Mountains, and extending from southwest to northeast, a distance of ten miles, in the order in which they are named. They constitute one mountain-ridge from 3,000 to 3,500 feet high, flanking the Blue Ridge, nearly parallel with it, bounded on the east by Crooked Creek, and on the west by Broad River, which, with its narrow valley, separates them from the high ridge of mountains that border the eastern side of Hickory Nut Gap.

Directing our course along the eastern slope, we came first to the house of Rev. Mr. Logan, a Baptist minister, from whom we learned that the noises and shocks were first heard and felt in Stone Mountain, on Tuesday, the 10th of February; that they were repeated on the following Sunday, with increased severity, so much so that the people sent for him, a distance of ten miles, to hold religious meetings with them; that he and his wife heard the explosions, and felt the shocks repeatedly day and night, once causing the lightning-rods attached to his chimneys to rattle considerably, the sky being clear, and no wind blowing; that the sounds came from the direction of Stone and Bald Mountains, were at first explosive, followed by a slight rumbling lasting for a few seconds, similar to a blast from a stone-quarry; that the shocks were almost instantaneous with the explosions, very rapid, making the ground tremble for a few seconds. In response to an inquiry, whether any one was blasting rock about the mountains, he replied that none could be found, and there was but one quarry, thirty-three miles distant in an opposite direction, and that had not been worked for several months past.

After going two or three miles further, we turned to the left, and were ascending Fork Knob, over which the road leads to the top of Stone Mountain, when a loud explosion in the direction of Stone Mountain startled us all. It was instantly followed by a low reverberatory sound, as if descending the slope of the mountain. We felt no shocks, which was due, no doubt, to the steep and stony road over which our buggies were passing at the time. This was on the 19th, at 5 p.m. Two of our company who had preceded us a mile, and were about a half mile from the top of Stone Mountain, heard the report, and also felt the ground tremble under them. The sound resembled the suppressed but sudden report of a quarry-blast, and seemed to come through the mountain. We arrived about sunset at Mr. Elliott's, whose house is situated in a depression between Round and Stone Peaks, about a half mile from the top of the latter. From Elliott's house, Round Mountain bears north 37 west, Stone Mountain south 73 west, and are about a half or three-quarters of a mile distant from each other. This house being about the center of the greatest agitation, and whence most of the exaggerated rumors had their origin, we determined to remain all night, and I kept watch until about two o'clock.

The next morning I gathered from Mr. and Mrs. Elliott, in answer to many inquiries, the following statement: "The first noise and shakes (as the shocks are very expressively denominated by the mountain people) were heard and felt on Tuesday, 10th February--some of them were felt as far as White House, on Cove Creek, eight miles distant. Sunday morning these sounds and shakes were repeated with increased severity, one a little after sunrise, another at 10, and another at 2 o'clock in the night; noises continued, some with shakes, and some without, until Thursday following, with intervals of about an hour or two. The house--a stout log building--shook so violently that the children became very much alarmed, all thinking it would fall. A ladder resting upon a support in the yard rattled frequently, and the ground seemed to tremble under their feet. The noise began like explosions of a quarry-blast, in the northwest, and west off to the southeast, with a rumbling sound under ground. The weather was quite variable, sometimes cloudy and rainy, at other times clear and cool. The people about the mountain were very much alarmed; had preaching and prayer-meetings daily for a week or more, and forty-five new members were added to the Baptist church."

About 9 o'clock in the morning of the 20th we began the exploration of Stone Mountain. From the base to the summit it is covered with a dark rich soil, about a foot deep, partly cleared and cultivated, but mostly clothed with a growth of heavy timber, consisting of chestnut and oak. The granite slates, about the thickness of flag-stones, scattered over the surface, indicate that the formation does not differ from most of the surrounding peaks. Near its highest point several large blocks of coarse granite protrude through the soil to the height of about 10 feet above the surface. Owing to the depth of the soil and the slight exposure of the rocky formations, I could not ascertain the direction or angle of the dip. No specimens were found which resembled what are usually called volcanic rocks. The mountain appeared as calm and peaceful as if it had never been disturbed since the morning of its upheaval. It presented no cavernous depths or rugged prominences to excite the fears of the dwellers upon its slopes. A dozen or more of the mountaineers had followed up everywhere in the exploration, and although much alarmed at the frequent agitations of this hitherto stable mountain, yet they unanimously contradicted the many rumors of gaping rocks, smoking peaks, sinking caverns, melting snows, &c., with which our newspapers have been teeming for many weeks past

We remained on the summit for some time, hoping for an opportunity to determine whether the explosions came from the east or west side of the mountain, or from the ground under our feet. As nothing occurred to settle this question, we descended the western slope to Mrs. Murphy's saw-mill, about eight miles from the head of Broad River. A portion of our party, who had passed two miles around the base of the mountain, heard three loud explosions, and felt two distinct shocks proceeding directly from the peak which we had left but one hour before. This I did not hear or feel, as I was engaged at the time in taking notes of the testimony of Mr. T.J. Dalton, amid the rumbling of machinery and the roar of the mill-dam.

It is unnecessary to give, in detail, all the testimony which we collected from the people while passing along the eastern and western side of this mountain, including a distance of eighteen miles. They all concurred in the following summary: That there were certain days marked by loud reports and severe shakes; that from fifty to seventy-five shocks have been felt since the 10th of February; that the noise begins with an explosion like a quarry-blast, followed by a rumbling sound, lasting only a few seconds; that the shocks are simultaneous, or almost so, with the reports, and seem to follow the direction of the rumbling sound, with this exception, that those near the top of the mountain assert they appear to be under and all around them; that the reports all came from the Stone and Bald Mountain Ridge, those living on the east side pointing to the west, and those on the west pointing to the east for the direction of sounds; that these reports occur as often during the nights as the day, in fair weather as in foul; that the effects are felt five miles on each side of the mountain-ridge, and extend from Broad River on the southwest to Catawba on the north, a distance of twenty-five miles; that houses shake, trees with their dead leaves tremble, glasses and crockery rattle, shavings in their workshops shake and "quaver," as one expressed it.

This testimony was collected from thirty or forty men and women of different degrees of intelligence, and their remarkable concurrence in the above statement places the facts beyond the possibility of doubt.

Several hypotheses have been proposed to explain these facts. One is, that the blasting of rock about the mountains will account for all of them. Upon this point we made particular inquiry. There is certainly no operation going on about Stone Mountain, and as the work upon the tunnels in Swannanoah Gap has ceased for more than twelve months, there is no occasion for blasting anywhere else, as fine stones for building purposes, of every form and size, are scattered over all these regions. Besides, any one acquainted with the law of sound knows that the vibratory motion communicated to the matter in the crust of the earth by a blast (supposing it capable of extending to a great distance) will be felt much sooner than the undulations of the atmosphere, which transmit sounds. A person, therefore, standing a thousand yards from a quarry feels the trembling of the earth some time before he hears the sound of the blast. But in all these convulsions of the mountain the concurrent testimony is that the sounds and shocks are either simultaneous or nearly so. The blasting of rock, therefore, cannot account for this important fact.

Another hypothesis is that these effects may be the result of electricity escaping from the mountain to the cloud, or descending from the cloud to the mountain. There is nothing in the known operations of electricity to produce effects of this kind. Furthermore, these sounds and shocks occur as often in fair as foul weather; and the sounds are altogether different, as we had an opportunity of comparing them during our first nights's stay upon the mountain. Electricity never explodes unless it meets with a bad conductor, and as the mountain affords it an easy transit, the explosion must take place somewhere between the summit and the cloud, or along the line of its pathway. the explosion, therefore, being in the air, must be subject to the same laws of sound as the blast of the quarry, and the same method of reasoning will apply in this case as in the other.

The simultaneousness of the shocks and explosions proves that the sound has not far to travel through the air to reach the observer; and while the primary cause of the explosions may be deeply seated in the earth, yet the immediate cause of the sounds may be at or near the surface. It is known that the loudness and intensity of sounds depend upon the amplitude of the sound-wave. Suppose, then, that the cause of these explosions be deeply seated in the crust of the earth, the force acting and reacting upon the superincumbent strata will impart its vibrations to them and transmit through them its impulses to the atmosphere above.* I am inclined, therefore, to the opinion that most of the noises accompanying earthquakes are the results of vibratory movements in the earth's crust, or are the secondary effects of a force acting at great depths beneath. This opinion seems to be sustained by the evidence of the witnessess upon the summit as well as five miles from the base of Stone Mountain, all of whom concur as to the simultaneousness of the shocks and explosions. To this it may be objected that earthquake-shocks are often unaccompanied with noises, or that the former may precede the latter by several minutes. In reply, I will state that the crust of the earth is composed of different strata, some capable of transmitting vibrations that are audible and others that are not, as a string may be made to vibrate and yet produce no audible sound. Now, suppose our observer to be standing upon a section of the earth's crust which is incapable of receiving or imparting sound-vibrations, he may feel the earthquake-shocks and yet hear no noise; or, if sounds should reach him after an interval of time, they may come from a distant section capable of producing them, but which must be transmitted to his ear through the intervening atmosphere.

This discussion leads me to the conclusion that the phenomena connected with the agitation of Stone Mountain must be referred to that general volcanic or earthquake force, which seems as necessary to the economy of nature as light, heat, or electricity. I am not bold enough to venture a theory sufficiently broad to explain these peculiar phenomena. I cannot penetrate the earth to examine the configuration of its inner surface. There may be broad and high arches under which the earthquake-wave may move without disturbing the crust above; or there may be deep depressions presenting walls, against which the molten tide may beat and break and send up its thundering vibrations to the summit of the loftiest mountain. All this is hypothetical and unsatisfactory. But although we are not sufficiently acquainted with the nature of this force, its modes of action and the laws which govern it, to suggest a theory capable of explaining all the phenomena, yet we may examine the facts with reference to the probability of Stone Mountain becoming an eruptive volcano.

While the explosive character of the sounds, simultaneousness of sounds and shocks, and the limited area of agitation seem to indicate some local cause, yet the general rule which regulates the distribution of volcanoes on continents seems to militate against such a conclusion. Volcanoes are arranged along the border regions of continents, as between the Pacific and Rocky Mountains, and no remains of volcanic action have ever been found along the Appalachian range. These are important facts, indicating no chance results, but pointing to a natural law which regulated their geographical distribution. And when we consider, too, that volcanoes, with but few exceptions, are only a few miles from the sea or lake; that the Blue Ridge, of which Stone Mountain is only an appendage, is two hundred and fifty miles from the Atlantic, and presents no marks of former eruptive action, we cannot believe that in these latter days it will behave itself unseemly and do violence to that natural law which planted it in the garden-spot of the South, and gave to the Carolinas the grandest, loveliest scenery on the Appalachian range.

[The following suggestions may be considered as a possible solution of the phenomena in question: It is a well-established fact in geology that the surface of the earth has undergone and is undergoing changes. The highest mountain-chains have been in past geological periods beneath the surface of the sea, as is evident from the marine shells which are found in their strata. It is also well established that some portions of the earth's surface are at present gradually rising and others slowly falling. Now, if we assume that the region around Stone Mountain is undergoing a very gradual elevation or depression, then it will follow that the rocky strata will be brought into a condition of stretching or tension which will go on until the limit of elastic cohesion is reached, when a rupture or crack will suddenly take place which must be attended with a jar, and, in some cases, with an audible sound. If the rocky strata is of the same material from the surface down into the interior; for example, granite, and the mountain being in the process of depression, the crack will take place deep in the interior. If, on the other hand, the mountain is being elevated, the crack will be at the surface. If, however, the upper strata are more extensible than the deeper seated, the crack may be in the interior in the case of an elevation as well as in that of a depression.

If has of late years been suspected, from the discrepancy in later and older measurements of points on the Andes, that this mountain system is in a state of very slow subsidence.

If the foregoing views are correct there is no indication of a volcanic outburst; and whatever moral effect the disturbances may have on the character of the inhabitants of the region, there is little danger as to any physical changes taking place of sufficient intensity to endanger life.--J.H.]

II. TVA [380]

1874 FEB 22

35.7 82.0

McDowell Co., NC

V

A. Rockwood [330]

February 10, 1874—There began a series of disturbances in Bald and Stone Mountains, McDowell County, NC, which continued at intervals for several months. The phenomena appear to have been occasional earthquake shocks, at no time violent, but accompanied by explosive and rumbling noises, and occurring, sometimes two or three in a day, and again with intervals of several days. These increased in frequency and intensity until the night of February 22, when the most severe shock was felt. About March 17 and 26, the shocks were again of some intensity, as also on April 14 and 17. A correspondent of the New York Evening Post, writing from Spartanburg, SC, under date of March 23, and having just visited the affected region, reported experiencing a decided shock, with a deep rumbling noise, about sundown of March 18, and another on March 19, these being all that he felt during a five days' visit. Another observer says "the sounds resembled the report made by blasting in a deep quarry or well, at first explosive and then reverberating." The shocks were most sensibly felt near the tops of the mountains, but were sometimes perceptible at distances of ten or fifteen miles, or even farther.

A paper by Gen. T.L. Clingman of North Carolina, on the volcanic character of this region, was read before the Washington Philosophical Society, July, 1874, and is noticed in this Journal, III, vol. ix, p. 55.

1. New York Evening Post (3/23/74), New York
2. Anonymous personal communication
3. Anonymous [10]

Earthquakes of North Carolina—An excellent article on earthquakes in the mountain region of North Carolina has been published by Hon. T.L. Clingman in the Wester Expositor of Asheville, NC. He states that more than thirty years since his attention was called to statements that a mountain in the northern part of Haywood County was shaken at intervals of two or three years; and in 1848 he visited the region and published a paper on it. The principal facts stated were these:

Between the Blue Ridge, which in North Carolina separates the waters falling into the Atlantic from those discharged into the Mississippi, and the great chain on the Tennessee border designated in its course by such names as Iron, Unaka, and Smoky, there is an elevated plateau of over two hundred miles in length, with an average breadth of fifty miles. The beds of the larger streams are two thousand feet above the sea, and the general level of the country, exclusive of the mountain ranges, may be estimated at twenty-five hundred feet above tide-water. Haywood County joins the State of Tennessee on its northern border, and the seat of the disturbance is within less than twenty miles of the line of that State. A considerable range of mountains extends north and south along the line which separates the counties of Buncombe and Haywood. From the west side of this extends a ridge, which terminates near the head of Fines Creek.

A quarter of a mile from its western end, as one moves up it toward the east, is the locality referred to. The effect of the disturbance is visible near the crest of the ridge and extends in a direction nearly south, down the side of the little mountain, four or five hundred yards, to the level ground, and across it for some distance and along the elevations beyond. The whole extent may be a mile in length, with a breadth of not more than a couple of hundred yards at any point. The top of the ridge, where evidences of violence are seen, is perhaps three or four hundred feet higher than the ground below. There are cracks in the solid granite of which the ridge appears to be composed, but the chief evidences of violence were observable a little south of the crest. From thence along the side of the mountain, as one descends, there were chasms, none of them above four feet in width, generally extending north and south, but also occasionally seen in all directions. All the large trees had been thrown down. There were a number of little hillocks, the largest eight or ten feet high and fifty or sixty feet in diameter. They were usually surrounded by what appeared to have been a narrow crevice. On their sides the saplings grew perpendicularly to the surface of the ground, but obliquely to the horizon, making it manifest that they had attained some size before the hillocks had been elevated. I observed a large poplar or tulip tree which had been split through its center, so as to leave one-half of it standing thirty or forty feet high. The crack or opening under it was not an inch wide, but could be traced for a hundred yards, making it evident that there had been an opening of sufficient width to split the tree, and that then the sides of the chasm had returned to their original position without having slipped so as to prevent the contact of the broken roots.

When I was there I was told that three years had elapsed since the last previous shock. They were first noticed about the year 1812, and usually repeated at intervals of two or three years. In 1851 I visited the locality again, having been informed that a feeble jar had occurred. As soon as I arrived at the locality, I was struck with the truthfulness of what many persons had told me, that after each shock the appearance of the place was so much changed that it did not at all resemble itself. On this occasion, though the shock had been a feeble one, I found the appearances very different. The greatest evidences of violence were near the foot of the ridge, the branch having been somewhat turned out of its course. Near this place a rock of considerable size had been thrown up and had only partially settled back, owing to the closing of the opening under it, so that the former earth marks were seen several feet above the ground on its sides.

In the year 1867 I saw the locality again. A number of shocks had in the meantime occurred, and the appearances were very different from what they had been. From the top of the ridge to the base it seemed a mass of rocks, most of the earth having been carried away. The depression at the top was greater, while the successive jars had, under the action of the force of gravity, moved the mass downward, and had forced the stream still further away from the hill. The violence had at one point extended itself a little further to the east. A large oak tree of great age and four or five feet in diameter had been entirely split open from root to top, and thrown down so that the two halves lay several feet apart.

In my former publication, it was suggested that if the phenomena at this point were due to volcanic action, similar disturbances would be noticed at other localities in the Alleghany range. I was soon informed that three or four years previously, in the southeastern part of Macon County, between the Tuckasegee River and the Cowee Mountain, the ground was shaken violently for several minutes. A few days afterward some persons discovered a fresh chasm, two or three feet wide, which extended more than a mile. This was in the month of June, and they said the leaves and branches of timber immediately above the chasm, in places, presented the appearance of having been scorched. Though I was not able to visit the place, yet from the character of my informants I do not doubt that the facts were as above stated.

I have also been informed that in the county of Cherokee, in the year 1829, or thereabouts, the Valley River mountain was left open for a considerable distance, during a violent shaking of the earth in that vicinity. The chasm, though partially filled up, is represented as still visible.

Mr. Silas McDowell, of Macon County, a highly respectable and intelligent gentleman, accustomed to observe and write on such subjects, has stated recently in a paper published at Asheville, that many years since there was a violent shock in the neighborhood where he resides, during which a chasm was opened on the north side of the mountain which separates the Ellejay waters from those of the Sugar Fork River. He states that the opening is still visible. This locality is eight or ten miles to the southeast of Franklin, in Macon County.

About three years since I heard from many persons, that for several weeks smoke continued to issue from a small crevice in the rock, in Madison County. Not long afterward I went to the place, and though the smoke had previously ceased to issue, yet there was evidence that the locality had at some time, probably during the present century, been subjected to violence, that had changed the outlines of the ground and surface rocks. This spot is about fifteen miles east of the Haywood Mountain, and about as far from the Warm Spring to the northwest of it.

Lastly, we have to notice the disturbance of the Bald and Stone Mountains. They are situated six or eight miles to the east of the Blue Ridge. Between the headwaters of the Catawba and those mountains of Broad River, there extends many miles eastward a range of mountains attaining the height in places of four thousand feet. The Bald and Stone Mountains, from their appearance, are probably the highest part of this ridge, and nearly equidistant from the Catawba and Broad Rivers. My information in reference to them is derived entirely from conversations with a number of gentlemen, and from the accounts published in newspapers. The first shocks were perceived on the 10th of February last, and they were for the first month or two more frequent than they have since been. During the last two months they have occurred at intervals of a week or two, but have been more violent than the average. Within the last five months, probably a hundred shocks, accompanied with noises, have occurred.

The distance from this point to the Valley River Mountain, in Cherokee, nearly due west, is more than one hundred miles in a direct line. From the mountain in Haywood, to reach the parallel of latitude passing through the mountain near Ellettsville, in Macon, one must travel more than thirty miles south. It is thus manifested that there is a belt of country more than a hundred miles in extent from east to west by thirty in breadth in which such disturbances have been observed. In the present state of scientific knowledge, it may not be an easy task to offer an explanation of the causes which will be generally accepted as satisfactory.

When we take into account these indications at different points in the North Carolina mountains, it seems evident that there is beneath the surface a condition of things that extends over a considerable area. A portion of the globe which, from its geological structure, ought to be regarded as being as stable as any part of our planet, is nevertheless not free from change. Whether this is to be regarded as due to the diminishing force, which at one time was sufficient to heave up this tract of country, with all its mountain chains, or whether it is to be considered as evidence of a gradual return of that volcanic action which manifests itself still elsewhere, to so great an extent, it is perhaps difficult to decide until further observations have been made. Is it not of sufficient interest to justify the managers of the Coast Survey, or some other competent agency, to make such careful measurements of the height of certain points, as to ascertain, within the next twenty-five or fifty years, whether any, and to what extent, changes may be occurring in this region?

A. Hon. T. L. Clingman, Western Expositor (No date)

B. MWR [290]

No notices of earthquakes have been reported by the signal-service or volunteer observers, except the reports of professor Duprey and others relating to the disturbances at Bald Mountain, in North Carolina, which show that the phenomena in that region have continued and are of the nature of slight concussions, with no traces of volcanic action.

1. Professor Duprey - personal communication

2. Anonymous - personal communication

C. Money-maker [283] 1874 FEB 10-17

Rumbling Bald, NC

1. Morley, Margaret Warner: The Carolina Mountains (1913)

"Close to us is the Old Rumbling Bald, high up on whose rocky top is what appears to be a cabin, but which is such only in seeming - from some trick of the shadows against the broken rock. This is pointed out to visitors as 'Esmeralda's cabin,' so named because here at Logan's the author of Esmeralda wrote her play in the presence of old Rumbling Bald. The Old Rumbling Bald is, perhaps, the most noted of any mountain in this part of the world. Up to 1878, he was just the 'Old Bald', but then he began to rumble and shake the earth, and thereby attained a distinction that set him apart from all the other mountains of the Blue Ridge. Whatever else the others were or did, none of them 'rumbled.' From '78 to '80 the Old Bald kept the people wondering, and those near him apprehensive. What was he rumbling about? Why was he shaking the earth? And what would he do next? He rumbled his last (95/96) rumble in '85, we were told, since when he has been as quiet as of old.

"To look at the rocky wall of the mountain and see the clean, new granite gives one an intimation of what has happened. Great slabs and cliffs have split off and settled down, no doubt 'rumbling' as they went, and the crack that suddenly appeared on top has grown to a chasm ten feet wide, one hundred feet deep and three or four hundred yards long. Curiosity prompts you to approach Old Rumbling

Bald over a pleasant path where one passes a lonely cabin that might be a child of the old mountain and out of which comes a lovely little girl with glorious blue eyes, her face framed in a wide ruffled pink sunbonnet.-----

"At last we get to a great crack in the mountain - not the chasm on top, but a crack lower down, that makes a series of caves from the threshold of which one looks out between massive walls of granite far down the valley, over the tops of the near mountains.-----

"Then we go into the cool caverns reached by narrow halls and partly by ladder, and whose walls are of freshly exposed granite, where great slabs and splinters look ready to fall at the slightest rumble. There is an opening to the sky at the far end but it is inaccessible. But there is a 'window' that lets in light, and, out of which one can look past massive casements of solid rock and across the valley to Chimney Rock Mountain and Sugarloaf, and between other and lower mountains down into the hot, quivering blue plains of the lowlands. It is delightfully cool in the caves, as one looks around at the fresh granite walls, one has a sense of being present at the creation of the earth.

"If you follow up the Broad River valley as far as the settlement of Bat Cave, you will find another mountain with similar cavernous openings and some one will guide you to the largest of these, Bat Cave."

A note by Dr. Sondley in the front of this book -

For silliness, ignorance, and untruths, this book is remarkable."

2. Notes on Rumbling Bald and the Rutherford County Earthquakes

Asheville Citizen-Times, 7-2-33. (Story by Arval L. Alcock)

Weird thunder-like sounds issue from Rumbling Bald Mountain from time to time and have almost terrified the residents of that section. There is a long fissure on the eastern slope of the mountain.

Thomas Jefferson wrote to John Adams July 9, 1819 and mentioned that: " - the volcano, so minutely related to us, as having broken out in North Carolina some half dozen years ago, in that part of the country, and perhaps in that very County of Mecklenburg --"

There is still a myth of a volcano in the Bald mountain area. The fact that the mountain "trembles and shakes like an earthquake" is attributed to volcanic action.

Big Bald in Yancey County, North Carolina is described by an encyclopedia in terms applicable to the Rumbling Bald.

"Bald Mountain, North Carolina, height 5,550 feet. Was the cause of much excitement in 1878, because of the inexplicable rumblings which lasted for about two weeks. The mountain shook as if in the throes of an earthquake, immense trees and rocks were hurled down its sides, and, for a time, fears were entertained lest volcanic eruptions should follow. A subsequent examination showed that a large section of the mountain has been split asunder but no further disturbance occurred."

Some of the older residents remember the disturbance and say that many families moved out of the valley and for years their fear was so great none would venture back. One writer said:

"The inhabitants were in a state of great alarm. Some sent 10 miles for a preacher to come and pray for them; preaching and prayer meetings were held twice daily for a week or more and 25 new members connected themselves with the Baptist Church."

3. John Preston Arthur: History of Western North Carolina.

Edward Buncombe Chapter of D.A.R., Asheville, 1914

"Quaking Bald. The most famous of the restless mountains of North Carolina is 'Shaking Bald'. The first shock, which occurred February 10, 1874, was followed in quick succession by others and caused general alarm in the vicinity. This mountain for a time received national attention. Within six months more than 100 shocks were felt.

"The general facts of these terrestrial disturbances have never been disputed but concerning the cause, there has been widely diversified speculation. Is there an upheaval or subsidence of the mountain gradually going on? Are they the effects of explosions caused by the chemical actions of minerals under the influence of electrical currents? Are they the effects of gases (sic) forced through fissures in the rocks from the center of the earth, seeking an outlet at the surface? These are the questions on which scientists differ. Be the cause what it may, there is no occasion to fear the eruption of an active volcano.

"The famous Bald mountain forms the north wall of the valley. Its sterile face is distinctly visible from the porch of the Logan Hotel. Caves similar to Bat Cave are high on its front. In 1874, Bald Mountain pushed itself into prominence by shaking its eastern end with an earthquake-like rumble, that rattled plates on pantry shelves in the cabins of the valleys, shook windows to pieces in their sashes, and even startled the quiet inhabitants of Rutherfordton, 17 miles away. Since then, rumblings have occasionally been heard, and some people say they have seen smoke rising in the atmosphere. There is an idea, widespread, that the mountain is an extinct volcano. As evidence of a crater, they point to a fissure about half a mile long, six feet wide in some places, and of unmeasured depths. This fissure, bordered with trees, extends across the eastern end of the peak. But the crater idea is effectually choked up by the fact that the crack is of recent appearance. The crack widens every year and, as it widens, stones are dislodged from the mountain steep. Their thundering falls from these heights may explain the rumbling and their clouds of dust account for what appears to be smoke. The widening of the crack is possibly due to the upheaval of the mountains." Chapter 12.

"Shaking Bald. Here, too, is Esmerelda's Inn long kept (sic) by Col. Thomas Turner, a veteran of the Federal Army, and now by his son, while not far away is Bat Cave, a gloomy cavern in the face of the mountain above one prong of Broad River; and Shaking Bald, a mountain top, which in the seventies, caused considerable comment because of the noises said to have been heard in that locality. Earthquake shocks and volcanoes even, were predicted for several years, but nothing ever came of the stories." Chapter 23 (Arthur)

"Those who have seen the fissure describe it as a gully-like crevice in which a number of trees and rocks have fallen; other parts of it look like a deep furrow that had been plowed on the mountain top, while again it looks like a creek bed. There are quite a few crevices on top of the mountain caused in places by water trickling from small springs and others that have been formed, perhaps, by faulting rocks which caused the crust of the mountain to sink in."

The rock of Bald Mountain is "honeycombed with cracks and narrow crevices running hundreds of feet to the top as though someone had cut through the mountain with a large knife." Some natives explain the rumbling as "the wind blowing through the cracks and crevices in the mountain creating a roaring sound."

Many of the boulders to be seen in the gorge of Broad River "were shaken off of the mountains during the disturbance of 1874 which, according to the late Dr. Foster A. Sondley in his 'Hickory Nut Gorge' began on February 10, 1874 and were renewed with increasing violence on the following Sunday. After that they grew more frequent, he said, and the noises were heard, and the shocks felt 880 (sic) miles around. Every disturbance began with an explosion similar to a blast at a rock-quarry, followed by a rumbling which lasted for a few seconds and accompanied by tremors of the earth, which rattled objects standing against the houses in the vicinity, and shook the houses themselves as in an earthquake. Sounds and shocks were simultaneous and occurred sometimes at night and sometimes during the day, often at intervals not greater than an hour or two. The ground itself was many times felt to vibrate under pedestrians. "A change in the weather caused no diminution of the phenomena. People on or near the top of Bald Mountain were sensible at the time of one of these occurrences of a quivering of the mountains all around them. Crockery and glassware in the houses rattled and trees having dead leaves shook as in a windstorm."

"The newspapers for hundreds of miles around continued to publish exaggerated the extravagant accounts of the 'Shaking of Old Bald' Sondley said and that scientists visited the locality, ascend (sic) the mountain where the disturbance took place, heard the explanation of the phenomena." There had been no blasting nearby for several months, and even then the nearest had been 33 miles away.

Dr. Sondley quotes a "learned geologist" as follows:

"It is a well established fact in geological circles that the surface of the earth has undergone and is undergoing changes. The highest mountain chains have been in past geological periods beneath the surface of the sea as is evidenced by marine shells which are found in their strata. It is also well established that some portions of the earth's surface are at present gradually rising and others are slowly falling. Now if we assume that the region around Stone Mountain is undergoing a very gradual elevation or depression then it will follow that the rocky strata will be brought into a crack will suddenly take place which must be attended with a jar, and, in some cases, with an audible sound. If the rocky strata is the same material from the surface down into the interior; for example, granite, and the mountain in the process of depression, the crack will take place deep in the interior. If on the other hand, the mountain is being elevated, the crack will be at the surface. If, however, the upper strata are more extensible than the deeper seated, the crack may be in the interior as well as in that of a depression."

Sondley points out that "a fissure appeared just at the time of this occurrence across the eastern end of the peak, about one half mile in length and at places six feet wide, whose depths have never been ascertained."

Sondley states that "time of the actual appearance of the fissure is ascertained" and as Jefferson's "volcano" took place in 1813, and the disturbance at Chimney Rock was not until 1874, "the idea of a volcano at Bald Mountain is completely done away with."

One Scout Jackson of Hendersonville reported that three months ago (Spring of 1933) a spring issued from Ice Cave, but then visited later in June, no water was to be seen or heard. Instead, a fissure of unmeasurable depth" was seen where the water had been, and had diverted the water to a lower level.

Note by BCM: Arval L. Alcock's Story appeared in the Charlotte Observer for 6-25-33.

4. Asheville Citizen Times (7/23/33), Asheville, NC

(Dr. Wade H. Whitesides of Horseshoe, North Carolina writes a letter to the Asheville Citizen-Times and gives some information and opinions on Rumbling Bald.)

Dr. Whitesides grew up in the vicinity of Bald Mountain and remembers the occurrences there.

The cave is between the mass of bare rock and an area where bedrock is concealed by overburden. (He describes the cave as it appeared when he once entered it, but the cave was not accessible in 1933 according to comments inserted parenthetically).

He states that he remembers the crevice when it was "very small. After a few years it got so wide you could hardly jump it. (The crack or chasm is now 10 feet wide, 100 feet deep and three or four hundred yards long)."

"Edmund Foster was living in the flat under the Rumbling Cave in 1880. The mountain did not scare him away. Then he sold to Frank Summer. They lived there for several years." B. H. Theodore and Nora Summer lived there with their grandfather for several years.

Dr. Whitesides describes a great slide that took place sometime between 1880 (?) and 1890. "Our mother came upstairs and woke us children, saying the world was coming to an end. Next morning we learned there had been a slide on the side of the mountain. The loose rock, weighing tons, fell hundreds of feet, leaving a great hole in the side of the mountain where the rocks had rolled from."

"After going into the cave one time and seeing the condition around it, I never would go to it any more; it is dangerous; those loose rocks are liable to break away any time."

Margaret W. Morley, Author of "The Carolina Mountains" says:

The Old Rumbling Bald is perhaps, the most noted of any mountain in this part of the world. Up to 1878, it was just the "Old Bald" then he began to rumble and shake the earth and thereby attained a distinction that set him apart from all the other mountains of the Blue Ridge. Whatever else the others were or did, none of them rumbled. From '78 to '80 the Old Bald kept the people wondering and those near him apprehensive. What was he rumbling about? Why was he shaking the earth? And what would he do next? He rumbled his last rumble in '85, we were told, since then he has been as "quiet as of old."

"---according to residents of the Chimney Rock section, however, old Bald has not quit rumbling. He gave a very distinct rumble in 1928 and has also been heard since then." (All from Asheville Citizen-Times 7-23-33)

5. Asheville Citizen, (7/29/1940), Asheville, NC

"Lake Lure, July 28 (AP). The Mystery of Rumbling Bald Mountain has been Solved."

A group of speleologists from the National Speleological Society, Washington, D.C., "crawled through the precipitous fissures that honeycomb the huge rock a thousand feet above Lake Lure and found that the noise is caused by boulders which break loose from the top of subterranean crevices and thunder down to the bottom of the caves."

"The shape of several of these caves is such as that they act as sounding boards and the rumble can be heard in the valley far below."

The caves never had been explored fully before, the State News Bureau said.

F. Sondley, F.A. The Hickory-Nut Gorge

On the other side of Broad River from the Pools, Chimney Rock and Hickory-Nut Falls is a high mountain ridge at about the same distance from the road. From this ridge which extends from the northeast to the southwest for twelve miles, arise several peaks called respectively Round Mountain, Stone Mountain, and Bald Mountain. This ridge is from three thousand to thirty-five hundred feet in height and runs between the waters of Broad River on the west and Crooked Creek on the east, nearly parallel to the Blue (32/33) Ridge. Great excitement was produced in this country in 1874 by a series of noises and shocks emanating from this ridge and continuing at frequent intervals from February 10 until the following April. They began on Tuesday, February 10, 1874, by concussions and vibrations heard and felt in Stone Mountain. These were renewed, with increased violence, on the following Sunday. After that, they grew more frequent and the noises were heard and the shocks felt for eight miles around. They came from Bald and Stone Mountains, people on the eastern side of the peaks perceiving them to be on the west and people being on the west perceiving them to be on the east. Every disturbance began with an explosion similar to a blast at a rock-quarry, followed by a rumbling, which lasted for a few seconds and accompanied by tremblings of the earth which rattled objects standing against houses in the vicinity and shook houses themselves as in an earthquake. Sound and shocks were simultaneous and occurred sometimes during the day, often at intervals not greater than an hour or two. The ground itself was many times felt to vibrate under pedestrians. A change in the weather caused no diminution in these phenomena. People at or near the tops of Stone and Bald Mountains were sensible, at the time of one of the occurrences, of a quivering of the mountains all around them. Crockery and glassware in the houses rattled and trees having dead leaves shook as in a wind storm. The effects were perceptible for five miles on each side of these two mountain peaks and even extended from Broad River on the southwest twenty-five miles to Catawba River on the east and seventeen miles to Rutherfordton on the southeast. (33/34) The inhabitants were in a state of great alarm. Some sent ten miles away for a preacher to come and pray with them, preachings and prayer-meetings were held daily for a week or more and twenty-five new members connected themselves with the Baptist church. The newspapers for hundreds of miles around continued to publish exaggerated and extravagant accounts of the "Shaking of Old Bald." Scientists visited the locality ascended Stone Mountain where the disturbances took place, heard the explosions, felt the vibrations, but could find no adequate explanation of the phenomena. There had been no blasting for several months, and even then the nearest had been thirty-three miles away. No rock of volcanic origin could be found in the neighborhood. The fact that on Stone Mountain sound and shock were perceived together showed that they originated in that peak. The rocks were not of igneous character but were gneiss and granitic slate. From fifty to seventy-five such outthrusts had been noted prior to March 18, 1874, and they continued for weeks after that date.

The phenomena have been clearly and satisfactorily explained. The ensuing explanation was suggested at the time by a learned geologist and is plainly correct:

"The following suggestions may be considered as a possible solution of the phenomena in question: It is a well established fact in geology that the surface of the earth has undergone and is undergoing changes. The highest mountain chains have been in past geologic periods beneath the surface of the sea, as is evident from the marine shells which are found in their strata. It is also well established that some portions of the earth's (34/35) surface are at present gradually rising and others slowly falling. Now if we assume that the region around Stone Mountain is undergoing a very gradual elevation or depression then it will follow that the rocky strata will be brought into a condition of stretching or tension which will go on until the limit of elastic cohesion is reached, when a rupture or crack will suddenly take place which must be attended with a jar, and in some cases, with an audible sound. If the rocky strata is of the same material from the surface down into the interior; for example, granite, and the mountain being in the process of depression the crack will take place deep in the interior. If, on the other hand, the mountain is being elevated, the crack will be at the surface. If, however, the upper strata are more extensible than the deeper seated, the crack may be in the interior in the case of elevation as well as in that of a depression.

"It has of late years been suspected, from the discrepancy in later and older measurements of points on the Andes, that this mountain system is in a state of very slow subsidence.

"If the foregoing views are correct, there is no indication of a volcanic outburst; and whatever moral effects the disturbances may have on the character of the inhabitants of the region, there is little danger as to any physical changes taking place of sufficient intensity to endanger life.

"In support of this theory, a fissure appeared, just at the time of these occurrences, across the eastern end of the peak, about one half mile in length and at places six feet wide whose depth has never been ascertained. This fissure widens from time to time and stones are still thrown down the mountain side as the process of widening goes on.

"It has also been pointed out, in further corroboration of this explanation, that similar shocks and noises were felt and heard in the northern part of Haywood County, North Carolina in 1812, and from time to time since, on a spur of the Newfound Mountain near the head of Fines Creek and that cracks are to be seen there in solid gneiss rock which composes the ridge and near its foot are chasms four feet wide radiating from a centre; and that in 1829, in Cherokee Mountain, North Carolina, one of the Valley River Mountains produced similar perturbations and sounds during which a cleft, still visible, was made several hundred yards in length; and many years ago, between Ellijay and Cullasaga (sic) in Macon County, North Carolina, a violent shock, as of an earthquake, produced a chasm on the northern side of the mountain there, and that similar crevices are to be seen on the Satoola Mountain in the same county. While a mountain in Madison County, North Carolina, has been heard to give forth rumbling sounds. All of these places are in the same mountain region as the Bald and Stone mountains and probably none of them more than a hundred miles away. These seem to show conclusively that the shocks and noises at Stone Mountain are correctly explained above."

Although not in limestone country the Hickory-Nut Gap neighborhood abounds in caverns, such as Bat Cave and some of these caves are well known to be in the mountain ridge of which Bald and Stone are peaks, and even in the parts of that ridge known as Bald Mountain and Stone mountain. It has also been said that, after the disturbances there of 1874, large rocks were found to have fallen in some of the caves from the overhead (36/37) formations. The theory that these shocks and accompanying noises in the early part of the year 1874 are to be attributed to the falling of these immense fragments of stone from the roofs to the floors of these caverns, and other caverns in that mountain which have no entrance or have never been discovered, like the theory of subterranean gasses generated in internal pockets and exploded by electric currents, seems wholly inadequate as well as highly improbable.

(See Le Conte's Elements of Geology, 1878, page 106)

- a. Margaret Warner Morley: The Carolina Mountains (1913), p. 95
- b. Asheville Citizen-Times (7/2/33), Asheville, NC
- c. John Preston Arthur: History of Western North Carolina (1914)
- d. Asheville Citizen-Times (7/23/33), Asheville, NC
- e. Asheville Citizen (7/29/40), Asheville, NC
- f. F.A. Sondley: The Hickory-Nut Forge

g. EQHUS [123]

h. Rockwood [330]

i. (BSSA, V. 3, 1913)

j. Smith [350]

k. MacCarthy [243]

D. Templeton [370] 1874 FEB 10 35.7 82.1 McDowell County, NC II-VII

Swarm of 50-100 shocks followed at various time intervals until April 10. Most severe shock occurred on 2/22. Shocks grew in number and intensity until 2/22, from about 3/17 to 3/26, and again from about 4/14 to 4/17.

1. Bollinger [33]
2. McClain, unpub., (1978)
3. McClain [260]
4. Moneymaker [281]
5. TVA, unpub., (1977)
6. EOHUS [121]

III. USGS [390]

A. EOHUS [123]	1874	FEB 10- APR 17	35.7	82.1	McDowell Co., NC	Local	V-VI (RF)
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There were a series of explosive shocks, none severe, followed by deep rumbling noise. These were in the vicinity of Stone Mountain. At times stout log buildings shook violently. There were probably 50 to 75 shocks, each accompanied by rumbling, during the period named. Some of the explosions were described as like the rattling of artillery followed by rumbling, the ground trembling for a few seconds after each explosion. The shocks were felt over an area 25 miles in diameter including Mount Mitchell, the highest point east of the Rocky Mountains. The explosive shocks and noises were simultaneous. Shocks occurred on February 10 and 22 p.m., March 17 and 26, April 14 and 17.

1. Rockwood [330]
2. BBSA, V. 3, (1913)
3. Smith [350]

B. EOHUS [121]	1874	FEB 10- APR 17	35.7	82.1	McDowell Co., NC	Local	V
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There were a series of explosive shocks, none severe, followed by deep rumbling noise. These were in the vicinity of Stone Mountain. At times stout log buildings shook violently. There were probably 50 to 75 shocks, each accompanied by rumbling, during the period named. Some of the explosions were described as like the rattling of artillery followed by rumbling, the ground trembling for a few seconds after each explosion. The shocks were felt over an area 25 miles in diameter including the Mount Mitchell, the highest point east of the Rocky Mountains. The explosive shocks and noises were simultaneous. Shocks occurred on February 10 and 22, March 17 and 26, April 14 and 17.

1. Rockwood [330]
2. BSSA, v. 3, (1913)
3. Smith [350]
4. MacCarthy [241]

C. EOHUS [120]	1874	FEB 10- APR 17	35.7	82.1	McDowell Co., NC	Local	V
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There was a series of explosive shocks, none severe, followed by a deep rumbling noise. These were in the vicinity of Stone Mountain. At times, stout log buildings shook violently. There were probably 50 to 75 shocks, each accompanied by rumbling, during the period named. Some of the explosions were described like the rattling of artillery followed by rumbling, the ground trembling for a few seconds after each explosion. The shocks were felt over an area 25 miles in diameter, including Mount Mitchell, the highest point east of the Rocky Mountains. The explosive shocks and noises were simultaneous. Shocks occurred on February 10 and 22, March 17 and 26, April 14 and 17.

1. Rockwood [415]
2. Smith [350]
3. MacCarthy [241]

IV. McClain [260]	1874	FEB 10	35.7	82.1	McDowell Co., NC		II-VII
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50 to 100 shocks from Feb. 10 to Apr. 17

A. Moneymaker [281]

B. EOHUS [121]

V. Bollinger [33]	1874	FEB 10 APR 17	35.7	82.1	McDowell Co., NC		V-VII
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Apparent swarm of 50 to 75 shocks

- A. EOHUS [120]
- B. MacCarthy [241]
- C. McClain [260]
- D. Moneymaker [281]

VI. Moneymaker [281] 1874 FEB 10 FEB 10 Western NC VI-VII
Through MAY

A series of 50 to 100 sharp local seismic shocks accompanied by explosive noises. "There began a series of disturbances in Bald and Stone Mountains, McDowell County, North Carolina, which continued at intervals for several months. The phenomena appear to have been occasional earthquake shocks, at no time violent, but accompanied by explosive and rumbling noises and occurring sometimes two or three a day, and again with intervals of several days. These increased in frequency and intensity until the night of February 22, when the most severe shock was felt. About March 17 and 26, the shocks were again of some intensity, as also on April 14 and 17." One observer reported a strong shock with a deep rumbling noise about sundown on March 18, and another on March 19. Another observer described the noise as resembling "the report made by blasting in a deep quarry or well, at first explosive then reverberating." The shocks were reportedly most strongly felt near the top of the mountains, but could be felt 10 to 15 miles farther. The area affected included portions of McDowell, Rutherford, and Henderson Counties.

- A. Anonymous [10]
- B. EOHUS [123]
- C. Rockwood [330]

1874, May. The disturbances at Bald Mountain, NC in February and March already noticed (Rockwood, v. 9) were reported as continuing at intervals during the months of April and May.

- 1. MWR [290]

VII. Woollard [410]

- 1. 1874 FEB 10 Bald Mtn, NC
- 14 mi. from Mt. Mitchell. Series of quakes. Smith Rpt. 1874, p. 254.

- a. Rockwood [330]

2. 1874 MAR 20 thru BALD Mtn. NC.
APR & MAY

Rumblings and explosives here at junction. McDowell, Henderson, Buncombe, and Rutherford Co.

- a. Rockwood [330]
- b. M. S. J., Manhattan, Ka. (?)
- VIII. MacCarthy [241] 1874 FEB 10 - 35.7 82.1 McDowell Co., NC Local V-VI (RF)
APR 17

A protracted series of moderately strong (intensity 5 to 6) but strictly local shocks in McDowell County, NC. This is undoubtedly the State's most famous earthquake, and much has been written concerning it. "Epicenter at about 35.7 N., 82.1 W. Local shocks, intensity 5-6. There were a series of explosive shocks, none severe, followed by deep rumbling noises. These were in the vicinity of Stone [and of "Rumbling Bald"] Mountain. At times stout log buildings shook violently. There were probably 50 to 75 shocks, each accompanied by rumbling, during the period named. Some of the explosions were described as like the rattling of artillery followed by a rumbling, the ground trembling for a few seconds after each explosion. The shocks were felt over an area 25 miles in diameter including Mount Mitchell.... The explosive shocks and noises were simultaneous. Shocks occurred on February 10 and 22, March 17 and 26, April 14 and 17." (E. Hist.)

See also: Smithsonian Report for 1874, "Series of Earthquakes in North Carolina," by Warren du Pre' Smith; "The Earthquake Scare in North Carolina," in Popular Science Monthly 13, p. 635, 1878; "Lecture Delivered Before the Washington Philosophical Society," by the Hon. Thomas L. Clingman, A. J. S. 109 (1874), pp. 55-58; A. J. S. 108 (1874), p. 79, with an account of a visit to this locality by F. H. Bradley; and the various State newspapers of the period.

There were more shocks in this area during January and February, 1880, and apparently also some slight repetition during January, 1884.

- A. EOHUS [123]
- B. DuPre' [110]
- C. Popular Science Monthly 13, p. 635, (1878)

D. Anonymous [10]

E. Am. Jour. Sci 108, (1874), p. 79

1. Bradley, F.H. personal communication (?)

F. Unspecified news accounts

IX. Varma [400]

1874

FEB 10

35.7

82.1

McDowell Co., NC

V

A. MacCarthy [241]

B. Smith [350]

I.	TEIC	1875	NOV 12	08:00	36.0	83.9	Knoxville, TN	III
Location: Knoxville, TN								
Intensity: Rumbling noise; vibration from west to east								
II.	TVA [380]	1875	NOV 12	08:00	36.0	83.9	Knoxville. TN	
	A. Rockwood [330]	1875	NOV 12	2:00 a.m.				
A shock at 2 a.m. at Knoxville, Tennessee, lasting ten seconds. The vibration was from west to east, and accompanied by a rumbling noise.								
	B. Templeton [370]	1875	NOV 12		35.9	83.9	Knoxville, TN	III-IV
Vibrations traveled from west to east.								
1. Bollinger [33]								
2. McClain, unpub., (1978)								
3. McClain, [260]								
4. Moneymaker [281]								
5. TVA, unpub. (1977)								
IV.	McClain [260]	1875	NOV 12	07:00	35.9	83.9	Knoxville, TN	III-IV
A. Moneymaker [281]								
V.	Bollinger [33]	1875	NOV 12	02:00	36.0	84.0	Knoxville, TN	III-IV
A. McClain [260]								
B. Moneymaker [281]								
C. Woollard [410]								

VI. Moneymaker [281] 1875 NOV 12 2:00 a.m. Southern Appalachians III-IV

A shock lasting about 10 seconds at Knoxville, Tennessee. The vibration was from west to east, and was accompanied by a rumbling noise.

A. Rockwood [330]

VII. Woollard [410] 1875 NOV 12 02:00 Knoxville, TN

Direction west to east; duration 10 seconds.

A. Rockwood [330]

I. TEIC	1876	JAN 23	35.5	82.2	Stone Mt., NC
Location: Stone Mt., NC					
Intensity: No indication					
Comment: Reference - Ferguson [150]					
II. TVA [380]	1876	JAN 23	35.7	82.0	McDowell Co., NC
A. Ferguson [150]	1876	JAN 23			McDowell Co., NC

IV

I. TEIC	1876	DEC 21	15:30	37.0	81.1	Wytheville, VA	III
Location: Wytheville, VA							
Intensity: Felt							
II. TVA [380]	1876	DEC 21	15:30	37.0	81.1	Wytheville, VA	
A. MWR [290]	1876	DEC 21	10:30 a.m.			Wytheville, VA	
An earthquake shock at 10:30 a.m. the 21st, is reported.							
B. Templeton [370]	1876	DEC 21		36.9	81.1	Wytheville, VA	
1. Bollinger [33]							
2. McClain, unpub., (1978)							
3. McClain [328]							
4. Moneymaker [281]							
IV. McClain [260]	1876	DEC 21	15:30	36.9	81.1	Wytheville, VA	
A. Bollinger [31]	1876	DEC 21	10:30	36.9	81.1	Wytheville, VA	
1. MacCarthy [244]							
V. Bollinger [33]	1876	DEC 21	10:30	36.9	81.1	Wytheville, VA	
A. Bollinger [31]							
B. MacCarthy [244]							
C. Hopper [210]	1876	DEC 21	10:30			Wytheville, VA	
"A shock at Wytheville, Va. at 10:30 a.m."							

1. Rockwood [330] 1876 DEC 21 10:30 a.m.

A shock at Wytheville, VA. at 10:30 a.m.

a. MWR [290]

VI. Moneymaker [281] 1876 DEC 21 10:30 a.m.

Southwestern VA III-IV

A shock at Wytheville, Va.

A. Rockwood [330]

VII. Woollard [410] 1876 DEC 21 10:30

Wytheville, VA

A. Rockwood [330]

VIII. MacCarthy [244] 1876 DEC 21 10:30 a.m.

Wytheville, VA

Rockwood (1878, p. 22) reports: "Dec. 21 - A shock at Wytheville, Va., at 10:30 a.m.", giving the U.S. Singl. Serv. as his authority. Nothing is said as to the magnitude of the tremor.

A. Rockwood [330]

I. TEIC 1877 APR 26 22:00 35.2 83.4 Franklin, NC III

Location: Franklin, NC

Intensity: Slight

II. TVA [380] 1877 APR 26 22:00 35.2 83.4 Franklin, NC IV

A. MWR [290] 1877 APR 26 5:00 p.m. Franklin, NC

A slight shock was felt at Franklin, N.C. at 5:00 p.m. of the 26th.

B. MacCarthy [241]

C. Templeton [370] 1877 APR 26 35.2 83.2 Franklin, NC III-IV

1. Bollinger [33]

2. McClain unpub., (1978)

3. McClain [260]

4. Moneymaker [281]

5. TVA, unpub., (1977)

IV. McClain [260] 1877 APR 26 22:00 35.2 83.4 Franklin, NC III-IV

A. Moneymaker [281]

V. Bollinger [33] 1877 APR 26 17:00 35.2 83.4 Franklin, NC III-IV

A. MacCarthy [241]

B. McClain [260]

C. Moneymaker [281]

VI. Moneymaker [281] 1877 APR 26 5:00 p.m. Western NC III-IV

A light shock at Franklin, North Carolina.

A. Rockwood [330] 1877 APR 26 5:00 p.m. Slight

A slight shock at Franklin, North Carolina at 5:00 p.m.

1. MWR [290]

VII. Woollard [410] 1877 APR 26 17:00 Franklin, NC Slight

Direction SW to NE.

A. Rockwood [330]

VIII. MacCarthy [241] 1877 APR 26 17:00 Franklin, NC

"A slight shock was felt at Franklin, North Carolina, at 5 p.m. on April 26." (M.V.R.) See also A.J.S. 115 (1878) p. 23. No mention of this shock has been found in contemporary newspapers.

A. MWR [290]

B. Rockwood [330]

I. TEIC	1877	MAY 25	36.0	83.9	Knoxville, TN	III
Location: Knoxville, TN						
Intensity: Felt						
II. TVA [380]	1877	MAY 25	36.0	83.9	Knoxville, TN	IV
A. Moneymaker [281]						
B. Templeton [370]	1877	MAY 25	35.9	83.9	Knoxville, TN	III-IV
1. Bollinger [33]						
2. McClain, unpub., (1978)						
3. McClain [260]						
4. Moneymaker [281]						
5. TVA, unpub., (1977)						
Earthquake shock, Knoxville, Tennessee.						
IV. McClain [260]	1877	MAY 25	35.9	83.9	Knoxville, TN	III-IV
A. Moneymaker [281]						
V. Bollinger [33]	1877	MAY 25	36.0	84.0	Knoxville, TN	III-IV
A. McClain [260]						
B. Moneymaker [281]						
C. Woollard [410]						

III-IV

Eastern TN

MAY 25

1877

VI. Moneymaker [281]

A shock At Knoxville, Tennessee.

MAY 25

1877

A. Rockwood [330]

A shock at Knoxville, TN.

1. MWR [290]

MAY 25

1877

VII. Woollard [410]

Knoxville, TN

A. Rockwood [330]

A shock at Knoxville, TN.

1. MWR [290]

I. TEIC 1877 OCT 9 01:00 35.3 82.5 Hendersonville, NC 1200 IV

Location: Hendersonville, NC

Intensity: Frightened inhabitants

Extent: SE NC; map; 1200 sq. km

II. TVA [380] 1877 OCT 9 01:00 35.3 82.5 Hendersonville, NC IV

A. McCarthy [242] 1877 OCT 8(?) 8:00 p.m. Brevard & Hendersonville, NC

A news item in the New York Times, Nov. 9, 1877, quoted from the Charleston News "of the 15th inst.", reports that an earthquake occurred at this time in the "Brevard-Henderson (sic)" area, which lasted "for several minutes" and which "frightened the inhabitants out of their wits." Reportedly it was not felt at Spartansburg or at Greenville, nor indeed "anywhere south of the mountains." Since no other reference to this supposed earthquake has been located, the above account may well be nothing other than a traveler's "tall tale."

1. New York Times (11/9/77), NY

a. Charleston News (10/15/77), Charleston, SC

B. Ferguson [150] 1877 OCT 8 20:00 Brevard-Hendersonville, NC

C. Templeton [370] 1877 OCT 8 35.0 82.7 Brevard-Hendersonville, NC

Seismic origin is questionable

1. Bollinger [33]

V. Bollinger [33] 1877 OCT 8 20:00 35.0 82.7 Brevard-Hendersonville, NC

(seismic?)

A. McCarthy [242]

I. TEIC 1877 NOV 16 08:38 36.0 83.9 Knoxville, TN 3200 IV

Location: Knoxville, TN; intensity

Intensity: Violent; walls shook, windows rattled @ Knoxville, TN

Extent: East TN to SW NC; map; 3200 sq. km.

II. TVA [380] 1877 NOV 16 08:38 36.0 83.9 Knoxville, TN IV

A. Nuttli [310] 1877 NOV 16 07:38 35.5 84.0 Near Knoxville, TN V

B. MWR [290] 1877 NOV 16 2:38 a.m. Knoxville, TN and Murphy, NC

On the 16th: Tennessee: Knoxville, 2:38 a.m., violent earthquake shock from SW. to N.; lasting about one minute.
North Carolina: Murphy 2:45 a.m. shock lasting 15 seconds from west to east.

C. Moneymaker [290] 1877 NOV 16 2:20 a.m. Knoxville, TN

Earthquake Shock: This morning at about twenty minutes past two o'clock a very perceptible quaking of the earth was experienced by those awake at that hour. It differed from the shocks ordinarily felt, in that instead of approaching gradually, as it were, gathering in intensity and passing away in an inverse ratio, its greatest strength was manifested at the outset, which caused the walls of buildings to shake and windows to rattle ominously. The shock was not a severe one, however, and in less than two minutes the tremulous motion had entirely ceased.

1. Knoxville Daily Chronicle (11/16/77), Knoxville, TN

D. MacCarthy [241]

E. Templeton [370] 1877 NOV 16 35.5 84.0 Knoxville, TN area IV-V

Three shocks

1. Bollinger [33]

2. EOHUS [120]

3. McClain, unpub., (1978)

4. McClain [260]
5. Moneymaker [281]
6. TVA, unpub., (1977)
7. EQHUS (1956)
8. EQHUS [121]

III. USGS [390]

A. EQHUS [122]	1877	NOV 16	02:38	35.5	84.0	West NC and eastern TN	13,000	V (RF)
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Felt at Knoxville, Tenn. and Murphy, N.C.

1. Rockwood [330] 1877 NOV 16 2:20 a.m.

A slight shock about 2:20 a.m. at Knoxville, Tenn.

2. Rockwood [330] 1877 NOV 16 2:30 a.m.

The shock about 2:30 a.m. at Knoxville, Tennessee, as noticed, III, XV, p. 27, was from SW to N; and was felt also at Murphy, North Carolina, where the direction was W to E and the duration fifteen seconds.

3. MWR [290]

B. EQHUS [121]	1877	NOV 16	02:38	35.5	84.0	Western NC and east TN	13,000	V
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Felt at Knoxville, Tennessee and Murphy, North Carolina.

1. Rockwood [330]
2. MWR [290]
3. MacCarthy [241]

C. EQHUS [120] [Same as B above]

IV. McClain [260] 1877 NOV 16 07:20* 35.5 84.0 13,000 Western NC and East TN IV-V

Felt at Knoxville, Tennessee and Murphy, North Carolina.

A. Bollinger [31] [does not refer to this event]

B. EOHUS [121]

V. Bollinger [33] 1877 NOV 16 02:38 35.5 84.0 13,000 East TN V

A. EOHUS [120]

B. McClain [260]

C. Moneymaker [281]

D. Woollard [410]

VI. Moneymaker [281] 1877 NOV 16 2:20 a.m. Southern Appalachians IV

A strong shock at Knoxville, Tennessee. "It differed from the shocks ordinarily felt, in that instead of approaching gradually, as it were, gathering in intensity and passing away in an inverse ratio, its greatest strength was manifested at the outset, which caused the walls of buildings to shake and windows to rattle ominously." The shock was felt also at Murphy, North Carolina. The time of the earthquake is reported differently in different references as 2:20, 2:30 and 2:38 a.m.

A. EOHUS [123]

B. Rockwood [330]

C. Knoxville Daily Chronicle (11/16/77), Knoxville, TN

VII. Woollard [410] 1877 NOV 16 2:38 36 84 East TN V (RF)

Also from Murphy, North Carolina; 65 miles south; duration one minute.

A. MWR [290]

B. Rockwood [330]

- VIII. MacCarthy [241] 1877 NOV 16 02:38 TN
- Tennessee earthquake, felt at Murphy, N.C. "At Murphy, N.C., at 2:45 a.m. shock lasting fifteen seconds, from West to East." (M.W.R.) "At 02:38 epicenter near 35.5 N., 84 W., force 5." (E. Hist.) See also A.J.S. 117 (1879), p. 158. No mention of this quake's having been felt in North Carolina has been found in contemporary newspapers.
- A. MWR [290]
- B. EOHUS [1947]
- C. Rockwood [330]
- IX. Varma [400] 1877 NOV 16 35.5 84.0 Monroe Co., TN V
- A. MacCarthy [241]

I. TEIC	1878	NOV 23	15:00	35.1	84.0	Murphy, NC	III
Location: Murphy, NC							
Intensity: Slight; rumbling noise							
II. TVA [380]	1878	NOV 23	15:00	35.1	84.0	Murphy, NC	IV
A. MWR [290]	1878	NOV 23	10:00 a.m.			Murphy, NC	
Murphy, North Carolina on the 23rd, 10 a.m. slight shock from west to east lasting one minute, not much jar, but a rumbling noise like distant thunder.							
B. MacCarthy [241]							
C. Templeton [370]	1878	NOV 24		35.1	84.0	Murphy, NC	III-IV
Shock waves appeared to move from west to east.							
1. Bollinger [33]							
2. McClain, unpub., (1978)							
3. McClain [328]							
4. Moneymaker [281]							
5. TVA, unpub., (1977)							
IV. McClain [260]	1878	NOV 24	03:00*	35.1	84.0	Murphy, NC	III-IV
A. Moneymaker [281]							
B. Woollard [410]							
V. Bollinger [33]	1878	NOV 23	10:00	35.0	84.0	Murphy, NC	III-IV
A. MacCarthy [241]							
B. McClain [260]							

C. Moneymaker [281]

VI. Moneymaker [281] 1878 NOV 23 10:00 a.m. Southern Appalachians III-IV

A slight shock at Murphy, North Carolina. It was accompanied by a rumbling noise and appeared to move from west to east.

A. Rockwood [330] 1878 NOV 23 10:00 a.m. Murphy, NC

At Murphy, N.C., a slight shock at 10:00 a.m. from west to east, with a rumbling noise.

1. MWR [290]

VII. Woollard [410] 1878 NOV 23 10:00 Murphy, NC Slight

Direction west to east.

A. Rockwood [330]

VIII. MacCarthy [241] 1878 NOV 23 10:00 Murphy, NC Slight

"At Murphy, North Carolina a slight shock at 10 a.m. from west to east lasting one minute, not much jar, but a rumbling noise like distant thunder." (M.W.R.) See also A.J.S. 117 (1879), p. 162. Not mentioned in E. Hist. or in available contemporary newspapers.

A. MWR [290]

B. Rockwood [330]

I. TEIC	1880	JAN 28	35.5	82.2	Stone Mt., NC	IV
Location:	Stone Mt., NC					
Intensity:	Shocks & rumbling sounds					
Comment:	Shocks over several days attributed to Bald Mt.; apparently originate on Stone Mt. instead. (see event Feb 22, 1874)					
II. TVA [380]	1880	JAN 28, 29 & FEB 10	35.7	82.1	McDowell Co., NC	IV
A. Rockwood [330]	1880	JAN 28, 29 & FEB 10			Bald Mountain, NC	
Shocks and rumbling reported from Bald Mountain, NC.						
1. Personal communication - J.M. Batchelder, ESQ of Boston.						
B. Templeton [370]	1880	JAN 28	36.0	82.7	Bald Mountain, NC	II-III
Subsequent shocks on January 29 and February 10						
1. McClain, unpub., (1978)						
2. McClain [260]						
3. Moneymaker [281]						
4. TVA, unpub., (1977)						
IV. McClain [260]	1880	JAN 28, 29 & FEB 10	36.0	82.7	Bald Mountain, NC	II-III
A. Moneymaker [281]						
V. Bollinger [33]	1880	JAN 28, 29 & FEB 10	35.7	82.1	Bald Mountain, McDowell Co., NC	II-III

- | | | | | |
|--|------|------------------------|---------------------------------|--------|
| A. MacCarthy [241] | | | | |
| B. McClain [260] | | | | |
| C. Moneymaker [281] | | | | |
| VI. Moneymaker [281] | 1880 | JAN 28, 29
& FEB 10 | Southern Appalachians | II-III |
| Shocks and rumbling at Bald Mountain, North Carolina. | | | | |
| A. Rockwood [330] | | | | |
| VII. Woollard [410] | 1880 | JAN 28, 29
& FEB 10 | Bald Mountain, NC | |
| Shocks and rumbling | | | | |
| A. Rockwood [330] | | | | |
| VIII. MacCarthy [290] | 1880 | JAN 28, 29
& FEB 10 | Bald Mountain, McDowell Co., NC | |
| "Shocks and rumbling again reported from Bald Mountain, N.C." (A.J.S. 123 (1881), p. 199). No mention found elsewhere. | | | | |
| A. Rockwood [330] | | | | |

I. TEIC	1882	OCT 15	17:30	35.1	84.0	Murphy, NC	III
Location: Murphy, NC							
Intensity: Slight							
II. TVA [380]	1882	OCT 15	17:30	35.1	84.0	Murphy, NC	IV
A. MWR [290]	1882	OCT 15	12:30 p.m.			Murphy, NC	Slight
Murphy, N.C., 15th. A slight shock of earthquake occurred at this place at 12:30 p.m. The vibration was from south or southwest to north or northeast.							
B. Templeton [370]	1882	OCT 15		35.1	84.0	Murphy, NC	III-IV
1. Bollinger [33]							
2. McClain, unpub., (1978)							
3. McClain [260]							
4. Moneymaker [281]							
IV. McClain [260]	1882	OCT 15	17:30	35.1	84.0	Murphy, NC	III-IV
A. Moneymaker [281]							
V. Bollinger [33]	1882	OCT 15	12:30	35.1	84.0	Murphy, NC	III-IV
A. MacCarthy [244]							
B. McClain [260]							
C. Moneymaker [281]							
VI. Moneymaker [281]	1882	OCT 15	12:30 p.m.			Southern Appalachians	III-IV

1882, October 15, 12:30 p.m., southern Appalachians (III-IV). A light shock at Murphy, North Carolina.

A. Rockwood [330] 1882 OCT 15 12:30 p.m. Murphy, NC Slight

"At 12:30 p.m. a slight shock reported at Murphy, NC" [should p.m. be a.m., and this be part of the earthquake in Illinois already noted?]

1. MWR [290]

VII. Woollard [410] 1882 OCT 15 12:30 p.m. Murphy, NC

A slight shock

A. Rockwood [330]

VIII. MacCarthy [241] 1882 OCT 15 12:30 Murphy, NC Slight

Felt at Murphy, N.C. "On the 15th a slight shock of an earthquake occurred at this place at 12:30 p.m. The vibration was from south or southwest to north or northeast." (M.W.R.) See also A.J.S. 125 (1883), p. 359, where it is suggested that the true time might have been 12:30 a.m. [0030 hrs] and the earthquake the Centralia, Illinois quake, which occurred about midnight that date. No mention that an earthquake of this date was felt in North Carolina has been found in contemporary newspapers. Not mentioned in E. Hist.

A. MWR [290]

B. Rockwood [330]

I. TEIC

Location: Elk Mt., NC

Intensity: Reported to be similar to that of event Aug. 13, 1885 (IV)
@ Blowing Rock

Elk Mt., NC

IV

II. TVA [380]

1884 Summer

35.7 82.5

Elk Mtn., NC

IV

A. MacCarthy [241]

B. Templeton [370]

1884 Summer

35.7 82.5

Elk Mtn., NC

Unknown

1. Bollinger [33]

V. Bollinger [33]

1884 Summer

35.7 82.5

Elk Mtn., NC

A. MacCarthy [241]

VIII. MacCarthy [241]

1884 Summer

35.7 82.5

Elk Mtn., NC

The Orange County Observer, for Sat., Sept. 5, 1885, in a story on the August 6, 1885, Watauga County earthquake, says: "There was a similar shock at Elk Mountain, near Asheville, last summer." This is presumably the summer of 1884, rather than that of 1885. The "Elk Mountain" mentioned is probably the Elk Mountains which are located just northeast of Asheville, at about 35 40' N., 82 30' W. No other mention of this shock has been seen anywhere.

A. Orange County Observer (9/5/85)

I. TEIC	1884	JAN	35.5	82.2	Stone Mt., NC
Location: Stone Mt., NC					
Intensity: No indication					
Comment: Incidental report contained in <u>Fayetteville Observer's</u> account of event Jan. 18, 1884					
II. TVA [380]	1884	JAN	35.7	82.0	McDowell Co., NC
A. MacCarthy [241]					
B. Templeton [370]	1884	JAN	35.6	82.0	McDowell Co., NC
1. Bollinger [33]					
V. Bollinger [33]	1884	JAN	35.6	82.0	McDowell Co., NC
A. MacCarthy [241]					
VIII. MacCarthy [241]	1884	JAN			McDowell Co., NC

The Fayetteville Observer concludes its account of the January 18th, 1884, quake with the remark: "This . . . lends probability to stories of the "trouble" at Bald Mountain. . . . By the way, the Morganton Mountaineer (no copies of this period available to the writer) reports more trouble in that quarter within the past week." No further mention of this occurrence has been found anywhere.

A. Fayetteville Observer (no date?), Fayetteville, NC

1. Morganton Mountaineer (no date)

265

I. TEIC 1884 APR 30 11:46 35.2 84.2 Ogreeta, NC II

Location: Ogreeta, NC

Intensity: Rumbling sound; not reported felt

II. TVA [380] 1884 APR 30 11:46 35.2 84.2 Ogreeta., NC IV

A. Moneymaker [283] 1884 APR 30 6:46 a.m. Ogreeta, NC

"Ogreeta, Cherokee County, North Carolina; At 6:46 a.m. of the 30th, a low rumbling sound of earthquake, like rolling thunder, was heard; noise apparently from a point nearly due north of here."

1. MWR [290]

B. Templeton [370] 1884 APR 30 35.2 84.0 Ogreeta, NC III

No tremors were felt, but a low rumbling sound was heard from the north (Moneymaker [281]).

1. Bollinger [33]

2. McClain, unpub., (1978)

3. McClain [260]

4. Moneymaker [281]

5. TVA, unpub., (1977)

IV. McClain [260] 1884 APR 30 11:46 35.2 84.0 Ogreeta, Cherokee Co., NC

Low rumbling sound of earthquake heard, no tremor reported.

A. Moneymaker [281]

V. Bollinger [33] 1884 APR 30 06:46 35.1 84.0 Ogreeta, Cherokee Co., NC

A. MacCarthy [241]

B. McClain [260]

C. Moneymaker [281]

VI. Moneymaker [281] 1884 APR 30 6:46 a.m. Southern Appalachians

"At 6:46 a.m., at Ogreeta, Cherokee County, North Carolina, a low rumbling sound of earthquake was heard, apparently from the north. No tremor was reported."

A. Rockwood [330] 1884 APR 30 6:46 Ogreeta, NC

At 6h 46m, Ogreeta, Cherokee County, North Carolina, a low rumbling sound of an earthquake was heard, apparently from the north. No tremor was reported.

1. MWR (290)

VII. Woollard [410] 1884 APR 30 06:46 Ogreeta, NC

Rumbling from the North---no tremors.

A. Rockwood [330]

VIII. MacCarthy [241] 1884 APR 30 06:46 Ogreeta, NC

"At 6:14 a.m. of the 30th a low rumbling sound of earthquake, like rolling thunder, was heard; the noise apparently came from a point nearly due north of here." (M.W.R.) See also A.J.S. 129 (1885), p. 428, which notes that no tremors were reported. No other mention of this occurrence has been found.

A. MWR (290)

B. Rockwood [330]

I. TEIC 1884 AUG 25 00:45 36.0 83.9 Knoxville, TN IV

Location: Knoxville, TN

Intensity: Windows rattled, low rumbling noise

II. TVA [380] 1884 AUG 25 00:45 36.0 83.9 Knoxville, TN IV

A. Moneymaker [283] 1884 AUG 24 7:45 p.m. Knoxville, TN

"The observer at Knoxville, Tennessee, reports that an earthquake shock, lasting about six seconds, occurred in that vicinity at 7:45 p.m. on the 24th. It was accompanied by a low rumbling noise like distant thunder and it was sufficient to make windows rattle."

1. MWR [290]

B. Templeton [370] 1884 AUG 25 35.9 83.9 Knoxville, TN IV

1. Bollinger [33]

2. McClain [260]

3. Moneymaker [281]

4. TVA, unpub., (1977)

IV. McClain [260] 1884 AUG 25 00:45 35.9 83.9 Knoxville, TN IV

A. Moneymaker [281]

V. Bollinger [33] 1884 AUG 24 19:45 36.0 84.0 Knoxville, TN III-IV

A. McClain [260]

B. Moneymaker [281]

C. Woollard [410]

VI. Moneymaker [281] 1884 AUG 24 7:45 p.m. Southern Appalachians IV

A light shock at Knoxville, Tennessee, and vicinity. It rattled windows and was attended by a low rumbling noise.

A. Rockwood [330]

At 19h 45m, a light earthquake, rattling windows and accompanied by a low rumbling sound, occurred at Knoxville, Tennessee, and vicinity.

VII. Woollard [410] 1884 AUG 24 19:45 Knoxville, TN III (RF)

Duration 6 seconds.

A. MWR (290)

I. TEIC	1885	FEB 2	12:10	37.0	81.1	Wytheville, VA	IV
Location: Wytheville, VA							
Intensity: Windows rattled, houses shook							
II. TVA [380]	1885	FEB 2	12:10	37.0	81.1	Wytheville, VA	IV
A. Moneymaker [283]	1885	FEB 2	7:10 a.m.			Wytheville, VA	
<p>"February 2 at 7:10 a.m. a light earthquake was felt Wytheville, Wythe County, Virginia, with a sound like the rumbling of distant thunder, which seemed to come from the northwest. Apparently it was confined to the immediate vicinity of Wytheville. Inquiries by letter to all adjoining counties brought replies from Marion, Smythe County, on the southwest; Rural Retreat, Wythe County and Independence, Grayson County, on the south; Hillsville, Caroroll County, on the southeast; Pulaski Station, Pulaski County, on the northeast; and Bland Court House on the north, at none of which place was it felt."</p>							
<ol style="list-style-type: none"> 1. MWR [290] 2. Rockwood [330] 							
B. MacCarthy [244]							
C. Templeton [370]	1885	FEB 2		36.9	81.1	Wytheville, VA	III-IV
<ol style="list-style-type: none"> 1. Bollinger [33] 2. McClain, unpub., (1978) 3. McClain, [260] 4. Moneymaker [281] 							
IV. McClain [260]	1885	FEB 2	12:00	36.9	81.1	Wytheville, VA	IV
A. Bollinger [31]	1885	FEB 2	07:10	36.9	81.1	Wytheville, VA	IV
<ol style="list-style-type: none"> 1. MacCarthy [244] 							

V. Bollinger [33] 1885 FEB 2 07:10 36.9 81.1 Wytheville, VA IV

A. Bollinger [28]

B. MacCarthy [244]

C. Hopper [210] 1885 FEB 2 07:10 Wytheville, VA

Wytheville, VA--(III)--"Very light earthquake felt, sound like rumbling of distant thunder, seemed to come from northwest. Apparently confined to immediate vicinity of Wytheville. Inquiries by circular to surrounding counties indicated not felt."

1. Rockwood [330] 1885 FEB 2 07:10 Wytheville, VA III

Feb. 2 - 7 10, a very light earthquake (III) was felt at Wytheville, Wythe County, Virginia, with a sound like the rumbling of distant thunder which seemed to come from the northwest. Apparently it was confined to the immediate vicinity of Wytheville, as inquiries by circular to adjoining counties brought replies from Marion, Smyth County, southwest; Rural Retreat, Wythe County, and Independence, Grayson County, south; Hillsville, Carroll County, southeast; Pulaski Station, Pulaski County, northeast; and Bland Court House, Bland County, north at none of which places was it felt.

a. Questionnaire

D. Woollard [410]

VI. Moneymaker [281] 1885 FEB 2 7:10 a.m. Southwestern VA III

A very light earthquake at Wytheville Virginia. A sound like the rumbling of distant thunder seemed to approach from the northwest.

A. Rockwood [330]

VII. Woollard [410] 1885 FEB 2 07:10 Wytheville, VA

A. Rockwood [330]

B. MWR (290)

VIII. MacCarthy [244] 1885 FEB 2 7:10 a.m. Wytheville, VA IV

1885: Feb. 2: 7:10 a.m. Rockwood (1886, p. 9) says: "A very light earthquake . . . was felt. . . , with a sound like the rumbling of distant thunder, which seemed to come from the northwest. Apparently it was confined to the immediate vicinity of Wytheville. . . ." The New York Times (Feb. 3) carries the following item: "The people of Wytheville were suddenly startled at an early hour this morning by a low rumbling noise This was quickly followed by a severe shock. . . . It shook the houses

to their foundations, and caused windows to rattle as though a hailstorm was beating against them. The quavering of the earth could be distinctly felt for some minutes after the sound. . . had died away. . . ." Rockwood gives the intensity as III, but the New York Times items would seem to make it closer to IV.

A. Rockwood [330]

B. New York Times (2/3/85), NY

I. TEIC 1885 AUG 13 13:00 36.1 81.7 Blowing Rock, NC 500 IV

Location: Blowing Rock, NC; intensity

Intensity: Dishes rattled, house rocked near Blowing Rock

Extent: Reported over small area W NC; map; 500 sq km.

Comment: Disagreement over whether this event occurred on Aug. 6 or Aug. 13; MacCarthy [241] believes Aug. 6 is correct.

II. TVA [380] 1885 AUG 13 13:00 36.1 81.7 Blowing Rock, NC IV

A. Moneymaker [283]

1. 1885

"Raleigh, North Carolina - August 20 - There were violent shocks of earthquake last Thursday in the Blue Ridge Mountains of Watauga County. At first there were noises like thunderclaps, while the sky was cloudless, then the earth shook, and terrible noises were heard. These were felt for many miles at the height of 4,100 feet and in [sic] Grandfather Mountain, 6,000 feet. People were frightened so that they fled. The noise and shocks were felt at Boone."

a. MWR [290]

2. 1885 AUG 6 NC

a. Rockwood [330]

b. Heck (1947)

c. MacCarthy [241]

B. MacCarthy [241]

C. Templeton [370]

1. 1885 AUG 6 36.2 81.6 Watauga County, NC IV-V

- a. Bollinger [33]
 - b. McClain [260]
 - c. Moneymaker [281]
 - d. TVA, unpub., (1977)
2. 1885 AUG 13 36.2 81.6 Watauga County, NC IV
- a. McClain [260]

III. USGS [390]

- 224
- A. EQHUS [122] 1885 AUG 13 36.2 81.6 NC Local IV-V (RF)
- Blue Ridge Mts. - Watauga Co., N.C. Noise like thunder at Boone.
- 1. Rockwood [330] 1885 AUG 13 Watauga Co., NC IV
- A light earthquake (IV) occurred in the Blue Ridge Mountains in Watauga [sic] County, in northwest corner of North Carolina. It was accompanied by a noise resembling thunder, and was also felt at Boone, ten miles from the mountains.
- B. EQHUS [121] 1885 AUG 6 08:00 36.2 81.6 NC Local IV-V
- Blue Ridge Mountains, Watauga County, N.C. Noise like thunder at Boone. Near Blowing Rock, N.C., dishes rattled and house rocked violently.

- 1. Rockwood [330]

- 2. McCarthy [241]

- C. EQHUS [120] [Same as B. above]

IV. McClain [260]

- A. 1885 AUG 6 13:00 36.2 81.6 Blue Ridge Mts. - Watauga Co. - west NC IV-V

1. EQHUS [121]

B. 1885 AUG 13 36.2 81.6 Blue Ridge Mts. - Watauga Co. - west NC IV

1. Woollard [410]

V. Bollinger [33] 1885 AUG 6 08:00-09:00 36.2 81.6 Watauga Co., NC IV-V

A. EQHUS [108]

B. MacCarthy [241]

VI. Moneymaker [281] 1885 AUG 6 8:00 or 9:00 a.m. Southern Appalachians IV-V

22
23
24

An earthquake centered somewhere in the Blue Ridge in Watauga County, North Carolina. It was felt at Boone and Blowing Rock, 10 miles to the west, and at Beech, Grandfather, and Sugar mountains. The date is given by Heck and Rockwood as August 13, 1885.

A. EQHUS [122]

B. Rockwood [330]

VII. Woollard [410] 1885 AUG 13 Blue Ridge - Watauga* Co., NC IV (RF)

Felt radius = 10-15 miles.

A. Rockwood [330]

VIII. MacCarthy [241] 1885 AUG 6 08:00 or 09:00 36.2 81.6 Watauga Co. IV-V (RF)

Felt at Boone, Banner Elk, Blowing Rock, on Grandfather Mountain, etc. The exact date of this quake is questionable. Although E. Hist. and most other references give it as August 13, a study of the contemporary newspaper accounts indicates that it was most probably on the 6th, the difficulty arising from the fact that most of the papers in which it was mentioned were weeklys so that one week's error in dates is easily produced by careless editing. "Epicerter near 36.2° N., 81.6° W. Blue Ridge Mountains, Watauga [sic] County, N.C. Noise like thunder at Boone. Intensity 4-5. (E. Hist.) "There were violent shocks of earthquake last Thursday in the Blue Ridge Mountains in Watauga County. At first there were noises like thunderclaps, . . . then the earth shook, and terrible noises were heard. . . . The noises and shocks were felt at Boone." (M.W.R.) The Lenoir Topic for Aug. 19 and Aug. 26, 1885, says in part: ".....Mrs. Ried, who lives....about 2-1/2 miles from Blowing Rock, was sitting in the house and was surprised to hear a very loud clap of thunder, although the sky was perfectly clear, and immediately the house began to shake, dishes to rattle, and a noise was heard as though 'a six-horse team was being driven rapidly through the house.' It lasted but a few moments, but during the time of it there was a perceptible and violent rocking. Mrs. Ried says she....could hardly stand. . . . It made its debut about 8 or 9 o'clock in the morning. We are informed that it was felt all over Watauga County, especially at high points. It seems, however, to have been more severe along the backbone of the Blue Ridge."

A. EOHUS [121] 1885 AUG 13 36.2 81.6 NC Local IV-V

B. MWR [290]

C. Lenoir Topic (8/19, 8/26/85), Lenoir, NC

IX. Varma [400]

1885 AUG 6 36.2 81.6 Watauga Co., NC IV+

mag = 4.0

A. MacCarthy [241]

B. Rockwood [330]

I. TEIC 1886 SEP 25 02:56 37.0 81.1 Wytheville, VA III

Location: Wytheville, VA

Intensity: Felt

Comment: At least one A/S

II. TVA 1886 SEP 25 02:56 37.0 81.1 Wytheville, VA

A. McCarthy [244]

B. Templeton [370] 1886 SEP 25 36.9 81.1 Wytheville, VA IV

At least one aftershock occurred.

1. Bollinger [33]

2. McClain, unpub., (1978)

3. McClain [260]

4. TVA, unpub., (1977)

IV. McClain [260] 1886 SEP 25 02:56 & 36.9 81.1 Wytheville, VA
03:10

Aftershock

A. Bollinger [31] 1886 SEP 24 21:56 & 36.9 81.1 Wytheville, VA
22:10

1. Woollard [410]

V. Bollinger [33] 1886 SEP 24 21:56 36.9 81.1 Wytheville, VA

Aftershocks

A. Bollinger [31]

B. Woollard [410]

VII. Woollard [410] 1886 SEP 24 17:56 & 22:10 Wytheville, VA

Duration 25 and 19 seconds respectively

A. MWR [290]

VIII. MacCarthy [244] 1886 SEP

During this month very many aftershocks were felt in the epicentral area at Charleston, S.C. Most of them were relatively slight, but at least one of them appears to have been felt in Virginia. M.W.R. lists the following shocks as having been felt in Virginia during this month:

Sept 1 10 p.m., University of Virginia
3 11:10 p.m., Lynchburg: 4 seconds
3 11:02 p.m., Norfolk: 7 seconds
3 11:00 p.m., Wytheville: 5 seconds
3 Midnight, Wytheville
24 9:56 p.m., Wytheville: 25 seconds
24 10:10 p.m., Wytheville: 19 seconds

Other contemporary reports refer to a slight shock in Chesterfield County on Sept. 3, time not stated, and to one "on the night of Sept. 3" which caused a "considerable jar" and awakened many people at Dale Enterprise. When the above occurrences are checked against a list of Charleston aftershocks (Taber, 1914), it becomes apparent that those of Sept. 1 and midnight of Sept 3 and both shocks of Sept. 24 do not agree with any even moderately severe aftershocks at Charleston. Hence they must have originated elsewhere, probably not too far from Wytheville. The Sept. 3 shock reported from various localities in Virginia at about 11 p.m. is, on the contrary, the 11:01 shock, reported as intensity VI, at Charleston. If there is an error of two hours in the time given, the Sept. 1 tremor reported as occurring at 10 p.m. at the University of Virginia may possibly refer to an 11:55 p.m. shock (intensity V?) reported from Charleston, although such an error in timing does not seem probable. Since almost everyone's attention was centered on the Charleston area at this time, almost no information is available regarding the three or four shocks apparently originating in Virginia, and nothing more can be said regarding them.

A. MWR [290]

I. TEIC 1888 MAR 17 36.3 82.5 Jonesboro, TN III

Location: Jonesboro, TN

Intensity: Slight

II. TVA [380] 1888 MAR 17 36.3 82.5 Jonesboro, TN IV

A. Moneymaker [283] 1888 MAR 17 Eastern TN

"A slight shock of an earthquake was felt at Jonesboro on the 17th (of March)."

B. Templeton [370]

1. Plunket, J.D. and Bates, H.C. (?)

2. Tennessee State Board of Health Bulletin 3, No. 9, April 15, 1888, pg. 110

IV. McClain [260] 1888 MAR 17 36.4 82.5 Jonesboro, TN

A. Moneymaker [281]

V. Bollinger [33] 1888 MAR 17 36.4 82.5 Jonesboro, TN

A. McClain [260]

B. Moneymaker [281]

VI. Moneymaker [281] 1886 MAR 17 Eastern TN

A slight shock at Jonesboro reported by the Tennessee Board of Health.

A. Tennessee State Board of Health Bulletin 3, No. 9, April 1888, pg. 110

I. TEIC	1889	SEP 28	p.m.	35.1	84.6	Parksville, TN	III
Location: Parksville, TN							
Intensity: Slight							
II. TVA [380]	1889	SEP 28		35.1	84.6	Parksville, TN	IV
A. Moneymaker [283]	1889	SEP 28	p.m.			Parksville, Polk Co., TN	
"The observer at Parksville reports a slight shock of an earthquake on the night of the 28th."							
1. Plunket, J.D and Bate, H.C. (?)							
2. MWR [290]							
3. Tennessee Board of Health Bulletin, Vol 4, No. 3, October 20, 1889, pg. 46.							
B. Templeton [370]	1889	SEP 28		35.2	84.5	Parksville, Polk Co., TN	III-IV
1. Bollinger [33]							
2. McClain, unpub., (1978)							
3. McClain [260]							
4. Moneymaker [281]							
5. TVA, unpub., (1977)							
IV. McClain [260]	1889	SEP 28	p.m.	35.2	84.5	Parksville, Polk Co., TN	III-IV
Night, shock							
A. Moneymaker [281]							
V. Bollinger [33]	1889	SEP 28		35.2	84.5	Parksville, TN	III-IV
A. McClain [260]							

B. Moneymaker [281]

VI. Moneymaker [281] 1889 SEP 28 p.m. Southern Appalachians III-IV

A light shock at Parksville (Polk Co.) reported by a weather observer.

A. Tennessee State Board of Health Bulletin 4, No. 3, October 20, 1889, pg. 46

I. TEIC 1892 DEC 2 08:00 35.0 85.3 Chattanooga, TN 1900 V

Location: Chattanooga, TN; intensity

Intensity: "Decided shock", doors in houses flew open, piles of lumber upset, coal at the chutes rolled down and water vibrated

Extent: SE TN - NW GA; map; 1900 sq. km.

Comment: Effects don't seem to be commensurate with relatively small felt area

II. TVA [380] 1892 DEC 2 a.m. 35.0 85.3 Chattanooga, TN V

A. Moneymaker [283] 1892 DEC 2 Chattanooga, TN

No damage done. Chattanooga gives a shock early this morning.

Chattanooga, Dec. 2. About three o'clock this morning a decided shock was felt in this section, extending from Hill City, a suburb north of town to the summit of Missionary Ridge an area of about two and a half miles square. The shock was apparently from north to south. Doors in houses flew open; piles of lumber upset, coal at the chutes rolled down, and water vibrated. Old residents claimed that the shock was caused by the breaking down of some of the enormous in honey comb zoological (sic) formations here. No casualties.

1. Knoxville Journal (12/3/92), Knoxville, TN

I. TEIC 1897 MAY 3 17:18 37.1 80.6 Radford, VA 47,000 VI

Location: Radford, VA; A/S; intensity

Intensity: Loosened bricks--old chimneys in Giles Co.; chimney "injured" @ Pulaski; @ Radford, bricks thrown from chimneys, plaster fell, stoves shaken; opened and shut doors, moved light furniture @ Roanoke

Extent: SW VA - NW NC; map; 47,000 sq. km

Comment: A/S - Blacksburg, Pulaski, Radford, Wytheville, Roanoke; F/S to May 31 Giles Co., VA earthquake

II. TVA [380] 1897 MAY 3 17:18 37.3 80.7 Giles County, VA VI

A. Hopper [210] 1897 MAY 3 12:18 Pulaski, VA 75,000

Bedford City, VA--(IV?)--"A distinct shock of an earthquake, preceded by a roaring similar to that caused by an approaching railroad train, and the houses shook in the most unmistakable manner." (RD 5/4/97) Time - 12:25, roaring noise (MWR);

Blacksburg, VA--(IV-V)--"A distinct earthquake shock. Doors and windows rattled, chimneys and walls were shaken, and many people were much alarmed." Another much lighter shock about 4 o'clock. (RD 5/4/97) Time - 12:14, duration - 4 or 5 seconds (MWR);

Christiansburg, VA - "A very distinct earthquake shock" - Wave seemed to travel westward, (RD 5/4/97);

Farmville, VA--(II-III)--Several persons felt perceptibly. "Lasted but a few seconds, and was not generally noticeable." (RD 5/4/97) Feeble shock (MWR);

Fincastle, VA--(V)--"Supposed to be earthquake shocks, sensibly felt here. Sufficient to attract the attention of some of our citizens and cause them to leave their houses. Two distinct shocks." (RD 5/4/97);

Giles County, VA--(VI)--Loosened some bricks from old chimneys. Accompanied by considerable noise, like low, rumbling thunder. (Campbell, 1898);

Harrisonburg, VA - Not felt here or in this vicinity. (RD 5/4/97);

Lynchburg, VA - Felt. (Eppley, 1965) Time - 12:15, perceptible (MWR) Only the initial shock felt. (MacCarthy, 1964);

Lexington, VA - Not felt. (RD 5/4/97);

Pearisburg, VA - Felt. (MacCarthy, 1964);

Pulaski, VA - "Two distinct, but not severe, earthquake shocks...one at 12:20 the other at about 4. No damage." (RD 5/4/97); Most strongly felt at Pulaski (Eppley, 1965); Time - 12:20, destructive, chimney injured. (MWR);

Radford, VA--(VI)--"Even more severe than in Roanoke...every building in town seemed to feel the shocks, but no damage was done outside of wrecking a few chimneys. No one was injured." (RT 5/4/97);

"Houses were rocked and shaken, bricks thrown from chimneys, plastering fell off, stoves were shaken, and merchants ran out of their houses of business, fearing they would fall. It seemed as if the whole earth was lifted up, rocked, and then settled back. There was no warning. Many did not realize what it was until it had passed, and no little excitement prevailed." Another shake at 4:30 this afternoon. (RD 5/4/97);

Bricks fell from chimneys and plaster fell. (Eppley, 1965);

A strong shock at 12:16, duration - 8 seconds, very severe;

Roanoke, Va.--(V)--A rumbling sound coming from the west toward the east. With the sound there was a jarring sensation somewhat similar to engines working, only it was more pronounced and far more uncomfortable. Buildings rocked slightly, windows shook, doors were opened and shut, and in some places where was a rattling of crockery." Immediately recognized as an earthquake "by all whose attention was not otherwise too deeply absorbed to notice it." One family getting ready to hurry outside, but stopped when the jarring ceased. Some felt a slighter, shorter second shock about an hour later. (RD 5/4/97);

"Plainly perceptible in all parts of the city. . .A jarring sensation and a rumbling sound followed immediately by the rattling of windows." (RD 5/4/97).

"Shaking of crockery, and in some places by a slight movement of furniture." Not as severe as the earthquake of 1886 (the Charleston earthquake.);

Chimneys damaged. (Eppley, 1965);

Time--12:20, duration--30 seconds. (MWR)

Rocky Mount, VA - Not felt. (RD 5/4/97);

Salem, VA--(IV-V)--"Plainly perceptible.... Made many houses rock, frightening the timid and causing many others wonder and astonishment." Only shock felt here since the Charleston earthquake of 1886. (RT 5/4/97) (IV-V);

"Rattling the glassware on the cupboards." (RD 5/4/97); Only the initial shock noticed. (MacCarthy, 1964); Time - 12:30, duration - 8 seconds. (MWR);

Woodstock, VA - Not Felt. (RD 5/4/97);

Wytheville, VA--(V)--"People ran out of their houses, fearing that these would be thrown down. Some of the largest brick houses in the place were shaken from their very foundations to the roofs. The window-glass and furniture in the houses shook, rocked, and rattled as though a fearful windstorm was prevailing.... Second shock at 4:17, noting as severe here since the great shock of July, 1853, during which persons were thrown to the ground in Wytheville." (RD 5/4/97);

"Three more earthquake shocks here late last night and this morning of about the same duration and force as those of yesterday afternoon. The last was felt about 5 o'clock this morning." (RD 5/5/97);

Three distinct shocks, at 12:15, 4:10 and about 6 p.m. (MacCarthy, 1964);

Duration - 30 seconds. (MWR);

Lenoir, NC - Two shocks felt. (Eppley, 1965);

Winston, NC - "A distinct earthquake shock was felt here at 2:17 o'clock." No damage. (RD 5/4/97); Duration - 3 or 4 seconds (MWR);

Washington, DC - Not felt, but registered by Weather Bureau Seismograph at 12:18:45. (MWR).

Extent:

Most strongly felt at Pulaski, Va. (Eppley, 1965); Intensity about VII. Felt in most of southwest Virginia and adjacent areas. (MacCarthy, 1964); Not felt at Harrisonburg, Rocky Mount, Lexington and Woodstock, Va. (MWR).

1. Richmond Dispatch (5/4/97), Richmond, VA

2. Roanoke Times (5/4/97), Roanoke, VA

3. MWR [290]

4. Science (1898)

5. EQHUS [121]

6. MacCarthy [244]

B. MacCarthy [244]

C. MacCarthy [241]

D. Templeton [370] 1897 MAY 3 37.1 80.7 Giles Co., VA VII

Location listed by McClain (1978) as Roanoke, VA

1. Bollinger [33]

2. McClain, unpub., (1978)

3. McClain [260]

4. Moneymaker [281]

5. EQHUS (1956)

6. EQHUS [121]

III. USGS [390]

A. EQHUS [123] 1897 MAY 3 12:18 37.1 80.7 VA 389,000 VII (RF)

This shock was felt most strongly at Pulaski City, Va. Chimneys were damaged at Roanoke. The shock was felt at Lynchburg and also at Winston-Salem, N.C. There was a rumbling like thunder in the central region.

1. MWR [290]

2. Science (1898)

B. EQHUS [121] 1897 MAY 3 12:18 37.1 80.7 VA 389,000 VI

This shock was felt most strongly at Pulaski City, Va. Chimneys were damaged at Roanoke. Bricks fell from chimneys and plaster fell at Radford, Va. The shock was felt at Lynchburg and also at Winston-Salem, N.C. There was a rumbling like thunder in the central region. Two shocks felt at Lenoir, N.C.

1. MWR [290]
2. Science (1898)
3. MacCarthy [241]
4. MacCarthy [244]

C. EOHUS [120] 1897 MAY 3 12:18 37.1 80.7 Pulaski, VA 75,000 VI

Strongest at Pulaski. Chimneys were damaged at Roanoke. Bricks fell from chimneys and plaster fell from walls at Radford, Va. The shock was felt at several Virginia towns and at Winston-Salem, N.C. There was a rumbling like thunder in the central region. Two shocks were felt at Lenoir, N.C.

1. MWR [290]
2. Science (1898)
3. MacCarthy [241]
4. MacCarthy [244]
5. Hopper [210]

IV. McClain [260] 1897 MAY 3 17:18 37.1 80.7 Near Roanoke, VA 389,000 VI-VII

A. EOHUS [121]

B. Moneymaker [281]

C. Bollinger [31] 1897 MAY 3 12:18, 16:10 & 18:00 37.1 80.7 Pulaski, VA 389,000 VI

1. MacCarthy [244]

V. Bollinger [33] 1897 MAY 3 12:18 37.1 80.7 Pulaski, VA 75,000 VI

Aftershocks

A. Bollinger [31]

B. EOHUS [120]

C. MacCarthy [244]

D. Hopper [210]

E. Woollard [410]

VI. Moneymaker [281] 1897 MAY 3 12:18 p.m. Southwestern VA VII

A strong earthquake centered in Giles County, Virginia, and felt over nearly all of Virginia and parts of West Virginia and North Carolina. It attained destructive intensities in Giles County and in Pulaski County, where bricks were loosened from chimneys. The shock was accompanied by a thunderous rumbling noise. From May 3 to May 31, no shocks were felt but a rumbling noise similar to that which accompanied the initial shock continued. On May 31, a very strong shock occurred.

A. Science (1898)

B. EOHUS [123]

C. MWR [290]

VII. Woollard [410] 1897 MAY 3 12:18 37.1 80.8 Pulaski City, VA 39,000 VII (RF)

Duration 20-25 seconds.

A. MWR [290]

VIII.(a) MacCarthy [241] 1897 MAY 3 12:18 37.1 80.7 Pulaski City, VA 389,000 VII (RF)

Reported as felt in Lenoir, Winston-Salem, Graham, Elkin, and other North Carolina localities. "Epicenter at 37.1° N., 80.7° W., intensity 7, felt over 150,000 square miles." (E. Hist.) "A very perceptible earthquake was felt here and in the county on Monday [May 3]. Two shocks were noticed - one at 12:16 (sic) and another two or three hours later in the day. Today's papers speak of its being felt very generally over the state." (Lenoir Topic, May 4, 1897.)

A. EQHUS [123]

B. Lenoir Topic (5/4/97), Lenoir, NC

VIII.(b) McCarthy [244]

1897

MAY 3

12:18
p.m.

37.1

80.7

389,000

VII

This was a fairly strong shock, of intensity about VII, which shook up most of southwestern Virginia and adjacent areas. According to E. Hist the epicenter was near 37.1° N, 80.7° W, not far from Pulaski, and the quake was felt over about 150,000 square miles. Chimneys were damaged at Roanoke and other places. According to accounts in the Washington Post (May 4), the shock opened and shut doors at Roanoke, was accompanied by a rumbling sound, rattled windows and crockery, and even, in a few instances, moved light furniture. A few people in this city reported a second much lighter tremor about an hour later. At Radford there was a strong shock at 12:16 p.m., and a much slighter one at 4:10 p.m. During the first one, bricks were thrown from chimneys, plaster fell, and people were generally much alarmed. At Wytheville three distinct shocks were reported, at 12:15, 4:10, and about 6 p.m. At Salem and Lynchburg only the initial shock was noticed. One or more of these tremors were also reported from Blacksburg, Christiansburg, Pearisburg, and Fincastle. The shock was felt as far south as Winston-Salem, in North Carolina.

A. EQHUS (1956)

B. Washington Post (5/4/97), Washington, DC

X. Varma [400]

1897

MAY 3

37.1

80.7

Pulaski Co., VA

VI

A. McCarthy [241]

B. McCarthy [244]

I. TEIC 1897 MAY 31 19:00 37.3 80.7 Pearisburg, VA 725,000 VIII

Location: Pearisburg, Giles Co., VA

Intensity: VIII

Extent: Felt area from Hopper [210]

Comment: This is the largest earthquake to have originated in the southern Appalachians in historical times. As such, it has been the object of intense investigation; substantial documentation is available and will not be duplicated in this study. The user is referred to the following references which provide the substance for the data presented above: Bollinger [34]; Hopper [210]; Campbell [70]; Law [225]; USGS [391]

I. TEIC 1897 JUN 29 04:00 37.3 80.7 Pearisburg, VA 12,000 V

Location: Pearisburg, VA; F/S

Intensity: People awakened in Pulaski; windows shaken @ Roanoke and rattled @ Fincastle where some were awakened

Extent: SW VA - probably S W; map; 12,000 sq. km.

Comment: F/S's @ Pearisburg and Eggleston

II. TVA [380] 1897 JUN 29 04:00 37.3 80.7 Giles Co., VA IV

A. Hopper [210] 1897 JUN 28 23:30 Roanoke, VA 25,000

Bedford City, VA--(III?)—"A very decided, though not violent, shock of an earthquake" last night at 11:25. Much shorter duration than the previous ones. No roaring sound. Sensation "very similar to that one experiences in the berth of a steamship at sea, and was more of a steady rocking than the shaking oscillation that characterized the shocks of the past month--May 2nd and 31st. These seismic disturbances have become so frequent as to make many persons quite nervous." (RD 6/30/1897);

Fincastle, VA--(IV)--Another earthquake shock here last night which alarmed, besides shaking up, some of our citizens." Accompanied by a roaring noise. Rattling of windows and tableware. Awoke some. Lasted only a few seconds. "Fully as severe as the one which preceded it a short time ago." [May 31, 1897, Giles County, Va., or one of its aftershocks.] (RD 6/30/97);

Lexington, VA--(III)--"A slight earthquake shock" felt at 11:15 last night. "Other localities in the county report it of much longer duration than felt here." (RD 6/30/97);

Lynchburg, VA - "A slight earthquake shock" between 11 and 12 p.m. (RD 6/30/97);

Pearisburg and Eggleston, VA - Other shocks, earlier in the afternoon, noticed there. (MacCarthy, 1964);

Pulaski, VA--(V)--An earthquake shock "distinctly felt." Many people were awakened and frightened. No damage. (RD 6/30/97);

Radford, VA--(III)--"Two separate and distinct earthquake shocks" at 11:25 p.m. The disturbances were short and sharp, not lasting over two or three seconds. No damage. (RD 6/30/97);

Roanoke, VA--(III-IV)--Another earthquake shock last night about 12 o'clock. Windows shaken and crockery rattled for a minute or more, but no serious damage. (RD 6/30/97);

Salem, VA--(III)--"Nearly everyone who had not retired felt the earth vibrate, the vibration being accompanied by an ominous roaring." Third shock here in the last sixty days. [May 3, 1897, Pulaski and May 31, 1897, Giles County.] (RD 6/30/97);

Wytheville, VA--(III)--"Another distinct earthquake shock" at 11:30 p.m. Lasted fully half a minute. No damage. (RD 6/30/97);

1. Richmond Dispatch (6/30/97), Richmond, VA

2. MacCarthy [244]

B. MacCarthy [244]

IV. McClain [260]	1897	JUN 28	37.3	79.9	Roanoke, VA
A. Bollinger [31]	1897	JUN 28	37.3	79.9	Roanoke, VA

Aftershocks?

1. MacCarthy [244]

V. Bollinger [33]	1897	JUN 28	23:00- 24:00	37.3	79.9	Roanoke, VA	25,000	V
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A. Bollinger [31]

B. Hopper [210]

C. MacCarthy [244]

VIII. MacCarthy [244] 1897 JUN 28 11-12 p.m.

Times vary somewhat in different accounts. Two slight but sharp shocks, strong enough in some instances to rattle windows and dishes, were reported from Radford, Lexington, Salem, and Roanoke, according to the Washington Post (June 30). Other shocks, earlier in the afternoon, are said to have been noticed at Pearisburg and Egglestons. At Salem rumbling sounds accompanied the shocks.

A. Washington Post (6/30/97), Washington, DC

I. TEIC 1897 SEP 3 11:00 37.3 80.7 Pearisburg, VA 2000 IV

Location: Pearisburg, VA; F/S; A/S

Intensity: "Decided uncomfortable proportions"

Extent: Felt throughout the county and adjoining territory; SW VA - S WV; map; 2000 sq km.

Comment: F/S & A/S @ Pearisburg

II. TVA [380] 1897 SEP 3 12:00 37.3 80.7 Giles Co., VA IV

A. Hopper [210] 1897 SEP 3 Pearisburg, VA IV
1897 SEP 4 06:00 Wytheville, VA

Pearisburg, VA--(IV)--"An earthquake shock of decided uncomfortable proportions was experienced here last Friday morning, since which time several slighter shocks have been felt. Reports indicate that the disturbance was more severe in this immediate vicinity than elsewhere, although extending all over the county, and even throughout the adjoining territory. A slight shock was quite generally noticed between seven and eight on Wednesday, Sept. 1, morning." (RT 9/5/97);

Wytheville, VA--(Felt)--A distinct earthquake shock was felt here this morning at 6 o'clock." (RD 9/5/97)

1. Richmond Times (9/5/97), Richmond, VA
2. Richmond Dispatch (9/5/97), Richmond, VA

B. McCarthy [244]

C. Templeton [370]

1. 1897 SEP 3 37.3 80.7 Pearisburg, VA IV

a. Bollinger [33]

2. 1897 SEP 4 36.9 81.1 Wytheville, VA III

a. Bollinger [33]

b. McClain [260]

c. TVA, unpub., (1977)

IV. McClain [260] 1897 SEP 4 36.9 81.1 Wytheville, VA

A. Bollinger [31] 1897 SEP 4 36.9 81.1 Wytheville, VA

1. McCarthy [244]

V. Bollinger [33] 1897 SEP 3 37.3 80.7 Pearisburg, VA
 1897 SEP 4 36.9 81.1 Wytheville, VA IV?

A. Hopper [210]

B. Bollinger [31]

C. McCarthy [244]

VIII. McCarthy [244] 1897 SEP 4 a.m. Wytheville, VA

"Forenoon." The Columbia (S.C.) State (Sept. 5) reports that a distinct shock was felt at Wytheville, but gives no details.

A. Columbia State (9/5/97), Columbia, SC

I. TEIC 1897 OCT 22 03:25 37.3 80.0 Salem, VA 36,000 V

Location: Salem, VA; greatest effects in northern part of felt area @ Salem and Bedford City

Intensity: Shook open doors @ Bedford City; @ Salem, house rocked, windows rattled; some alarmed @ Lynchburg

Extent: SW VA - NW NC; map; 36,000 sq. km.

II. TVA [380] 1897 OCT 22 03:25 37.3 80.7 Giles Co., VA V

A. MacCarthy [241]

B. MacCarthy [244]

C. Hopper [210] 1897 OCT 20 22:30 Wytheville, VA
1897 OCT 21 22:20 Wytheville, VA 60,000

Lexington, VA--(II-III)--Earthquake in southwest Virginia Wednesday night "just perceptible" in Lexington. (RD 10/24/97);

Wytheville, VA--(III)?--"A very distinct earthquake shock" Wednesday night about 10:30. Lasted for a number of seconds. No damage. (RD 10/24/97);

Note: Probably refers to October 21st shock.

Bedford City, VA--(IV+)--"A very decided shock of an earthquake" about 10:30 Thursday night. "Most uncomfortably and distinctly felt by many. It came as many of the recent shocks have done, without any roaring noise, and was manifested by the unmistakable rocking sensation, and in some instances shook open doors that had been firmly bolted." (RD 10/17/97);

Floyd, VA--(III)?--An earthquake shock at 10:30 p.m. accompanied by a heavy rumbling noise. (RD 12/23/97);

Lynchburg, VA--(V)--Many were alarmed. (Eppley, 1965);

"One or more distinct shocks," lasting about fifteen seconds and alarming a number of people, were felt. (MacCarthy, 1964);

Salem, VA--(IV-V)--An earthquake shock at 10:20 p.m. "Houses rocked windows rattled, and the earth reeled to and fro." (RD 10/23/97);

Wytheville, VA--(III)--A slight earthquake, lasting about a minute, was felt. (MacCarthy, 1963)* (III);

Time - 22:30; preceded by rumble. (MWR);

Winston, NC--(Felt)--Time - 22:30. Two waves in close succession. (MWR);

Washington, DC - Seismograph recorded earthquake shocks at 22:25 and frequently between 22:25:40 and 22:26:40.

Extent:

Felt in central and western North Carolina. (Eppley, 1965);

Newspaper accounts "would seem to place the epicenter nearer to Salem than to Wytheville." (MacCarthy, 1964)

1. Richmond Dispatch (10/23, 10/24/97), Richmond, VA

2. EQUUS [121]

3. MacCarthy [244]

4. MWR [290]

D. MWR [290]

E. Templeton [370] 1897 OCT 22 36.9 81.1 Salem and Wytheville, VA V

1. Bollinger [33]

2. McClain, unpub., (1978)

3. McClain [260]

4. Moneymaker [281]

5. EQUUS (1956)

6. EQUUS [121]

III. USGS [390]

A. EQHUS [123] 1897 OCT 21 22:20 36.9 81.1 Wytheville, VA 52,000 V-VI (RF)

Felt at Winston-Salem, N.C.

1. MWR [290]

B. EQHUS [121] 1897 OCT 21 22:20 36.9 81.1 Wytheville, VA 52,000 V

Felt in central and western North Carolina. Many were alarmed at Lynchburg, Va.

1. MWR [290]

2. MacCarthy [244]

3. MacCarthy [241]

C. EQHUS [120] 1897 OCT 21 22:20 37 81 Southwestern VA 52,000 V

Southwestern Virginia. Felt also in central and western North Carolina. Many were alarmed at Lynchburg, Va. Strong at Salem.

1. MWR [290]

2. MacCarthy [244]

3. MacCarthy [241]

4. Hopper [210]

IV. McClain [260] 1897 OCT 22 03:20 36.9 81.1 Wytheville, VA 52,000 V

A. EQHUS [121]

B. Bollinger [31] 1897 OCT 21 22:20 36.9 81.1 Wytheville, VA 52,000 V

1. EQHUS [121]

2. MacCarthy [244]

C. Moneymaker [281]

V. Bollinger [33] 1897 OCT 21 22:20 36.9 81.1 Wytheville, VA 60,000 V

A. Bollinger [31]

B. EQHUS [120]

C. MacCarthy [244]

VI. Moneymaker [281] 1897 OCT 21 10:20 p.m. Southwest VA V

A strong shock was felt at Salem and Wytheville, Virginia, and at Winston-Salem, North Carolina.

A. EQHUS [123]

B. MWR [290]

VII. Woollard [410] 1897 OCT 21 22:20 Salem, VA

Felt up to Washington, D.C.

A. MWR [290]

VIII.(a) MacCarthy [241] 1897 OCT 21 22:20 Wytheville, VA V-VI (RF)

Wytheville, Va., generally felt in central and western North Carolina, including Burlington, Winston-Salem, Lenoir, etc. "Epicenter near 36.9° N., 81.1° W., intensity 5-6, felt over 20,000 square miles." (E. Hist.) "Winston, N.C., Oct. 22:--There was a distinctive earthquake shock here about half past ten o'clock last night. It made windows rattle for a few seconds. The wave appeared to pass from west to east and seemed to be two waves in very close succession." (Raleigh News and Observer, Oct. 23, 1897.) See also M.W.R. for the month.

A. EQHUS [122]

B. Raleigh News and Observer (10/23/97), Raleigh, NC

C. MWR [290]

VIII.(b) MacCarthy [244] 1897 OCT 21 10:20 36.9 81.1 Central & western NC 52,000 V
p.m.

The epicenter was, according to E. Hist., near 36.9 N, 81.1 W, not far from Wytheville. It had an intensity of about V and was felt over some 20,000 square miles, being noticed southward into central and western North Carolina. The Washington Post (Oct. 23) says that at Salem, Va., "Houses rocked, windows rattled, and the earth reeled to and fro. A slight earthquake was felt...at Wytheville...which lasted about a minute." This account would seem to place the epicenter nearer to Salem than to Wytheville. The Lynchburg Daily Advance (Oct. 22) reported that "one or more distinct shocks," lasting about fifteen seconds and alarming a number of people, were felt in that city.

A. EQHUS (1956)

B. Washington Post (10/23/97), Washington, DC

C. Daily Advance 10/22/97), Lynchburg, VA

X. Varma [400] 1897 OCT 21 36.9 81.1 Near Wytheville, VA V

A. MacCarthy [241]

B. MacCarthy [244]

I. TEIC 1898 FEB 5 20:02 37.1 80.7 Dublin, VA 50,000 VI

Location: Dublin, VA; A/S; very near to Pulaski, apparently location of greatest intensity

Intensity: @ Pulaski, bricks thrown off some chimneys, people rushed into streets, furniture rocked slightly

Extent: SW VA - NW NC; map; 50,000 sq. km.

Comment: A/S @ Dublin

II. TVA [380] 1898 FEB 5 20:00 37.2 80.6 Southwestern VA IV
FEB 6 02:00

A. MacCarthy [244]

B. MacCarthy [241]

C. Hopper [210] 1898 FEB 5 15:00 Pulaski-Wytheville, VA 88,000
1898 FEB 5 21:00 Dublin, VA

Bedford City, VA--(III)--"A very distinct shock of earthquake" at 3:02 this afternoon, lasting several seconds. Preceded by "a loud explosive sound, differing entirely from the roaring noise that usually accompanies a seismic disturbance." (RD 2/6/98);

Lexington, VA - Felt at 3:38 p.m. (MacCarthy, 1964);

Lynchburg, VA - Very slight. (MacCarthy, 1964);

Pulaski, VA--(VI)--At 2:58 this afternoon there was an earthquake lasting about half a minute. A rumbling noise with slight tremor of the earth. In some houses furniture was slightly rocked. Bricks thrown off some chimneys. People rushed into the streets. (RD 2/6/98) (VI);

East Radford, VA--(V)--"A short and sharp earthquake shock" felt at 3:05 this afternoon. Lasted two or three seconds. Severe enough to shake houses so that the occupants ran out. "This is the first shock felt here since last summer, then they were quite frequent." (RD/2/6/98);

Salem, VA - Felt tremors. (MacCarthy, 1964);

Wytheville, VA--(IV)--"A severe earthquake shock." This afternoon about 3 o'clock. Shook some of the largest brick buildings. No damage. Lasted half a minute (RD 2/6/98);

A series of irregular tremors which shook buildings and lasted about half a minute. (MacCarthy, 1964);

Extent:

Felt throughout southwest Virginia and as far southeast as Raleigh, N.C.;

Dublin, VA--(felt)--A shock similar to the 3 p.m. one in Pulaski. (RD 2/6/98)

1. Richmond Dispatch (2/6/98), Richmond, VA

2. MacCarthy [244]

D. Templeton [370]

1.	1898	FEB 5	37.0	81.0	Pulaski and Wytheville, VA	IV
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There were possible aftershocks.

a. Bollinger [33]

b. McClain, unpub., (1978)

c. McClain, [260]

2.	1898	FEB 5	37.2	80.6	Dublin, VA	Unknown
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This is possibly an aftershock of the preceding earthquake.

IV. McClain [260]	1898	FEB 5	20:00	37.0	81.0	Pulaski - Wytheville, VA	IV
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A. Bollinger [31]	1898	FEB 5	15:00	37.0	81.0	Pulaski - Wytheville, VA	IV
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Aftershocks (?)

1. MacCarthy [244]

V. Bollinger [33]	1898	FEB 5	15:00	37.0	81.0	Pulaski-Wytheville, VA	88,000	VI
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Aftershocks (?)

1898 FEB 5 21:00 37.2 80.6 Dublin, VA

A. Bollinger [31]

B. Hopper [210]

C. MacCarthy [244]

VIII.(a) MacCarthy [241] 1898 FEB 5 15:00 Probably in Virginia

Epicenter probably in Virginia. Felt in North Carolina, according to contemporary newspapers, at: Roxboro, Raleigh, Lenoir and "other parts of Caldwell", Statesville, and Marion. Not mentioned in E. Hist. "The earthquake which shook many of the eastern states last Saturday, and was felt in the western part of this State, was also felt here.... The vibrations were distinct, lasting about three seconds and shaking windows in houses." (Raleigh News and Observer, Feb. 10, 1898.)

A. EOHUS (1947)

B. Raleigh news and Observer (2/10/98), Raleigh, NC

VIII.(b) MacCarthy [244] 1898 FEB 5 3 p.m. Southwestern VA

Epicenter in southwestern Virginia, somewhere in the Pulaski-Wytheville area, intensity IV or a little more. It was felt throughout the southwestern portion of the state and as far toward the southeast as Raleigh, N.C., where it lasted three seconds and rattled windows. According to accounts in the Washington Post and the Richmond Daily Dispatch (Feb. 6), it was very slight in Lynchburg; at Wytheville it consisted of a series of irregular tremors, shook buildings, and lasted about half a minute; at Lexington the time was given as 3:38 p.m.; at Pulaski it threw a few bricks from chimneys, shifted furniture in a few houses, was accompanied by a rumbling noise, and somewhat alarmed the populace; at Bedford City the accompanying noise was described as "explosive." An East Radford item reads: "A short and sharp earthquake shock was felt here. . .it did not last over two or three seconds. It was severe enough to shake houses so that the occupants ran out. This is the first shock felt here since last summer; then they were quite frequent." Salem also reported tremors from this earthquake.

1898 FEB 9 p.m.

The Richmond Dispatch (Feb. 6), in an account of the shock at about 3 p.m. on this date, mentions that "A similar shock was felt at Dublin, at 9 o'clock." Unless this is an error in timing, this second shock was, perhaps, an aftershock of the main earthquake. Dublin is a village 7 or 8 miles northwest of Pulaski.

- A. Washington Post (2/6/98), Washington, DC
- B. Daily Dispatch (2/6/98), Richmond, VA

I. TEIC 1898 NOV 25 20:10 37.1 80.6 East Radford, VA 92,000 V

Location: East Radford, VA; intensity

Intensity: @ Fincastle, pictures were knocked from pianos and mantle pieces, some ran out; shook buildings and frightened some @ Danville; windows rattled, buildings rocked @ East Radford; many awakened @ Roanoke

Extent: S WV; SW VA; NW NC and extreme NE TN; map; 92,000 sq. km.

II. TVA [380] 1898 NOV 25 20:00 37.2 80.6 Southwestern VA V

A. MacCarthy [244]

B. Hopper [210] 1898 NOV 25 15:00 Pulaski-Wytheville, VA 168,000

Bedford City, VA--(IV-V)--"A distinct shock of earthquake." A "jarring oscillating vibration continuing some seconds." Those outside heard distinctly the roaring noise and felt the waves of motion. Trees visibly shaken, doors and windows rattled. (RD 12/26/98);

Danville, VA--(V)--"A very distinct earthquake shock." Longest tremor lasted about fifteen seconds. Before it, came two faint movements of the earth and a scarcely audible rumbling sound. Officials on the first floor of the Municipal Hall rushed from the building. No damage. (RD 11/26/98);

"Felt throughout the city and surrounding country very perceptibly." (RT 11/26/98);

Lasted five seconds, shook buildings, frightened some people. (MacCarthy, 1964);

Fincastle, VA--(V)--Felt by a number of people. Severe enough to jar some pictures from pianos and mantlepieces and cause rattling of glassware. Women ran out of their houses. Preceded by "the usual rumbling sounds." (RD 11/26/98);

Lynchburg, VA--(IV?)--Earthquake felt here about 3:10 p.m. (RD 11/26/98);

Quite severely felt, but no damage. (RT 11/26/98);

"Quite severe." (MacCarthy, 1964);

Norfolk, VA - Two very light tremors. (MacCarthy, 1964);

Nottoway Courthouse, VA--(III?)—"A slight, but very perceptible earthquake shock." Lasted about thirty seconds. About 3:10 in the afternoon. (RD 11/26/98);

Pulaski, VA--(III)--"A slight earthquake shock" at 3:11. Lasted about twenty-five seconds. Distinctly felt in houses. No damage. A short cessation in the middle of the shocks. No one much frightened. (RD 11/26/98);

East Radford, VA--(IV)--At 3:10 p.m. two separate shocks felt. Shocks lasted several seconds. Severe, but not as heavy as those in 1897. Windows rattled and buildings rocked. (RD 11/26/98);

Two "quite severe" shocks, windows rattled and buildings shook. (MacCarthy, 1964);

Richmond, VA--(III)--Felt in several places although the sensation was not general throughout the city. Effects most severe at Richmond College; students on third floor startled and reported five or six distinct vibrations. Effect on glass and chinaware noticed some places. Felt but not severe in other places. (RD 11/26/98);

Roanoke, VA--(V)--"A considerable earthquake shock." Lasted about ten seconds. So severe that people who were asleep were aroused. (RD 11/26/98);

Felt especially in the western part of town where houses were shaken and several people frightened. Noticeable at City Hall. Lasted about thirty seconds. A rumbling sound "like some heavy article being rattled along." Some chinaware broken, but otherwise no damage reported. (RT 11/26/98);

Melrose school building shook enough to frighten teachers and students. Houses shook "as if heavy weights or pieces of furniture were being moved." (RT 11/27/98);

Many were awakened. (MacCarthy, 1964);

Wytheville, VA - Felt (MacCarthy, 1964);

Charlotte, NC - "A distinct earthquake shock" felt throughout this section. No serious damage reported. (RD 11/26/98);

Franklinville, NC - "A very distinct earthquake shock." Vibration from east to west. (RD 11/26/98);

Raleigh, NC - Two distinct shocks, the first more severe and lasting about five seconds. (MacCarthy, 1964);

Winston, NC - "A distinct earthquake shock" at 3:10 p.m. Shook the largest buildings in town. (RD 11/26/98).

Extent:

Most noticeable in southwest and southside Virginia (RD 11/26/98);

Felt all through southwestern Virginia (RD 11/26/98);

Lynchburg, Va. to Durham, N.C. (earthquake on the morning of November 25th) felt all along line of Lynchburg to Durham railroad. (RT 11/26/98);

Nottoway County to the Tennessee line (RT 11/26/98);

"Apparently originated at about the same point as did that of February 5. It affected a very similar but probably somewhat greater area." Quite strongly felt in central North Carolina.

Noticed from Norfolk to the Tennessee line, and at several points in southern West Virginia, but not felt in Virginia north of Fredericksburg. (MacCarthy, 1964).

1. Richmond Dispatch (11/26/98), Richmond, VA

2. Roanoke Times (11/26/98), Roanoke, VA

3. MacCarthy [244]

C. MacCarthy [241]

D. Templeton [370] 1898 NOV 25 37.0 81.0 Wytheville, VA IV-V

1. Bollinger [33]

2. McClain, unpub., (1978)

3. McClain [260]

4. Moneymaker [281]

IV. McClain [260] 1898 NOV 25 20:00 37.0 81.0 Pulaski-Wytheville, VA IV-V

A. Bollinger [31] 1898 NOV 25 15:00 37 81 Pulaski-Wytheville, VA IV-V

1. MacCarthy [244]

V. Bollinger [33] 1898 NOV 25 15:00 37 81 Pulaski-Wytheville, VA 168,000 V

A. Bollinger [31]

B. Hopper [210]

C. MacCarthy [244]

VI. Moneymaker [281] 1898 NOV 25 3:05 p.m. Southwestern VA V

An earthquake, apparently centered near Wytheville, felt over much of Virginia. Localities within the affected area include Bedford City, Bonair, Buckingham, Colman's Fall, Radford, Roanoke, Pulaski, Wytheville, Blacksburg, Burkes Garden, Fredericksburg, Lexington and Lynchburg. The shock was felt also at Washington, D.C.

A. MWR [290]

VIII.(a) MacCarthy [241] 1898 NOV 25 15:00-15:15 Virginia

Virginia earthquake, felt in North Carolina at Winston-Salem, Franklinsville, Charlotte, Raleigh, Graham, Pittsboro, and other localities. See M.W.R. "Two distinct earthquake shocks were felt here [Raleigh] Friday, Nov. 25 afternoon between 3 and 3:15 o'clock. The first shock was more violent than the second. It lasted about five seconds. Neither of the shocks was of such violence as to do any harm. As a rule only people in tall buildings detected that anything was wrong. From here the disturbance seems to have passed westward." (Quoted from the Raleigh News and Observer by the Graham Almanac Gleaner, Dec. 1, 1898). The Gleaner further states that "A very distinct earthquake shock was felt here [Graham] at 3:04 last Friday afternoon. . . . 'Squire Glendenin. . . was upstairs in the Oneida Store among the tinware and crockery and it rattled at such a lively rate that he was induced to get down rather hastily. . . . This quake is not mentioned in E. Hist.

A. MWR [290]

B. Almanac Gleaner (12/1/98), Graham, NC

1. Raleigh News and Observer (no date), Raleigh, NC

VIII.(b) MacCarthy [244]

1898 NOV 25 3:00 p.m.

Shortly after 3 p.m. This shock, IV or V in intensity, apparently originated at the same point as did that of February 5. It affected a very similar but probably somewhat greater area than did that shock. It was quite strongly felt in central North Carolina, Raleigh reporting two distinct shocks, the first the more severe, which lasted about five seconds. It was noticed as far east as Norfolk, where there were two very light tremors, and as far west as "the Tennessee line." Several localities in southern West Virginia reported it, but it does not seem to have been felt in Virginia north of Fredericksburg. In several localities it was preceded by "the usual roaring noise." Accounts in the Washington Post (Nov. 26) and in the Lynchburg Daily Advance (Nov. 26) state that at Danville it lasted five seconds, shook buildings, frightened some persons; at Roanoke many were awakened; at Lynchburg it was "quite severe" at East Radford there were two "quite severe"; shocks, windows rattled, and buildings shook. Other Virginia localities reporting this earthquake were Wytheville and Bedford City. It does not seem to have been noticed in Richmond. Times mentioned in various accounts range from "about 3 o'clock to 3:30, with most of them close to 3:10 p.m.

A. Washington Post (11/26/98), Washington, DC

B. Daily Advance (11/26/98), Lynchburg, VA

I. TEIC 1899 FEB 13 09:30 37.1 81.5 Tazewell, VA 115,000 V

Location: Tazewell, VA; A/S

Intensity: Awakened people - Christiansburg, Danville, Lynchburg, Martinsville, Pulaski & Wytheville, VA; Charlotte & Winston-Salem, NC; light furniture moved @ Lynchburg; furniture moved @ East Radford

Extent: SW VA, NW NC, NE TN, S WV and probably N SC; map; 115,000 sq. km.; one felt report from Ohio - inclusion in felt area would at least double the size

Comment: Tazewell reported 2 separate events @ 09:30 and 11:00

II. TVA [380] 1899 FEB 13 09:30 37.2 80.6 Southwestern, VA V

A. MacCarthy [244]

B. MacCarthy [241]

C. Hopper [210] 1899 FEB 13 04:30 Lynchburg, VA 298,000

Abingdon, VA - Felt in this section. Lasted about one minute. (RD 2/14/99);

Christiansburg, VA--(IV-V)--"An earthquake shock of considerable violence" felt at 5 o'clock this morning, "arousing people from their sleep, and in some cases causing consternation. (RD 2/14/99);

Danville, VA--(V)--Three distinct shocks. Many persons awakened. Vibrations north to south. (RD 2/14/99);

Dublin, VA--(V)--"A very decided earthquake shock" at 4:30 Monday morning. Accompanied by more noise than usual. Rumbling sound was prolonged after the tremor ceased. (RD 2/16/99);

Fincastle, VA - Felt. (MacCarthy, 1964);

Floyd, VA - An earthquake shock with a "heavy rumbling noise." (RD 2/4/99);

Lexington, VA - "A heavy seismic shock" about 4:00 a.m. (RD 2/4/99);

Lynchburg, VA--(V)--"A slight shock of earthquake thought more severe than the kind usually felt in Virginia." (RD 2/14/99);

Many awakened, buildings shaken and light furniture moved. (MacCarthy, 1964);

Earthquake distinctly felt during blizzard, many persons awakened, buildings shaken, furniture moved--it was considered more violent than any that has been felt in recent years" (MWR);

Martinsville, VA--(IV-V)--"An earthquake shock of about two or three minutes duration." Severe enough to shake houses and arouse persons from sleep. (RD 2/14/99);

"Distinct." (MacCarthy, 1964);

Pulaski, VA--(V)--"Quite a severe earthquake shock" at 4:45 a.m. "Awoke and startled the sleeping population." No damage done to buildings. Some think it the most severe shock ever had here. (RD 2/16/99);

East Radford, VA--(V+)--At 4:35 this morning "the heaviest earthquake shock ever felt." Lasted thirty seconds. Vibration from north to south. A heavy undulating movement, with a grinding noise. Houses rocked and furniture was moved backwards and forwards. "Many people were so wrought up over the length of the shock that they left their beds." (RD 2/14/99);

"It felt exactly like a wave, a heavy rise and fall, with a heavy, grinding noise." (MacCarthy, 1964);

Roanoke, VA - "A distinct earthquake shock" at 4:30 a.m. (RD 2/14/99);

Salem, VA - Two shocks. (MacCarthy, 1964);

Staunton, VA - "A slight shock of earthquake about 4:00 a.m. (RD 2/14/99);

Tazewell, VA - Two heavy shocks at 4:30 and 6:00 a.m. (RD 2/14/99);

Wytheville, VA--(V)--"A severe earthquake shock." Shook the largest brick buildings in town. About 4:30 a.m. (RD 2/14/99);

Almost all were awakened. (Eppley, 1965);

Charlotte, NC--(V)--"A sharp shock of earthquake" this morning between 4 and 5 o'clock. "Awoke the sleeping inhabitants and shook things up, but did no serious damage." (RD 2/14/99);

"A severe shock of earthquake" felt at Charlotte and at other points to the westward at 4:30 a.m. (RD 2/14/99);

Mount Airy, NC - "Time - 04:30, citizens awakened by four severe shocks." (MWR, 1899);

Chillicothe, OH--(II-III)--A "slight vibratory shock" was noticed by a few persons in that city. (MacCarthy, 1964);
 East Tennessee - "Earthquake felt, duration 5 to 10 seconds, Time - 03:30 [evidently CST]. (MWR, 1899);
 Washington, DC - No earthquake recorded on seismograph. (MWR, 1899).

Extent:

Four shocks felt in western Virginia, eastern Tennessee, western North Carolina. (Eppley, 1965);

As far west as Chillicothe, Ohio. (MacCarthy, 1964).

1. Richmond Dispatch (2/14, 2/16/99), Richmond, VA

2. MacCarthy [244]

3. MWR [290]

4. EQHUS [121]

D. Templeton [370] 1894 FEB 13 37.0 81.0 Lynchburg, VA V-VI

Four shocks felt in East Tennessee.

1. Bollinger [33]

2. McClain, unpub., (1978)

3. McClain, [260]

4. Moneymaker [281]

5. EQHUS (1956)

6. EQHUS [121]

III. USGS [390]

A. EQHUS [122] 1899 FEB 13 04:30 37.0 81.0 VA 78,000 V-VI (RF)

Lynchburg, Va. Four shocks felt in western Virginia and east Tennessee.

1. MWR [290]

B. EQHUS [121] 1899 FEB 13 04:30 37.0 81.0 VA 78,000 V

Lynchburg, Va. Four shocks felt in western Virginia, eastern Tennessee, and western North Carolina. Almost all were awakened at Wytheville, Va.

1. MWR [290]

2. MacCarthy [241]

3. MacCarthy [244]

C. EQHUS [120] 1899 FEB 13 04:30 37.0 81.0 Southwest VA 78,000 V

Southwestern Virginia. Four shocks were felt in western Virginia, eastern Tennessee, and western North Carolina. Light furniture moved at Lynchburg, Va. Almost all were awakened at Wytheville. Also aroused many from sleep at Danville, Dublin, East Radford, Lynchburg, and Pulaski.

1. MWR [290]

2. MacCarthy [241]

3. MacCarthy [244]

4. Hopper [210]

IV. McClain [260] 1899 FEB 13 09:30 37.0 81.0 Western VA 78,000 V

Four shocks, strongly felt in east Tennessee.

A. EOHUS [121]

B. Moneymaker [281]

C. Bollinger [31] 1899 FEB 13 04:30 37.0 81.0 Wytheville, VA 78,000 V

Aftershocks

1. MacCarthy [244]

2. EOHUS [121]

V. Bollinger [33] 1899 FEB 13 04:30 37 81 Pulaski-
Wytheville, VA 298,000 V

Aftershocks

A. Bollinger [31]

B. EOHUS [120]

C. Hopper [210]

D. MacCarthy [244]

E. Woollard [410]

VI. Moneymaker [281] 1899 FEB 13 4:30 a.m. VA V-VI

Four shocks felt over an extensive area in Virginia, Tennessee, and North Carolina. The disturbance was strongly felt in eastern Tennessee.

A. EOHUS [123]

B. MWR [290]

VII. Woollard [410] 1899 FEB 13 04:30 37 81 Southwest VA 78,000 V (RF)

Duration = 10 seconds

A. MWR [290]

VIII.(a) McCarthy [241] 1899 FEB 13 04:30 37 81 Lynchburg, VA 78,000 V-VI (RF)

Felt in North Carolina at such places as Mount Airy, Charlotte, Winston-Salem, Elkton, etc. in the western part of the state. "Epicenter near 37° N., 81° W., intensity 5-6, felt over 30,000 square miles." (E. Hist.) "Winston-Salem, Feb. 13: - Many citizens were awakened at 4:30 this morning by four severe earthquake shocks which lasted several seconds. The vibrations were from southeast to northwest. Many think it was the severest and most distinctive shock yet felt in this section." (Charlotte Daily Observer, Feb. 14, 1899.)

A. EOHUS (1947)

B. Daily Observer (2/14/99), Charlotte, N.C.

VIII.(b) McCarthy [244] 1899 FEB 13 4:30 a.m. 37 81 78,000

The epicenter, according to E. Hist., was near 37° N., 81° W., not far from Lynchburg. It was felt over some 30,000 square miles of western Virginia, eastern Tennessee, and western North Carolina, and had an intensity of perhaps V. In some localities up to four distinct shocks, lasting in all as much as 30 seconds, were reported. According to M.W.R. many were awakened at Lynchburg, where buildings were shaken and some light furniture moved; at Martinsville it was noted as "distinct." The Washington Post (Feb. 14) says that at East Radford "it felt exactly like a wave, a heavy rise and fall, with a heavy, grinding noise." At Wytheville almost everyone was awakened. At Salem two shocks were noted; at Danville there were three. Other Virginia localities reporting this shock were Pulaski, Lexington, Staunton, Roanoke, Abingdon, and Fincastle. According to the New York Times (Feb. 14), it was felt as far west as Chillicothe, Ohio, and the Washington Post (Feb. 14) notes that a "slight vibratory shock" was noticed by a very few persons in that city. No damage seems to have been caused anywhere.

A. EOHUS (1956)

B. MWR [290]

C. Washington Post (2/14/99), Washington, DC

D. New York Times (2/14/99), NY

IX. Varma [400] 1899 FEB 13 37.0 81.0 Wythe Co., VA V

A. McCarthy [241]

B. McCarthy [244]

I. TEIC	1902	MAY 18	04:00	37.3	80.7	Pearisburg, VA	V
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Location: Pearisburg, VA

Intensity: Many awakened, severe

II. TVA [380]	1902	MAY 18	04:00	37.3	80.7	Giles Co., VA	IV
Bollinger [35]	1902	MAY 17	23:00			Giles Co., VA	V

Pearisburg, VA- "An earthquake of considerable severity...one of the longest ever experienced." Rumbles heard. "Many were aroused from their slumbers, arose and went into their yards to look at the neighboring mountain, Angel's Rest, as if they expected to see it in violent eruption." Caused more anxiety than usual for earthquakes in this area. (RD 5/20/02) (V);

"Considerable severity, lasting for several seconds." (MacCarthy, 1964);

Duration 20 sec. Intensity III-IV. (Woollard, 1968).

1. Richmond Dispatch (5/20/02), Richmond, VA
2. MacCarthy [244]
3. Woollard [410]

B. Woollard [410]

IV. McClain [260]	1902	MAY 17		37.3	80.7	Pearisburg, VA	
A. Bollinger [31]	1902	MAY 17		37.3	80.7	Pearisburg, VA	

1. MacCarthy [244]

V. Bollinger [33]	1902	MAY 17	23:00	37.3	80.7	Pearisburg, VA	V
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- A. Bollinger [31]
- B. MacCarthy [244]
- C. Woollard [410]

VII. Woollard [410] 1902 MAY 17 23:00 Pearisburg, Giles Co., VA III-IV
(RF)

Duration = 20 seconds

A. S.B.I. [unknown reference]

VIII. MacCarthy [244] 1902 MAY 17 11:00 p.m.

1902: May 17: 11 p.m. According to Reid, an earthquake "of considerable severity, lasting for several seconds" was felt at Pearisburg, Va., at this time.

A. Reid [325]

I. TEIC	1902	MAY 29	07:30	35.0	85.3	Chattanooga, TN	IV
Location: Chattanooga, TN							
Intensity: House shaken, people awakened							
II. TVA [380]	1902	MAY 29	07:30	35.0	85.3	Chattanooga, TN	IV
Second shock at 19:00							
A. Nuttli [310]	1902	MAY 29	07:30*	35.1	85.3	Chattanooga, TN	V
B. Woollard [410]							
III. USGS [390]							
A. EQUUS [123]	1902	MAY 29	02:30	35.1	85.3	Chattanooga, TN	V (RF)
Felt area = local; houses shaken, rumbling heard, people awakened.							
1. Reid [325]							
B. EQUUS [121] [Same as A. above]							
1. Reid [325]							
2. Moneymaker [281]							
C. EQUUS [120] [Same as B. above]							
IV. McClain [260]	1902	MAY 29	07:30	35.1	85.3	Chattanooga, TN	V
A. EQUUS [121]							
B. Moneymaker [281]							
V. Bollinger [33]	1902	MAY 29	02:30	35.1	85.3	Chattanooga, TN	V
A. EQUUS [120]							

B. McClain [260]

C. Moneymaker [281]

D. Woollard [410]

VI. Moneymaker [281] 1902 MAY 29 2:30 a.m. Southern Appalachians V

A strong shock accompanied by a rumbling noise awoke sleepers at Chattanooga, Tennessee.

A. EQUUS [123]

B. Reid [325]

VII. Woollard [410] 1902 MAY 29 02:30 Chattanooga, TN V (RF)

With noise; duration = 2 seconds

A. S.B.I [unknown reference]

X. Docekal [100] 1902 MAY 29 01:30* 35.1 85.3 Chattanooga, TN V

A local tremor shook houses at Chattanooga, Tennessee. Residents were awakened. Rumbling was reported.

A. EQUUS [121]

B. EQUUS [123]

C. Moneymaker [281]

D. Woollard [410]

I. TEIC	1902	OCT 18	22:00	35.3	85.7	Tracy City, TN	5,300	V
Location: Tracy City, TN; F/S								
Intensity: Large vases thrown from mantle @ Lafayette, GA; house shook, dishes, windows rattled and people rushed outside @ Chattanooga, TN								
Extent: TN - AL - GA border area; map; 5,300 sq. km.								
II. TVA [380]	1902	OCT 18	22:00	35.0	85.3	GA - TN Border		V-VI
A. Nuttli [310]	1902	OCT 18	22:00	35.0	85.3			V
B. Woollard [410]								
C. Moneymaker [283]	1902	OCT 18	1:00 & 5:00 p.m.			Chattanooga, TN		

SHOOK BY EARTHQUAKE

Shock of Several Seconds' Duration Was Experienced at Chattanooga. Houses Shook and People Rushed from their Homes in Terror. At Sevanee, Monteagle and Tracy City, and also in Georgia Towns Shocks Were Felt.

Chattanooga, October 18. A distinct earthquake shock accompanied by a muffled rumbling like distant thunder was felt here this afternoon at five o'clock. The shock was of several seconds' duration and shook houses very perceptibly in the city and suburbs. Dishes and windows were rattled any many people rushed from their homes in fright.

At Lafayette, Georgia, large vases were thrown violently from the mantle in one residence. On the streets, the shock was felt, the earth seeming to upheave under the feet of pedestrians. Reports of shocks at the same time have been received from Trion, Georgia, Sevanee, Tennessee, Monteagle, Tennessee, Tracy City, Tennessee and other towns in Tennessee and Georgia.

Sevanee, Tennessee, October 18. Two earthquake shocks were felt here today, the first a very light one, about 1 p.m., and the second, which was more severe, about 5 p.m. The latter shock was very distinctly felt. The duration was but a few seconds, the waves appearing to pass from south to north, rattling windows and shaking things up generally. No damages have been reported.

Reports from Monteagle and Tracy city say that both shocks were felt at those places.

1. Journal and Tribune (10/19/02), Knoxville, TN

III. USGS [390]

A. EQHUS [123] 1902 OCT 18 13:00 35.0 85.3 Southeast TN and Northwest GA 3900 VII-VIII (RF)

Felt along east face of Rocky Face Mountain west of Dalton, Ga. Felt with force 5-6 at Lafayette. Felt at Johnson City and Chattanooga, Tenn.

1. Reid [325]

B. EQHUS [121] 1902 OCT 18 17:00 35.0 85.3 Southeast TN and Northwest GA 3900 V

Felt along east face of Rocky Face Mountain west of Dalton, Ga. Intensity V at Lafayette. Felt at Chattanooga, Tenn.

1. Reid [325]

2. Moneymaker [281]

C. EQHUS [120] [same as B. above]

IV. McClain [260] 1902 OCT 18 18:00 35.0 85.3 Southeast TN and Northwest GA 3900 V-VI

A. Moneymaker [281]

B. EQHUS [121]

V. Bollinger [33] 1902 OCT 18 13:00 35.0 85.3 Southeast TN and Northwest GA 3900 V

A. McClain [260]

B. Moneymaker [281]

C. Woollard [410]

D. EQHUS [120]

VI. Moneymaker [281] 1902 OCT 18 1:00 & 5:00 p.m. Southern Appalachians V

A light shock was felt at 1:00 p.m. at Sewanee, Tracy City, and Monteagle, Tennessee. At 5:00 p.m., a strong shock was felt at Lafayette, Trion, and Rocky Face, Georgia, and at Chattanooga, Sevanee, Tracy City, and Monteagle, Tennessee. The latter shock was centered near Lafayette, where large vases were shaken from the mantle in one home and pedestrians felt "the earth seeming to upheave" under foot. At Chattanooga, dishes and windows rattled and people rushed from their homes in fright. The second shock was strong at Sewanee. There, "the duration was but a few seconds, the waves appearing to pass from south to north, rattling windows and shaking things up generally." This earthquake was not felt at Johnson City, as reported by Heck (1938) (Knoxville Journal and Tribune for October 9, 1902)

A. EOHUS [123]

B. Reid [325]

C. Journal and Tribune (10/19/02), Knoxville, TN

VII. Woollard [410]	1902	OCT 18	13:00 & 17:00	34.8	84.8	Northwest GA	3900	VII-VII (RF)
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Chattanooga felt with IV; VI at Lafayette, Ga.; west of Dalton, Ga. is a thrust fault - strike N-S, dip east; upper Cambrian overthrust Silurian

A. S.B.I. [unknown reference]

IX. Varma [400]

1902	OCT 18	35.1	85.3	Chattanooga, TN	V
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A. Moneymaker [281]

B. Woollard [410]

I. TEIC 1904 MAR 5 00:30 35.8 84.0 Maryville, TN 2500 IV

Location: Maryville, TN; near center of elliptical felt area

Intensity: "Fairly strong"

Extent: Felt along mountains for 90-100 miles (?); map; 2500 sq. km.

Comment: If "felt along mountains for 90-100 miles", then felt area would be considerably larger

II. TVA [380] 1904 MAR 5 00:30 35.7 83.5 Maryville, TN 13,000 IV

A. Woollard [410]

III. USGS [390]

A. EOHUS [123] 1904 MAR 4 19:30 35.7 83.5 East TN 13,000 V

Center near Marysville* and Sevierville, east Tennessee. Felt along mountains for 90 or 100 miles. Sound was heard at Tellico Plains. Not reported outside of Tennessee.

1. Reid [325]

B. EOHUS [121] [same as A. above]

1. Reid [325]

2. Moneymaker [281]

C. EOHUS [120] [same as B. above]

IV. McClain [260] 1904 MAR 5 00:30 35.7 83.5 Maryville, TN 13,000 V

B. Moneymaker [281]

V. Bollinger [33] 1904 MAR 4 19:30 35.7 83.5 Maryville-Sevierville, TN 13,000 V

- A. EOHUS [120]
- B. McClain [260]
- C. Moneymaker [281]
- D. Woollard [410]

VI. Moneymaker [281] 1904 MAR 4 7:30 p.m. Southern Appalachians V

A fairly strong earthquake centered somewhere between Maryville and Sevierville and felt along the mountains for a distance of 90 to 100 miles. Sound was heard at Tellico Plains. This earthquake is not known to have been outside of eastern Tennessee.

- A. EOHUS [123]

- B. Reid [325]

VII. Woollard [410] 1904 MAR 4 19:30 35.7 83.5 Sevierville, TN 3900 IV (RF)

Center Maryville & Sevierville; felt 90-100 miles along mountain range; felt only in Tennessee.

- A. N.P. Correspondence [unknown reference]

IX. Varma [400] 1904 MAR 4 35.7 83.5 Sevier Co., TN V

- A. Moneymaker [281]

- B. Woollard [410]

I. TEIC

Location: Bedford, VA

Intensity: Slight shaking, rumblings

79.5 37.3 APR 29 1905 Bedford, VA III

II. TVA [380]

79.5 37.3 APR 29 1905 Bedford City, VA IV

A. MWR [290]

V. Bollinger [33]

79.6 37.4 APR 29 1905 Bedford City, VA III

A. Bollinger [31]

79.6 37.4 APR 29 1905 Bedford City, VA

1. McCarthy [244]

B. McCarthy [244]

C. Woollard [410]

VII. Woollard [410]

79.6 37.4 APR 29 1905 Bedford City, Bedford Co., VA III (RF)

Rumbling and shaking along Bold Branch of Roanoke River

A. MWR [290]

VIII. McCarthy [244]

1905 APR 29

1905: April 29: No time given. According to Reid "rumblings and a slight shaking (intensity III)" were noticed on this date along the Bold Branch of the Roanoke River, near Bedford City, Va.

A. Reid [325]

I. TEIC	1909	OCT 8	10:00	34.8	85.0	Dalton, GA	900	III
Location:	Dalton - Ringgold, GA							
Intensity:	Felt							
Extent:	Small area around Dalton and Ringgold in northwestern GA; map; 900 sq km.							
II. TVA [380]	1909	OCT 8	10:00	34.8	85.0	Dalton, GA		IV
A. Woollard [410]								
IV. McClain [260]	1909	OCT 8	10:00	34.8	85.0	Northwest GA	2100	IV-V
Felt at Dalton and Ringgold								
A. Woollard [410]								
V. Bollinger [33]	1909	OCT 8	05:00	35	85	Northwest GA	2100	IV-V
A. Woollard [410]								
VII. Woollard [410]	1909	OCT 8	05:00			Northwest GA, Dalton and Ringgold	2100	IV-V (RF)
A. S.B. III [unknown reference]								

I. TEIC

Location: Hendersonville, NC; location

Intensity: Slight trembling, roaring noise; felt throughout Henderson Co., NC; "cracks opened"??

Extent: Western NC-SC border region; map; 3900 sq. km.

1911 APR 22 03:00 35.3 82.5 Hendersonville, NC 3900 IV

II. TVA [380]

1911 APR 22 03:00 35.3 82.5 Hendersonville, NC IV

A. Woollard [410]

B. McCarthy [241]

III. USGS [390]

A. EQHUS [123] 1911 APR 21-22 35.2 82.7 NC 1600 V (RF)

April 21 and 22, Caesar's Head, N.C. along Blue Ridge

1. Reid [325]

B. EQHUS [121]

1911 APR 20 35.2 82.7 NC - SC 1600 V

Caesar's Head, S.C., along Blue Ridge. Cracks opened. Felt at Hendersonville, N.C., 15 miles northeast. Felt area extended from Asheville, N.C. to Spartanburg, S.C.

1. Reid [325]

2. McCarthy [241]

C. EQHUS [120] [same as B. above]

IV. McClain [260]

1911 APR 22 03:00 35.2 82.7 Caesar's Head, SC 1600 V

Blue Ridge at N.C. - S.C. border

A. EQHUS [121]

B. Moneymaker [281]

C. Woollard [410]

V. Bollinger [33] 1911 APR 20 22:00-23:00 35.2 82.7 NC - SC border 1600 V

A. EQHUS [120]

B. McClain [260]

C. Moneymaker [281]

D. MacCarthy [241]

E. Woollard [410]

VI. Moneymaker [281] 1911 APR 21 Southern Appalachians V

An earthquake, centered near Ceasar's Head on the North Carolina-South Carolina state line, was felt as far to the northeast as Hendersonville. Cracks were reportedly opened in the ground.

A. EQHUS [123]

VII. Woollard [410] 1911 APR 21 22:00 35.2 82.7 Caesar's Head, NC V (RF)

Felt radius = 15-20 mi.; Caesar's Head is in the Blue Ridge and has been cracking up.

A. S.B. III [unknown reference]

VIII. MacCarthy [241] 1911 APR 20 or 21 22:00-23:00 35.2 82.7 1600 V (RF)

1911: April 20 or 21, 22:00-23:00 hrs. Another very indefinite date. E. Hist. gives it as "April 21 & 22", available contemporary newspapers variously as "the 20th", "night of the 20-21st", etc. The most probable date seems to be the 20th. "Caesar's Head, N.C. (sic). Epicenter at about 35.2 N., 82.7 W., intensity 5, felt over 600 square miles. Along the Blue Ridge. Cracks opened. Felt at Hendersonville, 15 miles northeast." (E. Hist.) The given epicenter is in North Carolina, but Caesar's Head, despite statements in the Associated Press news dispatches and in E. Hist., is across the border in South Carolina. At Hendersonville the quake was described as "a long rolling detonation, a trembling of the earth felt throughout Henderson County and said to extend as far south as Spartansburg, S.C." (Charlotte Daily Observer, Apr. 23, 1911). According to other newspaper accounts it was also felt in Asheville, where a "slight trembling and a roaring noise" are mentioned.

A. Unspecified News Accounts

B. Associated Press News Dispatches

C. EQHUS [173]

D. Charlotte Daily Observer (4/23/11), Charlotte, NC

IX.

Varma [400]

1911

APR 20

35.2

82.7

Transylvania Co., NC

V

A. McCarthy [241]

B. Woollard [410]

I. TEIC	1913	MAR 13	05:00	34.5	85.0	Calhoun, GA	III
Location: Calhoun, GA							
Intensity: "Duration = 5 secs"							
II. TVA [380]	1913	MAR 13	05:00	34.5	85.0	Calhoun Co., GA	IV
A. Woollard [10]							
IV. McClain [260]	1913	MAR 13	05:00	34.5	85.0	Calhoun and Gordon Cos., GA	IV
A. Woollard [410]							
V. Bollinger [33]	1913	MAR 13	00:00	34.5	85.0	Calhoun-Gordon Cos., GA	IV
A. Woollard [410]							
VII. Woollard [410]	1913	MAR 13	00:00	34.5	85.0	Calhoun, Gordon Cos., GA	IV (RF)

Duration = 5 secs.; occurred during a storm

A. S.B. III [unknown reference]

I.	TEIC	1913	MAR 28	22:50	36.0	83.9	Knoxville, TN	4000	VI
Location: Knoxville, TN; intensity									
Intensity: @ Knoxville, TN, vibrations set off fire alarms, bricks thrown from chimneys, pictures crashed to floor, furniture overturned, loose sawdust (U.T. baseball field) thrown into air (toward northwest), many fled into streets									
Extent:		Felt over an elliptical area 100 x 50 km (approx. 4000 sq. km.)							
II.	TVA [380]	1913	MAR 28	22:50	36.0	83.9	Knoxville, TN		VI-VII
	A. Nuttli [310]	1913	MAR 28	21:50	36.2	83.7		7000	VI
	B. Woollard [410]								
	C. Gordon [170]	1913	MAR 28	4:50 p.m.			Knoxville, TN		

W
W
O

Earthquake of March 28, 1913

At 4:50 p.m., March 28, 1913, Knoxville and adjoining regions was visited by an earthquake which, though of short duration, was of such intensity as to cause general panic. Some persons report two shocks of about equal intensity, separated by an interval of several minutes. Generally, however, one shock only was recognized, consisting of two distinct concussions separated by an interval of not more than a second.

The shock gave the impression of some violent explosion near at hand, and the occupants of each particular building fled to the street, or sought the boiler-room in the belief that the boiler had exploded. While there were some who recognized that an earthquake had occurred, the general impression was that the disturbance was due to the explosion of a steam-boiler or of dynamite in some of the marble quarries in the vicinity. Finally, when no calamity was reported, and news was received that the shock had been felt over an area having a radius of thirty to fifty miles, the true nature of the disturbance was recognized.

People who were in the open experienced a noticeable rise and fall of the ground, followed by a trembling movement. This was accompanied by a sharp but somewhat muffled report, like distant thunder, ending with a low rumble or roar. Members of the University baseball team who were practicing on the athletic field, and others present there at the time, noted a decided upward and downward movement of the ground, and one stated that he observed the loose sawdust which covers the field thrown upward and slightly toward the northwest, as if the wave movement had come from the southeast. Several persons who were in the sitting-room of the women's dormitory state that a distinct wave-like movement of the floor was felt, coming from the southeast corner of the room and progressing toward the northwest. One young man states that he was lying on the switch trestle of the Louisville and Nashville Railroad near the bank of the river with his face close to the timbers trying to read the height of the water on the water-gauge, when the shock came with such force as to cause the bridge to strike him on the chin. Accompanying the shock, according to this observer, was a sharp muffled report, which seemed to come from the bluffs on the opposite side of the river and some distance below.

A number of false alarms were rung in at the fire station, apparently due to the vibrations setting off the alarm. In a number of places bricks were thrown from chimneys, pictures crashed to the floor, and in a few instances furniture was overturned. In a home on Church Avenue a heater was overturned, a potted plant and a table upset, and chairs knocked over. In many homes there was a rattling of dishes and kitchen utensils, and in one a bookcase was overturned.

While the shock was felt in nearly every building in the city, reports seem to indicate that in no other building was it so distinct as in the Knox County court-house. Observers state that this massive structure, which is situated on the bluff overlooking the Tennessee River, shook and trembled like a leaf for at least three seconds there being two concussions in quick succession. Persons in streetcars and in automobiles did not experience the shock, and these were greatly puzzled by the general indications of excitement and panic among the people upon the sidewalks whose number were quickly augmented by those who came pouring out of the buildings. A number report a feeling of nausea and sickness, and in some instances indications of fear among horses were noted.

The suddenness of the shock and the sensibly vertical movement experienced by many people suggests that the center of disturbance was in the near vicinity of Knoxville, possibly somewhat to the southeast. From reports received from outside places the area affected was approximately as shown on the map, with the longer axis lying parallel with the axis of the Great Valley. The shock was not observed at all places within the area outlined, according to reports received; but doubtless a more exhaustive investigation would discover persons who had noted some indication of earth movement.

Inquiries developed the fact that the earthquake was not recorded by the instruments in any of the seismological laboratories nearest this region, viz, Washington, D.C.; New Orleans, La.; Mobile, Ala.; and St. Louis, Mo.

D. Moneymaker [281]

E. Seismo. notes [340]

III. USGS [390]

A. EQHUS [123] 1913 MAR 28 16:50 36.2 83.7 TN 7000 VII (RF)

Knoxville Tenn. Two shocks were felt over an area 70 by 40 miles with noticeable rise and fall of ground in some places. Fire alarms were set off by quake. The Knox County courthouse, a massive structure, trembled for several minutes. Moveable objects were overthrown, bricks fell from chimneys. People in autos did not feel the shock while those walking in buildings did. There were some cases of nausea.

1. Gordon [170]

2. Reid [325]

B. EQHUS [121] [same as A. above]

1. Gordon [170]

2. Reid [325]

3. Moneymaker [281]

C. EQHUS [120] 1913 MAR 28 16:50 36.2 83.7 Near Knoxville, TN 7000 VII

[account same as B. above]

IV. McClain [260] 1913 MAR 28 21:50 36.2 83.7 Knoxville, TN 7000 VII

A. EQHUS [121]

B. Moneymaker [281]

V. Bollinger [33] 1913 MAR 28 16:50 36.2 83.7 East TN 7000 VII

A. EQHUS [120]

B. Gordon [170]

- C. McClain [260]
- D. Moneymaker [281]
- E. Woollard [410]
- F. Seismo. notes [340]

VI. Moneymaker [281] 1913 MAR 28 4:50 p.m. Southern Appalachians 5100 VII

A strong earthquake shock centered at Knoxville was felt over an area of 2000 square miles in eastern Tennessee. Buildings throughout the city shook violently, causing the occupants to rush out into the streets. The Knox County courthouse, a massive brick structure, trembled for a few seconds. A number of false alarms were set off at the fire station, bricks toppled from chimneys, pictures fell from walls, furniture was overturned, and kitchenware and windows rattled. People out-of-doors experienced a noticeable rise and fall in the ground, followed by a trembling motion. The shock was attended by a noise similar to the report of an explosion, followed by a low rumble or roar.

- A. Knoxville Sentinel (3/29/11), Knoxville, TN

B. Gordon [170]

C. Gordon [170]

D. Heinrich [190] [no mention of this event found]

E. Matthes [250] 1913 MAR 28 Knoxville, TN

Felt radius = 40 mi.

1. Gordon [170]

2. MWR [290]

F. Neumann [300] 1913 MAR 28 22:50 Southern Appalachians VII

- 1. Gordon [170]
- 2. Seismo. notes [340]
- G. Seismo. notes [340]
- H. Taber [361]

A number of earthquakes, mostly of low intensity, have occurred in the Southern Appalachian region within the last few years, but they have been rather widely distributed, and do not seem to have been any more frequent in one locality than another. The South Carolina earthquake of January 1, 1913, has already been mentioned, and two earthquakes with widely separated epicenters were felt in eastern Tennessee on March 28th and April 17th of the same year.

- 1. Gordon [170]

VII. Woollard [410] 1913 MAR 28 16:50 36.2 83.7 Near Knoxville, TN 5700 VII

334

Twenty miles northeast of Knoxville, TN.; duration = 3-4 secs.; sharp and rumble; explosion?;
 ellipse: ENE = 70 mi., WSW = 40 mi.

- A. Gordon [170]
- B. Seismo. notes [340]

I. TEIC 1913 APR 17 17:30 35.5 84.4 Madisonville, TN 6500 V

Location: Madisonville, TN; A/S; intensity

Intensity: Dished shaken from shelves @ Madisonville, TN; houses shook, rattling of loose objects, loud noises

Extent: Knoxville, TN to Blue Ridge, GA; map; 6500 sq. km.

Comment: Next event A/S?

II. TVA [380] 1913 APR 17 17:30 Near Madisonville, TN V

A. Woollard [410]

B. Gordon [170]

Earthquake of April 17, 1913

335
About three weeks later, on April 17th, at 11:30 a.m., a second earthquake was felt over an area somewhat larger than the preceding and lying to the southward. From various places within the area, as outlined on the map, observers report the shock was accompanied by loud noises like deep thunder, the shaking of houses, rattling of loose objects, such as dishes, doors, etc. While there was general agreement in reports of a loud roaring or rumbling noise, the explosive effect experienced in the preceding shock was not noted. A wave-like movement of the ground was reported by a number of observers. Some state that the shock lasted about thirty seconds, but the majority of observers report it as lasting from one to three minutes. In general one shock only was noted: but two observers (Coker Creek, Tenn., and Conasauga, Tenn.) report two shocks, separated by an interval of a few seconds only. A quivering or trembling sensation was noted by some, and in a few cases fear and dizziness.

From reports received the shock seems to have been most severe along the axis of the area from the vicinity of Ducktown northward to Kizer, near the Tennessee River. At Knoxville the shock was very slight, and observed by very few persons.

C. EQHUS [123]

D. Seismo. notes [340]

An earthquake shock of moderate intensity again disturbed lower East Tennessee and adjacent portions of North Carolina and Georgia, on April 17, 1913, at 11:30 a.m. The Knoxville papers give reports of the shock from Athens, Madisonville, Etowah, Vonore, Tellico Plains, and Copperhill in Tennessee, and from Blue Ridge, Georgia. The shock apparently reached its greatest intensity in the vicinity of Madisonville, where a few dishes were shaken from their shelves, and where farmers felt their plows shaken in their hands. No damage is reported. A noticeable feature of the reports is that each one, without exception, mentions a roaring or rumbling sound accompanying the shock. The shock was not felt in Knoxville.

E. McCarthy [241]

F. Money-maker [283]
Athens

Athens was disturbed by two minutes shock. A shock believed to have been a terrestrial quake was felt in this town and community this morning at 11:30 o'clock. It lasted about two minutes. Vibrations appreciable; rumbling; no damage reported.

Madisonville

20 seconds. 11:30 o'clock Thursday morning. Dishes shaken from shelves; great excitement; plows shook in farmers' hands. Slight rumble. East-West direction.

Etowah

Slight shock felt about 11:30 Thursday morning; rumbling plainly heard, lasting about 1/4 minute. No excitement.

Vonore

Vonore slightly shaken by an earthquake at 11:30 o'clock Thursday morning. No damage reported and little excitement. Rumbling noise.

Tellico Plains

Distinct earthquake shock at Tellico Plains at 11:30 o'clock Thursday morning. Much excitement. No damage. Accompanied by rumbling noise.

Copper Hill

Slight tremor felt at Copper Hill Thursday morning at 11 o'clock. It is thought that the quake had about spent itself when it reached Copper Hill. Rumbling noise, no damage.

Ducktown

Slight earth shocks felt just before noon. Shock faint, no damage.

1. Knoxville Sentinel (4/17, 4/18/13), Knoxville, TN

III. USGS [390]

A. EQHUS [123] 1913 APR 17 23:30 35.3 84.2 TN 9100 V-VI (RF)

Eastern Tennessee, North Carolina, and South Carolina. This was felt over a somewhat larger area than that of March 28 and had its center a little to the south. Felt over an elliptical area 45 by 25 miles NNE-SSW. Wave-like motion of the ground was felt in several places. There were noises like thunder. The effect was most severe in the southeast corner of Tennessee.

1. Gordon [170]

2. Reid [325]

3. Woodworth, J.B. (unpublished records)

B. EQHUS [121] 1913 APR 17 11:30 35.3 84.2 East TN 9100 V

Eastern Tennessee, North Carolina, northeastern Georgia, and South Carolina. This was felt over a somewhat larger area than that of March 28, and its center was a little to the south. Felt over an elliptical area 45 to 25 miles north-northeast - south-southwest. Wave-like motion of the ground was felt in several places. There were noises like thunder. The effect was most severe in the southeast corner of Tennessee. At Brasstown, N.C., shock lasted about 30 seconds.

1. Gordon [170]

2. Reid [325]

3. Woodworth, J.B. (unpublished records)

4. MacCarthy [241]

5. Moneymaker [281]

C. EQHUS [120] [same as B. above]

IV. McClain [260] 1913 APR 17 16:30 35.3 84.2 Near Ducktown, TN 9100 V-VI

A. Moneymaker [281]

B. EQHUS [121]

V. Bollinger [33] 1913 APR 17 11:30 35.3 84.2 East TN 9100 V

A. EQHUS [120]

B. McClain [260]

C. Moneymaker [281]

D. Woollard [410]

E. Seismo. notes [340]

VI. Moneymaker [281] 1913 APR 17 11:30 a.m. Southern Appalachians 9100 V-VI

This earthquake, centered in southeastern Tennessee, affected an elliptical area of 3500 square miles in Tennessee, North Carolina, South Carolina, and Georgia. The intensity was greatest along the major axis, between Ducktown and Kizer. Houses shook and windows and dishes rattled. Two closely spaced shocks were reported at Coker Creek. Some observers reported a wave-like motion of the ground. The disturbance was attended by a loud rumbling or roaring noise.

A. Branner [85] 1913 APR 17 East TN 622,000 VII-VIII

B. Gordon [170]

C. Gordon [?] (same as Gordon [170])

D. EQHUS [123]

E. Mathes [250] 1913 APR 17 Near Ducktown, TN

Epicentrum north of Ducktown, TN; shook houses; accompanied by loud roar.

1. Gordon [?]
2. Seismo. notes [340]

F. Neumann [300] 1913 APR 17 17:30 Southern Appalachians IV (RF)

G. Seismo. notes [340]

H. Taber [361]

A number of earthquakes, mostly of low intensity, have occurred in the Southern Appalachian region within the last few years, but they have been rather widely distributed, and do not seem to have been any more frequent in one locality than another. The South Carolina earthquake of January 1, 1913, has already been mentioned, and two earthquakes with widely separated epicenters were felt in eastern Tennessee on March 28th and April 17th of the same year.

VII. Woollard [410] 1913 APR 17 11:30 84.2 35.3 Near SE border TN 9100 V-VI (RF)

Rumble; duration = 30 secs.; ellipse: NNE = 45, SSW = 25

A. Gordon [170]

B. Seismo. notes [340]

VIII. McCarthy [241] 1913 APR 17 11:30 84.2 35.3 East TN 9100 V-VI (RF)

1913: April 17, 1130 hrs. East Tennessee. "Epicenter at about 35.3 N., 84.2 W., intensity 5-6, felt over 3,500 square miles, including western N.C." (E. Hist.) E. Hist. gives the time as 11:30 p.m., but contemporary accounts indicate that it was 11:30 a.m. See also B.S.S.A. 3 (1913), pp. 193-194. "Brasstown, N.C., April 19:--A slight but exciting earthquake shock was felt here about noon Thursday (the 17th) which lasted about thirty seconds." (Raleigh News and Observer, Apr. 20, 1913).

A. EOHUS [123]

B. Gordon [170]

C. Raleigh News and Observer (4/20/13), Raleigh, NC

V

Monroe Co., TN

84.2

35.3

APR 17

1913

IX. Varma [400]

A. MacCarthy [241]

B. Moneymaker [281]

I. TEIC 1913 MAY 2 07:00 35.5 84.4 Madisonville, TN III

Location: Madisonville, TN

Intensity: Rumbling sound, duration several seconds

Comment: A/S to event April 17, 1913?

II. TVA [380] 1913 MAY 2 07:00 35.5 84.4 Madisonville, TN III

A. Seismo. notes [340]

Continued disturbances in East Tennessee.—In this society's Bulletin of June, 1913, notes were published on shocks felt in eastern Tennessee. Since that time reports of similar disturbances have been received from the same region.

Dr. Charles P. McNab of Knoxville, Tennessee, reported a slight shock, accompanied by a rumbling sound which lasted several seconds, at one o'clock on the morning of May 2, 1913, near Madisonville, Tennessee. As Dr. McNab was riding in a buggy at the time of the shock he could not estimate its intensity.

1. McNab, C.P. (personal communication?)

IV. McClain [260] 1913 MAY 2 06:00 35.5 84.4 Near Madisonville, TN III

A. Moneymaker [281]

V. Bollinger [33] 1913 MAY 2 01:08 35.5 84.4 Madisonville, TN III-IV

A. EQUUS [120] [no mention of this event found]

B. McClain [260]

C. Moneymaker [281]

D. Woollard [410]

E. Seismo. notes [340]

W41

VI. Moneymaker [281]	1913	MAY 2	1:00 a.m.	Southern Appalachians	III
A light shock, accompanied by a rumbling sound and lasting several seconds, was felt near Madisonville, Tennessee.					
A. Neumann [300]	1913	MAY 2	07:00	Southern Appalachians	II-III? (RF)
1. Seismo. notes [340]					
B. Seismo. notes [340]					
C. Woollard [410]					
VII. Woollard [410]	1913	MAY 2	01:00	36.0 83.9 Knoxville, TN	IV (RF)
A. Seismo. notes [340]					

I. TEIC 1913 AUG 3 17:45 36.0 83.9 Knoxville, TN III

Location: Knoxville, TN

Intensity: Rumbling sound

II. TVA [380] 1913 AUG 3 17:45 36.0 83.9 Knoxville, TN IV

A. Seismo. notes [340] 1913 AUG 3 Knoxville, TN

A slight earthquake is reported to have occurred at Knoxville at 11:45 a.m. A rumbling sound was heard, and a slight quiver of the ground was noticeable similar to the shock of last March. The seismographs at Cleveland and Washington did not record any movement.

B. Moneymaker [290]

1. Knoxville Journal and Tribune (8/5/13), Knoxville, TN

IV. McClain [260] 1913 AUG 3 16:45 35.9 83.9 Knoxville, TN IV

A. Moneymaker [281]

V. Bollinger [33] 1913 AUG 3 11:45 36.0 84.0 Knoxville, TN IV

A. EOHUS [120] [no mention of this event found]

B. McClain [260]

C. Moneymaker [281]

D. Woollard [410]

E. Seismo. notes [340]

VI. Moneymaker [281] 1913 AUG 3 11:45 a.m. Southern Appalachians IV

A light shock at Knoxville and at several other points in east Tennessee.

"A rumbling sound was heard and a slight quiver of the ground was noticeable, similar to the shock of last March."

A. Knoxville Journal and Tribune (8/5/13), Knoxville, TN

B. Neumann [300] 1913 AUG 3 17:45

Knoxville, TN

II-III?
(RF)

1. Seismo. notes [340]

C. Seismo. notes [340]

D. Reid [325]

VII. Woollard [410]

1913

AUG 3

11:45

36.0

83.9

Knoxville, TN

IV (RF)

Same as March 28?

A. Seismo. notes [340]

I. TEIC 1914 JAN 24 04:24 35.6 84.5 Sweetwater, TN 5900 IV

Location: Sweetwater, TN; A/S; intensity; location

Intensity: Objects rattled, stopped clock

Extent: Knoxville - Chattanooga, TN; map; 5900 sq. km.

Comment: Much lighter A/S @ 04:41

II. TVA [380] 1914 JAN 24 04:24 35.6 84.5 Niota and Sweetwater, TN IV-V

A. Nuttli [310] 1914 JAN 24 03:24* 35.6 84.5 V

B. Seismo. notes [340]

Knoxville, Tennessee - Two earthquake shocks were reported from Sweetwater and Niota, Tennessee, on January 23rd, by Mr. C. H. Gordon, Assistant State Geologist. The first shock stopped the clock in the railroad block-house at 10:24 p.m., and the second and much lighter one was recorded at 10:41 p.m. The signals and switches rattled violently, and a lamp chimney was nearly shaken off a lamp and a rumbling noise accompanied the movements.

C. Moneymaker [290]

1. Knoxville Journal and Tribune (1/24/14), Knoxville, TN

III. USGS [390]

A. EQUUS [123] 1914 JAN 23 22:24 35.6 84.5 TN VI (RF)

Felt area = local; first shock, force 6; second lighter; loud sound.

1. Reid [325]

B. EQUUS [121] 1914 JAN 23 22:24 36.5 84.5 Eastern TN V

Felt area = local; first shock, intensity V; second lighter; loud sound

1. Reid [325]

2. Moneymaker [281]

C. EQHUS [120] [same as B. above]

IV. McClain [260] 1914 JAN 24 03:24 35.6 84.6 Niota and Sweetwater, IV-V
 & 03:41 Southeast, TN

A. EQHUS [121]

B. Moneymaker [281]

V. Bollinger [33] 1914 JAN 23 22:24 35.6 84.5 Sweetwater, TN IV-V

A. EQHUS [120]

B. McClain [260]

C. Moneymaker [281]

D. Woollard [410]

E. Seismo. notes [340]

VI. Moneymaker [281] 1914 JAN 23 10:24 10:41 p.m. Southern Appalachians IV-V

Two sharp shocks at Niota, Sweetwater, and other points along the Southern Railway between Chattanooga and Knoxville

A. Knoxville Journal and Tribune (1/24/14), Knoxville, TN

B. EQHUS [123]

C. Neumann [300] 1914 JAN 24 04:24 Knoxville, TN IV? (RF)

1. Seismo. notes [340]

D. Seismo. notes [340]

E. Woollard [410]

VII. Woollard [410] 1914 JAN 23 22:24 & 22:41 35.6 84.5 Sweetwater, TN VI (RF)

Felt area = local

A. Seismo. notes [340]

IX. Varma [400] 1914 JAN 23 35.6 84.5 Monroe Co., TN V

A. Money-maker [281]

B. Woollard [410]

I. TEIC	1915	JAN 14	09:20	36.6	82.2	Bristol, TN	IV
Location: Bristol, TN							
Intensity: Rattled windows							
II. TVA [380]	1915	JAN 14	09:20	36.6	82.2	Bristol, TN	IV
A. MWR [290]	1915	JAN 14	09:20	36.6	82.2	Bristol, TN	III-IV (RF)
One shock; duration = 20 secs.; rattled windows							
B. Matthes [250]	1915	JAN 14				Bristol, TN	Light
1. American Year Book (1915)							
2. MWR [290]							
IV. McClain [260]	1915	JAN 14	09:20	36.6	82.1	Bristol, TN - VA	III-IV
A. Woollard [410]							
V. Bollinger [33]	1915	JAN 14	04:20	36.6	82.2	Bristol, VA	III-IV
A. McClain [260]							
B. Moneymaker [281]							
C. Woollard [410]							
VI. Moneymaker [281]	1915	JAN 14	4:20 a.m.			Southern Appalachians	III-IV
A shock at Bristol, Tn. - Va.							
A. Matthes [250]							
B. Neumann [300]	1915	JAN 14	09:20			Bristol, TN	III-IV (RF)

1. MWR [290]

C. Taber [361]	1915	JAN 14	09:20	Bristol, TN	III-IV (RF)
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1. MWR [290]

D. Woollard [410]

E. MWR [290]

VII. Woollard [410]	1915	JAN 14	04:20	36.6	82.2	Bristol, TN	III-IV (RF)
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Duration = 20 secs.

A. MWR [290]

VIII. McCarthy [244]	1915	JAN 14	4:20 a.m.	Bristol TN-VA
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1915: Jan. 14: 4:20 a.m. A light shock was reported at this time from Bristol, Tennessee-Virginia, which lasted about 20 seconds and rattled windows. Mentioned in Moneymaker (1957), in Taber (1916), and in M.V.R. (p. 40), but no details seem to be available.

A. Moneymaker [281]

B. Taber [361]

C. MWR [290]

I. TEIC 1915 OCT 29 05:45 35.6 82.6 Asheville, NC 700 V

Location: Asheville - Marshall, NC

Intensity: Shook buildings, many people awakened @ Asheville and Marshall, NC

Extent: Parts of Buncombe and Madison Cos., NC; map; 700 sq. km.

II. TVA [380] 1915 OCT 29 05:45 35.8 82.7 Marshall, NC V

A. MWR [290] 1915 OCT 29 05:45 35.6 82.5 Asheville, NC IV (RF)

One shock; duration = 15 secs.; shook buildings

1. AP news service

Two distinct shocks were felt here at 12:35 a.m. The shocks came about two minutes apart and lasted a few seconds each. No damage reported.

350

B. Seismo. notes [340] 1915 OCT 29 12:25 a.m. Asheville, NC

"Asheville, North Carolina, October 29, 1915 - Two distinct earthquake shocks were felt at Asheville on October 29, at 12:25 a.m. The two shocks came about two minutes apart, and lasted only a few seconds each. They were of sufficient severity to shake the house and arouse many people from sleep."

C. Taber [361] 1915 OCT 29 06:25 35.8 82.7 Marshall, NC 3100 V (RF)

On October 29, 1915, at about 1:25 a.m., E.S.T. (6h 25m Greenwich) an earthquake was felt at several places in Buncombe and Madison counties, North Carolina. The origin was probably not far from Marshall, latitude 35°45'N., longitude 82°40'W., where the intensity was about V. Many people were awakened at Marshall and at Asheville, fifteen miles southeast. The shock was sensible over an area of approximately 1200 square miles, but because of the early hour the information is far from complete.

III. USGS [390]

A. EQHUS [123] 1915 OCT 29 00:23 35.8 82.7 NC 3100 V (RF)

Near Marshall, N.C. People awakened there and at Asheville.

1. Reid [325]

B.	EQHUS [121]	1915	OCT 29	01:00	35.8	82.7	NC	3100	V
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[account same as A. above]

1. Reid [325]
2. MacCarthy [241]

C.	EQHUS [120]	1915	OCT 29	01:00	35.8	82.7	Near Marshall, NC	3100	V
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Near Marshall, N.C. Many people were awakened near Marshall and at Asheville. Two distinct shocks were felt at Asheville.

1. Seismo. notes [340]
2. Taber [361]
3. Reid [325]
4. MacCarthy [241]

IV.	McClain [260]	1915	OCT 29	06:00	35.8	82.7	Near Marshall, NC	3100	V
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- A. EQHUS [121]
- B. Moneymaker [281]

V.	Bollinger [33]	1915	OCT 29	00:23	35.8	82.7	Marshall, NC	3100	V
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- A. EQHUS [120]
- B. MacCarthy [241]
- C. McClain [260]
- D. Moneymaker [281]
- E. Taber [361]
- F. Seismo. notes [340]

VI.	Moneymaker [281]	1915	OCT 29	12:45 a.m.	Southern Appalachians	V
	A shock lasting about 15 seconds at Asheville and at Marshall, North Carolina. Sleepers were awakened. (The time of this shock is given as 12:25 a.m. in some accounts).					
	A. Heinrich [190]	[no mention of this event found]				
	B. Matthes [325]	1915	OCT 29		Asheville, NC	
	Felt by persons walking					
	1. MWR [290]					
	C. Neumann [300]	1915	OCT 29	05:45	Asheville, NC	IV (RF)
	1. MWR [290]					
	2. Seismo. Notes. [340]					
	D. Seismo. notes [340]					
	E. Taber [361]					
	F. MWR [290]					
VII.	Woollard [410]	1915	OCT 29	00:23	Marshall, NC	3100 IV-V (RF)
	Duration = 6-8 seconds					
	A. Seismo. notes [340]					
VIII.	MacCarthy [241]	1915	OCT 29	35.8	82.7	3100 V (RF)
	*1915: October 29, Marshall, N.C. Times given in various accounts do not agree, i.e., 00:25 hrs., 00:35 hrs., 01:25 hrs. E. Hist. gives it as 23:00 hrs., perhaps a typographical error for 00:23 hrs. "Epicenter at about 35.8 N., 82.7 W., intensity 5, felt over 1,200 square miles. People awakened at Marshall and at Asheville." (E. Hist.) See also B.S.S.A. 5 (1915), p. 238, and B.S.S.A. 6 (1915), pp. 218-226, where it is stated that two distinct shocks were felt, about two minutes apart, strong enough to shake houses and awaken many people. No additional information has been found in available contemporary newspapers.					

A. EQHUS [123]
B. Seismo. notes [340]
C. Taber [361]
IX. Varma [400] 1915 OCT 29 35.8 82.7 Madison Co., NC V
A. MacCarthy [241]
B. Woollard [410]

I. TEIC 1916 FEB 21 22:39 35.5 83.0 Waynesville, NC 458,000 VII

Location: Waynesville, NC; intensity; location with respect to other reported damage

Intensity: @ Waynesville, NC, chimney tops thrown down, windows broken, people frightened and ran outside; unconfirmed reports of 3 houses being "wrecked" @ Skyland, NC; chimney damage in Newport, Sevierville, Bristol, Maryville and Athens, TN; plaster fell in Knoxville, Bristol and Morristown, TN, Tryon, NC; @ Forest City, NC, walls of hotel cracked in 4 places; shook dishes from shelves in Augusta, GA; furniture moved in Chattanooga, TN and Liberty, SC; @ Richmond, VA, pictures shaken from walls and bric-a-brac knocked down; in Wears Valley, TN, increased flow of springs, in some places water muddied

Extent: All or parts of 7 southeastern states; map; 458,000 sq. km.

II. TVA [380] 1916 FEB 21 22:39 35.5 83.0 Waynesville, NC VII

A. MWR [290]

<u>Station</u>	<u>Intensity Rossi- Forel</u>	<u>Number of Shocks</u>	<u>Duration (secs.)</u>	<u>Sounds</u>	<u>Remarks</u>
ALABAMA					
Anniston	2	1	3		
Valley Head	2	3	14		Windows rattled
GEORGIA					
Atlanta	1	1			Shook buildings
Augusta	4	3			Shook dishes from shelves
Canton	3-4	2			
Clarksville	2	2			Windows rattled
Clayton	4-5	1			
Columbus	3	2	15		
Dahlongega	4	1		Rumbling	Dishes rattled
Duluth	4	1			
Gillsville	4	1	15		
Kirkwood	3	1	2		
Macon	3	20			
Savannah	1	2	Few		
Toccoa	4	1	30	Rumbling	
Washington	3	2	6	Rattling	
NORTH CAROLINA					
Alta Pass	3-4	1	10		Some alarm
Andrews	1			Rumbling	
Asheville	5	2	10	Rattling	Caused some alarm
Black Mountain	5	2	30	Rumbling	
Blantyre	4	1	10	do	Doors moved
Brevard	5	2		do	
Brewers	3	3	45	Faint	
Caroleen	4			Rumbling	

<u>Station</u>	<u>Intensity Rossi- Forel</u>	<u>Number of Shocks</u>	<u>Duration (secs.)</u>	<u>Sounds</u>	<u>Remarks</u>
Charlotte	5	1	60		
Chimney Rock	5	1	4		
Cullowhee	3	1	60	Rumbling	
Elizabethton		1			
Elkin	4	1			Shook buildings
Franklin					
Greensboro	3	3	2		
Henderson		1	60		
Hickory	5	1	40		
Highlands	4-5	1	60	Rumbling	
Hot Springs	4	1	3		
Lake Toxaway	5	1			
Lenoir	5	1	10	Rumbling	
Lincolnton	5	1			
Marlon	4-5		15	Rumbling	
Marshall	4	2	20	Faint	
Morganton	4	2	15		
Mount Airy		2			
Pinehurst		1	15		
Raleigh		1			
Salisbury					
Saluda	5	1			
Settle	2	3	6		
Skyland	6	2	20	Rumbling	
Southport	2	1			
Statesville					
Swannanoa	4	2	12	Rumbling	
Wilmington	3	2	Few		
Winston-Salem	3				
SOUTH CAROLINA					
Anderson					
Batesburg	3	1	5		Children frightened
Belton	5	3	12		

<u>Station</u>	<u>Intensity Rossi- Forel</u>	<u>Number of Shocks</u>	<u>Duration (secs.)</u>	<u>Sounds</u>	<u>Remarks</u>
Calhoun Falls	4	1	6		Dishes rattled
Chappells	2	1	2		
Charleston	2	2	15		
Clemson College	4	1			Dishes rattled
Columbia	2-3	2	14		Windows rattled
Gaffney	4	1	40		
Greenville	5	1	10		
Greenwood	2	2	5		
Landrum	4	1			
Liberty	5	1	4	Rumbling	Furniture moved
Little Mountain	2	1	6		
Mountain Rest	5			Rumbling	
Newberry	3-4	2	8		
Rock Hill	5	3	45		Shook building
Santuck	5	2	5		
Spartanburg	5	1	20		Furniture moved
Summerville	1-2	1			
Walhalla					
Westminster	2	2	6		
TENNESSEE					
Chattanooga	4	1	5		
Elizabethton	4-5	1			Slight alarm
Loudon	3	1	15		
McMinnville					
Newport	4-5		5	Rumbling	Slight alarm
Sevierville	5	1	5	do	Bricks fell from chimneys
VIRGINIA					
Norfolk	3	1			
Richmond	3	3			
South Boston	3	1	15		
Wytheville	3	2	15		

<u>Station</u>	<u>Intensity</u> <u>Rossi-</u> <u>Forel</u>	<u>Number</u> <u>of</u> <u>Shocks</u>	<u>Duration</u> <u>(secs.)</u>	<u>Sounds</u>	<u>Remarks</u>
KENTUCKY					
Middlesboro	4	1	10	Rumbling	Shook buildings

1. Assoc. Press

Atlanta, Ga., February 21, 1916

An earth tremor of slight but distinct nature that made itself felt throughout Georgia, North and South Carolina, Virginia, and portions of eastern Tennessee and Alabama as reported early to-night as having been felt at about 5:45 p.m. central time. (Assoc. Press.) [Many similar reports received from other points in the affected district.]

2. MWR [290]

B. Seismo. notes [340] 1916 FEB 21

Southern Appalachians

Southern Appalachians, February 21, 1916 - A sharp earthquake or series of shocks was felt through a wide area in the southern Appalachian region about 5:45 p.m., February 21, 1916. Reports came from all parts of east Tennessee from Bristol to Chattanooga, and as far south as Atlanta, Georgia. The whole of the western part of South Carolina was shaken, and the western half of North Carolina was shaken, and also the southwestern part of Virginia. So far as it can be made out from newspaper reports, the highest intensity was in upper east Tennessee, near the North Carolina line. The only damage reported is at Newport, Tennessee, where it is said that chimneys were thrown down. Professor C.H. Gordon of the University of Tennessee says the shock lasted one minute at Knoxville - from 5:30 to 5:40 p.m.

1. Unspecified news accounts

2. Gordon, C. H. [personal communication]

C. MacCarthy [241]

D. MacCarthy [244]

E. Moneymaker [290]

Atlanta:

No damage--people left buildings hurriedly, but there was no panic. Only one seismograph reported, that was at Mobile which reported brief shocks. Tremor passed East-West and was felt only momentarily.

Augusta, GA: Three distinct shocks.

Western half of South Carolina: shock slight, but distinct; felt at Columbia, Charleston, and Greenville.

Asheville: Two distinct shocks; houses rocked in several sections; no damage.

Skyland, NC: (6 mi. from Asheville) Unconfirmed report that 3 houses were wrecked.

Wilmington and Greensboro: slight shocks.

Virginia: Norfolk, Richmond, and South Boston reported shocks.

South Boston: extinguished lights and broke china in many houses. Richmond: Buildings shaken perceptibly. Norfolk: Tremor not generally noticeable.

Augusta, GA: Three shocks, first slight, second more distinct, third faint.

Mobile, AL: Tremors lasted for 5 minutes, but were very slight.

Macon: Shock slight, no damage.

Savannah: Slight shock, no damage or excitement.

Knoxville:

Chattanooga: Two earth tremors 5:45 p.m. Monday. Rattled windows. Furniture moved perceptibly. Articles on desks in office buildings disturbed. Shocks of pronounced intensity on Lookout Mountain and Missionary Ridge.

Bristol: Distinct tremor at 6:45 (EST) Lasted about 10 seconds. No damage reported.

Sewanee: Slight earthquake at 5:39 Monday. Tremors lasted 5 seconds. Shock light—no damage reported.

Middlesboro: Very distinct shock 5:40 p.m. Windows rattled perceptibly. Counters and show cases were shaken in stores. No damage reported. 1. Knoxville Sentinel (2/22/16), Knoxville, TN

F. Taber [361] 1916 FEB 21 6:40 p.m. 35.6 83.1 Waynesville, NC VII (RF)

On February 21, 1916, about 6:40 p.m., eastern standard time, an earthquake occurred with its origin or origins in the southern portion of the Appalachian Mountains not far from the boundary between North Carolina and Tennessee.

The Monthly Weather Review for February 1916 contains a list of 86 places from which reports were received by the Weather Bureau. These places are located in North and South Carolina, Tennessee, Virginia, Georgia, Alabama, and Kentucky. A short note on the earthquake by Professor W. J. Humphreys was published in the Monthly Weather Review for March. It is accompanied by an isoseismal map of the region giving "the various places, [88], from which reports of this earthquake were received and the corresponding intensities as estimated by the observers" Professor Humphreys gives the time of the beginning of the disturbance at the epicenter as about 23h 39m 17s Greenwich civil time.

Immediately after the earthquake the present writer began to collect information concerning the intensity of the disturbance throughout the area over which it was felt. He was aided in this work by students in the University of South Carolina and by many others who courteously furnished information and assistance. From the data thus obtained the writer was able to make estimates of intensity for 198 places; and since the estimates were all made by the same person, they should furnish a better basis for comparison than would be possible if each were made by a different individual. In the preparation of the accompanying map (see fig. 1) estimated intensities for a total of 219 places were used. In the case of 21 of these places, located chiefly in North Carolina, the writer did not have sufficient data on which to base his estimates, and therefore used the intensities reported to the United States Weather Bureau by its observers.

The area of maximum intensity is located in a region that is sparsely inhabited, especially during the winter months, and the few small towns are widely scattered. For this reason the information from places in the epicentral region is not so complete as might be desired. The intensity seems to have been greater at Waynesville, N.C., than at any other town from which reports were received. At this place many chimney-tops were thrown down, window-panes were broken in a number of houses, and people rushed into the streets badly frightened. Two shocks occurring in rapid succession were reported. The intensity, which was probably about VII in the Rossi-Forel scale, is described as violent, and several observers state that it was more severe than at the time of the Charleston earthquake of 1886. Because of insufficient data it is not possible to draw isoseismals VII and VI.

Isoseismal V (see fig. 1) is elliptical in shape, the major axis extending in a northeast-southwest direction, and the area enclosed is approximately 27,000 square miles. The center of this ellipse is located about ten miles northwest of Waynesville, in the neighborhood of latitude $35^{\circ}35'N.$, and longitude $83^{\circ}05'W.$ Professor Humphreys locates the epicenter near Skyland, N.C., latitude $35^{\circ}30'N.$ and longitude $82^{\circ}30'W.$ Within isoseismal V the shock was felt generally by everyone; at many places dishes were shaken from shelves and tables, water splashed out of pitchers and pails, and people ran from houses in fright. Damage to chimneys was reported from Newport, Marysville, Sevierville and Athens in Tennessee, and from Bristol, Virginia. According to newspaper accounts the walls of a hotel at Forest City, North Carolina, were cracked in four places. Fall of plaster was reported from Morristown and Knoxville, Tennessee; Bristol, Virginia; and Tryon, North Carolina. The reports from several places state that there was an increased flow from springs, and in some instances the water was made muddy. Sounds seem to have been heard generally wherever the intensity was above IV.

Isoseismals IV and III are also elliptical and approximately concentric with isoseismal V; but there seems to have been a decidedly more rapid decrease in intensity in the southwesterly than in the northeasterly direction. At Richmond, Virginia, which is about 340 miles northeast of the center of the ellipse formed by isoseismal V, the intensity was nearly IV. Here the shock was felt by many, although not by everyone. Two distinct tremors were reported, each lasting but a few seconds. Pictures were shaken from the walls in several houses, and a few pieces of brick-a-brac were knocked from stands or mantels and broken. At Birmingham, Alabama, and Columbus, Georgia, both of which are about 240 miles in a southwesterly direction from the center of isoseismal V, the disturbance caused no damage, and was felt by comparatively few.

The earthquake was felt at points along the coast from Savannah, Georgia, to Norfolk, Virginia, the intensity varying from II to III. Norfolk, where the intensity was III, is about 390 miles N 75 E., from the center of the ellipse formed by isoseismal V. Going inland, the shock was felt as far west as Memphis, 400 miles from the center of isoseismal V. So far as the writer is aware, this is the most distant point reporting the shock as felt. Dr. C.W. Davis of Memphis, who was on the third floor of a building at the time of the earthquake, states that the vibrations were considerable, causing windows to rattle. The disturbance was noticed by many people in West Memphis, but resulted in no damage.

It is significant that this earthquake with a maximum intensity of about VII was felt at points approximately 400 miles from the epicenter and on opposite sides of it, while the San Francisco earthquake of 1906 with its extremely high epicentral intensity was not felt at any point more than 350 miles from the origin. Although the earthquake of February 21st was sensible at such relatively great distances from the origin, it was not recorded instrumentally at stations unusually far away. According to Professor Humphreys, the shock was recorded instrumentally at Harvard University (about 800 miles away); Canisius College, Buffalo; University of Kansas, Lawrence; and at several other stations located closer to the origin.

With the limited data at hand it is not possible to determine the exact area over which the disturbance was sensible, but it must have been not less than 300,000 square miles, and may have been considerably more. Considering the relatively low intensity reported from points in the epicentral region, this area is unusually large. The area within which a shock is perceptible, is commonly taken as a rough measure of the total energy set free by an earthquake; but this area varies with the character of the rocks through which the vibrations are propagated, as well as with the total amount of energy and the rate at which it is liberated during the disturbance. Therefore, in comparing the energy of earthquakes, especially when their maximum intensities are relatively low, it is preferable that the comparison be made between earthquakes occurring in the same region, or, at least, in regions where the elasticity, density and structure of the rocks are similar. In recent years a number of earthquakes have occurred in the Southern Appalachian region, and, fortunately for our present purpose, one of them has been studied in some detail.

The South Carolina earthquake of January 1, 1913, which epicenter near Union, had an intensity of about VIII, but the shock was sensible over an area of only 43,000 square miles. This means that the earthquake of February 21st, although it had a lower maximum intensity, was felt over an area approximately seven times as great as the South Carolina earthquake.

The outer isoseismals for both of these earthquakes are elliptical, with their major axes extending northeast and southwest. In both instances the isoseismals extend further in the northeastern direction than in any other, thus indicating that in this general region there is for some reason a better propagation of earth vibrations in that direction. In both cases the isoseismals tend to become less circular and more elongated in form the farther they are from the origin. This is probably explained by the fact that the rock structure throughout the Southern Appalachian region runs in a general northeast-southwest direction. Waves propagated parallel to the rock structure undergo less reflection and refraction than waves propagated in other directions, and therefore are not so quickly dissipated.

All of the recent earthquakes in his region are unquestionably due to the differential displacement of rocks under strain, although there may be no evidence of faulting on the surface. The displacement that resulted in the earthquake of January 1, 1913, was probably very limited in its linear extent, for the inner isoseismals were circular in form; and the small area inclosed by these lines, together with the rapid decrease in intensity with distance from the epicenter, indicates that the focus of the disturbance was comparatively near the surface. The lower maximum intensity of the earthquake of February 21st as measured by the Rossi-Forrel scale, may be due to greater depth of the focus. But greater depth is not sufficient to explain the enormous difference in the areas affected, and it is possible that the lower intensity is largely or in part due to a smaller maximum stress in the area that was under strain and perhaps to a slower adjustment of the strains.

The size of the area that is sensibly shaken depends on the total mass displaced during the adjustment of strains as well as the magnitude of the stresses relieved. The distribution of intensities in the epicentral region of the February earthquake is not such as to indicate a displacement along a fault of any considerable linear extent. The greater the distance that the strained area extends back from a fault, the greater must the displacement be in order to relieve a given stress.

A large displacement, however, along any fault plane intersecting the surface would probably have formed noticeable fissures, and nothing of this sort has been reported. The adjustment of strains may have been distributed along more than one fault, for two distinct shocks were felt over most of the region affected. This theory is supported to a limited extent by the distribution of intensities, and there may have been two epicenters, one on each side of the Great Smoky Mountains; but the incompleteness of data from the epicentral region makes a definite answer to this question impossible.

It is, of course, impossible to draw general conclusions from a list of earthquakes, probably incomplete and extending over a period of only four years. All of the information now available, however, seems to indicate that seismic activity is moderately high in the Southern Appalachians as a whole, although there is probably no single fault in the region that is especially active at the present time.

The earthquake of February 21, 1916, had its origin near the western boundary of the Appalachian Mountain Belt. The center of the ellipse formed by isoseismal V falls in the southeastern corner of the Mt. Guyot topographic sheet of the United States Geological Survey. While this quadrangle has not been mapped geologically, all of the adjoining quadrangles with the exception of the Cowee sheet on the south have been mapped, and the geologic folios published.

The Appalachian Mountains occupy a narrow belt which begins in eastern Alabama and extends northeastward, broadening to its greatest width of about seventy miles in North Carolina, where the highest elevations are found. In western North Carolina near the Virginia line the Blue Ridge forks, the Unaka or Great Smoky Mountains branch off toward the southwest, while the Blue Ridge proper continues in a more southerly direction. The Unaka mountains are higher and more rugged, but not so continuous as the well-defined Blue Ridge. The triangular area lying between these ridges is occupied by many short ranges and groups of mountains, some of which are merely spurs extending out from the principal ridges. To the southeast the Blue Ridge is flanked by the Piedmont plateau, while on the northwest the steep slopes of the Unaka ridge descend to a broad valley, occupied by the Tennessee River and its tributaries.

The rocks in the Appalachian Mountain division are for the most part crystalline, and consist of metamorphosed sediments and igneous rocks. In the central and southeastern part of the belt they are chiefly pre-Cambrian in age, while in the Great Smoky mountains they are Cambrian. The contact between the pre-Cambrian and Paleozoic rocks is very irregular, with many outliers and inliers, but in a general way it roughly parallels the North Carolina-Tennessee state line. It is frequently, though not always, marked by the presence of faults. This contact crosses the southeast corner of the Mt. Guyot Quadrangle close to the center of isoseismal V, as located on the accompanying map. The rocks that are sedimentary in origin furnish evidence of much folding, while thrust faults, usually having a southeasterly dip, are common. Most of the faults dip at steep angles, but a few are rather flat, and displacements of several miles have been measured.

In many of the folds adjustments have taken place along the planes of bedding and schistosity. Some of the recent earthquakes may have resulted from adjustments of this kind.

The topography, especially of the interior ranges, is controlled chiefly by the circumstance of drainage rather than by the structure. With few exceptions the general strike of the faults, as well as the schistosity of the rocks and the contacts between different formations, is in a northeast-southwest direction; but the minor ranges cut directly across this strike quite as frequently as otherwise. Therefore, while the recent earthquakes in this region are tectonic in origin, the crustal movements now going on are of such a nature and take place so slowly that the topography is not directly influenced by the faulting, as is the case in many of the younger and rapidly growing mountain ranges which are the loci of much greater seismic activity.

Although there are many faults in the Southern Appalachians, there has probably been very little displacement along most of them in recent geologic time. In other words, they may be classed as inactive faults. The crustal movements that have taken place in the Appalachians since the Cretaceous period and to which the present height of the mountains must be largely attributed, are in nature of a slow differential uplift, accompanied by a gentle warping or dome-like arching of the entire region. A movement of this kind probably results in the development of strains over a broad area, although these strains may in general be relieved by relatively small displacements. It is not unlikely that the recent earthquakes in the Southern Appalachians are due to a continuation of this slow gradual elevation of the region that has been going on intermittently in recent geologic time.

1. Humphreys [220] 1916 FEB 21 6:40 p.m. 35.5 82.5 Skyland, NC 518,000 VI (RF)

On February 21, 1916, about 6:40 p.m., 75th M. time, an earthquake occurred in the Appalachian Mountains of western North Carolina that was distinctly felt not only in various parts of that State but also in South Carolina, Georgia, Alabama, Tennessee, Kentucky, Virginia, and, presumably, in West Virginia. The various places from which reports of this quake were received and the corresponding intensities, as estimated by the observers, are given on the accompanying chart. Most of these reports were published in detail in the REVIEW for February, 1916.

The last earthquake of note that occurred in this general region was on January 1, 1913, with the epicenter near Union, S.C. While this earthquake had a higher intensity than the one under discussion, yet the area affected was only approximately one-fifth as great. On October 29, 1915, an earthquake with an intensity of IV Rossi-Forrel, was felt in Buncombe County, N.C., the same county in which the one of February 21 was the most severe, but reported only from Asheville and its immediate vicinity. Earthquakes are not uncommon in the southern Appalachians; indeed, scarcely a year passes without one or more being felt somewhere in this region.

According to scattered reports the epicenter of the earthquake of February 21 was near Skyland, N.C., lat. $35^{\circ}30'$ N., long. $82^{\circ}30'W.$, where an intensity of VI, Rossi-Forrel, was reported. The area over which this quake was felt, elliptical in shape, with the longer axis in a NE.-SW. direction, exceeded 200,000 square miles. The most distant point from the epicenter (assumed to be at Skyland, N.C.), to report feeling the shock is Norfolk, Va., 365 miles away. Instrumentally the quake was recorded at Harvard University, 1,250 miles away; Canisius College, Buffalo; University of Kansas, Lawrence; St. Louis University, St. Louis; Georgetown University, and the Weather Bureau, Washington, D.C.

The time of the disturbance, as given by a majority of the observers, whose reports show a surprisingly close agreement, was approximately 6:40 p.m., eastern time. Mr. M.L. Church, of Marshall, N.C., about 25 miles from the epicenter, gives the time of ending as 6h 39m 45s, and from his estimated duration places the beginning at 6h 39m 15-30s. These values are quite reliable, as the error of Mr. Church's watch was obtained by telegraph within five minutes after the disturbance. The times of beginning at the epicenter, as determined respectively from the seismograph records of Harvard University, Georgetown University, and the Weather Bureau by means of the P-0 and S-0 tables of Dr. Klotz, were substantially the same and averaged 6h 39m 17s. Of course, consistent reports as to intensity could not be expected, owing to occupation of observer, nature and intensity of artificial disturbances, errors of estimation, and many other factors. Hence the isoseismals on the accompanying chart are only relative and drawn to the average values of intensity.

Sounds were quite uniformly reported within the territory bounded by the IV isoseismal. Within a radius of 200 miles from the epicenter, approximately that of the III isoseismal, rattling of dishes and windows was noted. Several stated that it was the most severe quake they had experienced since the Charleston earthquake of August 31, 1886. Crockery and other utensils fell from shelves in several cities. Near Sevierville, Tenn., a team of horses became frightened and ran away, tearing up a buggy, while in the town bricks were shaken from chimneys. Near the same place, in Wears Valley, several springs increased in volume, some running muddy--a common earthquake phenomenon. A few observers reported the cracking of plaster. People became alarmed at several places within the territory bounded by the V isoseismal and rushed from their homes, but no damage of consequence occurred anywhere.

The data used in this note were assembled by Mr. R.H. Finch, who deserves much credit for his careful attention to the details of the seismological reports.

- a. MWR [290]
- b. Church, M.L. (personal communication)
- c. Taber [361]
- d. Various instrumental reports
2. McCallie, W.S. (personal communication)
3. Sullivan, H.E. (personal communication)
4. Sullivan, R.R. (personal communication)
5. Taber [455]
6. Gordon [170]

7. Taber [360]
8. Reid, H.F. (personal communication)
9. Finch [?]
10. Keith, A. - geologic mapping in area ?

G. Humphreys [220]

III. USGS [390]

A. EQHUS [123]	1916	FEB 21	17:39	35.5	82.5	Western NC	518,000	VII (RF)
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This earthquake occurred in the Appalachian Mountains near Skyland, N.C., not far from Asheville. It was felt from Georgia to Virginia and as far west as Alabama, Tennessee, and Kentucky. The most distant point where it was felt was Norfolk, Va., 365 miles away. Sounds were heard throughout the area included within isoseismal 4. Within 200 miles of the center--that is, to isoseismal 3,--rattling of dishes and windows was noted. In places near the center crockery fell from shelves. At Sevierville, Tenn., a team of horses ran away, and bricks were shaken from chimneys. Springs increased in volume. In a few places plaster was cracked. No important damage anywhere.

1. Taber [361]
2. MWR [290]
3. Reid [325]

B. EQHUS [121]	1915	FEB 21	17:39	35.5	82.5	Western NC	518,000	VI
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[account same as A. above]

1. Taber [361]
2. MWR [290]
3. Reid [325]
4. MacCarthy [241]

C. EQHUS [120] 1916 FEB 21 17:39 35.5 82.5 Near Asheville, NC 518,000 VI

1916. February 21. Near Asheville, N.C. This earthquake occurred in the Appalachian Mountains near Skyland, N.C., not far from Asheville. Felt from Georgia to Virginia and as far west as Alabama, Tennessee, and Kentucky. It was one of the largest North Carolina shocks in historic times. The most distant felt point was Norfolk, Va., 365 miles away. In places near the center, crockery fell from shelves. At Sevierville, Tenn., a team of horses ran away and bricks were shaken from chimneys. Springs increased in volume. In a few places, plaster was cracked. Sounds were heard throughout the area included within isoseismal IV. Within 200 miles of the center—that is, to isoseismal III—rattling of dishes and windows was noted.

1. Taber [361]

2. Woollard [410]

3. MWR [290]

4. MacCarthy [241]

IV. McClain [260] 1916 FEB 21 22:39 35.5 82.5 Near Waynesville, NC 1,495,000 VI-VII

A. Moneymaker [281]

B. EQHUS [121]

V. Bollinger [33] 1916 FEB 21 17:39 35.5 82.5 Skyland, NC 518,000 VII

A. EQHUS [120]

B. MacCarthy [241]

C. McClain [260]

D. Moneymaker [281]

E. Taber [361]

VI. Moneymaker [281] 1916 FEB 21 5:39 p.m. Waynesville 1,495,000 VII

This earthquake, centered near Waynesville, North Carolina, affected an area of 500,000 square miles in the Carolinas, Georgia, Alabama, Tennessee, Kentucky, Virginia, and other states. Two shocks, separated by a very short time interval, were felt at many localities, especially in western North Carolina. A rumbling noise was heard over an extensive area. At Waynesville, chimney tops were thrown down, many window panes were broken, and fear-stricken people rushed into the streets.

The earthquake was felt over nearly all of Tennessee. It was most severe in the mountains of eastern Tennessee. At Sevierville, bricks were shaken from chimneys and a team of frightened work horses ran away. There was an increase in the flow of springs and in some instances the water became muddy. Shocks equally strong were felt at Newport and Elizabethton. Plaster reportedly fell from walls at Knoxville, Morristown, and Bristol. At Memphis, the motion was considerable in the higher stories of buildings. Numerous people in West Memphis, Arkansas, felt the shocks.

A. Branner [85] 1916 FEB 21 Skyland, NC 518,000 VI

B. Hall [?]

"Until the earthquake of February 21, 1916, this spring (the "Fittifying" spring near Greenbrier Cave, Tennessee) appeared to be a normal spring like thousands of other mountain springs. This earthquake (Humphreys, 1916) was relatively severe, Intensity VI, Rossi-Forel Scale. In fact, this earthquake with its epicenter in the vicinity of Skyland, North Carolina, was sufficiently severe in Sevierville, Tennessee, to frighten a team of horses hitched to a buggy so that they ran away and damaged the vehicle. A number of springs in the limestone areas are reported to have discharged increased volumes of water. Springs in Wear's Cove about ten or twelve miles southwest of Sevierville are reported to have flowed muddy water, a phenomena (sic) not unusual when limestone areas are shaken. In the area above Greenbrier Cover the springs were not seriously affected except this one began to ebb and flow rhythmically."

1. Humphreys [220]

C. EOHUS [123]

D. Humphreys [220]

E. Neumann [300]

GA, KY, NC, SC, TN, VA

V-VII
(RF)

1916 FEB 21 23:40

1. MWR [290]

2. Taber [361]

3. Seismo. notes [340]

F. Seismo. notes [340]

G. Taber [361]

H. Woollard [410]

VII. Woollard [410]	1916	FEB 21	17:39	35.5	82.5	Near Skyland, NC	777,000	VII+ (RF)
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Duration = 20 secs.

A. Seismo. notes [340]

VIII.(a) McCarthy [241]	1916	FEB 21	17:39	35.5	82.5	Skyland, NC	518,000	VII (RF)
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*1916: February 21, 17:39 hrs. Skyland, N.C. "Epicenter at about 35.5 N., 82.5 W., intensity 7, felt over 200,000 square miles. In Appalachian Mountains near Skyland, N.C., not far from Asheville. Was felt from Georgia to Virginia, and as far west as Alabama, Tennessee, and Kentucky. The most distant point where it was felt was Norfolk, Va., 365 miles away. Sounds were heard throughout the area included within isoseismal 4. Within 200 miles of the epicenter crockery fell from shelves...In a few places plaster was cracked. No important damage anywhere." (E. Hist.") See also accounts in B.S.S.A. 6 (1916), pp. 218-226, B.S.S.A. 6 (1916), p. 50, and M.W.R. 55 (1916) p. 154. The account in B.S.S.A. 6, pp. 218-226, gives the epicenter as 35°35'N., 83°05'W., and the M.W.R. account places it at 35°30'N., 82°30'W. In the M.W.R. account, 37 different North Carolina communities are listed as having felt this quake, distributed pretty generally throughout the state. This earthquake, one of the very largest which has occurred within the borders of North Carolina during historic times, was instrumentally recorded at Cambridge, Mass.; Buffalo, N.Y.; Lawrence, Kans.; St. Louis, Mo.; Georgetown, Md.; and Washington, D.C., according to the M.W.R. account.

A. MWR [290]

B. Taber [361]

C. Seismo. notes [340]

D. EOHUS [123]

VIII.(b) MacCarthy [244]

1916 FEB 21 6:40 p.m. 35.5 82.5 Near Skyland, NC 518,000 VI

1916: Feb. 21: 6:40 p.m. A North Carolina earthquake, epicenter near 35.5 N, 82.5 W., near Skyland, N.C. (just south of Asheville), which was felt throughout southwestern Virginia. It affected some 200,000 square miles in all, being felt as far as Norfolk in Virginia. In the epicentral region the intensity was about VI (E. Hist.). According to Humphries (1916), two distinct tremors were felt in the central and western portions of Richmond, where a few pictures were shaken from walls and some bric-a-brac knocked down and broken. At Bristol the shock was described as "distinct and somewhat prolonged"; it damaged a chimney and caused some plaster to fall. At Norfolk it was slight and not generally noticed. At Danville there were several slight but distinct earth tremors. At South Boston it lasted between 10 and 15 seconds, "putting out the lights" and breaking some china. At Roanoke it was noticed by only a few. The Richmond Times-Dispatch (Feb. 22) carries a good account of this shock, quoting many local items from various parts of the state.

A. EQUUS [121]

B. Humphreys [220]

C. Times Dispatch (2/22/16), Richmond, VA

IX. Varma [400]

1916 FEB 21 35.5 82.2 Buncombe Co., NC VI

A. MacCarthy [241]

B. Woollard [410]

I. TEIC 1916 AUG 26 19:35 35.9 81.2 Taylorsville, NC 7100 V

Location: Taylorsville, NC; intensity; center of affected area

Intensity: Moved furniture @ Taylorsville, NC; felt by nearly everyone in North Wilkesboro, NC; @ Statesville, NC, caused alarm

Extent: Western NC; map; 7100 sq. km.

II. TVA [380] 1916 AUG 26 19:35 35.9 81.2 Taylorsville, NC V-VI

A. MTR [290] 1916 AUG 26 19:35

Station	Intensity Rossi- Forel	Number of Shocks	Duration (secs.)	Sounds	Remarks
NORTH CAROLINA					
Harmony	3	1		Rumbling	
Lenoir	3	1		None	
Lincolnton	2	3		do	
Morganton	2	1			
Newton	4	1	2	Rumbling	
North Wilkesboro	4-5	1		Faint	Felt by nearly everyone
Statesville	?	1			Caused some alarm
Taylorsville	5	?	2	Rumbling	

1. Assoc. Press.

Hickory, N.C., August 26, 1916

At 2:45 this afternoon a sharp earthquake was felt in Hickory, Conover, Statesville, and Newton. The shock was vigorous, but not of long duration. No damage was done. The shock seemingly was purely local in character.

2. Finch [140] 1916 AUG 26 2:35 p.m. 36 81 Western NC 9800 V (RF)

On August 26, 1916, about 2:35 p.m., an earthquake occurred in western North Carolina with its epicenter at, approximately latitude 36° N., longitude 81° W., or a little to the northeast of the epicenter of the earthquake of February 21, 1916.

While the area sensibly affected was very small, 3,800 square miles, and the highest intensity reported but V, Rossi-Forel, yet the earthquake is of special interest in view of the fact that fairly good records of it were obtained on the seismographs at the Weather Bureau, Washington, D.C., and Georgetown University. Considerable alarm was experienced in a few cities, but no damage occurred. Detailed reports from some of the places affected by the quake are given in Table 1*, noninstrumental earthquake reports, of this REVIEW. The time of the disturbance, as given by the majority of the best reports, was 2 35 p.m., Eastern Time. The time of beginning at the epicenter as determined from the seismograph record of the Weather Bureau, Washington, D.C., by means of the P-0 and S-0 tables of Dr. Klotz was 2 36 08 p.m. The estimated distance of the epicenter from Washington, determined from S-P tables, is in close agreement with the measured distance to the approximate epicenter, the former being 323 miles and the latter 320 miles.

*see MWR [290]

B. Taber [361]	1916	AUG 26	19:35	36	81	Western NC	10,400	V (RF)
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On August 26, 1916, about 19h 35s (Greenwich), an earthquake occurred in western North Carolina with its epicenter approximately at latitude 36 N., longitude 81 W. This highest intensity (V, R.-F.) was reported from Statesville and Taylorsville, and the area sensibly affected was probably 4,000 square miles or more.

USGS [390]

A. EQHUS [123]	1916	AUG 26	14:36	36	81	Western NC	9800	V (RF)
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Force 5 at Statesville, N.C.

1. Taber [361]

2. MWR [290]

B. EQHUS [121]	1916	AUG 26	14:36	36	81	Western NC	9800	V
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Intensity V at Statesville and Taylorsville, N.C. Felt over approximately 3,800 square miles.

1. Taber [361]

2. MWR [290]

3. MacCarthy [241]

C. EQHUS [120] [same as B. above]

IV. McClain [260] 1916 AUG 26 18:35 36.0 81.0 9800 V
Statesville and
Taylorsville, NC

Strong-Licolnton, N.C., reported 3 shocks; Aftershock

A. Moneymaker [281]

B. EQHUS [121]

V. Bollinger [33] 1916 AUG 26 14:36 36 81 9800 V
Western NC

Aftershock one our later

A. EQHUS [120]

B. MacCarthy [241]

C. McClain [260]

D. Moneymaker [281]

E. Taber [361]

VI. Moneymaker [340] 1916 AUG 26 1:35 p.m. V
Southern Appalachians

A strong shock at Statesville and Taylorsville, North Carolina. The shock, accompanied by a rumbling noise was felt also at Harmony, Lenoir, Lincolnton, Morganton, Newton, and North Wilkesboro, North Carolina. At Lincolnton, three shocks were reported.

A. Matthes [325] 1916 AUG 26 Western NC

Light to moderate; moved furniture; reported to weather bureau

B. Neumann [300] 1916 AUG 26 19:35 V (RF)
Southern appalachians

1. MWR [290]

C. Taber [361]

D. MWR [290]

VII. Woollard [410] 1916 AUG 26 14:36 36 81 Near Taylorsville, NC 9800 V (RF)

Duration = 2 secs.

A. MWR [290]

VIII. MacCarthy [241] 1916 AUG 26 14:36 36 81 Western NC 9800 V (RF)

*1916: August 26, 14:36 hrs. western North Carolina. "Epicenter at about 36 N., 81 W., intensity 5, felt over 3,800 square miles." See also M.W.R. 44 (1916), p. 483, which states that the epicenter was a little to the northeast of that of the quake of Feb. 21, 1916. See also B.S.S.A. 6 (1916), p. 224, where it is stated that the highest intensities were recorded from Statesville and Taylorsville. North Carolina towns mentioned in various accounts including available contemporary newspapers, are: Harmony, Lenoir, Lincolnnton, Morganton, Newton, North Wilkesboro, Statesville, Taylorsville, Hickory, and Conover. No damage seems to have been done anywhere.

A. MWR [290]

B. Taber [361]

IX. Varma [400] 1916 AUG 26 36.0 81.0 Alexander, NC V

A. MacCarthy [241]

I. TEIC	1916	OCT 18	22:04	33.5	86.7	Irondale, AL	358,000	VII
<p>Location: Irondale, AL; A/S; intensity</p> <p>Intensity: Chimneys fell @ Pell City and Irondale, AL - some 6 were leveled to rooftop; @ Easonville, AL; tops of chimneys fell; chimney damage and broken windows @ Birmingham, AL; @ Vincent, AL, chimney damage reported; a number of wells went dry, or were lowered @ Irondale, one dry well began to flow</p> <p>Extent: S AL to IN-KY border, E MS to W SC; map; 358,000 sq. km.</p> <p>Comment: A/S reported in Birmingham and Pell City</p>								
I. TVA [380]	1916	OCT 18	22:04	33.5	86.2	Easonville, AL		III
A. MWR [290]	1916	OCT 18	22:04					

<u>Station</u>	<u>Intensity Rossi- Forel</u>	<u>Number of Shocks</u>	<u>Duration (secs.)</u>	<u>Sounds</u>	<u>Remarks</u>
ALABAMA					
Aniston	5	2	4	None	Furniture moved
Asheville	5	2			Many people alarmed
Athens	5	1	3	None	
Auburn	3	3	9	do	
Benton	3-4	1	30	Rumbling	Dishes rattled
Bessemer	4-5	4		do	
Birmingham	5	3	14	do	Buildings trembled
Bridgeport	2	1	4	do	
Calera	4	1			
Camden				Rumbling	
Camp Hill	4				
Clanton	5	1	20	Rumbling	
Cordova	2	3		None	
Dadeville	2	2	20		
Decatur	5	2	6		
Easonville	7	1	10	Rumbling	Tons of chimneys fell
Kuhla	3	1		None	Shook some buildings
Florence	4	1		do	
Fort Deposit	2-3	1			
Gadsden	3-4	1			Buildings shaken
Geneva	2	1			
Goodwater	5	1		Rumbling	
Guntersville	5	1	8	do	Many frightened
Hamilton	5	1		None	
Lincoln	4	2		do	
Madison					
Maple Grove	?	?		Rumbling	
Mentone				do	
Milstead	4	2			
Montgomery	4	1	3	None	A few persons nauseated

<u>Station</u>	<u>Intensity Rossi- Forel</u>	<u>Number of Shocks</u>	<u>Duration (secs.)</u>	<u>Sounds</u>	<u>Remarks</u>
Moulton	3-4	2	10	Rumbling	
Oneonta	4-5	2	9		Furniture moved
Opelika					
Ozark	2	1	2		
St. Bernard	4				
Saltsboro	4-5	3		Rumbling	Buildings shaken
Selma					
Saline	3-4	1			
Talledega	5	3	30	Rumbling	Some plaster fell
Valley Head	2-3				
Vernon				None	Windows rattled
Wedowee	5	1	30	Rumbling	Doors and furniture moved
Birmingham					
Easonville					
GEORGIA					
Atlanta	5	2	5	None	Shook buildings
Augusta	3	1		None	Windows rattled
Blairsville	2	2	10	None	
Blue Ridge		1			Some objects upset
Canton		1	30		
Clayton	3	1	30	None	
Cleveland	5	2		Rumbling	
Columbus	3	2	30		
Concord	4-5	1	10	Rumbling	
Covington				Rumbling	
Dahlonega	2	3		None	
Dalton	3	2	10	None	Windows rattled
Duluth	5	1	25	None	
Forsyth	3-4	2	15		Buildings trembled
Gainesville	5		20	None	
Griffin	2	1	15	Faint	
La Fayette		1	30	Rumbling	
La Grange	5	1	10	None	
Hiwassee	3-4	1	15	None	

<u>Station</u>	<u>Intensity Rossi- Forel</u>	<u>Number of Shocks</u>	<u>Duration (secs.)</u>	<u>Sounds</u>	<u>Remarks</u>
Macon	3-4	2			Windows rattled
Madison	4-5	2	5	Faint	Pictures swayed
Marietta		2			
Marshallville	3	4			
Monticello	3	2		Rumbling	
Rome	3	1			
Sandersville	3				Dishes rattled
Summerville	2	1			
Tallapoosa	4	1	10		
Thomson	3	1	5	None	
Thunder		1	55	None	
Warrenton		1			
INDIANA					
Evansville	3	1	4	None	
KENTUCKY					
Beaver Dam	2	1			Buildings shook slightly
Calhoun		1			Windows rattled
Louisville	3	2		None	Windows rattled
Taylorsville					
MISSISSIPPI					
Aberdeen	2	1		Faint	Slight rattling of dishes
Booneville	3	1	2	None	Windows rattled
Corinth	2	1	10	None	
Fulton	2	1	30		
Porterville	2-3	1	2	None	Windows rattled
Toomsba	4	1	5	None	Buildings trembled

<u>Station</u>	<u>Intensity Rossi- Forel</u>	<u>Number of Shocks</u>	<u>Duration (secs.)</u>	<u>Sounds</u>	<u>Remarks</u>
NORTH CAROLINA					
Highlands	2-3	1	15	None	
Murphy		1			
Natahalia	3	1	10	Rumbling	Cans fell off shelves
SOUTH CAROLINA					
Columbia	2	2		None	
Liberty	3	2	15	None	
TENNESSEE					
Carthage		3	3		
Charleston	2	1	25	None	
Chattanooga	4-5	1	50	None	
Clinton	2	1	5	None	
Copperhill	3	1		None	Shook some buildings
Lewisburg	4-5	1	15	None	Alarmed some people
Lynnville	3-4	1	4	None	Dishes and windows rattled
McMinnville	5	3	3	Rumbling	
Murfreesboro	3-4			Rumbling	
Nashville	4	4	15		Widows rattled
Sewanee	5			Faint	
Sparta	3-4	2	50	Rumbling	
Tullahoma	2	1		None	

1. Assoc. Press

Atlanta, Ga., Oct. 18, 1916

Two distinct earthquake shocks that in some instances shook frame buildings and knocked chimneys down, were felt throughout Georgia and eastern Alabama and Tennessee shortly after 4 o'clock to day. From all points damage was reported as negligible except around Birmingham and Montgomery where it appeared to consist of damage to chimneys. The tremor was not felt at any point east of a suburb of Augusta, Ga., according to press reports tonight, some of which said the first shock was heavier than the second, while others reversed the description. Two distinct shocks were felt in Macon and Columbus, Ga. (Assoc. Press).

Birmingham, Ala., Oct. 18, 1916

Birmingham had the severest earthquake in her history this afternoon at 2 minutes past 4 o'clock. There were three sharp and distinct shocks separated by brief intervals. Little property damage was caused other than broken windows and toppled chimneys. (Assoc. Press).

Louisville, Ky. Oct. 18, 1916.

A slight earthquake shock was felt over a wide area in Louisville at 4:05 o'clock today. Police reported that downtown tall buildings noticeably were rocked, while in the outlying districts pictures swayed and chinaware rattled. (Assoc. Press).

B. Taber [361]

Alabama and neighboring states were disturbed by an earthquake on October 18, 1916, about 22h 04m (Greenwich). According to newspaper accounts the intensity seems to have been greatest near Birmingham, where windows were broken and many chimneys thrown down. Most places report two distinct shocks. These shocks were felt by a few people in Columbia, South Carolina (intensity about II, R.-F.), over 300 miles from Birmingham.

1. Unspecified news accounts

C. Finch [140]	1916	OCT 18	4:03 p.m.	Birmingham, AL	VII-VIII (RF)
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An earthquake occurred on October 18, 1916, a little to the northeast of Birmingham, Ala., that has been reported from eight different states: Alabama, Georgia, Indiana, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee. Undoubtedly it was felt in Florida also, as Geneva on the Alabama-Florida line reported it with an intensity of II, Rossi-Forel.

The occurrence of this earthquake was unnoticed in many places owing to the high winds and heavy rain incident to a hurricane then passing over the east Gulf States. Several persons, in fact, mistook the earthquake disturbance for wind effects. Thus, the observer at Marshallville, Ga., remarked to his wife, "We are having some wind today," to which she replied that there was just one strong gust and that it had died down.

The data used in this note, given in some detail on pages 589-590 in the Monthly Weather Review for October, 1916, were obtained from some 200 card reports rendered by Weather Bureau cooperative observers, United States postmasters, and others. Thanks are specially due to Mr. W.N. Maddox, of Easonville, Ala., who furnished much valuable information.

The influence of the geologic structure on the propagation of the earthquake waves is shown by the fact that the earthquake was felt 340 miles to the north and to the east, 190 miles to the south, and only 130 miles to the west, where the waves encountered the unconsolidated material of the Mississippi Delta. To the northeast along the continuation of the ridge in which the epicenter is situated, the quake was not felt as far as it was to the north and east. (See fig. 1.) An interesting account of the difference in effects of an earthquake on dry hilly land and most sandy land was furnished by Hon. R.E. Thompson, of Toombs, Miss. Mr. Thompson, whose house is located on a damp sandy foundation, felt and could give a good description of the earthquake, while his neighbors whose houses are on higher and drier land did not know that anything unusual had occurred.

Instrumental records of the earthquake were made by the seismographs of the University of Kansas at Lawrence, Kans., Georgetown University, and the Weather Bureau at Washington, D.C.

The highest intensity reported was VII-VIII (Rossi-Forel) at Easonville and Irondale, Ala. The different intensities as reported are shown on the accompanying chart. The isoseismals are, of course, only relatively accurate and are drawn for average values. The inaccuracy of isoseismals based upon a few reports is well illustrated by the fact that Lewisburg, Tenn., reported the quake with an intensity of IV-V, while a small hamlet on a rural free mail delivery route from Lewisburg reported that it was not felt.

The time of the shock as given by a majority of reports was 4:03-4:04 p.m., 90th meridian time. Mr. C.F. von Herrmann, in charge of the Weather Bureau office at Atlanta, Ga., reported two shocks and gave the time very accurately, reporting the first shock at 4h 04m 05s and the second at 4h 05m 25s p.m. But as Atlanta is about 130 miles from the epicenter it may be that these two shocks were only different phases of the same quake. The average time of the occurrence at the epicenter, as determined from the seismograph records of the University of Kansas, Georgetown University, and the Weather Bureau at Washington by means of the P-0 table of Dr. Klotz, is 4h 03m 14s p.m.

As is usual, the main shock of October 18 was followed by several weaker ones. At 10:54 p.m. October 18 a shock was felt over most of the territory bounded by the VII isoseismal. A few people felt shocks at about 9 p.m., October 22, and on the morning of October 28. Birmingham was shaken by a light tremor at 6:15 a.m. November 4, but there is some doubt as to whether this was seismic or due to a mine explosion.

The Geological Survey detailed a trained geologist, Mr. Oliver B. Hopkins, to make a study of the epicenter region, and his interesting report follows.

1. Card survey - Weather Bureau cooperative observers, postmasters, etc.
2. Thompson, R.E. (personal communication)

3. Instrumental records

D. Hopkins [200] 1916 OCT 18 4:03 p.m.

Time--According to Mr. C.J. Yow, train dispatcher of the Southern Railway at Pell City, Ala., the most intense shock occurred at 4:03 p.m. (90th meridian time), October 18, and smaller, but distinct, shocks at 8:53 p.m., and 9:11 p.m. on October 22. Other shocks are reported by a number of people as having occurred at about 11 p.m. October 18 and about 6 a.m. October 28.

The first shock at 4:03 p.m. on October 18 is the only one which was sufficiently severe to be generally felt from Birmingham eastward beyond Pell City.

Duration--The duration of the first shock has been variously estimated from less than one-half minute to more than a minute. No close estimate of the actual time during which the movement could be felt can be given because few people realized that any disturbance was taking place until it had reached its maximum intensity. An observer near Easonville was certain from his action during the shock that it could be distinctly felt for more than a minute; on the other hand another observer at Irondale stated that it could be felt probably less than one-half minute, since he rushed out of doors as soon as he was conscious of the shaking and when he got outside the shaking had ceased.

The subsequent shocks were less severe and were experienced by few people.

Direction of vibration--The examination of a number of fallen objects, principally chimneys, near Easonville, Pell City, and Irondale, suggests that the direction of vibration was from east to west. At Easonville a small water keg, resting on an east-west shelf was overturned on the west and did not roll off the shelf. Three-fourths of a mile east of Easonville about 30 bricks from a chimney fell in an easterly direction. Near Pell City a farmer, who was standing on the southwest side of a fence during the shock, clearly felt the fence being heaved toward him (or himself being heaved toward the fence.) The examination of 14 chimneys in Irondale which were partially destroyed, showed that 10 of them fell either to the east or west.

On the other hand, half a dozen bricks, which were dislodged from a chimney on the south side of the courthouse at Pell City, fell to the south, and several of the chimneys in Irondale fell as if they had been rocked in no particular direction, the bricks falling in all directions.

W
S
P

Noises—The noises reported consisted of two kinds—those due to the earthquake itself and those caused by the disturbance of objects. Simultaneously with the shock came a low rumbling noise, which has been likened to the rumble of heavy distant thunder or to the hum of a distant motor. Some likened the noise and shaking to the sudden gust of wind on a still day. This noise was clearly heard by many people from Irondale to Pell City.

The principal noise, which caused the people to be frightened was due to the disturbance of objects, such as the creaking of the houses, the rattling of dishes, and the falling of bricks, etc.

Effect on people—From the eastern edge of Birmingham to Pell City most of the people within doors at the time of the severe shock were so frightened that they rushed outdoors for fear their houses would fall; on the other hand, probably one-half of those who were out of doors at the time were entirely unconscious of the earthquake. Only one case of personal injury has been heard of, and that was caused by a falling brick. In the central part of Birmingham the effects of the earthquake were much less pronounced, and many people, who were indoors were either barely conscious of the earthquake or not conscious of it at all. Two persons who were asleep in the hotel at Pell City were suddenly awakened by the shock and so badly frightened that they rushed from the building.

The subsequent shocks were so mild that only a few people experienced them, and few persons, if any, were alarmed.

In Selma the first shock was distinctly felt by many, but it was not sufficiently intense to cause alarm. In general, people on the upper floors of buildings felt the shock, whereas those on the ground or on the lower floors were unconscious of it.

Effect on objects—Judging from the number of chimneys partially destroyed, the shock was more severe in Irondale than in any other part of the region between Easonville and Birmingham. Here 14 chimneys were partially destroyed within an area of two blocks. Six chimneys on a brick store were practically leveled to the roof. Many others were either leveled to the house roofs, or so badly cracked that they had to be rebuilt. Much less damage was done to chimneys in the surrounding area and farther west, toward Birmingham, although many poorly built chimneys were partially destroyed in the eastern edge of town. In Pell City a few bricks were dislocated from one of the chimneys of the courthouse. Near Easonville slight damage was done to a few chimneys and a few objects were upset. Effects of a similar nature near Vincent are reported, but were not verified.

Disturbance of the earth surface—A fissure and a landslide were reported to have been caused by the earthquake near Easonville. An investigation of these and other reported surface effects in that vicinity failed to reveal any evidence of surface dislocation of importance or to yield exact information as to the location of the readjustments which produced the earthquake shock. The fissure reported was relatively insignificant, and may or may not have had any connection with the earthquake. The landslide unquestionably antedated the earthquake by a month or two, and was in itself of little significance. The result of greatest geologic significance, so far as could be learned, was the effect upon the underground water, particularly in Irondale; a number of wells either went dry after the shock or the water in them was lowered.

The fissure referred to was developed in the back yard of J.M. Farley, on the property of L.C. Davis on Kelly Creek, 6 miles north of Vincent. Mr. Farley is positive that he saw the crack at least an hour before the earthquake occurred, although he states that it was larger after the earthquake than it was before. In maximum size the fissure was 12 feet long, 1 inch wide, and 18 inches deep. It extended in an east-west direction. At the time of the writer's visit only indistinct traces of the fissure could be seen. Although the origin of the fissure is obscure, it may be connected with the solution of limestone which underlies that area. This supposition is supported by the presence of limestone sinks near by, and by the presence of a bold spring of strong limewater which issues from the base of the hill.

No other fissures could be found and no reports of any others could be obtained with the exception of a crack in the bottom of a well near Irondale, which is probably due to the earthquake movement.

The landslide, which is referred to above, unquestionably antedated the earthquake by a month or more, according to the unanimous opinion of the people who live in the vicinity. It consisted of a tree, some large rocks, and other debris sliding from a steep bluff into the road after a prolonged rainy season.

The most interesting effect of the earthquake was the drying up of a number of heretofore unfailing wells and the lowering of the water level in others. The elevation of the water in a well in Pell City was lowered 2 feet by the earthquake. This lowering of the water level was definitely determined since the rope on the windlass was too short to reach the water after the earthquake. A small "day weather" branch north of Dykes Mill is reported to have begun running immediately after the earthquake, whereas it had been dry for months before.

This report could not be verified. In Irondale five wells within a single block went dry immediately after the earthquake, and in many of the surrounding ones the water level was materially lowered. The wells that went dry in Irondale after the earthquake are on the southern edge of the town and on slightly higher ground than the rest of the town, whereas the chimneys most affected are in the central and northern part of town on low ground.

Relation of earthquake effects near Irondale to Red Gap fault.

A careful study of the Red Gap fault, which extends from near Gate City to beyond Irondale, failed to reveal any direct evidence of recent movement. If the readjustments which caused the earthquake produced any surface cracks or showed in any way in the surface material, these results were very slight and all traces of them had been obliterated at the time of the writer's visit.

On the other hand, the effect on the underground water conditions proves that there was movement in the rocks of this area attending the earthquake, and strongly suggests that there was movement along this old fault plane. As shown in the Birmingham geologic folio, published by the United States Geological Survey, this fault passes approximately through the center of Irondale. Practically all the wells along the eastern end of the fault, as shown on that map, either went dry or the water level in them was materially lowered.

Most of the wells which went dry are located one block south of the fault line on a slight elevation, as compared with the others in town. Within a block five wells, ranging from 35 to 40 feet deep, went dry, whereas the sixth in the row which was only 14 feet deep did not. Two other wells, probably along the eastern extension of this fault or near it went dry.

One is a few hundred yards east of the center SE $1/4$ sec. 29, T. 17. S, R. 1 W., 4 miles east of Irondale; it was 28 feet deep and had 7 feet of water in it before the earthquake. The second well is 200 yards east of center of W. line of S.W. $1/4$ sec. 19, T. 17 S., R.1.W; it was 47-1/3 feet deep and had produced water for two years before the earthquake. After the well went dry it was found to have a crack 1-1/2 inches wide crossing its bottom in the direction N. 33 E. This crack, which did not show at the surface or in the upper part of the well, has been followed downward in deepening the well about 30 feet. The well is still dry in spite of its increased depth and the crack still shows in the bottom of the well.

Conclusions--The direction of movement, the intensity of the shock, and the effect upon the underground water near Irondale, suggest that the locus of the disturbance which produced the earthquake was along the Red Gap fault, which runs through Irondale; and that the movement along this fault was horizontal rather than vertical. Had the movement along this fault been vertical the direction of the resultant vibrations would have been at right angles to the line of fault, or approximately north and south, instead of east and west as it was found to be. The occurrence of the fissure in the well described above may be the result of this horizontal or torsional movement.

E. Seismo. notes [340] 1916 OCT 18 4:00 p.m.

An Appalachian earthquake, October 18, 1916--Shortly after 4 p.m., on October 18, a sharp earthquake was felt throughout northern Alabama, northwestern Georgia and western South Carolina, east Tennessee, and as far north as Louisville, Kentucky. Dr. Stephen Taber reports that the intensity at Columbia, South Carolina, was about III of the R.-F. scale. The epicenter seems to have been in northeastern Alabama, where the intensity was close to VIII.

Our colleague Dr. C.H. Gordon, of the University of Tennessee at Knoxville, has kindly furnished us the following account of it.

The southern states, including Alabama, Georgia, Tennessee, and Kentucky, were visited by an earthquake in the afternoon of October 18th. The center of the disturbance was in northeastern Alabama and northwestern Georgia. The quake occurred about 4 o'clock in the afternoon, and in some places seems to have consisted of two distinct shocks, though in others only one was reported.

Georgia--Two distinct earthquake shocks were reported from western and northwestern Georgia. Frame buildings were shaken and chimneys knocked down in various places. Many ran from their homes, but no serious damage was reported. Some of the reports state that the first shock was heavier than the second, but in other instances this was reversed. Two distinct shocks were reported to have been felt in Columbus and Macon, Georgia.

Alabama--In Montgomery, buildings were shaken by very distinct shocks which lasted about five seconds. The local weather bureau states that the shock came from the northwest and was of intensity V. There was no damage reported. At Talladega large buildings and dwellings were shaken, and hundreds of people ran from their homes. At Anniston two distinct shocks were felt, being so noticeable that a murder trial which was in session in the county courthouse was abruptly halted for a few minutes while the judge, jurymen, and spectators ran from the building. The shock was felt in other towns in this vicinity, but no damage was reported. At Birmingham the quake was the most severe that city has ever experienced. There were three sharp, distinct shocks, separated by brief intervals. The quakes caused great excitement, but very little damage other than broken windows and fallen chimneys was reported.

Tennessee--At Chattanooga the shock lasted from four to five seconds, and was distinctly felt throughout the city. One woman was almost thrown from her chair, according to reports. Slight shock was felt in Nashville, but no damage was reported. A number of persons in Knoxville reported a slight shock lasting a second or so. As it was raining there at the time, the disturbance was not generally noticed at Knoxville.

Kentucky--A slight shock was felt in portions of Kentucky, especially in the vicinity of Louisville. There buildings were rocked in the business district, while in the outlying districts pictures were knocked down and chinaware broken.

1. Taber, S. (personal communication)
2. Gordon, C.H. (personal communication)

F. Moneymaker [290]

1. Knoxville Journal and Tribune (10/19/16), Knoxville, TN

III. USGS [390]

A. EQHUS [123]	1916	OCT 18	16:04	33.5	86.2	AL	259,000	VIII
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This shock was felt most strongly in northeast Alabama, apparently most strongly at Easonville. It was felt from North Carolina to Mississippi and from Georgia to south Indiana. Near the epicenter frame buildings were badly shaken, windows were broken, and chimneys thrown down. Fairly hard shock at Birmingham and Montgomery.

1. Taber [361]

2. MWR [290]

B. EQHUS [121]	1916	OCT 18	16:04	33.5	86.2	AL	259,000	VI
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[account same as A. above]

1. Taber [361]

2. MWR [290]

3. MacCarthy [241]

C. EOHUS [120] [same as B. above]

IV. McClain [260] 1916 OCT 18 22:04 33.5 86.2 Birmingham, AL 440,000 VII

Aftershock at 03:52 on Oct. 19

A. Moneymaker [281]

B. EOHUS [121]

C. Woollard [410]

V. Bollinger [33] 1916 OCT 18 16:04 33.5 86.2 Birmingham, AL 440,000 VII

Aftershock, 6 hours later

A. Finch [140]

B. Hopkins [200]

C. McClain [260]

D. Moneymaker [281]

VI. Moneymaker [281] 1916 OCT 18 4:04 p.m. Southern Appalachians 440,000 VII-VIII

An earthquake centered at Irondale, Alabama, affected an area of more than 170,000 square miles in Alabama, Mississippi, Tennessee, Kentucky, Indiana, the Carolinas, Georgia, and other states. In the epicentral area, numerous chimneys were damaged and several wells went dry.

About two-thirds of Tennessee was affected by the earthquake, but there was no damage in the state. The disturbance was felt strongly at Chattanooga, Nashville, Waynesboro, Carthage, Sparta, McMinnville, Lewisburg, and other points in middle Tennessee. At Knoxville and Clinton a light shock was felt by many.

An aftershock at 10:52 p.m. was reported at many localities. Other aftershocks were felt at Birmingham on October 22 and at 7:15 a.m. on November 4.

A. Knoxville Journal and Tribune (10/19/16), Knoxville, TN

B. Branner [85] 1916 OCT 18 Easonville, AL 259,000 VIII

C. Finch [140]

D. EOHUS [123]

E. Hopkins [200]

F. Matthes [325] 1916 OCT 18 AL/GA/MS/SC/east TN

Slight shock in Knoxville

1. MWR [290]

G. Neumann [?] 1916 OCT 18 22:00 VIII (RF)

Aftershocks at 22:04 (V) and Oct. 19 at 04:54 (VII-VIII)

1. Taber [361]

2. MWR [290]

3. Finch [140]

4. Hopkins [200]

H. Seismo. notes [340]

I. Taber [361]

J. Woollard [410]

K. MWR [290]

VII. Woollard [410]	1916	OCT 18	16:04	33.5	86.5	Near Birmingham, AL, Irondale, 15 mi. east	1,036,000	VIII (RF)
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Felt all over SE U.S. for a distance of about 350 mi. from Birmingham including Savannah, Ga. and Louisville, Ky. Chimneys overturned at Birmingham. Another shock on Oct. 22 felt at Birmingham. Probably due to movement on Red Gap fault which passes through Irondale. Deep wells went dry.

A. S.B.IV [unknown reference]

B. Siesmo. notes [423]

C. MWR [290]

D. Finch [140]

E. Hopkins [200]

VIII. MacCarthy [241]	1916	OCT 18	16:04	33.5	86.2	Easonville, AL	259,000	
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1916: October 18, 16:04 hrs. Easonville, Alabama. "Epicenter near 33.5 N., 86.2 W., felt over 100,000 square miles. Was felt from North Carolina to Mississippi, and from Georgia to southern Indiana." (E. Hist.) See also B.S.S.A. 6 (1916), p. 238, where no mention of effects in North Carolina is made. Also M.W.R. 44 (1916), pp. 590, 690, where it is said to have been felt in Highlands, Murphy, and Nantahala in this State. News stories in most of the state papers; no mention seen of effects in North Carolina.

A. EQUUS [123]

B. Seismo. notes [340]

C. MWR [290]

D. Unspecified news accounts

IX. Varma [400]	1916	OCT 18		33.5	86.2	Talladega Co., AL		VII
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Felt radius = 366 km.

A. EQHUS [121]

B. Woollard [410]

X. Docekal [100] 1916 OCT 18 16:04 33.4 86.6 Chelsea, AL 393,000 VII

A very strong earthquake centering near Chelsea, Irondale, and Easonville, Alabama, threw down chimneys and broke windows. According to the isoseismal map presented by Finch (1916) the felt area included major portions of Alabama, Georgia, Tennessee, and Kentucky. It was also felt in eastern Mississippi, southern Indiana, and the western portions of the Carolinas.

Reid (unpublished) made various estimates of the felt area ranging from 100,000 to 400,000 square miles. Moneymaker (1965) places the area at 65,000 square miles, and Branner (1933) arrived at 100,000 square miles.

A. Branner [85]

B. EQHUS [183]

C. Finch [140]

D. MacCarthy [241]

E. Moneymaker [282] 1916 OCT 18 4:04 p.m. AL 154,000

This earthquake centered in Alabama was felt over an area of 60,000 square miles, including all of Central Kentucky. Intensities in Kentucky ranged from II to III+.

1. Moneymaker [281]

2. MWR [290]

3. EQHUS [123]

4. Finch [140]

- F. Reid [325]
- G. Seismo. notes [340]
- H. MWR [290]

I. TEIC	1916	NOV 4	12:15	33.5	86.8	Birmingham, AL	V
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Location: Birmingham, AL

Intensity: Some china knocked from cupboards; windows rattled

Comment: A/S to Oct. 18 event

II. TVA [380]	1916	NOV 4	12:15	33.5	86.8	Birmingham, AL	VI
A. MWR [290]	1916	NOV 4	12:15	33.5	86.8	Birmingham, AL	III (RF)

One shock; duration = 2 secs.; rumbling; possible due to explosion

1. Assoc. press

Birmingham, Ala., Nov. 4, 1916

A distinct earthquake tremor was felt here at 6:15 o'clock this morning, the local Weather Bureau announced. Windows were rattled and china knocked from the cupboards of several homes. (Assoc. Press)

Birmingham, Ala., Nov. 4, 1916

The explosion which occurred about 3 o'clock this morning caused an earth shock which was distinctly felt in Birmingham and persons in this city at first believed the tremor to be an earthquake. It lasted but a few seconds. (Assoc. Press)

IV. McClain [260]	1916	NOV 4	12:15	33.5	86.2	Birmingham, AL	
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Aftershock

A. Moneymaker [281]

V. Bollinger [33]	1916	NOV 4	06:15	33.5	86.2	Birmingham, AL	III
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Three shocks

A. Woollard [410]

B. McClain [260]

C. Moneymaker [281]

VI. Moneymaker [281] (mention is made of this event in the account for the Oct. 18, 1916, Birmingham, AL event)

V. Bollinger [33] 1916 NOV 4 06:15 Birmingham, AL III

Two shocks; aftershock of earthquake at Oct. 18; and explosion occurred at 03:00 (one shock)

A. MWR [290]

IX. Varma [400] 1916 NOV 4 33.5 86.8 Birmingham, AL III

Felt radius = 50 km.

A. Woollard [410]

B. MWR [290]

X. Docekal [100] 1916 NOV 4 06:15 33.5 86.8 Birmingham, AL 7800? III

A. Branner [85]

B. Woollard [410]

1916 NOV 4 7800? Birmingham, AL III

C. MWR [290]

I. TEIC 1917 JAN 2 10:30 36.1 83.7 Mascot, TN IV

Location: Mascot, TN

Intensity: Pronounced intensity, caused much alarm

Comment: If event caused "much alarm" it must have awakened many (v); MWR [290] indicates this event was a heavy dynamite explosion near McMillan, TN - @ 4:30 a.m.?

II. TVA [380] 1917 JAN 2 09:30 36.1 83.9 McMillan, TN

A. MWR [290] 1917 JAN 2 4:30 a.m. Mascot, TN

Knoxville, Tenn., January 2, 1917.

A seismic disturbance accompanied by a noise resembling a peal of thunder, in a wide area of which Mascot, Tenn., was the center, occurred at 4:30 this morning. The earthquake was of pronounced intensity and caused much alarm. No material damage. (Assoc. Press.)

[It has been found that this disturbance was due to a heavy dynamite explosion near McMillan, Tenn.]

1. Assoc. Press

IV. McClain [260] 1917 JAN 2 09:30 36.1 83.9 Near McMillan, Knox Co., TN

Thought by some to be an explosion

A. Moneyunaker [340]

V. Bollinger [33] 1917 JAN 2 04:30 36.1 83.9 McMillan, TN

Explosion?

A. McClain [260]

B. Moneyunaker [281]

C. Woollard [410]

VI. Moneymaker [281]	1917	JAN 2	4:30 a.m.	Southern Appalachians
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1917, January 2, 4:30 a.m., southern Appalachians. A shock near McMillan, Knox County, Tennessee. (This shock was thought by some to have been caused by an explosion).

A. Woollard [410]

VII. Woollard [410]	1917	JAN 2	04:30 CST- 10:30 GCT	Near McMillan, TN
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Explosion

A. S.B. IV (unknown reference)

B. MWR [290]

I. TEIC 1917 JAN 25 22:15 36.1 83.5 Jefferson City, TN III

Location: Jefferson City, TN

Intensity: Slight

Comment: Subsequent events on Jan. 26 & 27; this series of events and a series reported as beginning on Mar 25 are so similar in time & location that artificial origin is suspected - in both cases MWR [290] is the authority of all reports

II. TVA [380] 1917 JAN 25 Jefferson City, TN

A. Moneymaker [283] 1917 JAN 25 Jefferson City, TN

This shock, erroneously referred to Jefferson, Rutherford County, Central Tennessee, as follows: "Locality Jefferson, Central Tennessee, as follows: Lat. 35° 55' N. Long 86° 50' W. Local Date CST 4:15 p.m. January 25, 1917. Greenwich Date 22h 15s January 25, 1917 Intensity Slight Authority Georgetown University Annual Report"

H. F. Reid Card File

1917 JAN 26 Talbott, Jefferson County, TN

"Locality Talbott, Northeast Tennessee Local Date CST 7:15 a.m. January 26, 1917 Greenwich Date 13h 15s January 26, 1917 Intensity Slight Authority Georgetown University Annual Report"

H. F. Reid Card File

1917 JAN 27 3:00 p.m. Jefferson City, TN

This earthquake is erroneously listed by H. F. Reid, whose authority is the Annual Report of Georgetown University, centered at Jefferson, a small town in Rutherford County. "Locality Jefferson (sic) Central Tennessee (sic) Lat. 35° 55' N. Long. 86° 50' W. Local Date CST 3 p.m. January 27, 1917 Greenwich Date 21 January 27, 1917 Intensity II III Authority Georgetown University Annual Report 11

H. F. Reid Card File

1. Reid [325]

IV. McClain[260]

A. 1917 JAN 25 21:15 36.1 83.5 Jefferson City, TN III

1. Money maker [281]

B. 1917 JAN 26 12:15 36.1 83.5 Talbott, Jefferson Co., TN III

Aftershock

1. Money maker [281]

C. 1917 JAN 27 20:00 36.1 83.5 Jefferson City, TN III

Aftershock

1. Money maker [281]

V. Bollinger [33]

A. 1917 JAN 25 16:15 36.1 83.5 Jefferson City, TN III

1. McClain [260]

2. Money maker [281]

3. Woollard [410]

B. 1917 JAN 26 07:15 36.1 83.5 Talbot, TN III

1. McClain [260]

2. Money maker [281]

3. Woollard [410]

C. 1917 JAN 27 15:00 36.1 83.5 Jefferson City, TN II-III

1. McClain [260]

2. Moneymaker [281]

3. Woollard [410]

VI. Moneymaker [281]

A. 1917 JAN 25 4:15 p.m. Southern Appalachians III

A light shock at Jefferson City. (In the U.S. Coast and Geodetic Survey card file, this shock is listed at Jefferson, Rutherford County, Tennessee).

1. Reid [325]

B. 1917 JAN 26 7:15 p.m. Southern Appalachians III

A light shock at Talbott, Jefferson County, Tennessee

1. Reid [325]

C. 1917 JAN 27 3:00 p.m. Southern Appalachians III

A light shock at Jefferson City, Tennessee. The U.S. Coast and Geodetic Survey card file lists this shock at Jefferson, Rutherford County.

1. Reid [325]

VII. Woollard [410]

I. TEIC 1917 MAR 5 03:07 36.0 83.9 Knoxville, TN IV

Location: Knoxville, TN

Intensity: Houses rocked on foundations

II. TVA [380] 1917 MAR 4 Knoxville, TN

A. Moneymaker [283]

Earthquake of March 4, 1917

"ANOTHER QUAKE HITS KNOXVILLE"

Shock at 9:07 last night felt by many. News of disturbance comes to Journal and Tribune from all parts of city.

Citizens of Knoxville and vicinity felt a distinct earthquake Sunday night at 9:07 o'clock, the tremor continuing for only a few seconds. Owing to traffic of street cars in the business section of the city, many did not hear or feel the quake but reports from various residential districts said the shock was quite pronounced.

The first intimation of the disturbance was telephoned to the Journal and Tribune office by John O. Tilley who was at his home, 1116 Luttrell Street. He said the shock was felt and that it sounded like an explosion.

Later reports were received from Leon Blankenship, at Island home; W. R. Bradley in Park City; Guy Smithson, Island Home; H. L. Fraymond of Gratz Avenue; and John Kidd of East Hill Avenue. Many others were startled by the seismic disturbance and telephoned to ascertain if any damage had resulted.

In some sections of the city, reports said the windows were shaken and the buildings appeared to rock on their foundations. This is the second seismic disturbance felt in Knoxville and vicinity within the last ten days.

More than a year ago, a more severe quake was felt with pronounced intensity throughout East Tennessee.

No damage resulted from the slight quake Sunday evening.

(Ref.: Knoxville Journal and Tribune, Knoxville, Tennessee, Monday, March 5, 1917, page 12.)

1917 MAR 4 9:07 p.m. Knoxville

1917 MAR 2 & 4 Knoxville, Tennessee

Slight shocks reported by the Weather Bureau, Knoxville

Matthes, 1922

1917 MAR 5 3:07

Greenwich

Civil Time

Intensity Rossi-Forel Scale IIII Knoxville, Tennessee

M.W.R. 45, 130, 1917

Fred Robert Neumann, 1924

"Locality Knoxville E. Tennessee Lat. 35° 56' N. Long. 83° 58' W. Local Date CST 9:07 p.m. March 4, 1917
Greenwich Date 3h 07m March 5, 1917 Intensity IIII 1 shock Authority M.W.R. 130, 134 Note 2nd shock felt within 10
days

H. F. Reid Card File

1917 MAR 4 9:07 p.m. Knoxville, Tennessee

One shock felt in Knoxville. Reported by press. Ref: Monthly Weather Review, Vol. 45, No. 3, March 1917, page
130.

IV. McClain [260]

1917 MAR 5 02:07 35.9 83.9 Knoxville, TN.

III

Account suggests another unreported shock a few days earlier

1. Moneymaker [281]

V. Bollinger [33]

1917 MAR 4 21:07 36.0 84.0 Knoxville, TN.

III

1. McClain [260]

2. Moneymaker [281]

3. Woollard [410]

VI. Moneymaker [281] 1917 MAR 4 9:07 p.m. Southern Appalachians III

One heavy shock at Knoxville. Houses seemed to rock on their foundations. According to the Knoxville Journal and Tribune for March 5, 1917, "this is the second seismic disturbance felt in Knoxville and vicinity within the last ten days." Matthes (1922) lists the shock on March 2.

1. Matthes [250]
2. Neumann [300]
3. Reid [326]
4. Seismo. notes [340]
5. Reid [325]
6. MWR [290]

I. TEIC 1917 MAR 27 21:00 36.1 83.5 Jefferson City, TN V

Location: Jefferson City - Talbott, TN

Intensity: Shook buildings, moved furniture

Comment: Series of 3 events beginning Mar 25; very similar to series reported on Jan. 25-27, same locations - only differences - time of 2nd of 3 events (12:50 vs. 12:15) and reported effects greater this series

II. TVA [380] 1917 MAR 25 Jefferson Co., TN

A. Moneymaker [283]

Jefferson County, Tennessee

Light to moderate. Listed in Weather Bureau record

Matthes, 1922

1917 MAR 25 22:15

Greenwich
Civil Time
Intensity Rossi-Forel Scale III
Jefferson City and Talbott, Tennessee, M.V.R. 45, 130, 1917"

Fred Robert Neumann, 1924

"Locality Jefferson City and Talbott, E. Tennessee Lat. 36° 08' N. Long. 83° 30' & 83° 24' W. Local Date CST 2:15 p.m. March 24, 1917 Greenwich Date 22h 12m March 25, 1917 Intensity III 1 shock Duration 2s Authority M.V.R. Note Another shock at Talbott, March 26, 7:05 a.m. III and at Jefferson City, March 27, 3 p.m. V. These places are about 30 miles N.E. of Knoxville.

H. F. Reid Card File

1917 MAR 25 4:15 p.m. Jefferson City, Tennessee

One shock, accompanied by rumbling, felt at Jefferson City and Talbott.

Ref: Monthly Weather Review, Vol. 45, No. 3, March 1917, page 130.

1917 MAR 26 Jefferson County, TN

Light to moderate. Listed in Weather Bureau Record"

Matthes, 1922

1917 MAR 26 13:50

Greenwich
Civil Time

Intensity Rossi-Forel Scale III Talbott, Tennessee

M.W.R. 45, 130 1917

"Locality Talbott, Tennessee

Local Date CST 7:50 a.m. March 26, 1917

Greenwich Date 13 50 March 26, 1917

Intensity III

Authority M.W.R.

H. F. Reid Card File

1917 MAR 26 7:50 a.m. Talbott, TN

One shock accompanied by rumbling.

Ref: Monthly Weather Review, Vol. 45, No. 3, March 1917, page 130.

1917 MAR 27 Jefferson County, TN

Light to moderate; shock of March 27, felt by nearly everyone and moved furniture. Listed in Weather Bureau Record"

Matthes, 1922

1917 MAR 27 21:00

Greenwich
Civil Time
Intensity Rossi-Forel Scale V Jefferson City, Tennessee
M.W.R. 45, 130 1917

Locality Jefferson City, Tennessee
Local Date CST 3 p.m. March 27, 1917
Greenwich Date 21 March 27, 1917
Intensity V
Authority M.W.R.

H. F. Reid Card File

1917 MAR 27 3:00 p.m. Jefferson City, TN

One shock; shook buildings.

Ref: Monthly Weather Review, Vol. 45, No. 3, March 1917, page 130.

IV. McClain [260]

A. 1917 MAR 25 21:15 36.1 83.5 Jefferson City and Talbott, TN III-IV

1. Moneymaker [281]

2. Woollard [410]

B. 1917 MAR 26 12:50 36.1 83.5 Talbott, TN III

Aftershock

1. Moneymaker [281]

C. 1917 MAR 27 20:00 36.1 83.5 Jefferson City and Talbott, TN III-IV

Aftershock

1. Moneymaker [281]

V. Bollinger [33]

A. 1917 MAR 25 14:15 36.1 83.5 Talbott, TN III-IV

1. McClain [260]

2. Moneymaker [281]

3. Woollard [410]

B.

1917 MAR 26 07:50 36.1 83.5 Talbott, TN III

1. McClain [260]

2. Moneymaker [281]

3. Woollard [410]

C.

1917 MAR 27 15:00 36.1 83.5 Jefferson City, TN III-IV

1. McClain [260]

2. Moneymaker [281]

3. Woollard [410]

VI. Moneymaker [281]

A. 1917 MAR 25 4:15 p.m. Southern Appalachians III-IV

One shock accompanied by a rumbling noise was felt at Jefferson City and at Talbott.

1. Matthes [250]
2. Neumann [300]
3. Seismo notes [340]
4. Reid [325]
5. MWR [290]

B.

1917 MAR 26 7:50 a.m.

Southern Appalachians

III

A shock attended by a rumbling noise felt at Talbott

1. Matthes [250]
2. Neumann [300]
3. Reid [325]
4. MWR [290]

C.

1917 MAR 27 3:00 p.m.

Southern Appalachians

III-IV

Houses were shaken by a shock at Jefferson City

1. Matthes [250]
2. Neumann [300]
3. Reid [325]
4. MWR [290]

I. TEIC 1917 APR 19 81.1 81.1 Wytheville, VA III

Location: Southwestern VA; no details; Wytheville arbitrarily selected

Intensity: Slight shock

II. TVA [380] 1917 APR 19 Southwest VA

A. MacCarthy [244]

B. Moneymaker [283] 1917 APR 19 Southern Appalachians

"A slight shock occurred in southeastern Virginia, on April 19."

VIII. MacCarthy [244] 1917 APR 19 Southwestern VA

1917: April 19: A slight shock was reported from southwestern Virginia on this date. It is mentioned in Moneymaker (1957) and in A.Y.B., but in neither case are any details given. No mention has been found in contemporary newspapers.

A. Moneymaker [?]

B. Reid [326]

I. TEIC 1917 JUN 21 36.0 83.9 Knoxville, TN IV

Location: Eastern TN, Knoxville selected arbitrarily as location for this event

Intensity: Light to moderate shocks

II. TVA [380] 1917 JUN 21 36.0 83.0
 A. Templeton [370] 1917 JUN 21 36.0 83.0 Eastern TN IV

1. McClain [260]
2. Moneymaker [281]

IV. McClain [260] 1917 JUN 21 36.0 83.0 Eastern TN

1. Moneymaker [281]

VI. Moneymaker [281] 1917 JUN 21 Southern Appalachians IV

Harry Fielding Reid (1918) reports light or moderate shocks in eastern Tennessee, but gives no details.

1. Matthes [250]
2. Reid [326]

I. TEIC	1918	JAN 17	16:45	36.0	83.9	Knoxville, TN	2300	IV
Location: Knoxville, TN; intensity; location								
Intensity: Houses shook, windows rattled, loose objects disturbed, goods on store shelves rattled								
Extent: Felt less than 20-mile radius around Knoxville, TN; map; 2300 sq. km.								
II. TVA [380]	1918	JAN 17	16:45	36.0	83.9	Knoxville, TN		V
A. Nuttli [310]	1918	JAN 16	15:45	35.9	83.9			V
B. MWR [290]	1918	JAN 17	16:45	35.9	84.0	Knoxville, TN		V (RF)

One shock; duration = 3 secs.; sound resembled explosion, may have been dynamite on ice jam in river

C. Moneymaker [283]

1. Knoxville Journal and Tribune (1/17/18), Knoxville, TN

IV. McClain [260]	1918	JAN 16	15:45	35.9	83.9	Knoxville, TN		V
A. Moneymaker [281]								
V. Bollinger [33]	1918	JAN 16	10:45	36	84	Knoxville, TN		IV-V
A. McClain [260]								
B. Moneymaker [340]								
VI. Moneymaker [281]	1918	JAN 16	10:45			Southern Appalachians		V

A hard shock, apparently centered in northeast Knoxville, was felt over all of Knoxville and the suburban areas and as far away as Concord, Strawberry Plains, and Corryton. Houses shook, windows rattled, and loose objects were disturbed. In the Coker Springs, Greenway, and Washington Pike sections of north Knoxville the shock was strongly felt and the explosive sound seemed to be directly underfoot. Men sitting in a grocery store at Greenway found their feet suddenly raised from the floor as windows and goods on the shelves rattled.

By some, the disturbance was attributed to the detonation of a hundred sticks of dynamite in an ice jam on the Tennessee River. Such a small explosion could not have affected an area of 400 square miles with an intensity of III to IV. On February 5, 1949, the Tennessee Valley Authority detonated 1,400,000 pounds of explosive in a stone quarry in Sullivan County, Tennessee. The resulting vibrations were felt over an area comparable with that affected by the earthquake of January 16, 1918.

A. Matthes [250]	1918	JAN 17	Center in Smithwood, TN	
North of Knoxville, Th.; rattled dishes; swung pictures, etc.				
B. Neumann	1918	JAN 17	Knoxville, TN	V (RF)
May have been dynamite on ice jam in river				
1. MWR [290]				
C. Reid [325]				
D. MWR [290]				
VII. Woollard [410]	1918	JAN 17	Knoxville, TN	IV-V (RF)

Duration = 3 secs.; explosion?

I. TEIC 1918 JUN 22 00:59 35.8 84.3 Lenoir City, TN 5800 IV

Location: Lenoir City, TN; intensity; near center of felt area

Intensity: Heavy

Extent: East TN; map; 5800 sq. km.

Comment: EQHUS [122] lists this event in summary as an Intensity IV-V (RF) but in account indicates felt at "force 6" at Lenoir City

II. TVA [380] 1918 JUN 22 00:59 35.8 84.3 Lenoir City, TN V
 A. Nuttli [310] 1918 JUN 22 01:00 36.1 84.1 Clinton, TN 8000 V
 B. MWR [290] 1918 JUN 22 01:00 (?)

Station	Intensity Rossi- Forel	Number of Shocks	Duration (secs.)	Sounds	Remarks
Tennessee					
Clinton	4	1	05	Rumbling	Gradual trembling, NE
Kingston	3	1	03	Rumbling	Rapid rembling, SW
Knoxville	3	3	09	Faint	Rumbling, rapid rocking
Lenoir City	6			Loud	Rumbling like a pair of heavy trucks rolling over the floor, gradual trembling
Loudon	5	1	15	Loud	Like rumbling thunder; abrupt bump, then rapid trembling, NW
McGhee	57	1	00	Rumbling	Gradual onset with bumping, NE
Philadelphia	5	1	05	Faint	Abrupt bump, then gradual rocking and trembling, NE
Sweetwater	5	2	04	None	Abrupt trembling NS

C. Georgetown [160]

1918 JUN 22 Afternoon Knoxville, TN Pronounced

1. Assoc. Press

D. Moneymaker [283]

1. Knoxville Journal and Tribune, (6/22/18), Knoxville, TN

2. Sunday Journal and Tribune, (6/23/18), Knoxville, TN

E. Templeton [370] 1918 JUN 22 36.1 84.1 Lenoir City, TN V

1. Bollinger [33]

2. EOHUS [120]

3. McClain, unpub, (1978)

4. McClain, [260]

5. Moneymaker [281]

6. TVA, unpub. (1977)

7. EOHUS (1956)

8. EOHUS [121]

III. USGS [390]

A. EOHUS [122] 1918 JUN 21 20:00 36.1 84.1 TN 7800 IV-V (RF)

Felt with force 5 in east Tennessee with center at Lenoir City where intensity was force 6. Duration 10 to 15 seconds.

1. MWR [290]

B. EQHUS [121] 1918 JUN 21 20:00 36.1 84.1 TN 7800 V

Felt with intensity V in eastern Tennessee with center at Lenoir City. Duration 10 to 15 seconds.

1. MWR [290]

2. Moneymaker [281]

C. EQHUS [120] 1918 JUN 21 20:00 36.1 84.1 Lenoir City, TN 7800 V

Lenoir City, TN. Felt with intensity V. Duration 10 to 15 secs.

1. MWR [290]

2. Moneymaker [281]

IV. McClain [260] 1918 JUN 22 00:59 36.1 84.1 Near Lenoir City, TN 7800 IV-V

A. EQHUS [121]

B. Moneymaker [281]

C. Woollard [410]

V. Bollinger [33] 1918 JUN 21 20:00 36.1 84.1 Lenoir, TN 7800 V

A. Byerly (1942)

B. McClain [260]

C. Moneymaker [281]

D. Woollard [410]

VI. Moneymaker [281] 1918 JUN 21 7:59 p.m. Southern Appalachians 7800 IV-V

A "heavy" shock centered near Lenoir City affected an area of at least 3000 square miles in eastern Tennessee. It was felt from McGehee on the Little Tennessee River to LaFollette and at the intermediate localities of Knoxville, Sweetwater, Clinton, and Kingston.

The initial heavy shock was followed by a trembling motion and two lighter shocks in rapid succession. At some places, the motion was described as "rolling" or "rocking." A loud rumbling noise was reported at Lenoir City and Loudon.

A. Knoxville Journal and Tribune, (6/22/18), Knoxville, TN

B. Matthes [325]	1918	JUN 22	East TN	Light to Moderate
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Felt by nearly everyone.

1. MWR [290]

C. Neumann [300]	1918	JUN 22	01:00(?)	East TN	III-V (RF)
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1. MWR [290]
D. Seismo. notes [340]

E. Woollard [410]

F. MWR [290]

VII. Woollard [410]	1918	JUN 21	20:00	36.1	84.1	Near Lenoir City, TN	7800	V (RF)
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Duration = 15 secs.

A. MWR [290]

IX. Varma [400]	1918	JUN 21	36.1	84.1	Anderson Co., TN	V
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Felt radius = 50 km

A. EQUUS [121]

B. Moneymaker [281]

X. Docekal [100] 1918 JUN 21 19:00 36.1 84.1 Lenoir City, TN 7800 V

An earthquake lasting 10-15 secs. Centered at Lenoir City, TN.

A. EHUS [121]

B. Moneymaker [281]

C. EHUS [123]

I. TEIC 1920 DEC 24 08:30 35.8 84.7 Glen Alice, TN 2600 V

Location: Glen Alice, TN; intensity; location

Intensity: Entire village awakened @ Glen Alice; a few awakened @ Decatur; @ Rockwood, "considerable violence"

Extent: East TN; map; 2600 sq. km.

II. TVA [380] 1920 DEC 24 08:30 35.8 84.7 Glen Alice, TN V

A. Nuttli [310] 1920 DEC 24 07:30 36.0 85.0 [Crossville, TN] V

B. MWR [290] 1920 DEC 24

Station	Approximate time, Greenwich	Intensity Rossi- Forel	Number of shocks		
				Duration	Sounds
Crossville					
Decatur	8 00	5	2	60	Rumbling
Glen Alice	8 30	2			No damage Awakened a few
Spring City	8 40	5	1		Rumbling
Rockwood	8 30	3	1	60	do
			1	3 min.	None
					Felt by many

C. Seismo. notes [340]

Rockwood, Tennessee, December 24, 1920.—An earthquake of considerable violence was felt at several places in the neighborhood of Rockwood, Tenn., at 2 a.m. December 24th.

D. Moneymaker [283]

1. Knoxville Sentinel (12/24/20), Knoxville, TN

E. Georgetown [160] 1920 DEC 24 2:30 a.m.

Crossville, TN Feeble?

1. Assoc. Press

F. Templeton [370] 1920 DEC 24 36.0 85.0 Rockwood, TN V

1. Bollinger [33]

2. EQHUS [108]

3. McClain, unpub (1978)

4. McClain [260]

5. Moneymaker [281]

6. TVA, unpub, (1977)

7. EQHUS (1956)

8. EQHUS [121]

III. USGS [390]

A. EQHUS [122] 1920 DEC 24 02:30 36.0 85.0 East TN V (RF)

1. MWR [290]

B. EQHUS [121] 1920 DEC 24 02:30 36.0 85.0 East TN V

Felt area = local;

Shock of considerable violence was felt at several places in the vicinity of Lockwood*, Tenn.

1. Seismo. notes [340]

2. Moneymaker [281]

3. MWR [290]

417

C. EQHUS [120] 1920 DEC 24 02:30 36.0 85.0 Rockwood, TN, area

Felt area = local;

Shock of considerable violence was felt at several places in the vicinity of Rockwood.

1. Seismo. notes [340]

2. Moneymaker [281]

3. MWR [290]

IV. McClain [260] 1920 DEC 24 07:00 36.0 85.0 Rockwood, TN V

8/18

A. Moneymaker [281]

B. EQHUS [121]

V. Bollinger [33] 1920 DEC 24 02:30 36.0 85.0 East TN V

A. EQHUS [120]

B. McClain [260]

C. Moneymaker [281]

D. Woollard [410]

E. Seismo. notes [340]

VI. Moneymaker [281] 1920 DEC 24 2:00 a.m. Southern Appalachians V

An earthquake of "considerable violence" was felt at many eastern Tennessee localities including Rockwood, Glen Alice, Spring City, Harriman, Decatur, and Crossville. At the latter place, two shocks were reported. Many sleepers were awakened and it was reported that the entire village of Glen Alice was aroused.

A. Neumann [300]	1920	DEC 24	08:30		Rockwood, TN	V
1. MWR [290]						
2. Seismo. notes [340]						
B. Seismo. notes [340]						
C. Reid [325]						
D. MWR [290]						
VII. Woollard [410]	1920	DEC 24	02:00	35.8	84.7	Rockwood, TN
A. Seismo. notes [340]						IV-V
IX. Varma [400]	1920	DEC 24		36.0	85.0	Cumberland Co., TN
A. EQHUS [121]						V
B. Moneymaker [281]						
X. Docekal [100]	1920	DEC 24	01:30	36.0	85.0	Lockwood*, TN
A local shock was distinctly felt in the vicinity of Lockwood, Tn.						
A. EQHUS [121]						
B. EQHUS [123]						
C. Moneymaker [281]						

I. TEIC 1921 JUL 15 36.7 82.3 Mendota, VA VI

Location: Mendota, VA; intensity

Intensity: Damage from breaking of windows, twisting of frame buildings @ Mendota, VA

Extent: Reported being felt in parts of WV and TN without specifics; suggests felt radius of at least 80 km

II. TVA [380] 1921 JUL 15 36.7 82.3 Mendota, VA

A. Bollinger [35] 1921 JUL 15 Mendota, VA VI

Earthquake of July 15, 1921, Mendota, Virginia, (Friday, no time given)

Mendota, VA---"There is quite a deal of excitement east of Mendota brought about by several acres of ground in the River View section being heaved up in places and at other places it seems to be sinking. It is reported that the river bluff near the place is in danger of tumbling into the river. The disturbance started last Saturday week. Rumbings were heard beneath the surface of the earth by a Mrs. Wilson, near her home. Then the surface began to tremble and there were rumbings resembling the falling and breaking of large stones. It is said that one bluff is grinding into fragments. One observer told that he was sitting on the rock formation where it crosses the small valley and he could feel the rock quiver and heave, then a fissure about sixteen feet long opened in the rock right where he was sitting. . . . The last report says that the hills continue to 'shimmie.'" (BHC 6/15/21) (VI);

Note: The above newspaper account is dated July 14 and appears in the Bristol Herald Courier of Friday, July 15.

"District around Mendota, Va. shaken. Windows broken." Intensity V. (Eppley, 1965);

Buildings were shaken and windows broken. "Considerable damage resulted from the breaking of windows, twisting of frame buildings, etc." (MacCarthy, 1964).

Extent:

"A report from Norfolk, Va. states that heavy seismic disturbances were felt in Virginia and parts of West Virginia and Tennessee. . . . The hour is not stated." (MacCarthy, 1964)

Intensity V-VI. (Wollard, 1968)

50

1. Bristol Herald Courier (6/15/21), Bristol, VA

2. EOHUS [121]

3. McCarthy [244]

4. Woollard [410]

B. Moneymaker [283] 1921 JUL 15 Southern Appalachians

1921 JUL 15 Virginia

N. Lat. 36.6 W. Long. 82.3

Local intensity 5."

1921 JUL 15 District around Mendota, Virginia, shaken. Windows broken."

421

1. EOHUS [123]

2. Neumann [300]

3. Seismo. notes [340]

C. Seismo. notes [340] 1921 JUL 15 VA

A report from Norfolk, Virginia, states that heavy seismic disturbances were felt in Virginia and Tennessee on July 15, 1921. The hour is not stated. In the district around Mendota, Virginia, considerable damage resulted from the breaking of windows, twisting of frame buildings, etc.

D. Templeton [370] 1921 JUL 15 36.6 82.3 Mendota, VA V-VI

1. Bollinger [33]

2. McClain, unpub., 1978

3. McClain [260]

4. Moneymaker [281]

5. EQHUS (1956)

6. EQHUS [121]

III. USGS [390]

A. EQHUS [123]

1921

JUL 15

36.6

82.3

Mendota, VA

Local

V (RF)

District around Mendota, VA, shaken. Windows broken.

1. Seismo notes [340]

2. Georgetown [160]

B. EQHUS [121]

IV. McClain [260]

1921

JUL 15

36.6

82.3

Mendota, VA

V-VI

A. Moneymaker [281]

B. EQHUS [121]

C. Bollinger [31]

V. Bollinger [33]

1921

JUL 15

36.6

82.3

Mendota, VA

VI

A. Bollinger [31]

B. EQHUS [120]

C. MacCarthy [244]

D. Woollard [410]

VI. Moneymaker [281]

1921

JUL 15

Southern Appalachians

V

A sharp shock in southwestern Virginia and northeastern Tennessee. At Mendota, window glass was broken and frame buildings were twisted.

- A. EQUUS [123]
- B. Neumann [300]
- C. Seismo. notes [340]

D. Reid [325]

VII. Woollard [410] 1921 JUL 15 36.5 82.0 Mendota, VA VI-VII (RF)

Reported also W VA; and TN

VIII. MacCarthy [244] 1921 JUL 15 36.6 82.3 Mendota, VA V (RF)

1921: July 15: No time given. This was a local shock, of intensity V, according to E. Hist. The epicenter was near 36.6 N, 82.3 W, in the vicinity of Mendota. Buildings were shaken and windows broken. BSSA (1921, p. 197) says that "A report from Norfolk, VA, states that heavy seismic disturbances were felt in Virginia and parts of West Virginia and Tennessee. . . . The hour is not stated. In the district around Mendota, VA, considerable damage from the breaking of windows, twisting of frame buildings, & c." No contemporary newspaper accounts have been seen.

- A. EQUUS (1956)
- B. Seismo. notes [340]

I. TEIC 1921 DEC 15 14:20 35.9 84.5 Kingston, TN 2700 V

Location: Kingston, TN; intensity

Intensity: Shook pans and tableware from cupboards @ Kingston, TN; felt by many @ Rockwood, Athens, Decatur and Dayton, TN

Extent: East-central TN; map; 2700 sq. km.

II. TVA [380] 1921 DEC 15 14:30 35.8 84.7 Glen Alice, TN IV

A. Nuttli [310] 1921 DEC 15 13:20 35.8 84.6 V

B. MWR [290] 1921 DEC 15

Approximate

time,

Greenwich

Civil

Intensity
Rossi-
Forel

Number
of
Shocks

Station

Duration

Sounds

Remarks

14 20	Rockwood	4-5	2	30	Loud	Felt by many
14 50	Athens	4-5	1	180	Rumbling	do
	Decatur	4	2-3	2	do	do
15	Dayton	4	1	Few	do	do
	Spring City	4			do	Felt by several

C. Georgetown [160] 1921 DEC 15 09:00

Knoxville, TN

Varying

Disp. Seis. intensity

1. Assoc. Press

D. Seismo. notes [340] 1921 DEC 15 8:45 a.m.

Rockwood, TN

An earthquake of considerable intensity was felt at Rockwood and various parts of Tennessee at 8:45 a.m. on December 15, 1921. Near Kingston the shock was of sufficient intensity to shake pans and tableware from cupboards.

E. Templeton [370] 1921 DEC 15 35.8 84.6 Kingston, TN IV-V

1. Bollinger [33]

2. McClain [260]

3. Moneymaker [281]

4. TVA, unub. (1977)

IV. McClain [260] 1921 DEC 15 35.8 84.6 Near Kingston, TN V

Felt from Kingston to Dayton, east to Athens.

A. Moneymaker [281]

V. Bollinger [33] 1921 DEC 15 35.7 84.7 Southeast TN IV-V

A. McClain [260]

B. Moneymaker [281]

C. Woollard [410]

D. Seismo. notes [340]

VI. Moneymaker [281] 1921 DEC 15 8:20 a.m. Eastern TN V

An earthquake of "considerable intensity" was felt along the western portion of the Great Valley from Kingston and Rockwood to Decatur and Dayton, and as far eastward as Athens. Pans and tableware were shaken from cupboards near Kingston. A loud rumbling noise accompanied the disturbance.

A. Neumann [300] 1921 DEC 15 14:45 Rockwood, TN IV-V

1. MWR [290]

2. Seismo. notes [340]

B. Seismo. notes [340]

C. Woollard [410]

D. MWR [290]

VII. Woollard [410] 1921 DEC 15 08:45 35.8 84.8 Southeast TN 10,400-
13,000 IV (RF)

A. Seismo. notes [340]

I. TEIC 1922 MAR 30 22:20 36.6 82.5 Arcadia, TN IV

Location: Arcadia, TN

Intensity: Felt by many

II. TVA [380] 1922 MAR 30 02:21 36.6 82.5 Arcadia, TN

Second shock at 22:20

A. MWR [290] 1922 MAR 30 02:20 36.5 82.5 Arcadia, TN IV
& 22:20

1. Arcadia College

IV. McClain [260] 1922 MAR 30 02:21 36.5 82.2 Arcadia, TN IV
& 22:20

A. Moneymaker [281]

VI. Moneymaker [281] 1922 MAR 29 9:21 p.m. Northeastern TN IV

A light shock was felt at Arcadia, Sullivan Co.

1922 MAR 30 5:20 p.m. Northeastern TN IV

One shock was felt at Arcadia, Sullivan Co.

A. Woollard [410]

B. MWR [290]

VII. Woollard [410] 1922 MAR 29 20:20 36.5 82.5 Arcadia, MO* IV

A. MWR [290]

I. TEIC	1923	OCT 18	19:30	35.3	82.5	Hendersonville, NC	IV
Location: Hendersonville, NC							
Intensity: Moderate							
II. TVA [380]	1923	OCT 18	19:30	35.3	82.5	Hendersonville, NC	IV
A. Georgetown [160]							
	1923	OCT 18	2:30-3:00 p.m.			Henderson, NC	Moderate
1. Assoc. Press							
IV. McClain [260]	1923	OCT 18	19:30	35.3	82.5	Hendersonville and Saluda, NC	
A. Woollard [410]							
V. Bollinger [33]	1923	OCT 18	14:30	35.6	82.5	Hendersonville, NC	
A. Woollard [410]							
VII. Woollard [410]	1923	OCT 18	14:30	35.6	82.5	Hendersonville and Saluda, NC	
A. Georgetown [160]							

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I. TELIC	1924	OCT 20	08:30	34.9	82.7	Pickens, SC	87,000	VI
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Location: Pickens, SC; A/S; intensity; center of felt area

Intensity: A kitchen reported shaken down @ Pickens, SC, people alarmed; many awakened in Asheville, Hendersonville, NC, Athens, GA, Anderson, Chester, Greenville, and Greenwood, SC; Furniture reportedly overturned (not mentioned by Neumann [300] in his account.

Extent: E TN - NE GA - SW NC - W SC; map; map; 87,000 sq. km.

Comment: A/S @ Clemson College (Pickens) and Greenville, SC

II. TVA [380]	1924	OCT 20	08:30	34.9	82.7	Pickens, SC	IV
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A. Neumann [300]	1924	OCT 20	3:30 a.m.	35.0	82.6	Pickens Co., SC	145,000	V (RF)
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On the morning of October 20, 1924, the western parts of North Carolina, and South Carolina, the northeast part of Georgia, and the eastern part of Tennessee were disturbed by an earthquake. The area in which the disturbance was felt extends over about 56,000 square miles. The epicenter of the disturbed area is in Pickens County, South Carolina, and is approximately 35° north latitude and 82°35' west longitude. The maximum intensity was about V, Rossi-Forel scale.

The data upon which this paper is based were received from seventy-five different sources. Card with questionnaires were sent into various parts of the state; newspaper clippings furnished considerable data; and some students of the University of South Carolina gave accounts of the shock.

The time of the shock was variously given between 3:30 and 3:45 a.m. Eastern Standard Time. Since the shock was not recorded on any seismograph, an accurate determination of the time has been impossible.

The shock was generally described as starting with a distant rumbling which was compared to the roaring of an airplane motor; to a heavy moving truck; or to a distant explosion. The shock itself was abrupt and the estimated duration ranged from two and one-half seconds to one minute. Ten reports stated that two distinct shocks were felt. The shocks were close together but there was no uniformity in the testimony regarding the duration of each. Twelve observers reported the direction of vibration but the estimates varied so greatly that no satisfactory conclusion as to direction could be made. Aftershocks were reported from only two places.

All of the estimates of intensities were made by the writer. In many places additional information would have helped considerably in accurately locating the isoseismals and the epicenter (see Fig. 1), but due to the low intensity, the early hour, and the sparsely settled mountain country, the information obtainable was often meager. Abnormal intensities may be attributed to differences in geologic structure and insufficient data.

At Walhalla, S.C., where the intensity was estimated to have been IV to V, the shock was described as a powerful roar like the moving of a heavy truck, followed by the shaking of buildings and furniture. Some observers living in brick houses heard sounds as of a grating in the walls. Windows rattled as if going through a severe windstorm. At Pickens, S.C., with an estimated intensity of IV to V, there was first, a rumbling sound like the roar of a heavy truck, then a shaking of houses and a rattling of windows. A kitchen was reported to have been shaken down. The people in general were alarmed. At Brevard, N.C., which has been given an intensity of IV to V, a sound like a heavy detonation occurring some distance away, accompanied the abrupt jarring of the earth and houses. Many people were awakened.

Within isoseismal III, many people were awakened by a distinct shock which, in some places, was preceded by a low rumbling sound. The shock caused a trembling which was felt by many; pieces of furniture shook, and household utensils were rattled. The western limits of this isoseismal are indefinite, due to lack of information from the thinly settled mountain country.

The limits of isoseismal II are very indefinite, due to the low intensity and the lack of data. Most of the reports state that a few people were awakened by a slight shaking or rocking. In a few instances tin utensils rattled, and pictures on the walls were displaced. Within the area of isoseismal II, four observers reported that rumbling sounds preceded the shock. In Augusta, Ga., one observer stated that the house was shaken and that dogs in the neighborhood began barking. The northern limit of this isoseismal is undeterminable. Two reports from within the northern part of isoseismal II, each from a single observer, were received six weeks after the date of the shock, and these reports stated that the earthquake was not noticed. Nevertheless, the general curve of the isoseismal and the distribution of the nearby intensities, indicate that the shock may have extended farther north than the observers reported, and therefore the isoseismal has been drawn farther north on the map. Nothing is shown on the geologic folios available for this region, which would account for the earthquake vibrations not being transmitted farther north than observed.

In the region of the epicenter of the Blue Ridge Mountains rise from 3,000 to 3,300 feet above sea level. The topography is mature and the country mountainous. The rocks are mainly pre-Cambrian gneisses, schists, granites, and diorites with some Cambrian schists and Triassic diabase. The usual strike of the folds, schistosity, and contacts is northeast-southwest. No faults are shown on the Pisgah Folio, but farther north on the Asheville and the Mt. Mitchell Folios some faults are found. Most of these faults are normal and have steep dips, but a few are overthrusts with low dips. There are, undoubtedly, many faults in the crystalline rocks that have not been found. The origin of the earthquake was probably due to differential displacement along an old fault or the formation of a new one. Since Cretaceous time the Appalachians have been undergoing a gentle arching, and in this process the strains set up may be alleviated by small displacements along faults. These displacements are going on at the present day and probably account for the many minor earthquakes felt in the region.

A newspaper article of November 13, 1924, states that a shock was felt at 12:30 a.m., Eastern Standard Time, at Bristol, Va. An observer reported that suddenly the house shook violently, dishes rattled, mortar fell down the chimney into the fireplace, and the windows rattled. The correspondent stated that slight tremors had been noticed in the region for about a year.

Other earthquakes in the southern Appalachian region have been noted and described, and it seems to be a characteristic of these earthquakes that the isoseismals are elongated in a northeast-southwest direction which is parallel to the strike of the beds, the schistosity, and the contacts of the rocks. The elongation is undoubtedly due to the greater ease of transmission of the earthquake waves in this direction, there being less reflection and refraction than in other directions. There is no line or area in which the earthquakes have been especially frequent, and from the recorded earthquakes, it appears that the seismic activity in the southern Appalachians is scattered over a large area, which is what one would expect if the region is undergoing a gentle arching.

1. Weather Bureau
2. Richmond Times-Dispatch (11/13/24), Richmond, VA
3. Taber [450]

B. USEQ [490]

C. Templeton [370] 1924 OCT 20 35.0 82.6 Pickens County, SC V

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1. Bollinger [33]
2. McClain, unpub. (1978)
3. McClain [260]
4. Moneymaker [281]
5. TVA, unpub (1977)
6. EQHUS (1956)
7. EQHUS [121]

III. USGS [390]

A. EQHUS [123] 1924 OCT 20 03:30 35.0 82.6 Western NC 145,000 V-VI(RF)

West North Carolina, South Carolina, northeast Georgia, and east Tennessee were shaken by an earthquake felt over 56,000 square miles. At epicenter, buildings were shaken and furniture overturned. A loud roar accompanied the shock.

1. Neumann [300]

2. USEQ [395]

B. EQHUS [121] 1924 OCT 20 03:30 35.0 82.6 Pickens Co., SC 145,000 V

South Carolina, western North Carolina, northeastern Georgia, and eastern Tennessee were shaken by an earthquake. Highest intensities were reported at Pickens and Walhalla, S.C. and Brevard and Hendersonville, N.C. Buildings were shaken and furniture overturned. A loud roar accompanied the shock.

1. Neumann [300]

2. USEQ [490]

3. MacCarthy [244]

4. MacCarthy [241]

C. EQHUS [120] [same as B. above]

D. USEQ [395]

Table I. Non-instrumental earthquake reports; July 1, 1924 to December 31, 1924

Date	Time	Locality	Intensity	Source and Remarks
1924	G.M.T.			
Oct.		FLORIDA		
20	8:30	Clarksville	4	P. Many awakened; windows rtl., beds shook

Date	Time	Locality	Intensity	Source and Remarks
1924	G.M.T.			
Oct.		GEORGIA		
20				
	8:35	Athens	3	P. Many awakened; no damage reported.
	- -	Atlanta	1	P. not felt.
	8:30	Augusta	2	WB. Felt by sev; few s.
	- -	do	2	P. Felt.
	- -	Blue Ridge	2	A.J. Nitache, WB. Felt by sev; some awakened;
				rp'd, bmp, few s; rmb sound during.
	8:35	Gainesville	3	H.J. Bremer, WB. Grd. trm. SE-NW, 1-1/2 min; rmb sound.
		NORTH CAROLINA		
	8:30	Asheville	4	T.N. Taylor, WB. Felt by sev; dishes rtl;
	- -	do	3	abr, trm, 1/2 min; rmb during and after.
	- -	Brevard	4-5	P. Many awakened; abt 1 min.
				D.L. English, WB. Felt by many; abr, like effect of
				"sudden, heavy explosion some distance away;"
				loud exp sound with, lasting 2 min; val.
	8:36	Charlotte	2	Mrs. J.H. Ham, WB. Felt by few; abr, rkg, pln.
	- -	Hendersonville	5	P. Many awakened; windows rtl, mirrors and dishes shaken.
No damage.		Monroe	1	J.W. Love, WB. Not felt.
	- -	Morgantown	1	J.B. Massey, WB. Not felt.
	8:30	Murphy		A.B. Dickey, WB. Felt.
	- -	Salisbury	1	W.L. Ross, WB. Not felt.

<u>Date</u>	<u>Time</u>	<u>Locality</u>	<u>Intensity</u>	<u>Source and Remarks</u>
1924	G.M.T.			
Oct.		SOUTH CAROLINA		
20				
- --		Anderson	4	P. Many awakened; windows and dishes rtl.
- --		Calhoun Falls	2	D.M. Parker, WB. Felt by sev; trm.
- --		Cheraw	1	R.D. Rowe, WB. Not felt.
8:30		Chester	2-3	J.C. Carnwell, WB. Felt by many; abr, bmp, rkg, SE-NW, abt 2 min; 2 shocks; rmb sound before.
- --		do	4	P. Many awakened; 2 shocks close together.
- --		Clemson College	4-5	W.W. Klugh, WB. Felt by sev; rpd, rkg, NE-SW, abt 1 min; a second shock, duration abt 15s; rmb sounds during; hill.
8:32		do	5	C.P. Blackwell, WB. Felt by many; trm., SE-NW, 1 to 2 min; 2 shocks; rmb sound during.
8:30		Columbia	2	Richard H. Sullivan, WB. Felt by sev; abr, trm, NE-SW, 3 to 4s 2 shocks; rmb sounds during; pln.
- --		do	2	P. Felt by few.
8:30		Donalds	2	Jas. A. Wren, WB. Felt by one; grd, trm, SE-NW, possible 3 min; rmb sound during; hill.
8:45		Due West	4	J.O. Graham, WB. Felt by sev; abr, trm, 15s; rmb sounds during and after; pln.
8:30		do	4	E.L. Reid, WB. Felt by many; abr, trm, 15s; rmb sounds during and after; pln.
8:35		do	5	Mrs. C.G. Stevenson, WB. Felt by many; abr, trm, 1 min; loud rmb sounds during; pln.
- --		Easley, Greer, Liberty.	4	P. Felt by many.

Date 1924	Time G.M.T.	Locality	Intensity	Source and Remarks
Oct. 20	- -	Greenville	3	C.C. Merchant, WB. Felt by many; rpd, trm, NE-SW, abt 2s; second longer shock, abt 1/2s duration; rmb sound during;
	- -	do	4	P. Many awakened; many alarmed; windows rtl; E-W; sounds during.
	- -	Greenwood	3	P. Many awakened; houses shk; dishes rtl.
	- -	do	2	R.H. Sullivan, WB. Felt.
	- -	Kershaw	1	J.W. Hamel, WB. Not felt.
	- -	Kingstree	1	Mrs. J.A. Scott, WB. Not felt.
	- -	Landrum	2	R. Hartwellwils, WB. Sev awakened; grd, trm, 2 or 3 min;
	8:30	Laurens	2	L.G. Roff, WB. Felt by sev; tin dishes rtl; abr, trm, NE-SW, abt 1 min; rmb sounds during; hill.

1. Various unspecified press accounts

2. MWR [290]

IV. McClain [260]	1924	OCT 20	08:30	35.0	82.6	Pickens Co., SC	145,000	V
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A. EQUUS [121]

B. Moneymaker [281]

V. Bollinger [33]	1924	OCT 20	03:20	35.0	82.6	Pickens Co., SC	145,000	V
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Two moderate shocks felt

A. EQUUS [120]

B. McClain [260]

C. Moneymaker [281]

D. Neumann [300]

E. Woollard [410]

VI. Moneymaker [281] 1924 OCT 20 3:30 a.m. Southern Appalachians 155,000 V-VI

A strong earthquake centered in Pickens County, South Carolina, affected an area of about 60,000 miles in the Carolinas, Tennessee, Georgia, Florida, and Virginia. In the epicentral area, buildings were shaken strongly, and it was reported that "one man's kitchen was shaken down" at Pickens. Strong roaring and "whizzing" sounds attended the disturbance. There were two shocks about 15 seconds apart. In eastern Tennessee, the earthquake was felt at Knoxville, Elizabethton, and Bristol. Intensities stronger than II are not known to have been attained in Tennessee.

A. EQHUS [123]

B. Neumann [300]

C. Woollard [410]

D. USEQ [395]

VII. Woollard [410] 1924 OCT 20 03:35 35.0 82.8 Pickens Co., SC 145,000 VI

Origin in Mts., 50 mi. west of that of Jan. 1, 1913. Near Pickens, S.C. Almost on N.C.-S.C. line.

A. Neumann [300]

VIII.(a) MacCarthy [241] 1924 OCT 20 15:30 35.0 82.6 Western NC 145,000 V-VI(RF)

*1924: October 20, 15:30 hrs. Western North Carolina. "Epicenter near 35 N., 82.6 W., intensity 5-6, felt over 56,000 square miles. At epicenter buildings were shaken and furniture overturned. A loud roar accompanied the shock." (E. Hist.) See also Q.S.R. for 1924-25, where the epicenter is given as "Pickens Co., S.C." This quake, according to available information, was felt in North Carolina at: Asheville, Brevard, Charlotte, Hendersonville, Murphy, and in the adjacent areas, with the greatest disturbances at Hendersonville and Brevard." B.S.S.A. 14 (1924), pp. 223-229, states that this shock was not recorded on any seismograph then in operation. Ten reports mentioned two separate shocks. See also B.S.S.A. 14 (1924), p. 274.

A. EQHUS [123]

B. USEQ [395]

C. Neumann [300]

D. Seismo. notes [340] 1924 OCT 20 3:30 a.m.

Southern Appalachian Region, October 20, 1924.—An earthquake was felt at various places in North Carolina, South Carolina, and Georgia on October 20th at 3:30 a.m. A fuller account by Mr. Fred R. Neumann is given in an article published in this number of the BULLETIN.

1. Neumann [300]

VIII.(b) MacCarthy [244] 1924 OCT 20 3:30 a.m. 35.0 82.6 Pickens Co., SC 145,000 V

1924: Oct. 20: 3:30 a.m. (?). This was an earthquake centered in Pickens County, S.C., whose effects were felt, according to Moneymaker (1957), as far to the northwest as Bristol, Va. E. Hist. says that the total area shaken was about 56,000 square miles, the epicenter near 35.0 N., 82.6 W., and the maximum intensity about V. Virginia is not mentioned in this account.

A. Moneymaker [281]

B. EQUUS [123]

IX. Varma [400] 1924 OCT 20 35.0 82.6 Pickens Co., SC V

A. MacCarthy [390]

B. MacCarthy [244]

I. TELC 1924 NOV 13 05:30 36.6 82.2 Bristol, VA IV

Location: Bristol, VA

Intensity: Houses shook, dishes rattled, windows clattered, small particles of mortar fell from chimney into fireplace

II. TVA [380] 1924 NOV 13 05:30 36.6 82.2 Bristol, VA V
A. Bollinger [35] 1924 OCT 00:30 Bristol, VA IV

Bristol, VA—"Frequent disturbances of the earth's surface felt in Bristol and many other places in this section recently are attributed to slight earthquake shocks. The tremors have been noticed for about a year in southwest Virginia, east Tennessee, and northern North Carolina, but...no damage of consequence has resulted.... The disturbances felt here have been violent enough to shake houses, cause windows and furniture to rattle and to create alarm in some quarters. The only damage locally...was to a cistern...[where]...the sidewalls were cracked and the water permitted to escape. The first of the series of shocks experienced here was about a year ago [Earthquake of December 31, 1923, Boyce, Va.?] when dwellings in various parts of the city began trembling about one o'clock in the morning. Many thought the occurrence due to an explosion of powder or dynamite at some distant point while others were of the opinion that it was caused by a slipping of lower strata underneath the mountains of this section."

A Bristol resident describes the most recent tremor: "I was reading a newspaper in my home about 12:30 o'clock in the morning. Suddenly the entire house shook violently. Dishes rattled, small particles of mortar trickled down to my fireplace and the windows clattered. It was all over in an instant. Seated in my chair, I felt only the slightest vibration--a single tremor. Then all grew still." "Practically all the shocks felt here have occurred during the night hours, most of them early in the morning." (RTD 11/14/24) "Several people claim to have noticed a slight trembling of the earth in Bristol for a few seconds one night about 3 weeks ago." It was recorded on government instruments in Washington. Several people say they have observed what they took to be slight earth tremors on more than one occasion during the past 6 months, the most recent and most violent being the one about 3 weeks ago. "People living on Windsor Avenue also claim to have noticed a trembling.... They declare that on these occasions their houses shook and the doors and windows rattled for an instant each time." (BHC 11/9/24)

1. Times Dispatch (11/14/24), Richmond, VA
2. Herald Courier (11/9/24), Bristol, VA
3. EQHUS [121]
4. MacCarthy [244]

B. Templeton [370] 1924 NOV 13 36.6 82.1 Bristol, TN-VA IV-V

Tremors lasted over a year.

1. Bollinger [33]
2. McClain, unpub., (1978)
3. McClain [260]
4. Moneymaker [281]
5. TVA, unpub., (1977)

IV. McClain [260] 1924 NOV 13 36.6 82.1 Bristol, TN-VA IV-V

A. Moneymaker [281]

B. Woollard [410]

V. Bollinger [33] 1924 NOV 13 36.6 82.2 Bristol, VA IV-V

Swarm?

A. Woollard [410]

VI. Moneymaker [281] 1924 NOV 13 12:30 a.m. Southern Appalachians IV

A light shock was felt at Bristol, Tennessee-Virginia. One observer reported that suddenly his house shook violently, dishes and windows rattled, and mortar fell down the chimney into the fireplace. Slight tremors were reported to have been noticed in the region for about a year.

A. Neumann [300] 1924 NOV 13 05:30 Bristol, TN IV(?) (RF)

A newspaper article of November 13, 1924, states that a shock was felt at 12:30 a.m., Eastern Standard Time, at Bristol, Va. An observer reported that suddenly the house shook violently and the windows rattled. The correspondent stated that slight tremors had been noticed in the region for about a year.

1. Times-Dispatch (11/13/24), Richmond, VA

B. Woollard [410]

VII. Woollard [410] 1924 NOV 13 00:30 36.6 82.2 Bristol, TN IV-V(RF)

Slight tremors in this region for a year.

A. Neumann [300]

VIII. MacCarthy [244] 1924 NOV 13

Money maker quotes Neumann (1924) as one of his authorities, and apparently has misread one of this author's statements which is to the effect that "possibly the tremors of the Oct. 20 earthquake...may have passed unnoticed at Bristol." Neumann, in turn, quotes a news item in the Richmond Times-Dispatch for Nov. 13 [correct date Nov. 14], which reads as follows: "Bristol, Va., Nov. 13. — Frequent disturbances of the earth's surface...have been noticed for about a year in southwest Virginia, east Tennessee, and northern North Carolina...those felt here have been violent enough to shake houses, cause windows and furniture to rattle and to create alarm....The only damage locally was to a cistern.... The side walls of the cistern were cracked and the water...escaped. The first of the series of shocks was about a year ago, when dwellings...in the city began trembling about 1 o'clock in the morning...And resident of Bristol describes in the following words his impressions...of the latest tremor: 'I was reading a newspaper in my home about 12:30 o'clock in the morning. Suddenly the entire house shook violently. Dishes rattled, small particles of mortar trickled down to my fireplace and the windows clattered. It was all over in an instant. Seated in my chair, I felt only the slightest vibration—a single tremor. Then all grew still.' Practically all of the shocks felt here have occurred during the night hours, most of them early in the morning...."

Note that nowhere in this Bristol item is a specific date mentioned: the event described above could have taken place at any time not too long before Nov. 13. It may, perhaps, actually refer to Oct. 20, although there seems no reason to suppose so. Even so, it would have to be a different shock, since the time is given as 12:30 a.m. and not 3:30 a.m. Inquiries regarding this event addressed to the Public Library and to the local newspapers of Bristol have remained unanswered, so that the date of this shock is still very uncertain.

A. Money maker [281]

B. Neumann [300]

C. Times-Dispatch (11/14/24), Richmond VA

I. TEIC 1924 DEC 25 04:30 37.3 79.9 Roanoke, VA V

Location: Roanoke, VA

Intensity: Pictures shaken from walls, vases crashed from tables, furniture moved, everyone awakened

II. TVA [380] 1924 DEC 25 04:30 37.3 79.9 Roanoke, VA VI

A. Bollinger [35] 1924 DEC 25 23:30 Roanoke, VA V

Roanoke, VA--"Earthy tremors that nearly shook people from their beds and that knocked pictures from the walls." Some recognized it as an earthquake. Began with a slight vibration and increased in intensity. Shook houses. Everyone awakened. Windows rattled as it shaken by a violent hurricane. A distinct rumble "heard by acute listeners." Floor of a brick building "trembled and the furniture bumped up and down on the floor with a jar" watchman at a mill thought a water tank had exploded. Severe earth tremors." About 11:30 p.m. (RT 12/26/24) (V);

Severe earth tremors. Pictures shaken from walls, vases crashed from tables, and buildings rocked. In one case, furniture is said to have "bumped up and down." Police and newspapers received hundreds of calls. Many thought their furnaces were exploding. (RTD 12/27/24);

Extent:

No shocks registered on the seismograph at Georgetown University, Washington, D.C. (RTD 12/27/24).

1. Roanoke Times (12/26/24), Roanoke, VA

2. Times-Dispatch (12/27/24), Richmond, VA

IV. McClain [260] 1924 DEC 25 37.3 79.9 Roanoke, VA

A. Bollinger [31] 1924 DEC 25 37.3 79.9 Roanoke, VA

1. McCarthy [244]

V. Bollinger [33] 1924 DEC 25 24:00 37.3 79.9 Roanoke, VA V

A. Bollinger [31]

B. McCarthy [244]

VIII. McCarthy [244] 1924 DEC 25 12:00 a.m.

1924: Dec. 25: Shortly before midnight. According to the Richmond Times-Dispatch (Dec. 26), Roanoke and vicinity were startled by severe earth tremors. Pictures were shaken from walls, vases crashed from tables, and buildings rocked. In one case furniture is said to have "bumped up and down." Police and newspapers received hundreds of calls. Many persons thought that their furnaces were exploding.

A. Times-Dispatch, (12/26/24), Richmond, VA

I. TEIC 1926 JUL 8 09:50 35.9 82.1 Spruce Pine, NC VI

Location: Near Spruce Pine, NC in south Mitchell Co., NC

Intensity: Chimneys cracked, building foundations cracked, water pipeline broken, glassware displaced, cracks in ground

Extent: Very local - only felt 6 miles distance

Comment: Significant damage relative to size of perceptible area

II. TVA [380] 1926 JUL 8 09:50 35.7 82.1 McDowell Co., NC VII

A. USEQ [395]

B. Templeton [370] 1926 JUL 8 35.9 82.1 Mitchell Co., NC VI-VII

Very local event.

1. Bollinger [33]
2. McClain, unpub., (1978)
3. McClain [260]
4. Moneymakr [340]
5. TVA, unpub., (1977)
6. EQHUS (1956)
7. EQHUS [121]

III. USGS [390]

A. EQHUS [123] [no account]

B. EQHUS [121] 1926 JUL 8 04:50 35.9 82.1 Southern Mitchell Co., NC VI

Felt area = local. The following effects were observed over a small area about 1/2 mile long and 300 yards wide: houses rattled, chimneys cracked, building foundations cracked, water pipeline broken, glassware displaced. Shock was reported felt 6 miles from epicenter.

1. USEQ [395]

2. MacCarthy [241]

C. EQHUS [120] [same as B. above]

D. USEQ [395] 1926 JUL 8 09:50 South Mitchell Co., NC VI (RF)

felt by few; greatly alarmed; cracks appeared in ground; trees shook dew off; houses rattled; chimneys cracked; underpinning of buildings cracked; chimney fell N to SE; water pipe line broken; glassware broken; abrupt swaying.

IV. McClain [260] 1926 JUL 8 09:50 35.9 82.1 South Mitchell Co., NC VI-VII

A. EQHUS [121]

B. Moneymaker [281]

V. Bollinger [33] 1926 JUL 8 04:50 35.9 82.1 Mitchell Co., NC VI-VII

A. EQHUS [120]

B. MacCarthy [241]

C. McClain [260]

D. Moneymaker [281]

VI. Moneymaker [281] 1926 JUL 8 4:50 a.m. Southern Appalachians VII

A very sharp local earthquake damaged buildings and alarmed people in the southern part of Mitchell County, North Carolina. The damage included the throwing down of a chimney and the cracking of several other chimneys; the cracking of the underpinning and foundations of houses; the movement of houses on their foundations; the breaking of water pipes; and the breaking of glassware thrown from shelves. Other reported effects of the disturbance include the cracking of the ground, the abrupt swaying and rattling of houses, and the shaking of the dew from the trees. The area in which damage occurred was about half a mile long and 900 feet wide, but the shock was felt at least six miles away.

A. USEQ [395]

VIII. MacCarthy [241]

1926 JUL 8 04:50 35.9 82.1 Southern Mitchell Co., NC

*1926: July 8, 04:50 hrs. Southern Mitchell County, N.C. "Epicenter near 35.9 N., 82.1 W. "Felt by few alarmed: cracks in ground: houses rattled, chimneys cracked, underpinnings of buildings cracked; chimney fell NE to SW; water pipeline broken; glassware displaced. Abrupt swaying NE-SW. Disturbed area 1/2 mile long, 300 yards wide, several houses moved on their foundations and damaged. Shock said to have been felt six miles away." (Q.S.R., July-AUG.-Sept., 1926, quoting "Report to State Geologist by Prof. Collier Cobb".) No other mention of this earthquake has been found. The motion "Felt by few; alarmed few" is puzzling in view of the further description of the local effects. Probably "only a few" felt it because it affected such a small area but, within this area, almost everyone must have been at least aware of the quake, if not downright alarmed by it!

A. USEQ [395]

IX. Varma [400]

1926 JUL 8 35.9 82.1 Mitchell County VI

A. MacCarthy [241]

I. TEIC 1927 JUN 16 13:00 34.7 86.0 Scottsboro, AL 3000 V

Location: Scottsboro, AL; intensity; near center of affected area

Intensity: People fled into streets @ Scottsboro, Gurley and Woodville, AL; felt by all @ Scottsboro where houses rocked and dishes rattled

Extent: NE AL; map; 3000 sq. km.

II. TVA [380] 1927 JUN 16 13:00 34.7 86.0 Scottsboro, AL IV

A. USEQ [395]

B. Templeton [370] 1927 JUN 16 34.7 86.0 Scottsboro, AL V

1. Bollinger [33]

2. EQHUS [120]

3. McClain, unpub., (1978)

4. McClain [260]

5. Moneymaker [281]

6. TVA, unpub., (1977)

7. EQHUS (1956)

8. EQHUS [121]

III. USGS [390]

A. EQHUS [123] 1927 JUN 16 07:00 34.7 86.0 AL 4700 VI (RF)

Scottsboro, Ala. Houses shook. People fled to streets.

1. USEQ [395]

V

6500

V

6500

Northeastrn AL

<u>Time</u> <u>G.M.T.</u>	<u>Locality</u>	<u>Intensity</u>	<u>Source and Remarks</u>
	ALABAMA		
13 00	Madison and Jackson Counties		P. Shock felt from Gurley east to Stevenson and over a 60 mi. area.
13 00	Bridgeport		P. Felt.
13 00	Dutton		P. Shock and noise heavy.
- --	Gurley	5	P. Residents of small houses rushed into streets; shock accompanied by reverberating roar and a series of staccato explosions lasting 30 s.
- --	Huntsville		P. Felt.
13 02	Scottsboro	5	J.A. Bird, WB. Felt by all, many alarmed; dishes rtl; abr trm.; roaring sounds.
13 00	do	5	P. People fled to streets; earth's surface quivered for 30 s; bldgs rkd; windows shk and rtl; started with low rumble which mounted to deep and deafening roar.
- --	Stevenson	3?	P. Felt a very pronounced shock.
- --	Woodville		P. Pronounced shock; people left houses. WB office, R.L. Moore, WB. S. Moore, WB, report quakes not felt at Birmingham, Bridgeport and Tusculmbia respectively.

1. Unspecified news accounts

2. MWR [290]

- IV. McClain [260] 1927 JUN 16 12:00 34.7 86.0 Near Scottsboro, AL 6500 V
- A. EQHUS [121]
- B. Moneymaker [281]
- V. Bollinger [33] 1927 JUN 16 07:00 34.7 86.0 Jackson and Madison Co., AL 6500 V
- A. EQHUS [120]
- VI. Moneymaker [281] 1927 JUN 16 7:00 a.m. Southern Appalachians VI
- A sharp local earthquake centered near Scottsboro, Alabama, was felt over much of Jackson and Madison counties. At Scottsboro, it was felt by all; many rushed into the streets. The shock was attended by a noise, beginning with "a low rumble which mounted to a deep and deafening roar". It was felt also at Bridgeport, near the Tennessee state line, Dutton, Gurley, Huntsville, Stevenson, and Woodville.
- 448
- A. EQHUS [123]
- B. USEQ [395]
- IX. Varma [400] 1927 JUN 16 34.7 86.0 Jackson Co., AL V
- A. USEQ [395]
- B. EQHUS [121]
- X. Docekal [100] 1927 JAN* 16 06:00 34.7 86.0 Scottsboro, AL 6500 V
- Houses shook at Scottsboro and Gurley, Alabama. The shock was felt in Madison and Jackson counties. Roaring noises were heard. No damage was reported.
- A. EQHUS [123]
- B. EQHUS [121]
- C. Moneymaker [281]

I. TEIC 1927 JUL 20 09:58 36.0 83.9 Knoxville, TN V

Location: Knoxville, TN

Intensity: Windows broken, scores awakened

Extent: No specifics but reports indicate felt in middle and eastern TN; Money maker [281] reports a sharp local shock in the Oakwood section of Knoxville and that apparently some assumed it was felt in Oakwood, Montgomery Co., in middle TN

II. TVA [380] 1927 JUL 20 36.0 83.9 Knoxville, TN V

A. Money maker [283] 1927 JUL 20 3:58 a.m. Middle & east TN

1. News Sentinel (7/20/27), Knoxville, TN

Knoxville News-Sentinel, Wednesday Evening, July 20, 1927 "Was it a Quake?" "Windows Broken in City by Tremors; Experts Puzzled"

"Despite six hours of investigation of violent earth tremors which awoke scores of Knoxvilleans at 3:58 a.m. this morning, weathermen, geologists, and astronomers were still puzzled at noon today whether it was an earthquake or an explosion."

"Mute evidence of the force of the tremor was found at Oakwood School, where a dozen windows were broken by the vibrations. No trace of either an earthquake or explosion could be found, however."

"We have had no report from Washington's seismograph of an earthquake, weather observer, J. ? Widemeyer said at noon. 'We are investigating to find out if some quarry hasn't set off a giant blast which caused the tremor.'"

"Scores of persons reported that they had been awakened by the tremor, which lasted several seconds, starting about 3:58 a.m."

"The fact that the disturbance continued for over a brief period was taken by the weather bureau as indicative that it was caused by a real earth tremor."

"But other persons reported it, however, as one violent jar which might have been caused by an explosion near the city."

2. News-Sentinel (7/21/27), Knoxville, TN

Knoxville News-Sentinel, Thursday, July 21, 1927

"'Quake' Still Mystery"

No Record on Washington Instrument; No Big Blast Reported

Whether it was an earthquake or explosion that disturbed Knoxville early Wednesday morning continued unknown today.

No earthquake was recorded on the Washington, D.C., seismograph and, according to weather observer Widmeyer, it is questionable whether an earthquake could be so local in character as not to be recorded on the delicate Washington instruments.

Calls at dozens of quarries and plants in Knoxville and vicinity failed to disclose any blast or explosion that explained the phenomenon here.

Eli Lieber, retired business man, expressed the opinion that it was an explosion. He said that it sounded like a charge of dynamite. R.L. Munlyn, manager of the Farragut Taxi Company, declared that earthquakes which he had experienced on previous occasions made rumbling noises but did not sound like a cannon as in this case.

3. Seismological Report, July, August, Sept. 1927, U.S. Coast and Geodetic Survey, Washington, D.C., 1930, page 5.

1927 JUL 20 ?

Tennessee

"Violent earthquakes felt in eastern and middle Tennessee."

4. Knoxville Journal (7/21/27), Knoxville, TN

Knoxville Journal Thursday Morning, July 21, 1927

"Quake or Blast? Weatherman is yet in Doubt

Scores of persons awakened by jar early Wednesday; school windows are broken.

Did Knoxville have an earthquake yesterday morning, or was the violent tremor caused by an explosion? This question had not been solved last night by J. I. Widmeyer, weatherman.

Scores of persons reported that they were awakened by a tremor at 3:58 a.m. on Wednesday morning. Mute evidence of the force of the tremor was found at the Oakwood School where a dozen windows were broken by the vibrations. No report was received by the Weather Bureau from the seismograph at Washington, which records earthquakes, and if it had been an earthquake the weatherman believes that it would have been felt in other nearby towns.

Some persons reported that the quake continued for several seconds, which would indicate that it was caused by a real earth tremor, while others said it was one violent jar which might have been caused by an explosion near the city.

The Weather Bureau is investigating to see if it could have been a blast set off in a nearby quarry or if it could have been a mine explosion."

B. Seismo. notes [340] 1927 JUL 20

TN

Tennessee, July 20, 1927--Newspaper reports state that violent earthquakes were felt in eastern and middle Tennessee on July 20th. No definite times of occurrence were reported.

1. Unspecified news accounts

C. Templeton [370] 1927 JUL 20 35.9 83.9 Knoxville, TN

Unknown

Possible explosion. An intensity VI shock is reported by 7 on this date at latitude-longitude 35.8 86.0 .

1. Bollinger [33]

2. McClain, unpub., (1978)

3. McClain [260]

4. Moneymaker [281]

IV. McClain [260]

1927 JUL 20 08:58 35.9 83.9 Knoxville, TN

Questionable quake

A. Moneymaker [281]

V. Bollinger [33]

1927 JUL 20 03:58 36 84 Knoxville, TN

Questionable event

A. McClain [260]

B. Moneymaker [281]

VI. Moneymaker [281] 1927 JUL 20 3:58 Southern Appalachians

According to Seismological Notes, "Newspaper reports state that violent earthquakes were felt in eastern and middle Tennessee on July 20th. No definite times of occurrence were reported". The writer's examination of several newspapers failed to indicate that an earthquake was reported in middle Tennessee, but there was a sharp local shock, accompanied by a loud explosive noise, in the Oakwood section of Knoxville at 3:58 a.m. Several windows were broken at the Oakwood School. Because of the loud explosive noise which attended it, the shock was believed to have been caused by the detonation of a charge of dynamite. Investigations by the Knoxville Police Department failed to disclose any evidence of a dynamite blast. Although the cause of the disturbance was never determined, the writer found that it resembled a blast much more closely than any known southern Appalachian earthquake. All of the reported effects of the disturbance could have been produced by the detonation of a dynamite bomb in the air near the school. The mention of Oakwood School in press accounts led to the assumption that the shock had affected the town of Oakwood, Montgomery County, in middle Tennessee. On basis of this assumption, Branner and Hansall estimate the affected area to have been 70,000 square miles; actually, it was not more than a few square miles at the most.

- A. Knoxville News Sentinel (7/20, 7/21/27), Knoxville, TN
- B. Knoxville Journal (7/21/27) Knoxville, TN
- C. Branner [40]
- D. Moneymaker [283]
- E. Seismo. notes [340]
- F. Seismological Report (1925-1927), U.S.C. &

I. TEIC 1927 OCT 8 13:58 35.0 85.3 Chattanooga, TN 2000 V

Location: Chattanooga, TN; F/S; intensity

Intensity: Building material dislodged, felt by many, buildings rattled

Extent: Small area of SE TN near TN-GA border; map; 2000 sq. km.

Comment: F/S reported @ St. Elmo; other shocks felt in north Chattanooga

II. TVA [380] 1927 OCT 8 13:58 35.0 85.3 Chattanooga, TN IV

A. Nuttli [310] 1927 OCT 8 12:56 35.0 85.3 V

B. USEQ [395]

C. Templeton [370] 1927 OCT 8 35.0 85.3 Chattanooga, TN V

Many shocks between 23:30 (10/7) and 02:00 (10/8).

1. Bollinger [33]

2. McClain, unpub., (1979)

3. Moneymaker [281]

4. TVA, unpub., (1977)

III. USGS [390]

D. USEQ [395] 1927 OCT 8

<u>Time</u> <u>G.M.T.</u>	<u>Locality</u>	<u>Intensity</u>	<u>Source and Remarks</u>
	<u>TENNESSEE</u>		
13 58	Fort Wood		P. Felt. Shock felt in large and small buildings, light trembled, glassware rtl; felt generally in area bounded by Signal Mountain, Red Bank, East Ridge, and St. Elmo.
13 58	Chattanooga	5	L.M. Pindell, WB. Felt by many; few alarmed; bldgs rtl; rpd motion; 1 shock; val. rky. P. Felt.
	Signal Mountain Lookout Mountain St. Elmo		P. Felt
	N. Chattanooga		P. Shock felt; also another at 11:30 p.m., local time, night before.
	Red Bank		P. Building material dislodged; other mild shocks from 12 to 2 a.m., local time. P. Felt.
454			
	1. Unspecified news accounts		
	2. MWR [290]		
IV. McClain [260]	1927	OCT 8	12:56 35.0 85.3 Chattanooga, TN V
A. Moneymaker [281]			
V. Bollinger [33]	1927	OCT 8	07:56 35.0 85.3 Chattanooga, TN V
Foreshocks			
A. McClain [260]			
B. Moneymaker [281]			
VI. Moneymaker [281]	1927	OCT 8	7:56 a.m. Southern Appalachians V

A moderately strong earthquake was felt in all parts of Chattanooga and in suburban areas, including North Chattanooga, East Ridge, Lookout Mountain, Signal Mountain, St. Elmo, and Red Bank. The shock was felt in small and large buildings. Lights trembled and glassware, windows, and doors rattled. A few people were alarmed. Other mild shocks were reported from 11:30 p.m. on October 7 to 2:00 a.m. on October 8.

A. Branner [40] 1927 OCT 8

Chattanooga, TN

25,000 (?) V

B. USEQ [395]

I. TEIC 1928 NOV 3 04:04 35.9 82.8 Hot Springs, NC 187,000 VII

Location: Hot Springs, NC; near the center of area reporting damage and felt area; 1 of 6 locations reported to have felt the NOV 20 A/S

Intensity: People driving in Asheville, NC, reported cars shaken about, acting "queerly", several reporting shock sufficient to stop the car (?); in Asheville, NC, bookcases upset, walls cracked, floor cracked in one building; chimney top shaken off @ Greeneville, TN; bricks shaken from chimneys and plaster cracked @ Newport, TN; in Johnson City, TN, 3 frame buildings under construction were shaken down as was a similar building @ Morristown, TN; plaster cracked @ Chester, SC; windows broken in Bryson City, NC; temperature changes in springs along Spring Creek near Hot Springs, NC

Extent: KY-IN border to E SC, SW VA to N GA; map; 187,000 sq. km.

Comment: Next event (NOV 20) A/S (?); Dewey [95] JHD location

A. Dewey [95] 1928 NOV 3 04:24 36.1 82.8

04:24:09.8; 36.112, 82.828; 5.0R; 4.5F

Depth restrained; magnitude from felt area

II. TVA [380] 1928 NOV 3 04:04 35.9 82.8 Hot Springs, NC VII

A. USEQ [395]

B. Moneymaker [283] 1928 NOV 2 11:00 p.m. Southern Appalachians

1. Asheville Citizen, (11/3/28), Asheville, NC

"RESIDENTS ROUTED FROM BEDS AS BUILDINGS SHIVER DURING SHARP TREMBLOR

"Only damage reported is cracked floor in Jackson building; dishes and windows rattle as brief shock affects area as far south as Spartanburg, South Carolina; eastern Tennessee feels tremors

Heavy earthquake tremors shook the mountain side of western North Carolina and adjoining states last night a few minutes after 11 o'clock.

"The shock was brief, heavy and passed with startling rapidity. Almost every place from Bristol, Va.-Tenn. to Spartanburg, S.C. and from Asheville to Winston Salem reported that the quake had been felt, disturbing homes and throwing consternation into households. All of eastern Tennessee, according to reports, was shaken heavily.

"Every report indicated that the tremor had been only slight and that no serious damage had been done. Though something approaching panic followed the shock, and thousands of people were brought suddenly from their homes and many from their beds to find out what had happened, the tremor was not followed by any serious aftermath and no second tremors were felt at any point except at Spartanburg, S.C. where the shock was repeated twice within fifteen minutes.

"Hundreds of people ran to their telephones immediately after the incident to call the nearest police station, fire station or newspaper office to find out what had befallen. Many people whose telephones had been put out

of commission by the disturbance jumped in their automobiles and rushed to the nearest center of population to investigate the occurrence.

"TEMPORARY PANIC

"The disturbance came to Asheville without warning of any kind and left thousands of people in a state of temporary panic. Reports began to flow into the Citizen office at 11:05 o'clock, two minutes after the shock, that all parts of the city and surrounding county had been disturbed. Hundreds of people who had retired for the night were awakened. One or two citizens reported that they had been tumbled out of bed!

"Following the first early reports that came in, it was found that telephone service in several parts of the city, notably in the Northern section, had been put out of order. Several business men who were working in the Jackson building hurried out in the expectation of seeing the building tumble down.

"FLOOR IS CRACKED

"Books were thrown from their cases in several offices in the Jackson building and in the office of George Pannell, city attorney, the floor was cracked by the tremor.

"The shock appeared to have reached its greatest intensity along Montford Avenue and in the Montford Hills and Woodfin section. Citizens in this entire area rushed from their houses in a state of bewilderment and uncertainty. Many of them hurried to the Citizen office to make inquiries about the extent of the damage.

"SHOCK WIDESPREAD

"Within ten minutes after the tremor, calls were received from Lake View Park, Kenilworth, West Asheville, Orange Street, Spruce Street, Biltmore, Grove Park, Woodfin, Cumberland Avenue, South Biltmore, and Bingham School, advising that the shock had been heavy and that the entire communities were aroused and people hurrying from their homes to the streets.

"Many freak things were reported as having happened. Patrons at the Majestic theater, where the show was just coming to an end rushed from their seats and filled the streets and side walk. In the office of Carl Bamford at the Princess building, the heavy safe was rolled from its moorings by the quake and trembled about the floor while desks were rudely bumped about. In restaurants where many people were having dinner after the shows, the dishes were shaken on the table and many people frightened.

"From several homes came reports that dishes had been thrown from cupboards. In a few minutes after the shock, a telephone call from Newport, Tennessee, saying that people had been awakened and were hurrying from their houses. Several of them stated that their furniture and dishes had been cast about and that pictures had fallen from the wall.

"Automobilists who hurried to the Citizen office from every section of Asheville, West Asheville, Biltmore, and Kenilworth reported that their cars had been shaken about. Several people stated that their cars had acted queerly, and several of them stated that the shock had been sufficient to stop the car.

"Patients at the various city hospitals were frightened. Attendants from all indications were as badly frightened as the patients.

"The same sort of fright appeared to be general all over Buncombe County. Telephone girls at the office of the Southern Bell Company stated to the Citizen that in a period of two hours they were overwhelmed with thousands of calls from all parts of western North Carolina. Women were particularly agitated and pressed the Citizen for information as to whether there would be a recurrence of the shock. Most of them were completely reassured when it was explained that the tremor had covered the entire mountain region of Tennessee, western North Carolina and South Carolina.

"Radio fans who were sitting at their machines dialing for 'Al' Smith's voice from Brooklyn without success stated that the reception cleared up perceptibly after the earth shock and that they were able to get any station they wanted the moment the trembling ceased.

"THUDDING SOUND

"A feature of the shock was that it was accompanied by a low thudding sound, like the falling of rock. Hundreds of people thought that someone had blown up Beaucathcher Tunnel. After the low, falling sound came a moment of intense shock and then a few minutes of quivering as it the earth was being rudely shaken.

"From several sections of the city citizens declared that windows in their homes had been cracked. No more serious damage was done to any of the houses so far as could be ascertained.

"In some homes, the shock was so perceptible that even the animals were badly frightened, and one lady was exceedingly disturbed because her dog continued after the quake to moan and howl.

"HOMES SHAKEN"

"Homes in the Kimberly section seemed to be shaken with particular fury at the beginning of the tremor as were also homes in the Montford Hills and Woodfin sections. Indications were that in the entire area along the French Broad River all the way down to Newport the shock reached its greatest intensity. Several calls stated that the rumbling between the river banks was particularly heavy and that it gave every indication of having been a tremulous explosion.

"For an hour the street in front of the Citizen office was clogged with cars and reporters were kept busy answering queries mainly of men who crowded into the office, many of them frightened. Most of them were businessmen who were still down town, and politicians on their way home from the several political meetings which were held in the city and several parts of the county. Many of the politicians of both political persuasions were visibly agitated, and were only slightly composed after being told that probably the mishap was only the beginning of a political landslide. Some of them openly admitted that they were frightened.

"MANY AWAKENED"

"Mothers who called the Citizen office said that their children had been awakened and many of them said that they were having difficulty in quieting even the older members of the family. School girls by hundreds, just finishing up their regular or extra curricular work, called the Citizen to ascertain where the center of the shock was, which up until a late hour was not reported on by the government authorities in Washington.

"No seismographic reports could be obtained. The United States Weather Bureau had closed for the night and it was impossible to get any information from this source.

"J. Ed Gibson, city Secretary-Treasurer, came by the Citizen office soon after the tremor had passed and reported that people were hurrying helter-skelter in an effort to find out what was going on. He stated that in his section of the city the shock was very heavy.

"James H. Wood, Division Passenger agent for the Southern Railway, reported that his house had been very badly shaken but no serious damage done.

"G.O. Shepherd, manager of Radio Station WUNC and familiarly known through the columns of the Citizen as "GOSH" called from the Kenilworth section and stated that the entire section was in a near state of panic. Citizens who had been having radio and card parties in the Oakhurst section phoned the news within a few minutes of the tremor and declared they felt that the mountain was sliding down. Several of them were afraid that the White Fawn Reservoir had broken.

"People from the rural sections sent in similar reports about the intensity of the shake-up. Several of them who did not have telephones hurried to their neighbors houses to check up on what they feared would prove to be a catastrophe.

"WOMEN NERVOUS

"One lady asked reporters to advise her whether the 'end of the world was coming.' Most of the women were anxious to ascertain the extent

of the quake, and expressed fears for their relatives at distant points. Many of the women who called were crying. Many of the calls wanted to know whether damage had been done in Tennessee, and South Carolina. Not a few of the feminine callers were completely chagrined that reporters could not tell them within a few minutes after the shock just how far its extend (sic) and whether there would be another one.

"A call from the home of Gustov Lichtenfels stated that all of the pictures on the walls had been tossed about, and the mirrors turned awry. Similar reports came from hundreds of homes throughout the city.

"Many of the people who called at the Citizen office had gotten up from bed, dressed and journeyed down to ascertain whether any damage was done to their places of business.

"A late report from the Jackson building stated that damage had been done in most of the offices from the first floor up. Many book cases were reported thrown over, and books cast out onto the floor.

When the tremor shook the building violently the negro elevator boy ran the car to the first floor and fled. He could not be found last night. Tenants in the buildings who were still at work at 11 o'clock had to walk to the ground floor."

"TREMORS FELT BY MANY TOWNS OVER SOUTHEAST AREA

"Spartanburg, S.C. Nov. 2. AP. Two distinct shock were felt here at 11 and 11:05 o'clock tonight. No damage was reported here."

"TREMOR AT BRISTOL

"Bristol, Va. Nov. 2 AP. What is believed to have been a slight earthquake shock was felt in several different sections of Bristol, Va.-Tenn. tonight at 11:05 p.m.

"No damage was reported in telephone calls from alarmed residents shortly after 11 o'clock.

"Munsey Slack, president of Bristol Publishing Corporation, was the first to report the shock."

"RESIDENTS ROUSED (From the Citizen Bureau)

"Hendersonville, N.C. Nov. 2. An earth tremor was felt here shortly after 11 o'clock tonight, lasting for about 30 seconds. So far as can be learned no damage was done. The shock, however, was distinct, and practically all residents of the city were roused from their slumbers by the shaking of their homes."

"FURNITURE UPSET

"Newport, Tenn. Nov. 2. Residents of Newport were roused about 11 o'clock by an earthquake which shook for less than one minute. Windows were shaken by the tremor (sic) furniture upset in many places. No damage of any consequence has been reported."

"DISTINCT SHOCK (Special to the Citizen)

"Waynesville, N.C. Nov. 2. Waynesville felt a distinct shock at 11:03 o'clock tonight from an earth tremor which lasted about one minute. Windows, dishes and bric-a-brac rattled causing general alarm over the city, but no damage of consequence has been reported."

"AT CHATTANOOGA

"Chattanooga, Tenn. Nov. 2 AP. Distinct earth tremors were felt here tonight shortly after 10 o'clock. A number of people reported that their homes were rocked by the disturbance. In one apartment house the occupants became frightened and several left the building."

"ROCKS KNOXVILLE

"Knoxville, Tennessee, Nov. 2 (AP) Earth tremors of minor intensity rocked the entire city of Knoxville and extended over a wide area of east Tennessee according to messages that came to the Knoxville Journal from several towns tonight. The tremor occurred at 11:03 o'clock with a reported duration of 10-15 seconds. No reports of damage have been made."

"ATLANTA SHAKEN

"Atlanta, Nov. 2 (AP) Distinct tremors were felt here tonight at 10 o'clock, but no damage was reported. Numerous calls were received at newspaper offices by citizens seeking information regarding the shock which was reported to have caused dishes to rattle and furniture to move."

"SHAKES KINGSPORT

"Kingsport, Tenn. Nov. 2 (AP) A slight earthquake was felt here and at Greeneville shortly after 11 o'clock tonight. No damage was reported."

"FELT AT CHARLOTTE

"Charlotte, N.C. Nov. 2 (AP) After earth tremors had been felt in this city and section about 11 o'clock tonight, telephone calls poured into newspaper offices to inquire for further information. No damage was done."

"FELT AT WINSTON SALEM

"Winston Salem, N.C. Nov. 2 (AP) Earth tremors were felt here tonight shortly after 11 o'clock. Several residents in the western section of the city reported the shock as distinct. No damage was reported."

THE KNOXVILLE JOURNAL, (11/3/28), Knoxville, TN EARTHSHOCK SHAKES KNOXVILLE AND SOUTH Two distinct earth tremors shivered through Knoxville's hilly terrain at 10 o'clock last night.

Immediately the Journal's telephones began to ring with people calling up to ask about the quake. The shocks were generally felt over Knoxville, east Tennessee, and a large area through the southern Appalachians. So far as could be learned, the shocks did no damage beyond disturbing people. The Associated Press reported shocks from several southern points.

People parading in nightgowns in Newport, consternation in Dandridge, pigeons falling out of trees on East Scott Street in Knoxville--mirrors shaking wierdly--cards shifting about in uncanny fashion on a bridge table--windows rattling--and houses sounding like they were going to fall down--sitting room chairs suddenly deciding to change position.

Such were some of the reports from readers who called the Journal.

W.W. Comer, residing on Mountain Park Boulevard in North Hills, thought his furnace had exploded when the quake shocked that section of the city. It was a distinct shock that rattled the windows in their frames and glassware on the tables and in cabinets, he said. It must have lasted 10 or 15 seconds.

J.I. Widmeyer, Weather Bureau man in Knoxville, was one of the first to report that he had felt two tremors, expressing himself to the effect that he was certain it had been a small earthquake.

Others to call in were: L.T. Robertson, Island Home Park; Elmer Greer, Newport; J.L. King, 2038 East Fifth Avenue; A.F. Sanford; Dorothy Elgin, 909 Twenty-Second Street; M.A. McCallie, Island Home Park; Mrs. Frank Caldwell, South Knoxville; Mrs. C.F. Williams, 1905 Lake Street; Mrs. J.E. Gervin, 1808 Allor Avenue; K.P. Baum, 42 East Scott; W.F. Dickey, 901 West Hill Avenue;

Robert L. Carden, 1302 Luttrell Avenue; Ed S. Albers, Sequoyah Hills; F.A. Blackurn, 1817 White Avenue; B.L. Baum, Glenwood, Fountain City; Mel Miller, 323 North Gay; Mrs. Fred Houk, Lake Street; several people on Kenyon and Armstrong Streets.

TREMORS ARE FELT OVER THE STATE, SHOCK IN BRISTOL

Bristol, Va., Nov. 2 (AP)—What is believed to have been a slight earthquake shock was felt in several different sections of Bristol, Virginia-Tennessee, tonight at 11:05 p.m. No damage was reported in the telephone calls from alarmed residents shortly after the shock.

SHAKES SPARTANBURG

Spartanburg, S.C., Nov. 2 (AP)—Two distinct earth shocks were felt here at 11 and 11:05 o'clock tonight. No damage was reported.

TREMORS IN CHATTANOOGA

Chattanooga, Tenn., Nov. 2 (AP)—Distinct earth tremors were felt here at shortly after 10 o'clock tonight, a number of people reported that their homes were rocked by the disturbance.

PHONES DAMAGED

Asheville, N.C., Nov. 2 (AP)—Heavy earth tremors were felt here tonight, shortly after 11 o'clock. Telephones in many parts of the city were thrown out of order, but no other damage was reported.

FELT UPSTATE

Kingsport, Tenn., Nov. 2 (AP)—A slight earthquake was felt here and at Greeneville shortly after 11 o'clock tonight. No damage has been reported.

RATTLE DISHES

Atlanta, Ga., Nov. 2 (AP)—Distant tremors were felt here tonight at 10 o'clock but no damage was reported. Numerous calls were received at newspapers from citizens seeking information regarding the shock which was reported to have caused dishes to rattle and furniture to move."

3. Asheville Citizen, (11/12/28), Asheville, NC

"ICY SPRINGS TURN WARM FOLLOWING EARTHQUAKES
"MOUNTAIN PEOPLE ARE PERTURBED BY RESULTS OF RECENT SHAKE

"Marshall, Nov. 12. From the remote Spring Creek section reports have come to Marshall that cold mountain springs, whose flow, even during summer is almost the temperature of ice are becoming warm, following the series of earthquake shocks over a week ago, while several miles below, at the little town of Hot Springs, the warm mineral springs are said to be boiling in many instances, with water fed to them by the subterranean streams colored from foreign matter since the shock which was far more severe in that section than any other part of Madison County. Very strange, indeed, is the fact that the mountain springs, ten, fifteen and more miles back in the caves and high on the mountains, from Hot Springs, are affected, and it is said that a number of them which were cold as ice prior to the quake are now almost lukewarm, thus strengthening the belief of several mountain residents that the underground streams which feed the age old hot and mineral pools at Hot Springs, undermine the entire mountain country, and that the recent subterranean disturbances have accounted for the marked changes in the temperature of the water.

"Mountaineers say that a good spring is cold in summer and warmer in the winter, but none of the cold springs which flow in profusion in the Spring Creek members should be near as warm as some of them are now said to be. The section is said to be the best watered part of Madison County, with hundreds of springs and small streams flowing down from the caves to Spring Creek, which flows into the French Broad at Hot Springs.

"The warm springs at Hot Springs, which gave the town its name, have attracted undue attention since their discovery during the Civil War. However, none of them are said to have been hot until after the recent earthquake shocks, but since, a number of them have been boiling and jets of steam are said to be issuing from the ground about them."

C. Neumann [301]	1928	NOV 2 .	11:03 EST	Northwest of Asheville, NC	104,000
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On the night of November 2, 1928, at 11:03, Eastern Standard Time, an earthquake shook about 40,000 square miles of territory in Tennessee, North Carolina, South Carolina, Georgia, Virginia, and Kentucky. Its origin was northwest of Asheville and close to the boundary between North Carolina and Tennessee. This is the heart of the southern Appalachians, which has been the scene of quite a number of shocks of similar type. Their intensity seldom exceeds VI, in the Rossi-Forel scale.

On November 3rd questionnaires were mailed from the office of the Coast and Geodetic Survey to 105 postmasters at county seats in affected area. The accompanying isosismal map was constructed on the basis of reports received from about two-thirds of the postmasters canvassed; also from many co-operative observers of the United States Weather Bureau, and other residents. Additional information was obtained from press clippings forwarded by many of the correspondents. In all about one hundred localities are represented.

The proper classification of intensities according to the Rossi-Forel scale is at best only a rough approximation. Three degrees of intensity would seem to suffice; namely, (1) not felt at all, or by only about five per cent of the population; (2) felt by one-fourth or one-half of the population; and (3) felt by practically everyone, with damage of a superficial nature. While the delineation of isoseismals is largely a matter of adopting proper criteria, and no two persons may see them in the same light, the map as drawn seems without doubt to indicate abnormal dumping out of intensity in the mountain regions. This is also one of the outstanding characteristics of the isoseismals for the Charleston earthquake of 1886 and for the Quebec earthquake of 1925.

The existence of two isolated regions of perceptible activity seems to be substantially verified by the relatively large number of negative reports from regions lying between them and the epicentral area. As two reports on the northeast edge of the earthquake zone point to the possibility of still another isolated area, one cannot help but imagine a complete zone of quiet just inside a ring of extraneous isoseismals. A symmetrical distribution of this character suggests a phenomenon of dynamic origin rather than one due to any peculiarities in the geology of the region.

Instrumental reports were received from Charlottesville, Cincinnati, Georgetown, and St. Louis. No exhaustive investigation has been undertaken, but a preliminary study indicates that certain dominant phases may be designated. Knowing within reasonable accuracy the epicentral distances, it was a simple matter to plot travel time curves and determine the velocities of the recorded phases. In the case of the four P phases recorded, the slope of the travel time curve corresponds to a velocity of 5.4 kilometers per second, which is, according to Jeffreys, the velocity of a compressional wave (P) in the outer granitic layer. For the four S type phases, the slope of the line, and also the four intervals to 1, correspond to a velocity of 3.7 kilometers per second, which, according to the same authority, corresponds to a transverse wave (S*) in an intermediate layer. The next group of L type represents a velocity of 3.3 kilometers per second, or a transverse wave (S) in the outer granitic layer. There is also another group of velocity 2.8 kilometers per second. To summarize, each observatory recorded the following phases: P S*, S, and also an "L" at 2.8 kilometers per second, which may represent a discontinuity at a shallower level than any of the others.

These data are probably the first which have been obtained in sufficient quantity to determine the speed of propagation of seismic surface waves in the southern Appalachian region. The importance of the new installations at Charlottesville, Cincinnati, and St. Louis is clearly demonstrated.

On the strength of these data it appears possible to determine the distance and time of origin if P and S can be recognized on the seismograms. For shocks less than 700 or 800 kilometers away, we may use the formula:

$$\text{in which } 0.118 = 1/V - 1/V \quad . \quad V = 3.30 \text{ and } V = 5.40.$$

The results obtained in this way from the data for the earthquake of November 3d, G.M.T., are as follows:

	P	S	P	O
	h m s	s	km	h m s
Cincinnati.....	4 03 44	48	406	4 02 29
Charlottesville.....	4 03 55	52	440	4 02 34
Georgetown.....	4 04 23	73	618	4 02 29
St. Louis.....	4 04 45	85	720	4 02 32

Arcs based on these distances are drawn on the isoseismal map.

But little consideration has been given depth of focus. Considering the wide distribution of intensity in the epicentral region, it was a deep focus shock in the sense that the focus was not sufficiently near the surface to develop a highly restricted area of maximum intensity. The Santa Barbara shock of 1925 may be cited as an earthquake of relatively shallow focus.

D. Seismo. notes [340] 1928 NOV 3* 11:00 p.m. EST Southern Appalachians

Atlanta, Georgia, November 2, 1928.—The southern tip of the Appalachian mountain chain was shaken by two light earth shocks at 11:00 p.m., E.S.T., on November 3d. The Piedmont regions, farther south, felt a single and lighter shock at the same hour. Damages were negligible. Slight tremors were recorded westward as far as Frankfort, Kentucky. The disturbances occurred at Atlanta at 10:03 and 10:05 p.m. Asheville, North Carolina, reported the heaviest shocks, which came in succession at 11:00 and 11:05 p.m. Shocks were felt at Chattanooga, Tennessee; Spartanburg, South Carolina; Kingsport, Tennessee; and Greeneville, Tennessee.

E. Templeton [370]

1. 1928 NOV 3 36.0 82.6 Asheville, NC VI-VII

a. Bollinger [33]

b. EQHUS [120]

c. McClain, unpub (1978)

d. McClain [260]

e. EQHUS (1956)

f. EQHUS [121]

2. 1928 NOV 3 35.8 82.8 Big Pine, NC VII

a. Moneymaker [281]

3. 1928 NOV 3 36.4 82.6 Madison County, NC VI

a. TVA, unpub, (1977)

III. USGS [390]

B. EQHUS [121] 1928 NOV 2 23:03 36.0 82.6 Western NC 104,000 VI

An earthquake centered near the northeast border of Tennessee or in adjacent North Carolina. It was chiefly felt along the French Broad River from Asheville to Newport. There was some damage at Asheville in upper stories of buildings. The motion of automobiles was affected. Felt also in Alabama, Georgia, Virginia, and Kentucky.

1. USEQ [395]

2. MacCarthy [241]

3. Moneymaker [282] 1928 NOV 2 11:03 p.m. EST NC 104,000

The Tennessee-North Carolina earthquake of Nov. 2, 1928 was felt over an area of 40,000 square miles in N.C., S.C., Tn., Al., Ga., Va., and Ky. In the latter state, it was felt at Eubanks by a few, and at Frankfort by a few. At Frankfort pictures tilted and the motion was wavelike in a north-south direction with a definite vertical movement. Two swaying motions followed by trembling lasting 3-5 seconds a mild booming sound. At Louisville one abrupt shock NE-SW was reported by one person. At Williamsburg, felt by a few, dishes rattled, sounds like someone trying to enter house.

C. EQHUS [120] [same as B. above]

1. USEQ [395]

2. Neumann [301]

3. MacCarthy [241]

4. Moneymaker [282]

D. USEQ [395] 1928 NOV 2 23:03 36.0 82.6 Southern Appalachians 104,000

November 2: 23:03, Southern Appalachians (36 .0 N., 82 .6 W.), 40,000 square miles. Described in article by Frank Neumann in December, 1928, number of Bulletin of Seismological Society of America. Reports were received from the following places listed alphabetically by states and the accompanying map (fig. 3) gives the isoseismal lines.

NORTH CAROLINA

Asheville: Heavy tremors, strongest along French Broad River between Asheville and Newport with heavy rumbling. Felt in all sections of Asheville but especially in Montford Hills section. People were awakened and some left buildings, including a theater which was in temporary panic. Several were rolled out of bed. Motorists reported queer behavior of cars. In Jackson Building, above fourth floor, bookcases upset and walls cracked. Floor cracked in one building. Dishes were thrown from shelves and a heavy safe moved on its rollers. Several reported two shocks. Sound like falling rock followed shock and then quivering.

Batesville: Felt by many. Buildings trembled. Dishes rattled.

Boone: Not felt.

Bryson City; Windows broken.

Charlotte: Generally felt.

Elkin: Thunder-like sound preceded shock.

Franklin: Felt by few. Two shocks in quick succession.

Hendersonville: Thirty-second shock felt by all. Many wakened.

Jefferson: East-west swaying. Sounds heard by several.

Lenoir: Felt by nearly all. Faint sounds before shock.

Lincolnton: Light shock, generally felt. Loose objects disturbed.

Marion: Not felt.

Marshall: Felt by all. Sleepers wakened. Many frightened. Heavy jar. Sounds like thunder.

Mount Holly: Felt and sounds heard by a few.

Murphy: Light shock not generally felt. Dishes rattled.

Newland: Ground trembled for one-half minute. Roar with shock.

Newton: Light shock felt by several.

Rutherfordton: Two light shocks rattled windows. Not generally observed.

Shelby: Light shock.

Statesville: Not felt.

Tryon: Not felt.

Waynesville: Sight damage in business section.

Wilkesboro: Shock from NE. to SW. Sound like distant windstorm before shock.

Winston-Salem: One gradual shock with accompanying noise gave effect of passing train or heavy truck. Objects swayed or rattled. In some sections of city people were generally wakened, in others the shock was scarcely noticeable.

Yadkinville: Not felt.

SOUTH CAROLINA

Aiken: Buildings swayed.

Anderson: Two shocks, slight but rattled windows.

Andrews: Not felt.

Blackville: Felt by one.

Bladesburg: One heard windows rattle.

Calhoun Falls: Two shocks, light rocking motion. Generally felt.

Catawba: Not felt.

Chappell: Several were positive of ground movement. Windows rattled.

Charleston: Not felt.

Cheraw: Not felt.

Chester: Plaster cracked. Dishes and pictures moved. Rapid rocking for 35 seconds.

Clemson College: A few awakened. distinct but mild.

Columbia: Shock lasted a very short time. noises heard by a few.

Conway: Not felt.

Darlington: Not felt.

Due West: Generally felt. One shock. Dishes rattled. Rumbling sound like passing truck.

Easley: Slightly felt.

Effingham: Not felt.

Eutawville: Not felt.

Florence: Not felt.

Gaffney: Generally felt. Floors shaken. Loud roar.

Greenville: Generally felt. Many roused. Furniture creaked. Lasted 20 to 40 seconds. Dull rumbling. Plaster cracked.

Greenwood: Faint shock.

Landrum: Two shocks felt by a few. Windows rattled.

Laurens: Felt by many. Noises heard. Swaing in south to north direction.

Marion: Not felt.

Newberry: Doors rattled, pictures swayed. Not generally felt.

Orangeburg: Not felt.

Pelzer: Felt by some who were positive of ground movement; windows, crockery, and glassware rattled. One shock.

Pickens: One shock. Sound like heavily loaded truck.

Pinopolis: Not felt.

Rimini: Not felt.

Saluda: Not felt.

Santuc: Felt by a few.

Spartansburg: Distinct shock followed by a second lesser one.

Union: Gradual rocking, felt by few.

Walhalla: Ten-second shock felt by many. Loose objects rattled.

Winnsboro: Shocks generally felt and noises heard.

Yemassee: Not felt.

York: Generally felt. Slight but distinct. Lasted 10 seconds. Loose objects rattled.

ALABAMA

Birmingham: Feeble shock felt by one, sitting. North-south direction.

GEORGIA

Atlanta: Distinct tremors felt by many. Dishes rattled. Furniture shook.

Blue Ridge: Felt by several. Buildings and beds trembled. Moderately loud sound accompanied shock.

Chatsworth: Not felt.

Clayton: Faintly felt by a few.

Cleveland: Two shocks noted by a few.

Dalton: Felt by a few. Some noted two shocks.

Ellijay: Not felt.

Jasper: Not felt.

Lafayette: Abrupt bumping felt by several. One shock.

Ringgold: Not felt.

Toccoa Falls: Not felt.

VIRGINIA

Abingdon: Felt by many and many awakened. Windows trembled and some plaster cracked. Loose objects disturbed.

Bristol: Generally felt. Houses and doors shook and rocked.

Floyd: Not felt.

Independence: Not felt.

Stuart: Not felt.

Wytheville: Gradual trembling, lasting 20-30 seconds noted by a few. Dull rumbling like distant thunder at start. Windows and dishes rattled.

KENTUCKY

Eubank: Three shocks felt by a few.

Frankfort: Felt by a few. Some pictures tilted. State geologist states that first motion was wavelike in north-south direction with definite vertical movement. Two swaying motions followed by trembling lasting 3 to 5 seconds. Mild booming sound.

Greensburg: Not felt.

Lexington: Not felt.

Loudoun: Not felt.

Louisville: One abrupt shock, NE.-SW., felt by one.

Taylorsville: Not felt.

Williamsburg: Felt by a few. Dishes rattled. Sound like someone trying to enter house.

TENNESSEE

Benton: Not felt.

Blountville: Two shocks lasting 30 seconds. Objects swung south to north.

Bristol: People awakened.

Chattanooga: Generally felt. Houses rocked. People wakened and frightened.

Cleveland: Not felt.

Dandridge: People wakened.

Dayton: Not felt.

Erwin: Three slight shocks. Rocked chairs. Some alarm.

Greenville: Felt by most. Rapid trembling woke people. Top thrown off one chimney. Roaring sounds.

Jacksboro: Not felt.

Jellico: People awakened.

Johnson City: Three frame houses under construction were shaken down. Windows broken.

Jonesboro: Buildings trembled. Dishes rattled. People awakened.

Kingsport: Felt and sounds heard by few.

Kingston: Felt by half of people. Beds moved. Windows shook. First shock sharp, second like faint echo of first.

Knoxville: Felt by nearly all. Undulating motion lasted 15 seconds. Furniture shook. Faint rumbling.

Loudon: One gradual shock felt by a few.

Madisonville: Two shocks. Sounds like thunder.

Marysville: Trembling.

Maynard: Not felt.

Morristown: Felt by many and some alarm. Buildings rocked. One building under construction damaged. Bump and rapid trembling.

Mountain City: Not felt.

Newport: Felt by all. Sleepers awakened and rushed into street. Rapid trembling. Trees and buildings swayed. Bricks shaken from some buildings and plaster cracked. Pictures fell from walls.

Rogersville: People generally awakened and many rushed into street. Windows rattled. Opinions differed as to one or two shocks.

Rutledge: One shock felt by several.

Sevierville: Felt by many with alarm. Light fixtures swayed. Windows rattled. Doors shook. Three shocks with sounds before and during shocks.

Sneedville: Not felt.

1. Neumann [301]

IV. McClain [260]	1928	NOV 3	04:03	36.0	82.6	Northeast TN--western NC border Region	104,000	VI-VII
Felt in Ala., Ga., Va., Ky., S.C.								
A. EOHUS [121]								
B. Moneymaker [281]								
C. USEQ [490]								
D. Bollinger [31]	1928	NOV 2	20:03	36.0	82.6	Western NC	104,000	VI
1. EOHUS [121]								
2. MacCarthy [241]								
3. Neumann [301]								
V. Bollinger [33]	1928	NOV 2	23:03	36.0	82.6	Asheville- Newport, NC	104,000	VI-VII
A. MacCarthy [241]								
B. McClain [260]								
C. Moneymaker [281]								
D. Neumann [301]								
E. USEQ [490]								
VI. Moneymaker [281]	1928	NOV 2	11:03 p.m.			Southern Appalachians		VII

A strong earthquake centered in the mountains of Madison County, North Carolina, at Big Pine (N.35.8 , W 82.8), was felt over an extensive area in several states and as far away as Winston-Salem, North Carolina; Columbia, South Carolina; Atlanta, Georgia; Birmingham, Alabama; and Louisville, Kentucky. In Tennessee, the earthquake was felt generally in the mountains and in the Great Valley. In the large cities, especially Knoxville, Chattanooga, Morristown, Greeneville, Erwin, Johnson City, and Bristol, people were awakened and frightened. Three frame buildings under construction at Johnson City were shaken down; a building under construction at Morristown was damaged. A chimney top was shaken off at Greeneville; bricks were shaken from chimneys and plaster was cracked at Newport. The number of shocks reported by observers ranged from one to three. In some sections of Asheville, people were rolled out of bed, bookcases were overturned, walls and one floor were cracked, dishes were thrown from shelves, and a heavy safe moved about on its rollers. At Bryson City, window panes were broken. The springs along Spring Creek, three or four miles west of the epicenter, became warm, and the warm springs at Hot Springs became hot. (Asheville Citizen for November 3 and 12, 1928; The Knoxville Journal for November 3, 1928).

A. EQHUS [?]

B. Neumann [301]

C. USEQ [490]

MacCarthy [241] 1928 NOV 2 23:03 36.0 82.6 Asheville, NC, area 104,000

*1928: November 2, 23:03 hrs. Asheville, N.C. area. "Epicenter near 36.0° N., 82.6° W., intensity 6, 40,000 square miles. Reported as felt in some twenty North Carolina communities (which are listed)." (U.S.E. 1928, pp. 6-9). See also B.S.A.18 (1928), pp. 243-245, 287, and Proc. G.S.A. (1934), pp. 446-447. E. Hist. describes it as being centered near the northeast border of Tennessee, or in adjacent North Carolina, and as chiefly felt along the French Broad River from Asheville to Newport. There was some slight damage at Asheville in upper stories of buildings, where bookcases were upset and walls cracked. A mild panic

was created in one theater. Some floors were cracked, dishes thrown from shelves, and a heavy safe moved on its rollers. Several reported two shocks. In some places, as at Elkin, thunder-like noises preceded the shock. Was felt as far east as Winston-Salem.

A. USEQ [490]

B. Neumann [301]

C. Seismo. notes [340]

D. EQHUS [121]

IX. Varma [400]

1928

NOV 2

36.0

82.6

Madison Co., NC

VI

Felt radius = 183 km.

A. USEQ [490]

B. Neumann [301]

I. TEIC 1928 NOV 20 03:45 35.9 82.8 Hot Springs, NC 4700 IV

Location: Hot Springs, NC; probable A/S NOV 3 event; between the 2 locations reporting greatest intensity

Intensity: Houses jarred on mountain @ Marshall; shook windows and doors @ Greeneville, TN

II. TVA [380] 1928 NOV 20 03:45 35.9 82.8 Hot Springs, NC IV

A. USEQ [395]

B. Moneymaker [283] 1928 NOV 19

1. Knoxville Journal (11/20, 11/21/28), Knoxville, TN

EARTH TREMORS FELT IN SECTION

Asheville, N.C., Nov. 19 (UP)—Asheville sustained its third earth tremor to-night at 10:47 when a distinct shock was felt over the entire section of western North Carolina. The shock was of less intensity than those of November 1.

Johnson City, Tenn., Nov. 19 (AP)—A slight earthquake was felt in Johnson city at 10:46 o'clock this evening. The shock was distinct. No damage has been reported."

2. Asheville Citizen (11/20, 11/21/28), Asheville, NC

"ASHEVILLE FEELS SLIGHT TREMOR MONDAY EVENING

"VICTORIA NORWOOD PARK REPORT DISTINCT SHOCK NO DAMAGE

"A slight earthquake was felt in Asheville last night at 10:46 o'clock particularly in the Victoria and Norwood Park sections.

"No damage was reported and many persons did not detect the tremor at all. Others were disturbed by the phenomenon and called the Asheville Citizen office to learn the extent of the shock or to determine if one actually occurred. Many thought it an extra heavy blast in Beaucatcher Tunnel.

"Calls also came in from Pearson Drive, Courtland Avenue, Henrietta Street, Orange Street, the Sayles Biltmore Bleacheries, Oakhurst, and several other sections. None apparently came from the West Asheville side of the river. "Reports from Hot Springs showed that the shock was felt there plainly and the Associated Press reported that the tremor was detected in Johnson City, Tennessee. It is believed that it was confined to a comparatively small locality and was not nearly so severe as the shock felt last month."

C. Templeton [370] 1928 NOV 20 35.9 82.8 Asheville, NC IV

1. Bollinger [33]

2. McClain, unpub., (1978)

3. McClain [260]

4. Moneymaker [281]

5. TVA, unpub. (1977)

III. USGS [390]

D. USEQ [395] 1928 NOV 19 22:45 35.8 82.3 Asheville, NC and Johnson City, TN 25,900

Probably aftershock of earthquake of November 2. Felt with most force in West Asheville along the French Broad River and at Hot Springs, N.C., and Erwin, Tenn. No damage.

IV. McClain [260] 1928 NOV 20 03:45 35.9 82.8 Western NC-east TN Border area 25,900 IV

Felt at Asheville and Hot Springs, N.C., Johnson City and Greeneville, TN

A. Moneymaker [281]

V. Bollinger [33] 1928 NOV 19 22:45 35.8 82.3 Asheville, NC 25,900

A. MacCarthy [241]

B. Seismo. notes [340] 1928 NOV 19 10:45 p.m.

Asheville, North Carolina, November 19, 1928--Asheville was rocked by a slight earthquake at 10:45 p.m. on November 19th.

Johnson City, Tennessee, November 19, 1928--A slight earthquake was felt in Johnson City at 10:46 p.m. on November 19th. The shock was distinct, but no damage was reported.

VI. Moneymaker [281] 1928 NOV 19 10:45 p.m. Southern Appalachians 25,900 IV

An earthquake shock was felt over an area of 10,000 square miles in western North Carolina and eastern Tennessee. It was felt most strongly at West Asheville and Hot Springs, North Carolina, and at Erwin, Greeneville, and Johnson City, Tennessee.

A. Knoxville Journal (11/20/28), Knoxville, TN

"EARTHQUAKE FELT AT GREENEVILLE

Greeneville, Tenn., Nov. 20 (Special)--Distinct earthquake shocks were heard and felt in Greeneville and Greene County Monday night at 9:50 o'clock. The shock which was sufficient to shake windows and doors of staunch buildings, lasted for only a few seconds, a little less than the shock only a few weeks ago."

B. Asheville Citizen (11/20/28), Asheville, NC

"FEEL EARTHQUAKE

"Marshall, Nov. 20. Earthquake shocks of varying intensity and rather heavy in some localities were reported from Marshall and other sections of Madison County last night, and today a number of citizens stated that their homes were badly shaken. In Marshall a number of homes, mostly on the mountain above the town were jarred and sleeping families awakened."

C. Seismo. notes [340]

D. USEQ [395]

VII. Heinrich [190] 1928 NOV 19 10:46 p.m. Johnson City, TN

1928 November 19. A slight but distinct earthquake was felt in Johnson City, Tennessee, at 10:46 p.m.

A. Seismo. notes [340]

VIII. McCarthy [241] 1928 NOV 19 22:45 35.8 82.3 Asheville, NC and Johnson City, TN 25,900

*1928: November 19, 22:45 hrs. Asheville, N.C., and Johnson City, Tenn. "Epicenter near 35.8 N., 82.3 W. Felt over 10,000 square miles. Probably an aftershock of the earthquake of November 2. Felt with most force in West Asheville along the French Broad River, and at Hot Springs, N.C. and Erwin, Tenn. No damage." (U.S.E. 1928.) Not mentioned in E. Hist. See also B.S.S.A.18 (1928), p. 288. Generally mentioned in the State papers, where the shock was described as "slight."

- A. USEQ [395]
- B. Seismo. notes [340]
- C. Unspecified news accounts

I. TEIC 1930 AUG 30 10:28 35.8 84.3 Lenoir City, TN 4000 V

Location: Lenoir City, TN; intensity

Intensity: Dishes shaken from cabinet @ Lenoir City, TN, vase of flowers toppled; people awakened in Kingston, Oliver Springs, Rockwood and Harriman, TN

Extent: E TN; map; 4000 sq. km.

II. TVA [380] 1930 AUG 30 10:28 35.9 84.5 Kingston, TN V

A. Nuttli [310] 1930 AUG 30 09:28 35.9 84.4 [Kingston, TN]

mb = 3.0

B. Ramirez [322]

On the next day, August 30th, at 10 31 , G.M.T., another shock was reported from Lenoir City, and parts of Roane County, central Tennessee, through the courtesy of the United States Weather Bureau observers. This shock also appears in the records of the Florissant Station.

1. MWR [290]

2. Florissant seismograph records

C. Moneymaker [283]

1. News-Sentinel (8/31/30), Knoxville, TN

Knoxville News-Sentinel Sunday, August 31, 1930
"QUAKE SHAKES ROANE COUNTY
No Damage Reported; Thunder-like Noise With Shock
Special to the News-Sentinel—
Rockvood—A decided earth tremor shook this section Saturday morning about 4:30, but did no material damage.

Buildings rocked, windows and dishes rattled. Many residents were aroused, but none became alarmed.

An area covered roughly by Roane County reported the shock.

At Lenoir City and at Lawnville, near Harriman, citizens reported the shock was accompanied by sounds like thunder. Many persons believed it to be a blast of some description, but none was reported.

At Kingston, Harriman, Oliver Springs, and Rockwood, persons were awakened by rocking buildings and the noise.

No Shocks Here

Although no quake was reported here yesterday, Sterling Bunch, U.S. Weather Bureau Observer said he had been told there was a geologic fault here which is likely to cause a quake at some time." 506.RNO (Second Half) Pages 506-520

"QUIVER AT LENOIR CITY

A slight quiver of the earth was recorded at Lenoir City, about thirty miles from Knoxville on August 30 at 4:30 p.m. this year, but the jar was not experienced in Knoxville.

The following reported the quake:

Malcolm Miller, No. 3100 Woodbine Ave.

'I thought my automobile had escaped from the brakes and had run into the back of my house. It seemed as though something had struck the house. Then I noticed that the neighbors were all running into the street afraid to reenter their homes. I was the first to go back inside to discover that nothing apparently was wrong.'

Mrs. W. C. Rector, No. 3301 Woodbine Ave.

'Dishes in my breakfast room were shaken from the cabinet. A vase of flowers toppled over. I thought there had been a terrific explosion.'

W. G. Thomas.

'I was in Lonsdale at the time, perhaps five minutes before five o'clock. I distinctly felt the tremor that lasted perhaps half a minute.'

Roy Hutchens, Tazewell Pike.

'I was at Whittle Springs. It was either an earthquake or a powerful explosion in that vicinity.'

Rhea Crawford, 1116 Laurel Ave.

'Mrs. Crawford was in our home at that time--just about 5 p.m.--and felt the shock distinctly. It lasted for an appreciable length of time.'

Dewey W. George.

'I was playing golf on the Whittle Springs course with Bud Scott and Fred Parkhurst. Just as we were driving off the seventeenth tee, the earth began to shake under us. The tremor lasted probably half a minute. We thought there had been an explosion near. It was such a queer feeling--the ground moving under us. Mrs. George at home on Wells Avenue felt the shock, too.'

Mrs. Harper, Knoxville General Hospital.

'We felt the shock out here and thought it must be an earthquake. We inquired and found that at Riverside--Fort Sanders they had not noticed it but had felt the shock distinctly at St. Mary's. I was told that people on street cars became very nauseated by the tremors.'

Alfred Sterling, U.S. Weather Bureau.

'I was at my home, No. 2628 McCalla Avenue at the time sitting on the porch. A hanging basket of flowers was set in motion by the tremors--there seemed to me to be three with a slight rumbling noise. I was confident it must be an earthquake.'

C. Seismo. notes [340]

D. USEQ [490]

E. Seismo. notes [340] 1930 AUG 30

Roane Co., TN

Roane County, Tennessee, experienced an earth tremor on August 30th which rocked buildings and rattled windows and dishes, but did no material damage. Residents of Louisville report that the tremor was accompanied by a noise like thunder.

F. Templeton [370] 1930 AUG 30

Kingston, TN

V

1. Bollinger [33]

2. McClain, unpub., (1978)
3. McClain [260]
4. Moneymaker [281]
5. TVA, unpub., (1977)

III. USGS [390]

D. USEQ [395] 1930 AUG 30 35.9 84.4 Eastern TN

August 30: 4:28, eastern Tennessee (35 .9 N., 84 .4 W.). One strong shock like heavy blast at Lenoir City. Moderately strong sound before shock at Kingston. Rapid trembling, 10 seconds in all, at Oliver Springs. At Lawnville a roar like thunder.

IV. McClain [260] 1930 AUG 30 09:28 35.9 84.4 Near Kingston, TN V

Felt also at Lenoir City, Oliver Springs, and Lawnville, TN.

A. USEQ [395]

B. Moneymaker [281]

V. Bollinger [33] 1930 AUG 30 04:28 35.9 84.4 East TN V

A. McClain [260]

B. Moneymaker [281]

C. USEQ [395]

VI. Moneymaker [281] 1930 AUG 30 04:28 Southern Appalachians V

1930, August 30, 4:28 a.m., southern Appalachians (V)

A strong earthquake shock was felt over a sizeable area in Roane, Loudon, and Blount counties, Tennessee. Localities within the affected area include Kingston, Rockwood, Harriman, Lawnville, and Oliver Springs in Roane County; Lenoir City in Loudon County; and Louisville in Blount County. Sleepers were awakened by the rocking motion and the accompanying explosive noise.

A. Knoxville News-Sentinel (8/31/30), Knoxville, TN

B. Ramirez[390]

IX. Varma [400]

1930

AUG 30

35.9

84.4

Near Kingston, TN

III

A. USEQ [490]

I. TEIC	1930	OCT 16	21:50	36.0	83.9	Knoxville, TN	V
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Location: Knoxville, TN

Intensity: Desks, chairs and tables moved; dishes fell from shelves; bricks fell from a chimney

II. TVA [380]	1930	OCT 16	21:50	36.0	83.9	Knoxville, TN	VI
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Aftershock at 02:15 on October 17

A. Nuttli [310]	1930	OCT 16		36.0	83.9		V
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B. USEQ [395]

C. Moneymaker [283]

1. Knoxville Journal (10/17/30), Knoxville, TN

TREMOR RATTLES WINDOWS WHEN EARTH SHAKES HERE

An earth tremor which rattled windows and doors of residences and sent a crashing sound through office buildings, was recorded in Knoxville at 4:51 p.m. by the Weather Bureau.

The report of a second quake by half a dozen residents in different sections of the city about 9:15 p.m. was not verified by the bureau, but a quiver of force equal to that of the first was felt by residents of an apartment house on Laurel Avenue. As the quake occurred, one of the residents was having a telephone conversation with a friend near St. Mary's Hospital who also noticed the tremor, and calls coming to the Knoxville Journal indicated that a second shock was felt in the city. The tremor came late in the afternoon as supper was being prepared in many homes. In certain sections of the city, residents rushed out into the street in excitement. The sound accompanying the jar was like that of some heavy object falling. No broken windows were reported but bricks fell from a chimney on Wells Street and window panes of homes in different sections were so severely shaken that they expected them to break.

As soon as the shock of the quake passed, calls began to come to the Journal, and inquiries were received until a later hour last night. The telephones at the weather bureau were kept busy for an hour or more after the tremor was recorded.

The quake was the first occurring here since November 10, 1928, at 10 p.m. Previous to that, a tremor had been felt on July 19, 1927, at 5:38 p.m.

D. Seismo. notes [340] 1930 OCT 16 Just before 5:00 p.m. Knoxville, TN

A short earthquake was felt throughout the business district of Knoxville and over the eastern and western residential areas just before 5:00 p.m. on October 16th. It was reported that desks, chairs, and tables were moved in the business area. China clashed and windows rattled in the residential area.

E. Templeton [370] 1930 OCT 16 36.0 84.0 Knoxville, TN III-IV

1. Bollinger [33]

2. McClain, unpub., (1978)

3. McClain [260]

4. Moneymaker [281]

5. TVA, unpub., (1977)

III. USGS [390]

D. USEQ [395] 1930 OCT 16 16:50 36.0 84.0 Knoxville, TN

October 16: 16:50, Knoxville, Tenn. (36.0 N., 84.0 W.). One shock felt by nearly all. Objects swung east-west, windowpanes broken, dishes fell from shelves, furniture moved. Surface and subterranean noise.

IV. McClain [260] 1930 OCT 16 21:50 36.0 84.0 Knoxville, TN III-IV
& 17 & 02:15

A. USEQ [395]

B. Moneymaker [281]

V. Bollinger [33] 1930 OCT 16 16:50 36.0 84.0 Knoxville, TN III-IV

Aftershock four hours later

- A. McClain [260]
B. Moneymaker [281]
C. USEQ [395]

VI. Moneymaker [281]

1930

OCT 16
& 9:15

4:50 p.m.

Southern Appalachians

III-IV

1930, October 16, 4:50 p.m. and 9:15 p.m., southern Appalachians (III-IV)

An earthquake shock was felt in all parts of Knoxville at 4:50 p.m. and a second a lighter shock was felt in some sections at 9:15 p.m. Bricks were shaken from a chimney on Wells Street.

- A. Knoxville Journal (10/17/30), Knoxville, TN
- B. Seismo. notes [340]
- C. USEQ [395]

IX. Varma [400]

1930

OCT 16

36.0

83.9

Knoxville, TN

A

A. USEQ [395]

I. TEIC 1931 MAY 5 13:18 33.5 86.8 Birmingham, AL 33,200 V

Location: Birmingham, AL; intensity; center of felt area

Intensity: Bricks fell from one chimney @ Birmingham, AL; objects fell from walls @ Cullman, AL

Extent: E AL; map; 33,200 sq. km.

II. TVA [380] 1931 MAY 5 13:18 33.5 86.8 Birmingham, AL VI

A. USEQ [395]

III. USGS [390]

B. EQHUS [121] 1931 MAY 5 07:18 33.7 86.6 Northern AL 16,800 V-VI

There was slight damage at Cullman in northern Alabama and the shock was generally felt in Birmingham.

1. USEQ [395]

C. EQHUS [120] [Same as B above]

D. USEQ [395] 1931 MAY 5 7:18 Northern AL 16,800

May 5: 7.18,* northern Alabama. (See map p. 9.) Felt over an area of 6,500 square miles exclusive of isolated points in Georgia and possibly South Carolina. Force V at Cullman, where objects fell from walls of a blacksmith shop and the shock was generally strong. At Birmingham it was generally observed and bricks fell from one chimney. The movements were accompanied by roaring sounds. They were reported also from Bessemer, Oneonta, Bernard, Lay Dam No. 5 (on the Coosa River 12 miles northeast of Clanton), Jones Valley, and 25 miles north of Tuscaloosa. Lighter movements were reported from Spring Junction, Colta, Clanton, Calera, Pell City, Leeds, Lincoln, Montgomery, and doubtful activity from Tuscaloosa, Gadsden, and Decatur. Camilla, Ga., reported feeling the shock. Recorded at St. Louis.

1. St. Louis Univ. Seismograph Record

2. USEQ [395]

Felt in Ga. and possibly S.C.

A. USEQ [395]									
B. Moneymaker [281]									
C. EQHUS [121]									
V. Bollinger [33]	1931	MAY 5	07:18	33.7	86.6	Cullman, AL	16,800		V-VI
A. EQHUS [120]									
B. USEQ [395]									
VI. Moneymaker [281]	1931	MAY 5	7:18 a.m.			Northern AL	16,800		V
1931, May 5, 7:18 a.m., northern Alabama (V)									
An earthquake attended by a roaring noise was felt over an area of more than 6500 square miles in Alabama and at isolated localities in Georgia and possibly South Carolina. It was felt strongly at Cullman (V) where objects fell from the walls of a blacksmith shop, and at Birmingham (IV) where it was observed generally and bricks were thrown from a chimney. It was felt less strongly at Bernard, Bessemer, Calera, Clanton, Colta, Decatur, Gadsden, Jones Valley, Lay Dam, Leeds, Lincoln, Montgomery, Pell City, Tuscaloosa, and a point "25 miles north of Tuscaloosa." A light shock was felt at Camille, Georgia, at the same time.									
A. Branner [85]	1931	MAY 5				Oneonta and Montgomery, AL	51,000		V-VI
B. EQHUS (1938, 1947)									
C. USEQ [395]									
IX. Varma [400]	1931	MAY 5		33.7	86.7	Pinson, AL			V+
Felt radius = 100 Km.									
A. Branner [85]									
B. USEQ [395]									
X. Docekal [100]	1931	MAY 5	06:18*	33.7	86.7	Birmingham, AL	31,000		V-VI

A fairly strong earthquake was centered near Birmingham, Alabama. The disturbance was generally felt in Birmingham, and bricks fell from one chimney. Stronger movements and a roar were reported from Bessemer, Oneonta, Bernard, Lay Dam no. 5, Jones Valley, and 25 miles north of Tuscaloosa. At Cullman objects were shaken from the walls of a blacksmith shop. The shock may have been felt in isolated points in Georgia, and possibly in South Carolina. Neumann (1932) estimated the felt area at 6,500 square miles. Branner (1933) estimated the area at 20,000 square miles.

- A. Branner [85]
- B. EQHUS (1938, 1947)
- C. Moneymaker [281]
- D. USEQ [395]
- E. Seismo. notes [340] [No mention of this event found]

I. TEIC 1935 JAN 1 08:15 35.2 83.7 Tipton, NC 14,700 VI

Location: Tipton, NC; near center of area reporting damage and felt area

Intensity: Slight damage to light structural parts of building @ Almond, NC; plaster on wall cracked slightly, slight damage to buildings @ Gay, NC; window pane shaken from frame, one man nearly thrown from bed @ Shooting Creek, NC; @ Tipton, NC, part of a stove dislodged; @ Neels Gap, GA, lumber stacked against wall shaken down; garments on display stand @ Franklin, NC, overturned; dishes broken @ Hiwassee, GA, many awakened, furniture vibrated

Extent: V NC - NE GA; map; 14,700 sq. km.

II. TVA [380] 1935 JAN 1 08:15 35.1 83.6 GA-NC V

A. Crickmay [90] 1935 JAN 1 Southern Appalachians

On January 2, 1935, reports were received in Atlanta through the Associated Press that a "slight earthquake" had been felt early in the morning of January 1 at Young Harris, Towns County, Georgia. The Geological Survey division of the Georgia Department of Forestry and Geological Development immediately sent out preliminary questionnaires to editors of county newspapers and other residents of northern Georgia to determine, if possible, the intensity of the earthquake and the area affected. As returns were received, it became apparent that the earthquake had been felt over a much larger area than indicated by the first report. In order to obtain first-hand information, the writers made a four-day trip, January 22 to 25, to parts of northern Georgia, western North Carolina, and eastern Tennessee. Further data were obtained by questionnaires mailed to county newspapers in Tennessee and North Carolina, and from information supplied by the United States Coast and Geodetic Survey, Washington, D.C. From these reports the accompanying map has been prepared.

GEOGRAPHY AND GEOLOGY The area over which the earthquake was felt is a mountainous section embracing the Great Smoky and Blue Ridge mountains, two main ranges of the southern Appalachians. Owing to the ruggedness of the topography, the population is concentrated in valleys and intermontaine uplands. In the area affected, Canton and Asheville, North Carolina, are the only two cities with populations of more than 5000, and there are only eleven cities with populations of more than 1000. Most of the inhabitants of the region are rural. The houses are mainly of wood-frame construction and are supported on field-stone pillars. Almost all the houses are built on residual soil or rock foundations on hillsides or uplands, well above the alluvial soils in the narrow valley bottoms. The region is underlain mainly by Cambrian and pre-Cambrian formations* which have been folded, faulted, and more or less metamorphosed. The pre-Cambrian formations, which cover the largest part of the region, include biotite gneiss, mica schist, hornblende gneiss, and granite gneiss. These rocks are intruded by granite, generally thought to be late Paleozoic in age, and dolerite dikes of Triassic age. The last major deformation of the rocks was the Appalachian orogeny near the close of the Paleozoic era.

There is record of more recent movements, but the dates of most of them cannot be ascertained. The prevailing structural trend is northeast; and this, it is to be noted, corresponds with the longest diameter of the elliptical area over which the earthquake was felt.

THE EARTHQUAKE

Time - Because most people were asleep, there was found to be some diversity of opinion concerning the time when the earthquake occurred. Three observers, however, consulted their clocks, and all agree that the time was 3:15 a.m., Eastern Standard Time, January 1, 1935.

Duration - It is not recorded that anyone measured the duration of the shock by watch. Estimates range from 3 seconds to 15 minutes. If the extremes are disregarded, the average estimate is one and one-half minutes.

*The geology of the region is fully described in the following named folios of the United States Geological Survey's Geological Atlas: Cleveland folio, no. 6; Knoxville folio, no. 16; Loudon folio, no. 25; Asheville folio, no. 116; Nantahala folio, no. 143; Pisgah folio, no. 147; Ellijay folio, no. 187.

Number of shocks - There is fairly general agreement that only one shock occurred. A competent observer at Franklin, North Carolina, recorded three distinct shocks at intervals of several seconds, preceded by rumbling. Two shocks were said to have been felt by two of the eight people interviewed in Lumpkin County, Georgia.

Subterranean sounds - The kind of sounds accompanying the earthquake differed little from place to place. They are described as a loud roaring and rumbling comparable to thundering or to underground blasting, but more persistent, more "dead," or more "smooth." Many compared the noise to the passage of a laden truck, automobile, or airplane. Except at Franklin, North Carolina, the subterranean noises are reported to have followed the shock with rapid onset. In a few places they gave the impression of coming from a particular direction. Two observers in Hayesville, North Carolina, and one in Cleveland, Georgia, report that the sounds came from the south and "headed" north. At Franklin, North Carolina, the sounds appeared to come from the epicentral area to the west.

Damage - As far as has been determined, the earthquake did no serious damage, even though many of the buildings in the region are of fragil construction. The Civilian Conservation Corps camp at Topton, North Carolina, reported: "Practically the entire camp was awakened by the continued rumbling noise followed by several pronounced shocks. Some were scared, others bewildered, and of course many recognized the disturbance. The roof of the bathroom [was found to be] missing due to what [was at first thought to be] an explosion of the hot water tank. A part of the stove was dislodged by the disturbance and fell."

At Shooting Creek, Clay County, North Carolina, a window pane was shaken from its frame. At Franklin, North Carolina, garments on display stands in a store window were overturned. At Neels Gap, Union County, Georgia, on the crest of the Blue Ridge, lumber stacked against a wall was shaken down.

Aside from these few happenings, the earthquake left no visible sign of its occurrence. Pendulum clocks are not uncommon in the region, but none of those running was stopped, nor was a stopped one started. Most of the observers interviewed were awakened by the rattling of loose objects such as chinaware and window panes. In a few places it was noted that curtains shook and electric drop lights swung, but the direction of swing was not noted. Vibration of beds and furniture was common and some felt a vibration of entire house. Personal reactions - Only near the epicentral region did the earthquake cause any alarm and there only a few people were concerned enough to get up and investigate. In the Shooting Creek district one man was nearly thrown from his bed. Alarm was felt by a few people in Towns County, Georgia, and Clay County, North Carolina, where probably more than half of the inhabitants were awakened. Slight nausea was felt by a member of the CCC camp at Tipton, North Carolina, and by a woman near Cleveland, Georgia. The shock, however, lasted such a brief time that many, as they put it, "had no time to get scared." Although the region is not one of much seismic activity, 13 shocks have been recorded* in the past 60 years and many of the inhabitants at once recognized what the disturbance was. The previous shocks, of which that near Asheville in 1928 was the most intense, occurred around the border of the area affected by the earthquake here described.

*N. H. Heck, "Earthquake History of the United States," United States Coast and Geodetic Survey, Spec. Publ. no. 149, 1928; N. H. Heck, and R. R. Bodle, "United States Earthquakes, 1928," United States Coast and Geodetic Survey, no. 483, 1930; Frank Neumann and P. R. Bodle, "United States Earthquakes, 1930," United States Coast and Geodetic Survey, no. 539, 1932.

Area - The area over which the earthquake was felt has been outlined on the basis of only 95 reports and consequently the boundary is in some places drawn arbitrarily. It is possible that more thorough questioning would reveal places in which particularly susceptible people felt the earthquake beyond this boundary. For example, at Knoxville, Tennessee, first thought to be entirely outside the area, two persons, responding to a newspaper notice, said they had felt the shock. If such sporadic reports are omitted, the total area affected, as determined by planimetric computation, is 6725 square miles. The epicentral region appears to lie in the area between Tipton, North Carolina, and Hiwassee, Georgia, and occupies 549 square miles. In this area some objects were displaced, alarm was felt, and almost half of the residents were awakened. In terms of the Wood-Neumann scale, the shock had an intensity of V near the epicenter, west of Hayesville, North Carolina. The position of the epicenter was approximately latitude 35 07' N, 83 38' W. The geologic conditions that gave rise to the earthquake and determined its epicenter are unknown.

SEISMOGRAPHIC RECORD

R. S. Patton, Director of the United States Coast and Geodetic Survey, reports: "The seismographic records from the stations at the University of South Carolina and the University of Virginia have been carefully examined, but no trace can be found of any disturbance which might correspond to the earthquake of January 1, 1935, in northern Georgia." F. W. Sohon, S. J., Director of the Seismological Observatory, Georgetown University, Washington, D. C., reports: "The records of January 1 show such intense microseismic activity that any earthquake short of real destructive intensity would be completely masked."

B. USEQ [395]

C. Templeton [370]	1935	JAN 1	35.1	83.6	Hayesville, NC	V
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1. Bollinger [33]
2. McClain, unpub., (1978)
3. McClain [260]
4. Moneymaker [281]
5. TVA, unpub., (1977)
6. EQHUS (1956)
7. EQHUS [121]

III. USGS [390]

B. EQUUS [121]	1935	JAN 1	03:15	35.1	83.6	NC-GA Border	18,100	V
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Border of Georgia and North Carolina. Slight damage at Dahlonga, Ga., and at Almond and Gay, N.C.

1. USEQ [395]
2. McCarthy [241]

C. EQHUS [120] [Same as above]

1. USEQ [395]
2. McCarthy [241]
3. Crickmay [90]

D. USEQ [395]	1935	JAN 1	3:15	35.1	83.6	GA-NC Border	18,100	V
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Felt over an area of nearly 7,000 square miles. See map, page 15. The map is reproduced from a report published by G. W. Crickmay and Lane Mitchell, in the bulletin of the Seismological Society of America, vol. 25, no. 3 (July 1935), page 247.

According to the authors "The epicentral region appears to lie between Topton, N.C., and Hiawasee, Ga., and occupies 549 square miles. In this area some objects were displaced, alarm was felt, and almost half of the residents were awakened." "The position of the epicenter was approximately 35 07' N., 83 38' W." The area was canvassed for information by the Geological Survey division of the Georgia Department of Forestry and Geological Development. Further data on the earthquake and on the geology of the region will be found in the report itself.

Intensity V in Georgia:

Dahlonega - "Windows were shaken out."

Hiawassee - Loud roaring. Some dishes broken.

Neels Gap - Lumber stacked against a wall was shaken down.

Young Harris - Felt, no details.

Intensity V in North Carolina:

Almond - Slight damage to light structural parts of buildings.

Franklin - Unstable objects overturned.

Gay - Plaster on walls cracked slightly. Slight damage to buildings.

Shooting Creek - Window shaken from frame.

Intensity IV in Georgia: Blue Ridge, Cleveland, Ellijay.

Intensity IV in North Carolina: Aquone, Brasstown, Bryson City, Cherokee, Franklin, Hayesville, Marble, Murphy, Otto, Robbinsville, Tomotla, Topton, Wesser, Wests Mill, Whittier.

Intensity IV in Tennessee: Copperhill.

Intensity III and under in North Carolina: Andrews, Cullasaja, Etna.

Not felt in Georgia: Chatsworth, Clarkesville, Clayton, Cleveland,

Cornelia, Dawsonville, Hemp, Jasper, Royston.

1. Crickmay [90]

2. Report by the Geological Survey division of the Georgia Dept. of Forestry and Geological Development.

IV. McClain [260] 1935 JAN 1 08:15 35.1 83.6 GA-NC Border 18,100 V

Damage at Dahlonega, Ga. and Almond and Gay, N.C.; centered near Hayesville, N.C.; felt in Tennessee

A. Moneymaker [281]

B. EOHUS [121]

C. USEQ [395]

V. Bollinger [33] 1935 JAN 1 03:15 35.1 83.6 NC-GA Border 18,100 V

A. Crickmay [90]

B. EOHUS [120]

C. MacCarthy [241]

D. USEQ [395]

E. Seismo. notes [340]

VI. Moneymaker [281] 1935 JAN 1 3:15 a.m. Southern Appalachians 18,100 V

An earthquake centered near Hayesville, North Carolina, was felt over an area of more than 7000 square miles in North Carolina, Georgia, and Tennessee. The shock was felt most strongly between Tipton, North Carolina, and Hiwassee, Georgia. In Tennessee, it was felt at Copperhill (IV) and at Knoxville.

A. Crickmay [90]

B. Heck (1937 or 1948)

C. USEQ [395]

VIII. MacCarthy [241] 1935 JAN 1 03:15 NC-GA Border V-VI

"Epicenter near 35.1 N., 83.6 W., intensity 5-6, felt over 7,000 square miles. Slight damage at Dahlonega, Ga., and at Almond and Gay in N.C." (E. Hist.). U.S.E., 1935, reports that it was felt in 23 North Carolina communities, which it lists. According to B.S.S.A. 25 (1935), pp. 247-251, there was one shock at most places, but at Franklin three at intervals of several seconds, preceded by a rumbling. Except at Franklin, the noises followed the shock. Not recorded at any seismological station.

A. EQUUS [?]

B. USEQ [395]

C. Crickmay [90]

IX. Varma [400] 1935 JAN 1 35.1 83.6 Near Hayesville, NC V

Felt radius = 77 Km

A. Crickmay [90]

B. USEQ [395]

I. TEIC 1936 JAN 1 08:00 34.9 84.3 Blue Ridge, GA 4800 III

Location: Blue Ridge, GA; location

Intensity: Light, felt

Extent: TN-NC-GA border area; map; 4800 sq. km

II. TVA [380] 1936 JAN 1 08:00 34.9 84.3 Blue Ridge, GA <IV

A. USEQ [395]

B. Seismo. notes [340] 1936 JAN 1 3:00 a.m., CT GA-TN-NC III

An earthquake estimated at intensity 3 on the Wood-Neumann scale was felt, about 3 a.m. Central Time, at Blue Ridge, Ellijay, and Cleveland, Georgia, at Isabella, Tennessee, and at Murphy, North Carolina. The epicenter, according to the Division of Geology, Atlanta, Georgia, was probably between Murphy, North Carolina, and Blue Ridge, Georgia, about 35 miles from the epicenter of an earthquake of intensity 5 that occurred in the same region January 1, 1935.

C. Templeton [370] 1936 JAN 1 35.0 84.2 Blue Ridge, GA III

1. Bollinger [33]

2. McClain, unpub., (1978)

3. McClain [260]

4. Moneymaker [281]

5. TVA, unpub., (1977)

III. USGS [390]

D. USEQ [395] 1936 JAN 1 3:00 NC-GA Border III

January 1: about 3: . Border of North Carolina and Georgia, III. Epicenter probably between Murphy, N.C. and Blue Ridge, Ga., according to the State Division of Geology at Atlanta, Ga. Felt at Blue Ridge, Ellijay, and Cleveland, Ga.; at Isabella, Tenn.; and at Murphy, N.C.

1. Georgia State Division of Geology

IV. McClain [260] 1936 JAN 1 08:00 35.0 84.2 GA-NC Border III

Between Blue Ridge, Ga. and Murphy, N.C.; felt also in Ducktown basin of Tennessee.

A. Moneymaker [281]

B. USEQ [395]

V. Bollinger [33] 1936 JAN 1 03:00 35.0 84.2 NC-GA Border III

A. MacCarthy [241]

B. McClain [260]

C. Moneymaker [281]

D. USEQ [395]

E. Seismo. notes [340]

VI. Moneymaker [281] 1936 JAN 1 3:00 a.m. Southern Appalachians III

A light earthquake centered somewhere between Murphy, North Carolina, and Blue Ridge, Georgia, was felt at Murphy, North Carolina, Blue Ridge, Ellijay, and Cleveland, Georgia, and in the Ducktown Basin of Tennessee.

A. Seismo. notes [340]

B. USEQ [395]

VIII. MacCarthy [241] 1936 JAN 1 About 03:00

"Epicenter near the Georgia-North Carolina border, between Murphy, N.C. and Blue Ridge, Ga. In North Carolina was felt only at Murphy. Intensity 3." (U.S.E. 1935.) See also B.S.S.A. 26 (1936), p. 177, where it is stated that the epicenter of this quake was 35 miles from that of January 1, 1935, which was of intensity 5. Not mentioned in E. Hist., and no mention found in contemporary newspapers.

A. USEQ [395]

B. Seismo. notes [340]

IX. Varma [400]

1936

JAN 1

34.9

84.2

Near Blue Ridge, Ga.

III

A. USEQ [395]

I. TEIC 1938 MAR 31 10:10 35.5 84.0 Tapoco, NC 14,500 V

Location: Tapoco, NC; near center of felt area

Intensity: @ Bryson City, NC, shook buildings; jarred houses @ Calderwood and awakened nearly everyone; rattled windows, dishes @ Fontana, NC; people awakened near Santeelah and Cheoah Dams, in the Ducktown Basin, @ Tapoco, NC and in Knoxville, TN

Extent: SE TN - SW NC; map; 14,500 sq. km.

II. TVA [380] 1938 MAR 31 10:10 35.5 84.0 Tapoco, NC IV

A. USEQ [395]

B. Moneymaker [283] 1938 MAR 31

NC-TN

A slight earthquake was felt generally in the drainage areas of the Hiwassee and Little Tennessee Rivers between 4:10 and 4:15 a.m., Central Standard Time, on March 31. Two shocks were felt from Parksville, Tennessee, eastward to Asheville, North Carolina, and from the Blue Ridge Mountains northward to Knoxville, Tennessee.

A few people who were awake at the time felt slight vibrations at Asheville and Waynesville, North Carolina. At Knoxville, Tennessee, the shocks were distinct enough to awaken a number of persons and cause the two newspaper offices to be flooded with telephone inquiries. However, no one reported feeling the earthquake at Norris, 20 miles northwest of Knoxville. The shocks were also reported to be very distinct at Sweetwater, Tennessee, about 45 miles southwest of Knoxville, but no reports of the tremor were received from Chattanooga.

The earthquake seemed to be strongest south of the Great Smoky Mountains from Bryson City, North Carolina, to Calderwood Dam, Tennessee. At Bryson City the shocks shook buildings and turned on the electric lights at Thurman Leatherwood's home. In the foothills of the Great Smokey Mountains towermen were frightened from shaking fire towers at Fry Mountain, High Rocks, and Shuck Stack. Mr. Alexander reported that the shocks lasted about 40 seconds at Fontana, North Carolina, and rattled the windows, dishes, and pans in his home. The shocks jarred houses and awakened nearly everyone in the vicinity of Calderwood, Santeelah, and Cheoah Dams. Residents of the Ducktown Copper Basin and vicinity were also awakened by shaking houses and rattling windows. Some mistook the tremors for a mine cave-in at Copperhill. At Hiwassee Dam the shocks showed on the recording rain gage charts. From all reports, no damage was caused by the earth tremors in any locality. An accompanying map shows the approximate extent of the known earthquake and the localities from which shocks were reported.

1. Knoxville News-Sentinel (3/31/38), Knoxville, TN

Issue No. 16, 913 Knoxville, Tennessee Thursday Evening, March 31, 1938

"ROCKS SHIFT FIFTH OF INCH--AND KNOXVILLE HAS EARTHQUAKE:

Two Tremblors Shortly After 4 a.m. Set Houses Quivering, Dishes Rattling--and Telephones Jangling in News-Sentinel Office; No Damage Reported

At 4:15 a.m. today two telephones jangled simultaneously at the News-Sentinel building. Since that time phones have rung constantly as Knoxville residents called up to report the first earth tremblor felt in Knoxville since October 16, 1930, according to the Weather Bureau.

At a time established by the ones who phoned in as between 4:10 and 4:15 a.m., two distinct earth tremblors rumbled through Knoxville with the sound of thunder.

Anna May Jones, switchboard operator for the Cherokee Spinning Mills, had just 'crawled out of bed' at her home on Lowes Ferry Pike when she felt a rumbling jar. At first she thought it was thunder but when it occurred the second time, she thought 'Judgment Day was coming.'

In Forest Hills, Mrs. W. A. Dickey was awakened suddenly. 'I thought the water heater had burst,' she stated. 'It was deathly quiet and then it shook again....I was scared.'

She Wasn't Fooled

Mrs. A. S. Sylvester, 3327 Woodhill Drive, wasn't fooled a bit. She knew it was an earthquake when she felt it because she remembered the one eight years ago, but she called the News-Sentinel 'just to make sure I wasn't dreaming.'

In North Knoxville, Mrs. L. Moore's bed began to quiver and her neighbors in the 100 block of West Gill Avenue felt it, too. In West Knoxville dogs tucked their tails and ran in under the bed. On Magnolia Avenue plates and windows rattled and in South Knoxville people thought their houses had been struck by a blast.

H. J. Moorhead, News-Sentinel promotion manager, who lives at 124 Fairmont Boulevard, stated he was startled awake by the groaning noise made by the earth-wave. 'I could feel the bed swaying after that first shock,' Mr. Moorhead stated. 'I turned on the light and saw the pictures swaying back and forth on the wall.'

'My house just quivered and shook,' said Mrs. O. J. Brown who lives in a large two-story brick home at the corner of Smoky Mountains Highway and Moody Avenue.'

George Martin, instructor in Geology at the University of Tennessee, explained last night's two shocks as being caused by two waves of movement in the earth's crust, one a fast wave which runs transversely through the earth and is felt first, and a second, the slow wave which runs on the surface of the earth. Tennessee's greatest earthquake in historical times rolled eight-foot waves over the surface of the earth.

Recalls Reelfoot Creator

This was the New Madrid earthquake, one of the most severe ever recorded in the United States. It created Reelfoot Lake in western Tennessee and shook the Central Mississippi Valley at intervals throughout the year 1811-1812. Last night's tremblor was nothing compared to real earthquakes. Mr. Martin thought that solid rocks probably moved less than two-tenths of an inch in last night's tremblor, but a shift of only three-fourths of an inch in solid rocks is sufficient to produce a severe earthquake. Most destructive earthquake from the human standpoint, Mr. Martin said, occurred in China in 1556, when the earth shook like jelly and destroyed 800,000 human lives.

The University of Tennessee owns no seismograph to record earth tremblors, Dr. Martin said. He thought the last night's quake might have originated in North or South Carolina.

The Weather Bureau has no seismograph either.

QUAKE ALSO FELT IN SWEETWATER

Sweetwater, March 31--An earthquake was felt here about 4 a.m. today. There were two shocks accompanied by a rumbling noise."

C. Templeton [370] 1938 MAR 31 35.6 83.6 NC-TN Border III-IV

1. Bollinger [33]

2. McClain, unpub., (1978)

3. McClain [260]

4. Moneymaker [281]

5. TVA, unpub., (1977)

III. USGS [390]

D. USEQ [395] 1938 MAR 31 5:10 NC-TN Boundary III-IV

March 31: 5:10. North Carolina-Tennessee boundary. A shock of intensity III to IV was felt over an area extending from Knoxville, Tennessee, to Asheville and Murphy, North Carolina.

IV. McClain [260] 1938 MAR 31 10:10 35.6 83.6 NC-TN border area III-IV

Felt from Asheville and Murphy, N.C. to Knoxville, Tn.

A. Moneymaker [281]

B. USEQ [395]

V. Bollinger [33] 1938 MAR 31 05:10 35.5 83.5 NC-TN border III-IV

A. MacCarthy [241]

B. McClain [260]

C. Moneymaker [281]

D. USEQ [395]

VI. Moneymaker [281] 1938 MAR 31 05:10 Southern Appalachians IV

1938, March 31, 5:10 a.m., southern Appalachians (IV)

An earthquake centered in the mountains in the Little Tennessee River Basin affected an extensive area in western North Carolina and eastern Tennessee. Nearly everyone was awakened at Fontana, Santeetlah, and Tapoco, North Carolina, and Calderwood, Tennessee. At the Fontana copper mine on Eagle Creek, the duration of the shock was about 10 seconds. Houses shook, dishes and doors rattled,

and towermen were frightened from fire towers on several peaks in the Great Smoky Mountains north of the river. The earthquake was felt at Knoxville, Sweetwater, Parksville, and Copperhill, Tennessee, and at Asheville, Waynesville, Bryson City, and Murphy, North Carolina.

A. Moneymaker [283]

B. USEQ [395]

VIII. MacCarthy [241] 1938 MAR 31 05:10 NC-TN border III-IV

*1938: March 31, 0510 hrs. North Carolina-Tennessee border. "A shock of intensity 3 to 4 was felt over an area extending from Knoxville, Tenn., to Asheville, N.C." (U.S.E. 1938.) No further mention of this supposed earthquake has been found elsewhere.

A. USEQ [395]

IX. Varma [400] 1938 MAR 31 35.6 83.5 Sevier Co., TN IV

A. USEQ [395]

- I. TELC 1939 MAY 5 03:45 33.7 85.8 Anniston, AL 2000 V
- Location: Anniston, AL; intensity; location
- Intensity: Shook floor lamps, moved beds and rattled dishes @ Anniston, AL
- Extent: NE AL; map; 2000 sq. km.
- II. TVA [380] 1939 MAY 5 03:45 33.7 85.8 Anniston, AL V-VI
- A. USEQ [395]
- III. USGS [390]
- B. EQHUS [121] 1939 MAY 4 21:45 33.7 85.8 Anniston, AL V
1939. May 4. Anniston and Oxford Lake, Ala. Also felt at Blue Mountain, Choccolocco, De Armanville, Jacksonville, Jenifer, Lincoln, Talladega, and Weaver.
1. USEQ [395]
- C. EQHUS [120] [Same as B above.]
- D. USEQ [395] 1939 MAY 4 21:45 33.7 85.8 V
- Center near 33.7° north, 85.8° west. Felt with intensity V at Anniston and Oxford Lake, Ala. At Anniston the sudden tremor shook floor lamps, moved beds, and rattled dishes, while many ran to the street to find out what was making the disturbance. Many people were not certain of the cause. The shock was felt less strongly at Blue Mountain, Choccolocco, De Armanville, Jacksonville, Jenifer, Lincoln, Talladega, and Weaver, Ala.
- IV. McClain [260] 1939 MAY 5 03:45 33.7 85.8 Anniston, AL V
- Felt also at Oxford Lake, Blue Mountain, Talladega, Choccolocco, and Jenifer.
- A. EQHUS [121]
- B. Moneymaker [281]
- C. USEQ [395]

V. Bollinger [33] 1939 MAY 4 21:45 33.7 85.8 Anniston, AL V

A. USEQ [395]

VI. Moneymaker [281] 1939 MAY 4 9:45 p.m. Southern Appalachians V

A strong shock was felt at Anniston, Alabama. Loose objects were disturbed, furniture was moved, and people ran out of buildings to ascertain what was happening. The shock was felt with less intensity at Talladega, Blue Mountain, Choccolocco, De Armanville, Jacksonville, Jenifer, Weaver, and Lincoln.

A. EOHUS (1938 or 1947)

B. USEQ [395]

IX. Varma [400] 1939 MAY 4 33.7 85.8 Near Anniston, AL V

A. USEQ [395]

I. TELC 1939 JUN 24 11:27 34.7 86.6 Huntsville, AL 6400 IV

Location: Huntsville, AL; F/S; A/S; intensity; location

Intensity: Dishes, windows rattled @ Huntsville, AL, telephone poles swayed

Extent: Central AL-TN border area; map; 6400 sq. km.

II. TVA [380] 1939 JUN 24 10:00, 34.7 86.6 Huntsville, AL IV
11:27,
12:45

A. USEQ [395]

B. Templeton [370] 1939 JUN 24 34.7 86.6 Huntsville, AL III
1939 JUN 24 34.7 86.6 Huntsville, AL IV

510

The second shock in this series may have been the strongest. There was also another shock on the same date.

1. Bollinger [33]
2. McClain, unpub., (1978)
3. McClain [260]
4. Moneymaker [281]

III. USGS [390]

D. USEQ [395] 1939 JUN 24 4:00, 1300
5:27,
6:45 a.m. Huntsville, AL area

They were felt at Huntsville, Ala., and immediate vicinity. The shocks consisted of light rumbling, accompanied by the rattling of dishes and windows. The stronger shock at 5:27 a.m. was felt in an area extending eastward from Athens to Paint Rock, Ala., and northward from Guntersville Dam, Ala., to Pulaski, Tenn. It was most distinct at Huntsville, where it was felt with about intensity IV. One person reported seeing telephone poles sway. The affected area covers about 500 square miles. No damage.

IV. McClain [260] 1939 JUN 24 10:00, 34.7 86.6 Huntsville, AL III-IV
11:27,
12:45

Second shock strongest shock, felt at Pulaski, TN.

A. Moneymaker [281]

B. USEQ [395]

V. Bollinger [33] 1939 JUN 24 05:27 34.7 86.7 Huntsville, AL 1300 IV

Also at 04:00 and 06:45

VI. Moneymaker [281] 1939 JUN 24 4:00, 4:00, 5:27, 6:45 a.m. Southern Appalachians IV
5:27,
6:45 a.m.

1939, June 24, 4:00, 5:27, and 6:45 a.m., southern Appalachians. Three shocks at Huntsville, Alabama, and vicinity. The stronger shock at 5:27 a.m., was felt from Athens to Paint Rock, Alabama, and from Gunter'sville Dam to Pulaski, Tennessee. The maximum intensity of this shock was IV at Huntsville.

A. Seismo. notes [340] 1939 JUN 24 a.m. Huntsville, AL Slight

"Huntsville, Alabama, June 24, 1939. Residents reported feeling a slight earthquake shortly after dawn."

B. USEQ [395]

IX. Varma [400] 1939 JUN 24 34.7 86.6 Huntsville, AL IV

Felt radius = 20 Km

A. USEQ [395]

B. Archival Records of the USGS

X. Docekal [100] 1939 JUN 24 03:00, 34.7 86.6 Huntsville, AL 1300 IV
04:27
05:45

An earthquake was felt at Huntsville, Alabama. The second shock was the strongest.

A. Seismo. notes [340]

B. Archival Records of USGS

I. TEIC 1940 OCT 19 05:55 35.0 85.1 Ryall Springs, TN 3200 V

Location: Ryall Springs, TN; location

Intensity: Loose objects disturbed, houses shook, dishes and windows rattled, thousands awakened

Extent: SE TN - NW GA border area; map; 3200 sq. km.

II. TVA [380] 1940 OCT 19 05:55 35.0 85.1 Ryall Springs, TN IV

A. Moneymaker [283]

A feeble tremor, which occurred at 12:55 a.m., was felt over approximately 1,500 square miles in southeastern Tennessee and northwestern Georgia. Reports from about one hundred persons who experienced the shock were tabulated by the writer and the epicenter was located in East Brainerd, Brainerd Hills and Ryall Springs just east of Chattanooga. On basis of the Rossi-Forel scale, the intensity was about 2.8 in this area. The origin of the tremor is not definitely known. Seismograms at Columbia, South Carolina, and Cincinnati, Ohio, did not record the disturbance. According to the U.S. Weather Bureau, this was the fourth tremor felt in Chattanooga since 1905.

a. Survey Precip. in Tn. River Basin.

2. Unspecified news account

Earthquake

A light but pronounced earth tremor was felt in the Chattanooga area on the morning of October 19. According to newspaper accounts the disturbance apparently centered in the vicinity of Chattanooga, and extended in a northeast and southwest direction for about 30 or 40 miles. The shock was reported as far south as Dalton, Georgia, and north to Charleston, Tennessee.

Persons feeling the disturbance report that it occurred between 12:55 a.m. and 1:00 a.m., and described it as a low rumbling noise with rattling of windows and kitchenware. No damage was reported.

3. Evening Times (10/19/40), Chattanooga, TN

"A tremor...startled sleeping residents of a wide area in the vicinity of Chattanooga about 1 o'clock this morning. Some thought the disturbance was an explosion. Several thought the Germans had dropped a bomb "somewhere." At Ooltewah, a powder plant was swamped with calls from people who feared it had been blown up. At Cleveland, people thought there had been an explosion at the Ooltewah powder plant.

Calls came from a radius of 30 miles around Chattanooga.

4. Free-Press (10/19/40), Chattanooga, TN

In Chattanooga several people thought a furnace had exploded.

"The quake was especially vigorous in the Cleveland area."

"The quake was felt all over Cleveland....there were dozens of calls, one of them came from 11 miles south; the quake seems to come from or be headed in that direction. Windows were rattled, houses shook."

A Chattanooga, who thought there was something wrong with the furnace said, "It shook the whole house and sounded like a couple of big moving vans passing by on a cobblestone street." Some reported that houses rocked, venetian blinds "rattled vigorously." A weatherman at the Chattanooga airport described the shock as a "distinct but light earthquake."

B. USEQ [395]

C. Templeton [370] 1940 OCT 19 35.0 85.0 Chattanooga, TN IV

1. Bollinger [33]

2. McClain, unpub., (1978)

3. McClain [260]

4. Moneymaker [281]

5. TVA, unpub., (1977)

III. USGS [390]

D. USEQ [395] 1940 OCT 19 00:35

Chattanooga, Cleveland, TN- Ringgold, GA Moderate

October 19: 00:55. Chattanooga and Cleveland, Tenn., and Ringgold, Ga. Moderate shock. Loose objects disturbed. Telephone exchanges swamped with calls.

IV. McClain [260]

1940 OCT 19 05:55 35.0 85.0 Southern TN- North GA Border 1300 IV

Felt in Chattanooga, Cleveland, Charleston, Tn. and Dalton and Ringgold, Ga.

A. Moneymaker [281]

B. USEQ [395]

V. Bollinger [33] 1940 OCT 19 00:55 35.1 85.3 Chattanooga, TN 1300 IV

A. Moneymaker [281]

VI. Moneymaker [281] 1940 OCT 19 12:55 a.m. Southern Appalachians IV

An earthquake which shook houses and rattled windows awoke thousands of sleepers in Chattanooga. It affected an area of more than 500 square miles in southern Tennessee and northern Georgia and was felt at such widely separated points as Charleston, Tennessee, and Dalton, Georgia. At Cleveland and Ringgold it was strong enough to disturb sleepers. A "low rumbling" sound accompanied the shock.

A. Brill [60]

B. Moneymaker [283]

C. Seismo. notes [340] 1940 OCT 19 12:54 a.m. Chattanooga, TN

An earthquake was felt in Chattanooga, Tennessee, and its vicinity on October 19 at 12:54 a.m. According to a report received from Mr. Berlen C. Moneymaker, the shock was felt as far away as Cleveland, Tennessee (30 miles), and Ringgold, Georgia (15 miles), and over an area of 450 square miles in Tennessee and northern Georgia. It caused houses to shake and windows and dishes to rattle, and awakened thousands of people from sleep, but did no damage.

D. USEQ [395]

IX. Varma [400] 1940 OCT 19 34.7 85.1 Near Ringgold, GA IV

A. USEQ [395]

515

I. TEIC 1940 DEC 25 06:50 35.9 82.8 Hot Springs, NC 17,300 V

Location: Hot Springs, NC; located near center of felt area and between Greeneville, TN and Asheville, NC where F/S, A/S reported

Intensity: Many awakened in Asheville, Marshall, Spruce Pine, Skyland, Burnsville, NC, Greeneville, TN; houses, windows, dishes shaken, Christmas Tree decorations fell

Extent: E TN - W NC; map; 17,300 sq. km.

Comment: F/S, A/S @ Greeneville, TN; A/S @ Asheville, NC

II. TVA [380] 1940 DEC 25 06:50 35.9 82.8 Hot Springs, NC IV

A. Moneymaker [283]

1. Citizen (12/26/40), Asheville, NC

MANY PERSONS AWAKENED BY EARTH SHOCKS HERE

Two Tremblors Reported on Christmas Eve; No Damage Done

Asheville and some other parts of Western North Carolina were shaken by two earthquakes Christmas eve and morning, the first coming shortly before 9 o'clock Tuesday night and the other at 1:50 o'clock yesterday morning.

What possibly was a third shock was noticed by several persons shortly before midnight last night. They called The Citizen to report hearing a loud noise and to ask if there had been an explosion.

No reports of damage were received. Police said that Christmas tree decorations were shaken off in some instances, that dishes were rattled, and many houses shook.

Many Seek Information

Police, the sheriff's department, The Citizen and Radio Station WUNC received many calls yesterday from persons seeking information concerning the tremblor.

The early morning shock appeared to be more violent. It awoke many persons, some of whom said their beds were shaken violently.

The second 'quake, practically everyone seemed to agree, consisted of three "rumbles," one following the other quickly, and then a "boom" that sounded as if it came from an explosion.

It was the first shock Asheville had felt in approximately 10 years, it was said. Many persons at first failed to identify the 'quakes, thinking it was blasting or a heavy truck passing.

Sections of Western North Carolina, in addition to Asheville, where the 'quake had enough force to arouse residents included Spruce Pine, Skyland, Canton, Brunsville, and Green Mountain.

2. Tri-County News (12/26/40),

SLIGHT SHOCK FELT FROM EARTHQUAKE ON CHRISTMAS EVE

No Damage Has Been Reported In This Section From Tremblor

One of the first earthquakes of any importance to occur in this part of the country in many years was experienced Christmas eve and early the following morning. The first shock came at about 9 p.m. December 24 and the second at 1:50 Christmas morning.

No damage whatever was occasioned by the two shocks. In fact, few people knew they occurred. Those who did notice them thought that men putting off dynamite in celebrating the holiday had caused the jar noticed in some places.

3. News-Record (12/26/40), Marshall, TN

MARSHALL SHAKEN BY EARTHQUAKE

Marshall residents were awakened just before two o'clock Tuesday night (or Christmas morning if you prefer) by a sudden sound somewhat as if a bomb had exploded against each residence. This was followed by a rumbling sound that caused windows to shake for about 30 seconds apparently. It was distinctly heard by the telephone central who had just been on duty. Soon reports came that the same disturbance had been experienced in Weaverville. Residents of Marshall called central to know if she knew what had happened. The next day (Christmas Day) there was no Asheville paper, so that a complete report of the shocks was not available until Thursday morning, when the Asheville Citizen reported that the disturbance had been distinctly felt in Spruce Pine, Skyland, Canton, Burnsville, Green Mountain as well as Asheville. No damage was reported.

4. Herald Courier (12/26/40), Bristol, TN

SLIGHT 'QUAKE HIT APPALACHIAN REGION

Bristol, Number of Other Towns Experience Distinct Tremors

A slight earth tremor, believed to be part of the same disturbance that shook Johnson City, Ervin, Elizabethton, Asheville, N.C., and a number of other towns in this section, was noted in Bristol shortly after 2 o'clock yesterday morning.

Dr. T. P. Johnston, president of King College, said that he felt a distinct rocking of his home which lasted for several seconds but caused no damage.

Roy McClue, Lex Simpson, and a number of other Bristol citizens reported having felt the same shock.

No damage was reported in Bristol.

Johnson City, Tenn., Dec. 25. (AP)—Johnson City experienced a slight earth tremor about 2 a.m. today.

Although the quake did no damage, it was felt in all sections of the city, as well as in nearby Ervin and Elizabethton. Most persons who knew of the shock said it lasted several seconds and was sufficient to shake beds and windows.

Asheville NC, Dec. 25, (AP)—Two earth tremors were felt here last night but caused no known damage.

The first occurred shortly before 9 o'clock and the second at 1:50 a.m.

The disturbances were similar to those caused by the passing of a heavy truck, followed by a distinct "boom" sound.

5. Sun (12/26/40), Greeneville, TN

LIGHT EARTHQUAKE FELT IN GREENEVILLE

The light earthquake tremor, which occurred on Christmas Eve over the country, was also felt in Greeneville and Green County. The light quake lasted for almost a minute and a large number of people were awakened by the shake. There was a strong vibration and shaking of strong and well-built homes and in some instances there was a heavy rumbling as if there was a disturbance deep in the earth. A number of people were awakened by the jolt and arose after going to bed for fear there was real danger ahead.

A very small quake was also reported to have occurred around eight o'clock, but only a very few felt it.

There was no known damage from the tremors.

6. Precip. in Tn. Riv. Basin, Dec. 1940, pg. 3

Earthquake

A light earth tremor shook the city of Asheville, North Carolina, and vicinity at 9:00 p.m. eastern standard time on December 25; to be followed by a second shock at 1:50 a.m. eastern standard time on the 26th. The second tremor was felt in the East Tennessee cities of Knoxville, Maryville, Jonesboro, Greeneville, and Morristown at this same hour. Houses were shaken and Christmas tree decorations fell to the floor, but there were no reports of damage from any community.

7. Stechulte [?] 1940 DEC 25 1:47 a.m. EST Northwestern NC

"A small earthquake occurred in northwestern North Carolina about 1:47 a.m., eastern standard time, December 25, 1940. Shocks were recorded at approximately this time at Cincinnati, St. Louis, Pittsburgh, Williamstown, Weston and Fordham, but attempts to correlate the readings suggest that the New England stations recorded a different shock occurring at nearly the same time. A number of small shocks have occurred in this general region of the Appalachians in recent years.

a. Various seismic records

B. USEQ [395]

C. Templeton [370] 1940 DEC 25 35.9 82.9 Greeneville, TN Area III

Foreshock of the 12/25/40 event.

1940 DEC 25 35.9 82.9 Asheville, NC Area V

Main shock.

1940 DEC 26 35.9 82.9 Asheville, NC Area III

Aftershock of the 12/25/40 event. Latitude-longitude for this series is reported...as (35.5 82.5).

1. Bollinger [33]

2. McClain, unpub., (1978)

3. McClain [260]

4. Moneymaker [281]
5. TVA, unpub., (1977)

III. USGS [390]

D. USEQ [395] 1940 DEC 25 01:49 Honeycutt-Asheville, NC

December 24: 20:50. Asheville, N.C. Very light shock.

December 25: 01:49.* Weak earthquake felt at Honeycutt and Asheville, N.C. Recorded on the seismograph at Cincinnati.

December 24: 20:30. Greenville, Tenn. Light tremor felt by several.

December 25: 0:50. Greenville, Tenn. Moderate shock. Some residents awakened.

1. Seismograph at Cincinnati

IV. McClain [260]	1940	DEC 25	01:50 & 06:49	35.9	82.9	Asheville, NC	18,100	V
	1940	DEC 26	05:00	35.7	82.7	Asheville, NC		III

A. Moneymaker [281]

B. USEQ [395]

V. Bollinger [33] 1940 DEC 25 01:50 35.5 82.5 Asheville, NC

Foreshock 5 hours earlier, III; Aftershock 22 hours later, III

A. MacCarthy [241]

B. McClain [260]

C. Moneymaker [281]

D. USEQ [490]

E. Seismo. notes [340] 1940 DEC 25

Two earth tremors similar to the passing of a heavy truck were felt in the night of December 24-25.

VI. Moneymaker [281] 1940 DEC 24 8:30 p.m. Southern Appalachians III

1940, December 24, 8:30 p.m. southern Appalachians (III)

A light earthquake shock was felt at Greeneville, Tennessee, and Asheville, North Carolina, and at numerous other points in the two states. This shock affected much the same area as that at 1:50 a.m. on December 25, 1940.

1940 DEC 25 1:50 a.m. Southern Appalachians 18,100 V

1940, December 25, 1:50 a.m., southern Appalachians (V)

This moderately strong earthquake affected an area of about 7000 square miles in eastern Tennessee and western North Carolina. Localities at which the shock was felt included Bristol, Elizabethton, Ervin, Greeneville, Johnson City, Jonesboro, Knoxville, Maryville, and Morristown, Tennessee, and Asheville, Burnsville, Canton, Green Mountain, Marshall, Skyland, Spruce Pine, and Weaverville, North Carolina. Houses were shaken strongly; and Christmas tree decorations fell to the floor. Thousands of sleepers were awakened at widely separated points. At Asheville, there were three distinct "rumbles" in rapid succession, followed by a "boom" like the report of an explosion. In Tennessee, the noise was described as a "heavy rumbling."

1940 DEC 25 Near 12:00 a.m. Southern Appalachians III

1940, December 25, "near midnight," southern Appalachians (III)

A light shock and explosive noise were felt and heard in the Asheville area "shortly before midnight." This shock was not reported in other parts of the area affected by the two preceding shocks.

A. Moneymaker [281]

B. Seismo. notes [340]

C. USEQ [395]

VIII. MacCarthy [241] 1940 DEC 24 20:50 Asheville, NC

*1940: December 24, 2050 hrs. Asheville, N.C. "Very light shock" (U.S.E. 1940). For mention in State papers see accounts of earthquake of December 25, 1940. Not mentioned in E. Hist.

1940 DEC 25 01:49

*1940: December 25, 0149 hrs. "Weak earthquake felt at Honeycutt and at Asheville, N.C. Recorded on the seismograph at Cincinnati." (U.S.E. 1940). According to contemporary newspapers, there were two distinct shocks felt at Asheville, the first shortly before 9 p.m. on December 24, and the second at 1:50 a.m. on the 25th. Witnesses likened the occurrence to that which might be caused by the passing of a heavy truck and said it was followed by a distinct "boom" sound. No damage was reported. Described in B.S.S.A. 31 (1941), p. 177. Generally reported in the State papers and in the New York Times for December 26th. Not in E. Hist.

A. USEQ [395]

B. Seismo. notes [340]

C. New York Times (12/26/40), New York

IX. Varma [400]

1940 DEC 24 36.2 86.2 Greenville, TN II+

A. USEQ [395]

I. TEIC 1941 MAR 4 06:15 35.9 83.9 Rockford, TN IV

Location: Rockford, TN

Intensity: Bed shook, some awakened @ Rockford, TN

II. TVA [380] 1941 MAR 4 06:15 35.9 83.9 Rockford, TN <IV

A. Moneymaker [283]

1. Knoxville News-Sentinel (3/4/41), Knoxville, TN

"Did you Feel an Earthquake Last Night? Did you feel the earth tremble last night?

J. T. Rick of Rockford said he did. 'I was lying in bed awake at 1:15 a.m. when suddenly my bed shook like someone had taken hold of it. The tremble woke my wife and daughter and I heard the rumbling until it lost itself in the direction of the Smokies,' Mr. Rick said.

It couldn't have been thunder, Mr. Rick believes, since that occurred earlier in the night.

The Weather Bureau here said no report of an earthquake had been received here except from persons who had called from nearby declaring they felt a tremble during the night."

B. USEQ [395]

C. Templeton [370] 1941 MAR 4 35.9 83.9 Knoxville, TN III

1. Bollinger [33]

2. McClain, unpub., (1978)

3. McClain [260]

4. Moneymaker [281]

5. TVA, unpub., (1977)

III. USGS [390]

D. USEQ [395] 1941 MAR 4 1:15 Knoxville, TN

Slight shock; loud rumbling noise

IV. McClain [260] 1941 MAR 4 06:15 35.9 83.9 Knoxville, TN III

Felt at Rockford, Blount Co., Tenn.

A. USEQ [395]

B. Moneymaker [281]

V. Bollinger [33] 1941 MAR 4 01:15 36.0 84.0 Knoxville, TN III

A. McClain [260]

B. Moneymaker [281]

C. USEQ [395]

VI. Moneymaker [281] 1941 MAR 4 1:15 a.m. Southern Appalachians III

1941, March 4, 1:15 a.m., southern Appalachians (III)

A light earthquake shock accompanied by a rumbling noise which "seemed to recede toward the southeast" was felt at Rockford, Blount County, Tennessee. The motion was described as a "tremble."

A. Moneymaker [290]

B. USEQ [395]

IX. Varma [400] 1941 MAR 4 36.0 83.9 Knoxville, TN II+

A. USEQ [395]

I. TEIC	1941	MAY 10	11:12	35.6	82.6	Asheville, NC	IV
Location: Asheville, NC							
Intensity: Windows, dishes rattled							
II. TVA [380]	1941	MAY 10	11:12	35.6	82.6	Asheville, NC	IV
A. USEQ [395]							
B. Seismo. notes [340]							
	1941	MAY 10	6:42 a.m.			Asheville, NC	Slight
Asheville, North Carolina, May 10, 1941 - A slight earth shock was felt in the northern and western parts of Asheville at 6:42 a.m. Windows and dishes rattled, but no damage was reported.							
C. Templeton [370]	1941	MAY 10		35.6	82.6	Asheville, NC	III
1. Bollinger [33]							
2. McClain, unpub., (1978)							
3. McClain [260]							
4. Moneymaker [281]							
5. TVA, unpub., (1977)							
III. USGS [390]							
D. USEQ [395]							
	1941	MAY 10	06:12			Asheville, NC	
Slight shock felt in northern and western parts of the city							
IV. McClain [260]	1941	MAY 10	11:12	35.6	82.6	Asheville, NC	III
A. Moneymaker [281]							
B. USEQ [395]							

V. Bollinger [33] 1941 MAY 10 06:12 35.5 82.5 Asheville, NC III

A. MacCarthy [241]

B. Moneymaker [281]

C. McClain [260]

D. USEQ [395]

E. Seismo. notes [340]

VI. Moneymaker [281] 1941 MAY 10 6:12 a.m. Southern Appalachians III

1941, May 10, 6:12 a.m., southern Appalachians (III) A light shock was felt in the northern and western sections of Asheville, North Carolina.

A. Seismo. notes [340]

B. USEQ [395]

VIII. MacCarthy [241] 1941 MAY 10 06:12 Asheville, NC

*1941: May 10, 0612 hrs. Asheville, N.C. "Slight shock felt in northern and western parts of the city." (U.S.E. 1941). B.S.S.A. 31 (1941), p. 268, says that windows and dishes rattled in Asheville. Not in E. Hist. or any available contemporary newspapers.

A. Seismo. notes [340]

B. USEQ [395]

X. Varma

1941 MAY 10 35.6 82.6 Asheville, NC

II

A. USEQ [395]

I. TEIC	1941	SEP 8	09:45	35.0	85.3	Chattanooga, TN	1200	V
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Location: Chattanooga, TN; intensity

Intensity: Rattled windows, vibrated walls, flooring, shook houses, broke glassware, jarred beds

Extent: Small area of SE TN around Chattanooga; map; 1200 sq. km.

II. TVA [380]	1941	SEP 8	09:45	35.0	85.4	Lookout Mt., TN	IV
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A. USEQ [395]

B. Moneymaker [283]

1. Times (9/9/41), Chattanooga, TN

"A moderate quake of twenty seconds' duration, second here in recent months, shook Chattanooga homes yesterday morning at 4:45 o'clock and was reported felt in sections of Lookout Mountain and Marion County."

"Unaccompanied by a rumbling warning the tremblor rattled windows, vibrated walls and flooring and was reported to have broken glassware in a few homes."

Reports of the shock came from Guild, Jasper and Sequatchie Valley.

One person said the tremor "shook the house terribly."

2. Precip. in Tn. Riv. Basin (September 1941)

A light earthquake occurred at 4:45 a.m., on September 8, in the vicinity of Chattanooga. It was most distinct on Lookout Mountain, Cameron Hill, Mission Ridge, and extending westward to Jasper. The shock was sufficient to rattle dishes and venetian blinds, jar beds and shake houses mildly, but no damage was reported.

C. Templeton [370]	1941	SEP 8		35.0	85.3	Chattanooga, TN	III-IV
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1. Bollinger [33]
2. McClain [260]
3. Moneymaker [281]
4. TVA, unpub., (1977)

III. USGS [390]

D. USEQ [395] 1941 SEP 8 4:45 Chattanooga, TN 260

September 8: 4:45. Chattanooga, Tenn. Earthquake accompanied by a rumbling sound was felt over an area of about 100 square miles. Strong in the Lookout Mountain section.

IV. McClain [260] 1941 SEP 8 09:45 35.0 85.3 Chattanooga, TN 260 III-IV

A. Moneymaker [281]

B. USEQ [395]

V. Bollinger [33] 1941 SEP 8 04:45 35.1 85.3 Chattanooga, TN 260 III-IV

A. McClain [260]

B. Moneymaker [281]

C. USEQ [395]

VI. Moneymaker [281] 1941 SEP 8 4:45 a.m. Southern Appalachians III-IV

1941, September 8, 4:45 a.m., southern Appalachians (III-IV) An earthquake sufficiently strong to shake houses mildly, jar beds, and rattle dishes and venetian blinds, was felt throughout Chattanooga and as far to the west as Jasper. The shock was felt most strongly at the higher elevations, including Cameron Hill, Missionary Ridge, and Lookout Mountain.

A. Moneymaker [283]

B. Seismo. notes [340] 1941 SEP 8 4:45 a.m. Chattanooga, TN

Chattanooga, Tennessee, September 8, 1941 - Mr. Berlen C. Moneymaker reports an earthquake at 4:45 a.m., which was accompanied by a rumbling sound. It rattled dishes, jarred beds, and was felt over an area of about 100 square miles. It was strongly felt in the Lookout Mountain section. There was no damage reported.

C. USEQ [395]

X. Varma [400]

1941 SEP 8 35.0 85.3 Chattanooga, TN III

A. USEQ [395]

I. TEIC 1945 JUN 14 03:25 35.2 84.9 8100 V

Location: Cleveland, TN; intensity

Intensity: Rattled dishes, pans; many ran into the streets in Cleveland, TN

Extent: SE TN near NC-GA-TN border; map; 8100 sq. km.

II. TVA [380] 1945 JUN 14 03:25 35.2 84.9 Cleveland, TN V

A. Moneymaker [283]

1. Precip in Tn. River Basin (June 1945)

A slight earthquake shock was felt between Chattanooga and Cleveland on the night of June 13. G. W. Martin, Water Resources Section, says, "he heard a rumbling noise rolling toward him from the east, sounding much the same as distant thunder seems to roll over the hills, diminishing as it approaches. However, this rumble increased slightly as it approached. When the noise and tremor reached his home, the house vibrated enough to rattle dishes and pans with about the same effect as would be caused by an extremely heavy and long clap of thunder in the immediate vicinity." The shock was felt over an area extending eastward at least as far as Copperhill and southward into Georgia. This earthquake was also felt in Knoxville.

a. Martin (personal comm.)

B. USEQ [395]

C. Templeton [370] 1945 JUN 14 35.2 84.9 Cleveland, TN IV-V

1. Bollinger [33]

2. EQUUS [120]

3. McClain, unpub., (1978)

4. McClain [260]

5. Moneymaker [281]

6. TVA, unpub., (1977)

7. EQHUS [121]

III. USGS [390]

B. EQHUS [121] 1945 JUN 13 22:25 35 84.5 Cleveland, TN V

Felt strongly between Cleveland, Tenn. and Blue Ridge, Ga. Many were alarmed and ran into streets at Cleveland. No damage.

1. USEQ [395]

C. EQHUS [120] [Same as above]

D. USEQ [395] 1945 JUN 13 22:25 Cleveland, TN V

A distinct tremor felt strongly in area between Cleveland, Tenn., and Blue Ridge, Ga. Intensity V in Cleveland. Many were alarmed and ran to streets. No damage.

Intensity IV:
Athens and Chattanooga.

Intensity I to III:
Bradley, Copperhill, and Ocoee.

Intensity I to III in Georgia:
Blue Ridge.

IV. McClain [260] 1945 JUN 14 03:25 35.0 84.5 Cleveland, TN 10,400 V

Felt to Blue Ridge, Ga.

A. USEQ [395]

B. Moneymaker [281]

C. EQHUS [121]

V. Bollinger [33] 1945 JUN 13 22:25 35.2 84.9 Cleveland, TN 10,400 IV-V

- A. McClain [260]
- B. Moneymaker [281]
- C. USEQ [395]

VI. Moneymaker [281] 1945 JUN 13 10:25 p.m. Southern Appalachians 10,400 V

1945, June 13, 10:25 p.m., southern Appalachians (V)

This moderately strong earthquake, centered near Cleveland, Tennessee, affected an area of about 4000 square miles in eastern Tennessee and northern Georgia. At Cleveland, many frightened people ran into the streets. The shock and the concomitant rumbling noise were felt and heard southwestward to Chattanooga; southeastward to Blue Ridge, Georgia, eastward to Copperhill, and northeastward to Knoxville.

- A. Moneymaker [283]
- B. USEQ [395]

IX. Varma [400] 1945 JUN 13 35.2 84.9 Cleveland, TN V

- A. USEQ [395]

I. TEIC	1946	APR 7	06:00	35.2	84.9	Cleveland, TN	IV
Location: Cleveland, TN							
Intensity: Sharp shock							
II. TVA [380]	1946	APR 7	05:00	35.2	84.9	Cleveland, TN	IV
A. USEQ [395]							
B. Templeton [370]	1946	APR 7		35.2	84.9	Cleveland, TN	III-IV
1. Bollinger [33]							
2. McClain, unpub., (1978)							
3. McClain [260]							
4. Moneymaker [281]							
5. TVA, unpub., (1977)							
III. USGS [390]							
D. USEQ [395]	1946	APR 6	24:00			Cleveland, TN	
April 6: 24:00. Cleveland, Tenn. Sharp shock like truck hitting building reported by several in and near the town. Some heard sound like distant thunder on the horizon.							
IV. McClain [260]	1946	APR 7	05:00	35.2	84.9	Cleveland, TN	III-IV
A. USEQ [395]							
V. Bollinger [33]	1946	APR 6	24:00	35.2	84.9	Cleveland, TN	III-IV
A. USEQ [395]							
VI. Moneymaker [281]	1946	APR 6	12:00 a.m.			Southern Appalachians	

1946, April 6, 12:00 (midnight), southern Appalachians (III-II)

At Cleveland, Tennessee, a "sharp shock like truck hitting building reported by several in and near the town. Some heard sound like distant thunder on the horizon."

A. USEQ [395]

IX. Varma [400]

1946

APR 6

35.2

84.9

Cleveland, TN

IV-V

A. USEQ [395]

I. TEIC 1947 JUN 6 12:55 36.0 83.9 Knoxville, TN IV

Location: Knoxville, TN

Intensity: Shook dishes, houses

II. TVA [380] 1947 JUN 6 12:55 36.0 83.9 Knoxville, TN IV

A. Moneymaker [283]

1. Assoc. Press

ST. LOUIS RECORDED A QUAKE OR LIGHT SHOCK AT 7:55 A.M. (EST) ASSOCIATED PRESS REPORTED

A.P. quoted a St. Louis University Seismologist as saying the only shock recorded there was "very light" and that he was unable to determine the direction or distance. New Orleans seismograph equipment has been dismantled and, consequently, no shock was recorded there.

2. News-Sentinel (6/6, 6/7/47), Knoxville, TN

"RUMBLING TREMOR" GIVES KNOXVILLE FIRST RECORDED QUAKE

The mystery tremor that shook Knoxville to be bewildered awakening early yesterday morning was generally believed today to have been a light earthquake.

A quake was recorded in St. Louis, where the nearest seismograph is located, at about the time yesterday that some Knoxvilleans "heard a rumble like thunder and felt tremor."

The instrument recorded the quake at 7:55 a.m. Knoxville time, but did not give its location.

The Knoxville Weather Bureau has no record of previous earthquakes, but it is believed that there have been a number of slight ones felt here in former years. One tremor which was believed to have been an earthquake, was remembered as occurring some 30 years ago, and being strong enough to shake bricks from chimneys.

MAN OR NATURE?
MYSTERY QUAKE
PUZZLES CITY
HOUSES SHAKEN

Houses in widely separated parts of Knoxville were shaken this morning before 8 a.m., in a mysterious blast or quake. Reports of feeling the blast or quake came from as widely separated sections as Lincoln Park, Topside and Chapman Highway residents.

Efforts to find what may have caused the shaking were fruitless. Atlas Powder Company officials knew of no heavy explosive charges. The County Highway Department knew of no road blasting that may have caused it.

Tom Osborne who lives on Topside reported the shake at 7:45 a.m. at his home.

"My 3-year old granddaughter was the first to notice it he said, when the dishes on the breakfast table began to shake. My first thought was that the furnace had exploded, but then I remember that there was no fire in it. It sounded like a low rumbling coming from the earth."

J. C. Burns, Chief Clerk at the County Highway Department, said the shaking was felt at the Highway Department quarry at Neuberts "Our men there felt a slight jar and heard the rumbling," he said.

Mrs. John Shell of Western Heights said she was awakened when her house shook for a minute. A woman who lives on Oliver Road new Chapman Highway, reported that her brick house shook in a frightening manner. Other women in South Knoxville sections reported hearing rumbling and feeling the "shake." One said china almost shook from shelves at her home.

The Weatherman received a number of calls, several from North Knoxville, one from the Whittle Springs section and several from Chilhowee section.

CITY MANAGER MORRISON BELIEVES THE SAME SHAKES WERE FROM QUARRY BLASTS

I heard the same thing yesterday—three muffled blasts and vibration, he said. Our rock formations are such that a blast as far away as Oak Ridge could cause vibrations here, with strata running all around the city getting a jar.

B. Templeton [370]	1947	JUN 6	35.9	83.9	Knoxville, TN	III
1. Bollinger [33]						
2. McClain, unpub., (1978)						
3. McClain [260]						

4. Moneymaker [281]

5. TVA, unpub., (1977)

IV. McClain [260] 1947 JUN 6 12:55 35.9 83.9 Knoxville, TN III

A. Moneymaker [281]

V. Bollinger [33] 1947 JUN 6 07:55 36 84 Knoxville, TN III

A. McClain [260]

B. Moneymaker [281]

VI. Moneymaker [281] 1947 JUN 6 7:55 a.m. Southern Appalachians III

1947, June 6, 7:55 a.m., southern Appalachians (III)

A light tremor was felt throughout the Knoxville area and southward to Neuberts and Topside. It was described by some as a "trembling, thunderous bump." Mr. Robert A. Laurence of the U.S. Geological Survey reported experiencing the shock in west Knoxville.: "A slight jarring of the table was felt; not enough to rattle dishes or windows, but, nevertheless, distinct enough that my wife remarked about it and said it might be an earthquake." In south Knoxville, houses were strongly shaken; a rumbling sound was heard.

A. Moneymaker [281]

B. USEQ [395] [No listing for this event]

I. TEIC 1947 DEC 28 00:05 35.0 85.1 Ryall Springs, TN 3000 IV

Location: Ryall Springs, TN; location

Intensity: Windows, doors rattled, houses shook in Chattanooga, Red Bank, Ooltewah, Cleveland, Hixson, TN, Rossville and Fort Oglethorpe, GA; caused piano wires to pop (east of Missionary Ridge)

Extent: SE TN - NW GA border area; map; 3000 sq. km.

II. TVA [380] 1947 DEC 28 00:05 35.0 85.1 Ryall Springs, TN IV

A. USEQ [395]

B. Moneymaker [283]

1. Times (12/28/47), Chattanooga, TN

Chattanooga Times on December 28, 1947

"A slight earth tremor was felt in the Chattanooga area and as far south as Ringgold, Ga., between 7:00 and 7:10 o'clock last night."

"Most of the reports came from Brainard, North Brainard, East Lake, Foust Addition and Rossville, indicating the tremor was first felt east of Missionary Ridge and moved in a southerly direction."

"The tremor was felt in Boynton, Ga. also" where "there seemed to be one tremor, a short pause and then a longer one."

Reports include:

"We could hear a rumble a second or two before the house shook, and then another rumble in the other direction as it passed on."

"Something rocked the house and rattled the dishes on the table."

The piano popped twice "as if two strings had been broken."

Dishes danced on the table.

The tremor rattled dishes and pans.

Theories:

Some thought the furnace had exploded.

Some thought a truck had hit the house.

Some thought there had been a wreck.

One person felt the vibration and thought there was a train in the tunnel through Missionary Ridge.

Felt at:	Chattanooga, Tennessee	Not felt:	Lafayette, Georgia
	Rossville, Georgia		Chickamauga, Georgia
	Boynton, Georgia		
	Ringgold, Georgia		

C. Templeton [370]	1947	DEC 28	35.0	85.3	Chattanooga, TN	IV
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1. Bollinger [33]

2. McClain, unpub., (1978)

3. McClain [260]

4. Moneymaker [281]

5. TVA, unpub., (1977)

III. USGS [390]

D. USEQ [395]	1947	DEC 27	19:00	TN-GA	Moderately Strong
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December 27: About 19:00. Tennessee and Georgia. Moderately strong shock felt in Missionary Ridge area. At Chattanooga, windows rattled, houses shook, and rumbling sounds were reported. Red Bank residents reported 2 tremors, windows and doors rattled, and venetian blinds were jarred. Houses also shook in Ooletewah, Collegedale, Cleveland, and Hixon. A resident in Sequatchie Valley reported 3 movements about one-half hour apart. Many inquiries were received by the Marion County sheriff. In Georgia, a concrete block house in Rossville was rocked for 1 minute, and at Fort Oglethorpe the disturbance was reported as distinct, lasting 2 or 3 seconds, and accompanied by a rumble like heavy thunder underground. Windows, doors, and a coal scuttle on a porch rattled. Toys fell to the floor.

IV. McClain [260] 1947 DEC 28 00:05 35.0 85.3 Southeast TN-Northwest GA 780 IV
Strongly felt in Missionary Ridge and Chattanooga are of Tennessee and Rossville, Georgia

A. Moneymaker [281]

B. USEQ [395]

V. Bollinger [33] 1947 DEC 27 19:00 35.0 85.3 TN-GA Border 780 IV

A. McClain [260]

B. Moneymaker [281]

C. USEQ [395]

VI. Moneymaker [281] 1947 DEC 27 7:05 p.m. Southern Appalachians IV

540

1947, December 27, 7:05 p.m., southern Appalachians (IV)

In the Chattanooga area, an initial light earthquake shock at 7:05 p.m. was followed immediately by a much stronger shock. The second shock affected an area of about 300 square miles in Tennessee and Georgia. It was felt at Chattanooga, Hixson, Cleveland, Red Bank, Ooltewah, Collingdale, and in the Sequatchie Valley, Tennessee, and at Rossville, Boynton, Oglethorpe, and Ringgold, Georgia. The disturbance was strongest east of Missionary Ridge, where it shook houses, rattled dishes and windows, and caused piano wires to pop. One observer in the Sequatchie Valley reported three shocks about one-half hour apart.

A. Moneymaker [283]

B. Seismo. notes [340] 1947 DEC 27 7:05 p.m. TN

Tennessee, December 27, 1947 - Residents of Chattanooga, Tennessee, and of Oglethorpe, Rossville, Ringgold, and Boynton, Georgia, felt an earthquake about 7:05 p.m. The shock was felt most sharply east of the Missionary Ridge fault, where it shook houses, rattled dishes and windows, and caused piano wires to pop. A rumbling noise was heard by some persons. Only one shock was felt by most, but one reported a slight shock followed by a much stronger one.

C. USEQ [395]

IX. Varma [400] 1947 DEC 27 35.0 85.3 Chattanooga, TN IV

A. USEQ [395]

I. TEIC 1948 FEB 10 00:04 36.4 84.0 Wells Springs, TN 1700 VI

Location: Wells Springs, TN; intensity; location

Intensity: "Mild damage" in Powell Valley between Lafollette and Wells Springs, TN; furniture shaken @ Eagan; one window broken in Elk Valley, TN; window panes broken @ Speedwell, TN; @ Wells Springs, TN, window panes were broken and screens shaken from windows

Extent: SE KY - TN border; map; 1700 sq. km.

II. TVA [380] 1948 FEB 10 00:04 36.4 84.0 Wells Springs, TN VI

A. USEQ [395]

B. Moneymaker [283]

1. Questionnaire Data

Tennessee

Arthur: Questionnaire not returned.

Caryville: "No one here claims to have heard anything on that date."

Chaska: Felt by very few. The earthquake was attended by a noise like "a slight muffled explosion."

"I was on duty at the Post Office which is located in a large two-story building. Just as I heard the noise the building shuddered slightly, but not enough to give it a second thought at the time because a heavily loaded train with two engines and just starting out close by has caused the same thing to happen. As there was no trains at the time tho I did wonder what caused it then in a few minutes the operator at the depot came down and ask me if I noticed it and said he was getting calls from Westbourne which is over a mountain not far from here and it seems they had felt a decided shock over there and thought perhaps a R.R. engine had exploded over here. Wherein we thought that perhaps there had been a mine explosion over there. I hardly knew how to describe this to you exactly but perhaps you may get the idea of the affect it had on us here from what I've told you." Lorena E. McNeil, Asst. P.M.

Clairfield: Felt by nearly everyone. Windows and doors rattled, but no seismic noise was heard. The Postmaster reported: "The people in this vicinity felt the earthquake and it happened about 7 p.m. My house shook - others stated it sounded like a door slammed."

Clouds: "We have not heard it mentioned here."

Cumberland Gap: Questionnaire not returned.

Duff: Felt by nearly everyone. Dishes and windows rattled. "Some reported rumbling noise. Some reported a noise which sounded like someone walked very heavy on their porch." "It was felt hardest near the gap of the Cumberland Mountains, known as Star Gap according to the reports. People there heard and felt it more so than the others."

Eagan: Felt by nearly everyone. Windows rattled. An explosive sound attended the shock. "Some miners thought there had been an explosion at the mines but did not come out. A person working in the store, a 3 story brick building, did not feel the quake on the second floor. However, at my residence, which is very close to the ground without a basement, the quake was felt very definitely shaking some of the furniture."

Elk Valley: Apparently not felt. "A window broke in my home. A window pane broke in my home on date given above. I didn't notice any other noise. It was just after dark. We heard the window break and when we investigated one pane had broken all the way through. No one else seemed to notice anything unusual." Della Douglas, P.M.

Goin: Not felt.

Harrogate: Not felt.

Jacksboro: Felt by a few. A loud rumbling noise attended the shock.

Lafollette: Felt and heard by most of the people. The disturbance was more strongly felt in Powell Valley between Lafollette and Well Springs, where there was mild damage in a small area.

Lone Mountain: Questionnaire not returned.

Maynardville: Not felt.

New Tazewell: Not felt.

Pioneer: Not felt.

Pruden: Felt. "Some people definitely are sure they felt a strange sensation, and others think they may have, but due to the fact that there is a strip mine operating in this vicinity, they ascribed the sensation to possible dynamiting charges set off by the strip mine operations."

"I was sitting in my living room at the time and felt a sensation and heard a noise which I thought to be a gas explosion in my furnace. Went down to the basement and finding the furnace door closed knew it couldn't be that and wondered what it was. We have a furnace which is fed by stoker and on a couple of occasions gas has accumulated and exploded with force enough to push open the furnace door. These explosions always created a disturbance upstairs like a mild tremor thru the house." Fred W. Butler, Postmaster, Pruden, Tenn.

Rogers Dock: Mr. J. C. Rogers, Operator, reported that the shock handled the dock rather roughly, and that it "shook his home some."

Sharps Chapel: The earthquake was felt in the Sharps Chapel vicinity by about half of the people. "On Feb. 9 my wife and I were in our kitchen listening to our radio when it occurred. It seems to us the house moved suddenly with a downward trend noticeable. I asked her if she noticed the impact. She said she did, so I got up and went out to see if the wind was blowing, thinking it was a sudden gush of wind, but everything was very still and no wind blowing. I asked all of my neighbors about it, and it seems about half of the people felt it as we did. The other half didn't know anything about it." Resp. H. Clay Stiner

Sharps Chapel: Frank Grizzell, Postmaster, reported as follows: "If a quake was felt here no one had mentioned anything of it and it isn't over 15 air line miles northwest of here."

Speedwell: Felt by nearly everyone. Dishes and windows rattled. An explosive sound was reported. The damage was "not bad." Window panes were broken, but "not very many." "The Speedwell, Tennessee, Post Office is located two miles east of Well Springs and the earthquake was more severe west of Well Springs." Mrs. Carrie E. Monday, P.M.

Tazewell: Felt by a few. Accompanied by a "slight rumble which sounded like thunder or explosion."

Tiprell: Not felt.

Valley Creek: Felt by few. Light. Windows rattled. The sound was described as "just a heavy quiver like dynamite blast, but not loud." "It was noticed very little by very few people. I did not notice it myself but a few people did." Henry E. Loveday

Wells Springs: Strongly felt. Window panes were broken and screens were shaken from windows between Wells Springs and Lafollette.

Westbourne: Postal Clerk, Sonya Gray, reported that the shock was felt by nearly everyone. Dishes and windows rattled, but there was no noise, and no damage.

KENTUCKY

Chenoo: Not felt.

Colmar: Not felt. "No report of any earthquake at or around this section." L. F. Gatliff, P.M.

Fonde: Not felt.

Frakes: Not felt.

Middlesboro: Not felt. "Can find no one who knows about this. C.H.A.

Wasioto: Not felt. "Made several inquiries and no one felt the earthquake in Wasioto, Kentucky." Emma Smith, P.M.

2. Press, (2/12, 2/19/48), Lafollette, TN

Many people who felt the earthquake and heard the rolling noise thought it was an explosion close at hand, such as the furnace in the basement, or an oil tank, or, perhaps, the slamming of a door.

It was reported that:

Windows rattled and some were broken

Screens fell out of windows

The shock rattled dishes.

People felt the earth "quiver and shake."

The earthquake was felt at Arthur and Westbourne, Tennessee, and Pruden, Kentucky.

C. Templeton [370]	1948	FEB 10	36.4	84.1	Lafollette, TN	V-VI
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1. Bollinger [33]

2. McClain, unpub., (1978)

3. McClain [260]

4. Moneymaker [281]

5. TVA, unpub., (1977)

III. USGS [390]

D. USEQ [395] 1948 FEB 9 19:00 Campbell Co., TN

February 9: 19:00. Campbell County, Tenn. Light tremor accompanied by a roar and a rumbling felt in Lafollette and as far south of the town as 12 miles. The St. Louis seismograph recorded the tremor.

1. St. Louis seismograph

IV. McClain [260] 1948 FEB 10 00:04 36.4 84.1 Lafollette, TN V-VI

A. USEQ [395]

B. Moneymaker [281]

V. Bollinger [33] 1948 FEB 9 19:07 36.4 84.1 Lafollette, TN V-VI

A. McClain [260]

B. Moneymaker [281]

VI. Moneymaker [281] 1948 FEB 9 7:04 p.m. Southern Appalachians V-VI

1948, February 9, 7:04 p.m., southern Appalachians (V-VI)

A very sharp local earthquake centered between Lafollette and Wells Springs, Tennessee, was felt over a four-county area. In the epicentral area, window panes were broken and screens were shaken from windows. Other localities within the affected area include Duff, Tazewell, Eagan, Valley Creek, Speedwell, Jacksboro, Sharps Chapel, Clairfield, Chasca, and Westbourne, Tennessee, and Pruden, Kentucky. A "rolling noise" accompanied the shock and caused some fear that there had been an explosion in a coal mine.

A. Moneymaker [290]

B. USEQ [395]

IX. Varma [400] 1948 FEB 9 36.4 84.1 Campbell Co., TN III-IV

A. USEQ [395]

I. TEIC 1949 SEP 17 09:30 36.8 83.0 Pennington Gap, VA 1700 IV

Location: Pennington Gap, VA; F/S reported; location

Intensity: @ Jonesville, VA; people awakened, report of a crack in a wall of a stone building; awakened some in Clinchport, VA

Extent: SW VA - SE KY; map; 1700 sq. km.

Comment: F/S @ Pennington Gap, VA

II. TVA [380] 1949 SEP 17 09:30 36.8 83.0 Pennington Gap, VA V

A. USEQ [395]

B. Bollinger [35] 1949 SEP 17 04:30 1800 IV

Duffield, VA - Felt. (MacCarthy, 1964);

Pennington Gap, VA - "An earth tremor shook the houses of scores of families at Station Creek Mountain, near here...but did no serious damage." One man said he heard a rumbling along with the tremor. Police believed it was an explosion in an abandoned coal mine, but there are no mines in the area. (RT 9/19/49) (RTD 9/19/49);

Weather bureau "received telephone calls all day from people who were 'shaken up' and who reported that buildings quivered, kitchen utensils and windows rattled in their homes. Scores of reports from over an 11-mile radius reaching from Station Creek Mountain to St. Charles related similar stories of an explosive sound and tremor." One man said he "was aroused and disturbed by the tremor, adding that he 'thought it was an explosion.'" Not felt at Lee County sheriff's office but several reports received from people who noticed the tremor. (BHC 9/8/49)

Station Creek, VA - Felt. (MacCarthy, 1964);

Stone Creek, VA - Felt. (MacCarthy, 1964).

EXTENT:

"Reported in an 11-mile area [sic] of extreme southwest Virginia." (RT 9/19/49);

Shook eastern portions of Lee County. (BHC 9/18/49);

"Greater than a dynamite blast, and lasting four times as long." (MacCarthy, 1964)

1. Times (9/19/49), Roanoke, VA
2. Times-Dispatch (9/19/49), Richmond, VA
3. Herald-Courier (9/18/49), Bristol, VA
4. MacCarthy [244]

C. Moneymaker [283]

1. Powell Valley News (9/22/49), Pennington Gap, VA

Earth Tremor Felt in Lee Saturday Morning - by J. M. Moseley

On the morning of Saturday, Sept. 17, at 2:30, while most people were asleep, there occurred a mild earth tremor, distinctly heard and felt in many places in Lee County. There was at first a rolling uplift from deep in the earth like the roll of a great tide, ending in a violent jerk which shook houses and rattled windows. The shock was brief, but very exciting to those who distinctly heard and felt the upheaval. The cause has not yet been ascertained. If there was no surface explosion, then it was evidently a heavy cavernous rockfall deep in the earth.

However, it was enough to bring to mind the subject of earthquakes. There are two classes of these disturbances, volcanic and tectonic. In the first, water reaching the heated interior of the earth through a break in the crust, usually causes a volcanic outburst. In the tectonic quake, the cause is the faulting or breaking of some portion of the earth's crust, ranging from a few feet to 100 feet, in the process of folding or mountain forming, or from undue weight of sediment on the ocean floor.

Every break in the earth's crust results in a quake of more or less intensity. The tectonic quake is more dangerous and destructive than the volcanic quake. It sends out its violent waves through the solid earth and extends its damaging vibrations farther, shaking down buildings and causing fires.

The geology of Southwest Virginia and adjoining territory indicates many rock faults occurring in passed ages, but such earth folding and faulting is not now in progress here, and not likely to occur. This whole section being a land of caves, there can be heavy rockfalls in deep underground caverns, which could cause a miniature earthquake.

In 1886, an earthquake occurred on our eastern shore, centered under or near Charleston, S.C. As a result of its violence, between 50 and 60 people lost their lives. The shock was distinctly heard and felt in Lee County. Several people here can recall the experience, which was not likely to be forgotten.

The most violent earthquake ever recorded was at Tokyo, Japan, in 1923. It caused the death of 150,000 people, and did property damage of more than four and one-half billions of dollars.

The parts of the earth now subject to violent seismic disturbances are the border regions of the Mediterranean Sea, and the Pacific Ocean, and Southern Asia, though they sometimes occur in unexpected quarters of the earth.

2. Precip. in Tn. River Basin

Earthquake in Pennington Gap Region - At 2:30 a.m. on September 17, 1949, an earthquake was experienced by a number of people in and near Pennington Gap, Virginia. The U.S. Weather Bureau observer, Mr. C. J. Lewis, reported that the trembling of the earth awakened a number of people there. He included a location map with his weekly report which showed other places where the disturbance was heard and felt. One was at St. Charles, Virginia, three miles north-northwest of Pennington Gap, another was at Pocket Powerhouse,

two miles north-northwest, a third was at Jonesville, seven miles south-southwest, and a fourth was in the Slayton Creek area about five miles south-southeast of the observer's home.

The Powell Valley News of Pennington Gap reported the tremor as follows:

"There was at first a rolling uplift from deep in the earth like the roll of a great tide, ending in a violent jerk which shook houses and rattled windows. The shock was brief, but very exciting to those who distinctly heard and felt the upheaval."

No damages were reported.

a. Weather Bureau Observer

b. Powell Valley News (date?), Pennington Gap, VA

3. Questionnaire Data

Virginia

Appalachia: Inquiry not returned.

Big Stone Gap: "No earthquake shocks were felt in this section. We did not carry the news item because too much of the news coming from Lee County and published in daily newspapers is unreliable." Carl B. Knight, Editor, The Post, Big Stone Gap, Virginia

Blackwater: Not felt.

Clinchport: Felt by very few. Windows rattled. The shock was attended by a rumbling thud. "Only reports noticed on September 17, approximately 2:30 a.m. People who made reports were awakened from their sleep." John F. Wolfenbarger, Postmaster

Duffield: Felt.

Ewing: Not reported felt.

Jonesville: The earthquake about 2:30 a.m. of September 17, was felt in Jonesville. About half of the people were awakened. Dishes and windows rattled. The shock was attended by a sound. "Some reported a low rumbling sound; some thought it was a blast of explosives in the distance. Only damage reported as a crack in the wall of a stone building on Main Street here." W. F. Cox, Postmaster.

Morton: Inquiry not returned.

Pennington Gap: A light shock was felt at 4:30 p.m. on September 16. A much heavier shock at 2:30 a.m. on September 17. "The U.S. Weather Observer, Mr. C. J. Lewis, reported that the trembling of the earth awakened a number of people there. He included a location map with his weekly report which showed other places where the disturbance was heard and felt. One was at St. Charles, Virginia, three miles north-northwest of Pennington Gap; another was at Pocket Powerhouse, two miles north-northwest; a third was at Jonesville, seven miles south-southwest, and a fourth was in Slayton Creek area, about five miles southeast of the observer's home."

Rose Hill: "Nothing here that I can find out." Nannie Lee Stickley, P.M.

St. Charles: Felt strongly.

Station Creek: Felt.

Stone Creek: Felt.

Stonega: Not Felt.

4. TVA Geologic SVC Progress Report
1949 SEP 16 & 17

Pennington Gap, VA

Earthquake Shocks

On Friday, September 16, at about 4:30 p.m. (EST) a very light earthquake shock was felt at Pennington Gap, Virginia. On Saturday, September 17, at about 2:30 a.m. a much stronger shock was felt over a sizeable area in southwest Virginia and southeast Kentucky.

An investigation by the Geologic Branch shows that the first shock (Friday, September 16, at 4:30 p.m.) was felt only in the Pennington Gap area. The second shock (Saturday, September 17, at 2:30 a.m.) was also centered at or near Pennington Gap, where many people were awakened from their sleep. It was felt very strongly at St. Charles and Jonesville, Virginia, and nearby points, and less strongly at Clinchport, Dot and Ewing, Virginia, and in Earlan County, Kentucky. The intensity of the first shock was II and that of the second shock was IV (Wood-Neumann scale). The first shock apparently was not accompanied by a noise, but the second was accompanied by a noise described variously as a "rumbling thud," "like an explosion" and "a low rumbling sound."

Dr. Ross R. Heinrich of the Department of Geophysics at St. Louis University reports that the second shock was recorded at St. Louis, Missouri from 02H-28M-33.5S to 02H-30M-19S, EST and at Floirssant at 02H-30M-37S EST.

a. Heinrich-St. Louis Seismograph

D. Templeton [370]	1949	SEP 16	36.7	83.0	Pennington Gap, VA	II-III
	1949	SEP 17	36.7	83.0	Pennington Gap, VA	IV-V

1. Bollinger [33]
2. McClain, unpub., (1978)
3. McClain [260]
4. Moneymaker [281]
5. TVA, unpub., (1977)

III. USGS [390]

D. USEQ [395]	1949	SEP 17	04:30		Lee Co., VA
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September 17: 04:30. Lee County, Va. Brief shock, but very exciting to those who distinctly heard and felt the upheaval. Houses shook and windows rattled. The disturbance was reported as "greater than dynamite and lasted about 4 times longer." Pennington Gap, St. Charles, Station Creek, Stone Creek, and Duffield residents reported the tremors.

IV. McClain [260]	1949	SEP 16	21:30	36.7	83.0	Near Pennington Gap, VA	II-III
	1949	SEP 17	09:30	36.7	83.0	Lee Co., VA	IV-V

Main shock, widely felt.

A. USEQ [395]

B. Moneymaker [281]

C. Bollinger [31] 1949 SEP 17 04:30 36.8 83.0 Lee Co., VA

1. USEQ [395]

2. MacCarthy [244]

V. Bollinger [33] 1949 SEP 16 16:30 36.8 83.0 Lee Co., VA II-III

1949 SEP 17 04:30 36.8 83.0 Lee Co., VA IV-V

A. Bollinger [31]

B. MacCarthy [244]

C. McClain [260]

D. Moneymaker [281]

E. USEQ [395]

VI. Moneymaker [281] 1949 SEP 16 4:30 p.m. Southern Appalachians II-III

1949, September 16, 4:30 p.m., southern Appalachians (II-III)

A light foreshock of the earthquake of September 17 rattled windows and was noticed by a few people in and around Pennington Gap, Virginia.

1949, September 17, 2:30 a.m., southern Appalachians (IV-V)

An earthquake centered near Pennington Gap, Virginia, affected a sizeable area in southwestern Virginia and Harlan County, Kentucky. Many sleepers were awakened at Pennington Gap. The shock was "strong" also at St. Charles, Jonesville, Stone Creek, Station Creek, Duffield, and nearby points, and somewhat less intense at Clinchport, Dot, and Ewing. "There was at first a rolling uplife from deep in the earth like the roll of a great tide, ending in a violent jerk which shook houses and rattled windows." The noise which accompanied the vibrations was described as "a rumbling thud."

A. Moneymaker [283]

B. USEQ [395]

VIII. MacCarthy [244]

1949 SEP 17 4:30 a.m.

Lee Co., VA

1949: September 17: 4:30 a.m. According to U.S.E. this was a brief but exciting shock felt in Lee County. One report described it as "greater than a dynamite blast, and lasting four times as long." It was reported from Pennington Gap, St. Charles, Station Creek, Stone Creek, and Duffield.

A. USEQ [395]

IX. Varma [400]

1949

SEP 17

36.8

83.0

Lee Co., VA

IV

A. USEQ [395]

I. TEIC 1950 JUN 19 04:19 35.5 84.0 Tapoco, NC 9700 V

Location: Tapoco, NC; intensity; location

Intensity: Jars and cans on shelves displaced @ Tapoco, NC; houses shook in Maryville and Knoxville, TN, many awakened

Extent: E TN, extreme W NC - N GA border area; map; 9700 sq. km.

II. TVA [380] 1950 JUN 19 04:19 35.5 84.0 Tapoco, NC IV

A. Moneymaker [283]

1. Journal (6/19/50), Knoxville, TN

Knoxville Journal for June 19, 1950

"Earth tremors rumbled through this area last night" at 11:15.

"The vibrations were felt from Knoxville to localities in North Carolina."

"Tremors were reported from all parts of Knoxville by excited residents."

"From Alcoa and Maryville and as far away as Tapoco, N.C., came reports of the tremor."

Newspapers, police stations and the Weather Bureau were flooded with telephone calls.

Many Knoxvilleians were awakened by the shock, which shook houses and rattled windows.

Individuals reported:

"We thought it was a truck but looked out and there was no truck."

"It felt just like the tremble one feels on a bridge when a truck rumbles past."

"Buildings trembled and windows were rattled."

In Maryville, a man felt "the rumbling and rolling."

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At Topside, near Fort Loudoun Lake, a lady "heard something like a slapping in the river, like a whale."

In West Knoxville, a lady felt the "whole house shake, rushed outside and all of the neighbors came out, talking about the same thing."

A man in Maryville said the shock was felt as far as 7 miles away. Telephone operators in Maryville felt the shock.

2. News-Sentinel (6/19/50), Knoxville, TN)

Tremor Shakes Homes in Area - Calls Pour in From Many Residents

Calls continued to pour in today from bewildered Knoxville area residents, who were disturbed shortly after 11 last night by a vibration that jarred homes briefly for miles around.

The radius of the tremor indicated it may have been a slight earthquake.

St. Louis University said a slight disturbance was indicated on the university seismograph at 11:22 last night but the shock was too faint to show where it came from.

The station at Loyola University at New Orleans told United Press it recorded no earthquake last night, but that a "tiny local tremor" could have occurred here and not been perceptible there.

Calls Come In

Dozens of calls reached The News-Sentinel today. Some samples:

A Bearden resident: "We thought the baby had fallen out of bed in the next room."

North Knoxville man: "Sounded like a heavy bundle fell off a table upstairs."

Oakwood resident: "Our house trembled definitely."

Lowe's Ferry Pike woman: "The windows shook heavily. We thought it was a big, distant explosion."

'Felt Like Furniture Falling'

Burlington resident: "We live in a duplex, and it felt like the neighbors' furniture was falling."

State Patrol office, Kingston Pike, said "it felt and sounded like a heavy truck going over a wooden bridge. The vibration was reported in Maryville and other nearby towns. No damage was reported.

Weather Bureau telephones jangled all night with inquiries, but earthquakes are not in the bureau's department.

'Heard Slight Rumble'

From as far as Sweetwater came tremor reports. "Our house shook for four or five minutes, and I could hear a slight rumble," said M. N. Lloyd of Sweetwater Valley News. "We also had a hard hail storm yesterday afternoon.

Some Fountain Citians were wondering if an apparent break in a water-main under North Broadway at Fountain City business center might have resulted from the tremor.

Nearby business firms said there was some seepage from the pavement seam earlier, but that today water was bubbling up briskly. Herman Witt, Knox County Water Co. superintendent, was having the main uncovered for examination of the break and repairs.

3. Oak Ridger (6/19/50), Oak Ridge, TN

The Oak Ridger for June 19, 1950

A few people in Oak Ridge felt the earthquake, but most people did not feel it.

Summary:

Felt at Alcoa
Knoxville
Maryville
Oak Ridge
Sweetwater
Tapoco

Recorded at St. Louis at 11:22 p.m. EST.

4. Precip. in Tn. River Bas.

1950 JUN 18 11:15

Western NC, east TN,
And north GA

555

Slight earth tremors were felt from Knoxville, Tennessee, south to Blue Ridge, Georgia, at about 11:15 p.m. on June 18. Reports of the tremors were received from Knoxville, Maryville, and Alcoa, Tennessee, Tapoco, Hayesville, Andrews, and Murphy, North Carolina, and Blue Ridge, Young Harris, Blairsville, and Hiwassee, Georgia. The St. Louis University seismograph recorded a slight disturbance at 11:22 p.m. on June 18. No damage resulted from the earthquake.

a. St. Louis Seismograph

B. USEQ [395]

C. Templeton [370] 1950 JUN 19 35.7 84.0 Alcoa, TN IV

Maximum intensity

1. Bollinger [33]

2. McClain, unpub., (1978)

3. McClain [260]

4. Moneymaker [281]

5. TVA, unpub., (1977)

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III. USGS [390]

D. USEQ [395] 1950 JUN 18 23:19 Alcoa, TN

June 18: 23:19. Alcoa, Tenn. Rapid trembling motion felt by many. Loose windows rattled. The tremor was felt in Knoxville, Marysville*, and as far west as Tapoco, N.C. At the last-named places reporters stated jars and cans on shelves were displaced.

IV. McClain [260] 1950 JUN 19 04:19 35.7 84.0 Alcoa, TN IV

Felt at Knoxville, Tn. and in N.C.

A. Moneymaker [281]

B. USEQ [395]

C. Seismo. notes [340] 1950 JUN 19 Knoxville, TN

Knoxville, Tennessee, June 19, 1950—A slight earthquake shook the Knoxville area on June 19. No damage or injuries were reported.

V. Bollinger [33] 1950 JUN 18 23:19 35.7 84.0 Alcoa, TN IV

A. McClain [260]

B. Moneymaker [281]

C. USEQ [395]

VI. Moneymaker [281] 1950 JUN 18 11:20 p.m. Southern Appalachians 16,800 IV

An area of about 6500 square miles in southeastern Tennessee, western North Carolina, and northern Georgia was affected by a light earthquake centered in the mountains of Blount County, Tennessee. The area of maximum intensity between Calderwood and Tapoco is near the geographical center of the affected area. At Tapoco, canned goods on shelves were dislocated. The shock was felt strongly at Alcoa, Maryville, and Knoxville, where many people were alarmed by the abrupt shaking of their homes. It was felt by many at Sweetwater and by a few at Oak Ridge. At Fountain City, the writer felt a light trembling motion and heard the rattling of window frames. Other localities reporting the shock include Andrews, Murphy, and Hayesville, North Carolina; and Blairsville, Blue Ridge, Hiwassee, and Young Harris, Georgia. A rumbling noise was heard over much of the area.

A. Moneymaker [283]

B. Seismo. notes [340]

C. USEQ [395]

VIII. McCarthy [241] 1950 JUN 18 23:19 Alcoa, TN

1950: June 18, 2319 hrs. Alcoa, Tenn. "Rapid trembling motion felt by many. Loose windows rattled. Was felt in Knoxville, Marysville, etc. in Tenn., and as far as Tapoco, N.C. In the last named place reporters stated jars and cans on shelves were displaced." (U.S.E. 1950). No mention found in available state papers.

A. USEQ [395]

IX. Varma [400] 1950 JUN 18 35.8 84.0 Alcoa, TN IV

A. USEQ [395]

I. TEIC 1952 FEB 6 16:12 33.5 86.8 Birmingham, AL IV

Location: Birmingham, AL; intensity

Intensity: Felt by many in Birmingham, AL, one slightly cracked wall reported

Extent: USEQ [395] reports affected 50 sq. mi - about 150 sq. km.

II. TVA [380] 1952 FEB 6 16:12 33.5 86.8 Birmingham, AL V-VI

A. USEQ [395]

III. USGS [390]

D. USEQ [395] 1952 FEB 6 10:12 Birmingham, AL IV

February 6: 10:12. Birmingham, Ala. IV. Felt by many and few alarmed. Affected area estimated 50 square miles. One slightly cracked wall reported.

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IV. McClain [260] 1952 FEB 6 16:12 33.5 86.8 Birmingham, AL IV

A. USEQ [395]

V. Bollinger [33] 1952 FEB 6 10:12 33.5 86.2 Birmingham, AL IV

A. USEQ [395]

B. McClain [260]

IX. Varma [400] 1952 FEB 6 33.5 86.8 Birmingham, AL IV

A. USEQ [395]

I. TEIC 1952 JUN 11 20:20 36.3 82.3 Johnson City, TN V

Location: Johnson City, TN; intensity

Intensity: Houses shook, dishes, doors and windows rattled, picture shaken from wall and plaster crumbled @ Johnson City, TN

II. TVA [380] 1952 JUN 11 20:20 36.3 82.4 Johnson City, TN VI

A. Moneymaker [283]

1. Press-Chronicle (6/12/52), Johnson City, Tn.

B. USEQ [395]

III. USGS [390]

D. USEQ [395] 1952 JUN 11 15:20 Johnson City, TN

Slight tremor felt by a few

IV. McClain [260] 1952 JUN 11 20:20 36.6 82.4 Johnson City, TN

A. USEQ [395]

V. Bollinger [33] 1952 JUN 11 15:20 36.4 82.4 Johnson City, TN

A. McClain [260]

B. Moneymaker [282] [no mention of this event found]

VI. Moneymaker [281] 1952 JUN 11 3:20 p.m. Southern Appalachians IV

1952: June 11 3:20 p.m. Southern Appalachians, (IV) A light tremor of several seconds duration was felt at Johnson City, Tennessee and vicinity. Houses shook, and dishes, doors and windows rattled. A picture was shaken from the wall and plaster crumbled in a building at East Tennessee State College. The tremor is not known to have been noticed outside of the Johnson City area.

- A. USEQ [395]
- B. Moneymaker [283]

I. TEIC 1953 NOV 10 14:53 36.0 83.9 Knoxville, TN 700 IV

Location: Knoxville, TN; intensity

Intensity: Windows rattled, houses shook @ Knoxville, TN

Extent: Localized area around Knoxville; 700 sq. km.

II. TVA [380] 1953 NOV 10 14:53 36.0 83.9 Knoxville, TN IV

A. Moneymaker [283] 1953 NOV 10 14:53:31 Knoxville, TN

1. News-Sentinel (11/10, 11/11, 11/12/53), Knoxville, TN

Knoxville News-Sentinel for November 11, 1953

A light earthquake was felt from "south Knoxville to Inskip".

Explosive sounds or "muffled blasts" were heard; "window panes rattled and the ground shook".

Reports of the tremor also came from Burlington.

The News-Sentinel and the U.S. Weather Bureau received several calls.

The Knoxville News-Sentinel for November 10, 1953

An observer reported that "the windows rattled and the whole house shook". "The grass (on a lawn) began to move."

The Knoxville News-Sentinel for November 12, 1953

Additional shocks were reported by a few, at "near noon" and "near midnight" on November 11, 1953.

2. Journal (11/11/53), Knoxville, TN

The Knoxville Journal for November 11, 1953

"The quake followed a narrow line from south Knoxville through Burlington in east Knoxville to Inskip. Residents in these sections reported a rumbling that accompanied the tremor."

B. USEQ [395]

III. USGS [390]

D. USEQ [395] 1953 NOV 10 About 10:00 Knoxville, TN IV

November 10: (about 10:00). Knoxville, Tenn. IV. Windows rattled and ground shook. Other reports from Burlington and Inskip.

IV. McClain [260] 1953 NOV 10 14:53 35.9 83.9 Knoxville, TN

A. USEQ [395]

B. Seismo. notes [340] 1953 NOV 10 9:53 a.m.
CST

Knoxville, Tennessee, November 10, 1953—Mr. B. C. Moneymaker, of the T.V.A., reports that a light earthquake was felt in Knoxville and suburban areas at 9:53 a.m., CST*. The shock was accompanied by a rumbling noise. Houses shook, and doors and windows rattled, for several seconds.

1. Moneymaker [personal communication?]

V. Bollinger [33] 1953 NOV 10 10:00 36.0 84.0 Knoxville, TN IV

A. McClain [260]

B. USEQ [395]

VI. Moneymaker [281] 1953 NOV 10 9:45 a.m. Southern Appalachians IV

A. Seismo. notes [340]

B. Moneymaker [283]

C. Moneymaker [280] 1953 NOV 10 9:53 a.m.
EST Knoxville, TN Light

1953 November 10 - 9h 53m EST Knoxville—A light earthquake was felt in all residential sections of Knoxville and the suburban areas at about 9:53 a.m. EST. Houses shook and windows rattled and many reported hearing "deep rumbling noise".

D. USEQ [395]

IX. Varma [400]

1953

NOV 10

36.0

83.9

Knoxville, TN

IV

A. USEQ [395]

- I. TEIC 1953 DEC 5 13:45 36.0 83.9 Knoxville, TN 660 IV
- Location: Knoxville, TN
- Intensity: Rattling of doors and windows in the Fountain City section of Knoxville, TN
- Extent: Very local - Knoxville, TN; 660 sq. km.
- II. TVA [380] 1953 DEC 5 13:45 36.0 83.9 Knoxville, TN IV
- A. Moneymaker [280] 1953 DEC 5 8:45 EST Knoxville, TN
- 1953 December 5 - 8h 45m EST Knoxville--A light but abrupt shock was felt in Knoxville and vicinity. It was especially noticeable in the Fountain City section, and was felt by nearly everyone at rest. There was a brief rattling of doors and windows but the disturbance was not accompanied by a noise.
- IV. McClain [260] 1953 DEC 5 13:45 35.9 83.9 Knoxville, TN
- A. Seismo. notes [340] 1953 DEC 5 8:45 a.m. CST
- 564
- Knoxville, Tennessee, December 5, 1953--Mr. B. C. Moneymaker, of the T.V.A., reports that a light but abrupt shock was felt in Knoxville and its suburbs at 8:45 a.m., C.S.T.* It attained its maximum intensity in Fountain City, where nearly everyone at rest noticed the jolting light shock and the rattling of windows. Many persons thought their houses had been struck by some object.
1. Moneymaker (personal comm.)
- V. Bollinger [33] 1953 DEC 5 08:45 36.0 84.0 Knoxville, TN
- A. McClain [260]
- B. Seismo. notes [340]
- VI. Moneymaker [281] 1953 DEC 5 8:45 a.m. Southern Appalachians III
- 1953 December 5 8:45 a.m. Southern Appalachians, (III) A light but abrupt shock was especially perceptible in the Fountain City section where it was noticed by nearly everyone at rest. There was a brief rattling of windows and doors, but no seismic sounds were reported.

- A. Moneymaker [280]
- B. Moneymaker [283]
- C. Seismo. notes [340]

I. TEIC 1954 JAN 1 01:30 37.2 83.2 Hazard, KY 350 IV

Location: Hazard, KY

Intensity: House shook in Woodland Park section of Hazard, KY, furnace switched on

Extent: Local - Hazard, KY; 350 sq. km.

Comment: Possible F/S to next event (JAN 2)

II. TVA [380] 1954 JAN 1 01:30 37.2 83.2 Hazard, KY IV

A. USEQ [395]

III. USGS [390]

D. USEQ [395] 1953 DEC 31 20:30 Woodland Park, KY IV

December 31: 20:30. Woodland Park, Ky. IV. Felt by several in Woodland Park. Report of house and chest shaking and furnace switching on. Also felt in Allais and Hazard.

IX. Varma [400] 1953 DEC 31 37.3 83.2 Hazard, KY IV

A. USEQ [395]

I. TEIC 1954 JAN 2 02:25 36.6 83.7 Middlesboro, KY 33,600 VI

Location: Middlesboro, KY; intensity

Intensity: Slight cracks to foundations, loose bricks dislodged @ Middlesboro, KY, tables slid across floors; small objects fell off shelves in Pikeville, KY; @ Harlan, KY; furniture moved

Extent: E TN - SE KY, SW NC; map; 33,600 sq. km.

Comment: Previous event (JAN 1) reported only from Hazard, KY, if a F/S, may indicate epicenter for this event although the distribution of intensities suggest otherwise

II. TVA [380] 1954 JAN 2 37.2 83.2 Hazard, KY VI-VII

A. USEQ [395]

B. Moneymaker [280] 1954 JAN 1 21:25 EST Eastern TN

1954 January 1 - 21h 25m EST Eastern Tennessee—One abrupt shock, followed by a few seconds of trembling motion then a second but much lighter shock, was felt over most of eastern Tennessee and adjacent portions of Kentucky, Virginia and North Carolina. The intensity seems to have been about the same at Knoxville and LaFollette, Tenn., and at Middlesboro and Harlan, Kentucky. Outside of the Knoxville to Harlan belt, the earthquake was felt by a great many people at several other localities, including Pikeville, Kentucky; Ewing, Jonesville and Gate City, Virginia; Asheville, North Carolina; Newport, Greeneville, Jefferson City, Morristown and Johnson City, Tennessee. It was felt by a few people at localities scattered over a wide area—from Kingston and Oak Ridge, Tennessee eastward to Shelby, North Carolina, and from Murphy, North Carolina northward to the Kentucky-West Virginia state line. The earthquake was light and its intensity is not known to have been more than 3+ (Wood-Neumann scale).

C. Moneymaker [283] 1954 JAN 1 Eastern TN

1. Questionnaire Data

TENNESSEE

Bristol: Not felt; not heard. "No record of any disturbance at Intermont Weather Substation in Bristol."

Ducktown: Not felt. "I have canvassed about 10 people. None felt the quake nor had any of these heard others mention it." O. Kingman

Erwin: "In so far as I have been able to find this earthquake was not felt at all in Erwin, Tennessee." R. R. Elliott, Postmaster

Catlinburg: Felt by very few. Windows rattled. One observer reported a noise "like a passing truck."

Was the earthquake felt in Catlinburg? Yes

If so, was it felt by: Very few

Did the earthquake make any noise? One man so reported

What did it sound like? Like a passing truck

Was any damage done? No

Were window panes broken? No

Other comments: I myself was startled by the rattling of our window frames. We live in an old house with wooden frames, well dried out during the heating season, and on alluvium of Roaring Fork Valley. The rattling resembled that which would be caused by an unusually heavy truck on the main road a block away, but it lasted many seconds longer than if it had been caused by a truck—enough longer so that I got up and felt the windows to see what was the matter. As the windows were closed, I did not hear sounds outside. Other people interviewed, who live in new houses with steel window frames, did not notice anything (e.g., Arthur Stupka, Park Naturalist) James Bell, with Bureau of Public Roads, had same experience as I did. In addition, he heard an outside noise. Also, one of his boys in bed upstairs felt a sideward motion of the quake. By Phillip B. King, U.S. Geological Survey

Harriman: Not felt. "Have talked to city carriers and rural carriers and they have not heard anyone say they felt this earthquake in this vicinity." (By the Harriman Postmaster)

Jacksboro: Felt by very few. According to U.B. Coker, Postmaster, no one reports any sound or noticed the rattling of loose objects.

Johnson City: Felt by very few. Dishes rattled. "A very faint trembling." Not felt at the Weather Bureau office at the airport, 15 miles from the city.

Kingston: Felt by very few. Dishes and windows rattled. A slight noise described as a "slight jar" was reported by H. F. Eblan, Acting Postmaster.

Lafollette: Felt in Lafollette by "over half, say 75 per cent", of the people. A few reported the rattling of dishes; some reported the rattling of windows. The earthquake was reported generally as "a distinct jar." About half of the people reported a noise, "reports vary from dull thud to sharp-like explosion". "The quake was distinct as heard by the writer and others, lasting about 10 seconds, with a tremor then a jar." Guy Easterly.

Lenoir City: Not felt.

Loudoun: Not felt.

Madisonville: Not felt.

Newport: Felt by very few. "Only a light tremor."

Oliver Springs: Not felt.

South Holston Dam: Not felt.

Tellico Plains: Not felt.

Watauga Dam: Lt. Hughes, TVA Public Safety Officer, reported that the earthquake was not felt at Watauga Dam by the operators and public safety officers on duty at the time.

GEORGIA

Blairsville: "The earthquake was not felt here." Charles W. Conley, Postmaster

Hiawassee: Mr. M. A. Burns, Postmaster at Hiawassee "contacted 50 people" and found no one who had felt the earthquake.

NORTH CAROLINA

Murphy: Felt by Mr. Joe Bailey as a very light jar. (II)

Shelby: Mr. William C. Overstreet reported "I felt the house shake mildly. The shock was just strong enough to be felt, to rattle a cup on a saucer, and to rattle a glass ash tray on my desk. I should say the shock and the resulting disturbance to the crockery occupied no more than two seconds. It felt as if the house had rocked gently on one wave. I immediately thought it was a mild quake."

Bryson City: Not felt. The Postmaster interviewed several people, but found no one who had felt the shock.

Burnsville: Not felt.

Fontana Dam: Not felt.

Hiwassee Dam: Not felt.

Hot Springs: Not felt.

Marshall: Felt by very few. Windows rattled. A "small rumble" was heard.

Robbinsville: Felt by very few. A "rumble" like "distant thunder" was heard, one observer reported. "I was awakened by the rumble and thought it to be thunder as was a low rumble--and did not know until the next day that it was possibly an earth tremble. No other member of my family heard the rumble." Postmaster, Robbinsville, N.C.

Sylva: Not felt.

Waynesville: "Only one person reported that he felt the earthquake, his bed rocked slightly for about two seconds at about the time of the quake. No one else contacted was aware of the earthquake. The local paper received no calls concerning it."

Asheville: Felt by several. (See clipping file)

KENTUCKY

Cumberland: Not felt.

Harlan: Felt by nearly everyone. Windows rattled slightly. The noise was like an explosion. (See clipping from the Harlan Daily Enterprise).

Jackson: Not felt.

Hazard: Felt by "a small proportion of the population." Windows rattled "and furniture vibrated". No seismic sounds were reported, but the objects affected sounded "like a freight train running through the house". "Some people called plumbers and reported that furnaces were blowing up. Some people reported that TV programs became distorted. One owner of a brick house, situated a few hundred feet from the river bed, reported a noise like the rushing of a huge amount of water". Charles Metcalf, News Director, WKIC, Hazard

Middlesboro: Felt by many. (See clipping file)

Jenkins: Not felt.

Paintsville: Not felt.

Pikeville: Felt by very few; no sound. "Yes, I felt it" Albert S. Stone, Weather Bureau Office, Pikeville, Ky.

Prestonburg: "To my knowledge, the earthquake was not felt in Prestonburg, Kentucky". Bess S. May, Postmaster

VIRGINIA

Ewing: Felt by nearly everyone. Dishes and windows rattled. There was a "sort of roaring just before jar. Like a heavy puff of wind". "Several people at first thought their furnace had blown up. Some who lived near the highway thought a truck had run off the road and hit the house. In fact, that was my first thought."

Gate City: Felt by very few. "It made a light tremble."

Jonesville: "Reported as felt by several people". Dishes, doors and windows rattled. "One or two reported hearing faint noises".

WEST VIRGINIA

Kermit: Not felt.

Logan: Not felt.

Williamson: Not felt.

2. Journal (1/2/54), Knoxville, TN

MYSTERIOUS EARTH TREMOR SHAKES EAST TENNESSEE AREA

Area Escapes Quake Reported Felt For 60 Miles; Residents Alarmed

An earth tremor which shook the East Tennessee area and as far north as Middlesboro, Ky., last night gave many residents a bad scare but apparently failed to result in any injuries or property damage.

The mild earthquake, felt about 9:30 p.m., caused a great deal of excitement in almost every surrounding county. Many persons feared an atomic explosion had occurred at nearby Oak Ridge but officials there said they knew nothing of the origin of the tremor.

Police stations, the Weather Bureau, radio stations and The Journal were swamped with calls from persons as far as 60 miles away who felt the tremor. Officials at the Weather Bureau said they too felt the jar but were at a loss to explain it.

A check with other areas was being made late last night in an effort to determine if the jar had been measured on a seismograph, an instrument used in recording movements of the earth. The Knoxville Weather Bureau does not have one of the delicate instruments.

The tremor, which was not felt at The Journal building, was generally described by callers as a "very rough jar." Several callers said they at first thought that their furnace had exploded. None of the callers heard a noise, however.

Similar reports came from Morristown and Greeneville. Radio station WNOX here received a report from Middlesboro, Ky., resident who said the tremor was felt sharply there and caused "pots to dance on the stove."

In Knoxville Miss Inez Franklin said she felt a "terrible jar and the house shook violently" when the tremor occurred.

E. H. Rochat said he was "nearly shaken out of bed."

Mrs. Charles Daves said she thought someone was "throwing something at the house."

The Journal answered more than 150 calls concerning the tremor in a 30 minute period. City policemen, county officers, and the Highway Patrol Office were also "swamped" with calls.

One caller, Mrs. W. R. Sanford, Seventh Avenue, Fountain City, reported that it shook her house "like a rocking chair" and said she felt two distinct tremors. J. F. Austin, newspaper publisher of New Tazewell, said the quake was reported on one side of the town and a few miles north but that it was not felt at the immediate vicinity where he lives.

HOMES SHAKEN

A Sevierville caller, James H. Atchley, owner of Atchley Funeral Home, said several homes there were shaken by the trembling earth.

A Knoxville resident, Lack Lannon of Apartment 714, Shelbourn Towers, said the chair in which he was seated watching television shook.

Mrs. Ray Atchley, of Albert Avenue, said she first thought a car had run into her home the "house shook so much." She said she ran outside to find that her neighbors had also felt the jar.

Calls were received from every section of Knoxville and Knox County. Almost every caller seemed to think the tremor had been caused by an explosion in their immediate neighborhood, the jar was so strong. Many callers said the windows in their homes were jarred.

Ed Harris, Journal Sports editor, said he was at home on Linden Avenue watching television when the tremor jarred his set from Channel Six to Channel Five.

Mrs. T. M. Carter of Van Gilder Place said it shook her house "awful" and a Mrs. Poe of North Hills Boulevard said the tremor came all through her home seeming to start at one side of the building and spread through the house.

Mrs. Cas Walker said the tremor was felt at her home in Fairmont section. Miss Mary Allen, police woman of East Fourth Avenue, said she also felt the quake.

Mrs. Mary H. Tomas, of West Clinch Avenue, said she was reading by a lamp which suddenly began to shake. She said she knew it was an "earthquake" since she had been in San Francisco, Calif., when quakes hit.

FELT LIKE EXPLOSION

Gordon Marks of West Knoxville said "I was sure my furnace had exploded.

Wendell Davis of Harbinsons Cross Roads said he thought the tremor lasted four or five seconds. J. M. Malone of Black Oak Ridge said he thought "Oak Ridge had exploded."

WINDOWS SHAKEN

"I was watching TV and thought my basement had fallen in," said Pete Monroe of 826 East Radford Place.

Mrs. M. B. McCloud of Oak Crest Drive said the jar "hit" her house at 9:26 p.m. shaking "every window in the house."

"It gave our house an awful jar," Mrs. J. S. Wilson of Route 2, Corryton said. She said the whole family ran from the house to see what was happening.

T. D. Baldwin of Old Sevierville Pike said he noticed the tremor at 9:25 at his house. He said "every window in the house shook."

Mrs. C. S. Roberts of Blaine Community in Grainger County said the jar was felt at her home. "We thought the furnace had blown up," she said.

MOORROER

Mrs. T. C. Wyatt of Lansing Avenue said she thought her "grandchildren were trying to scare me." She explained that she was lying across her bed when it "began jumping up and down." She thought the children had crawled under the bed, she said.

3. News-Sentinel (1/2/54), Knoxville, TN

"We live near the railroad and over the noise of the TV set we heard a rushing, rumbling sound and thought at first it was a freight train. But no train was passing. The noise came before the house began to shake from the tremor." (Corryton, Tennessee)

Middlesboro: The tremor was strong enough to make "the pots on the stove dance".

Asheville: The tremor was strong enough to shake houses. One person felt the davenport, on which he was sitting, move. Another reported seeing a "grandfather's clock" move.

Johnson City: The tremor was felt as the city "was jarred slightly." A tumbler "danced" on a dresser.

4. Press-Chronicle (1/2/54) Johnson City, TN

The earthquake was felt as a light shock. One person said the windows in her home "rattled ominously". The courthouse "shook noticeably".

5. Daily Enterprise (1/3/54), Harlan, KY

"Harlan County was included in the three state area which was jarred by a minor earth tremor Friday night about 9:30 p.m. No injuries or property damage were reported in the area, however." The shock was felt throughout the county.

Residents of Wallins (Kentucky) called the Safety engineer of a mining company, believing that there had been a coal mine explosion.

A man at Loyall thought a truck had struck his home.

Some residents at Harlan noticed a slight tremor; others were completely mystified when furniture and other house furnishings moved visibly.

6. Citizen Times (1/2, 1/3/54), Asheville, NC

Houses in Asheville shook slightly or seemed to slip sideways, but nothing was damaged.

Many people felt the shock, but it was so light that the most of them thought nothing of it until they read or heard reports of it.

Reported from Oakley and Fairview sections.

Houses began to shake or vibrate at 9:25 p.m. EST and continued for about five seconds.

Note: The earthquake was recorded instrumentally at St. Louis, Chapel Hill, N.C., and at the Fordham seismograph in New York.

7. Overstreet - personal correspondence

Your comment about the mild earthquake is the first that we have heard about it. Neither the Shelby nor the Charlotte papers carried any comments, or if they did it escaped our notice. I have asked several people in town if they noticed it, but those to whom I talked were unaware of it. Mac White has had the same reception to his questions about the quake. With that as background (that it appears to have passed unnoticed) I shall now state that I felt the shock. Circumstances as follows: At about the time you mention I was variously engaged in reading, smoking, eating fruit cake, and drinking coffee in my room in the west part of Shelby when I felt the house shake mildly. The shock was just strong enough to be felt, to rattle a cup on a saucer, and to rattle a glass ash tray on my desk. I should say the shock and resulting disturbance to the crockery occupied no more than two seconds. It felt as if the house had rocked gently on one wave. I immediately thought it was a mild quake, then dismissed the possibility and ascribed it to some local industrial explosion. The next day's papers had nothing about explosions or earthquakes, so I was without any record of other people experiencing the shock. I asked the people with whom I live if they had noticed the shock, but they had not noticed it. Their evening had been passed before the television set and had been undisturbed. Although I was sure I had felt a shock I explained it to myself as the result of heavy truck traffic on nearby U.S. Route 74A. I am ashamed to confess that I didn't have sense enough to check the time; it was in the middle of the evening about half-way between supper and repose. Supper at 7 PM; bed about 11:30-12:00M.

D. MacCarthy [241]

III. USGS [390]

B. EOHUS [121] 1954 JAN 1 21:25 36.6 83.7 Middlesboro, KY VI

Middlesboro, Ky. Slight damage and general alarm among people at Middlesboro. Felt area included parts of Tennessee, North Carolina, and Virginia.

C. EQUS [108] [same as B. above]

1. USEQ [395]

D. USEQ [395] 1954 JAN 1 21:25 Middlesboro, KY VI

January 1: 21:25*. Middlesboro, Ky. VI. Tremor centered near Middlesboro causing slight cracks to foundations and dislodging loose bricks and was felt in the bordering states of Kentucky, North Carolina, Tennessee, and Virginia. It was recorded by the Chapel Hill, N.C. seismograph. In Middlesboro, besides the slight damage, there was general alarm among the people, tables slid across the floors, and dishes, windows and small objects rattled. Intensity V was reported from Arjay, Capito, Harlan, Hazard, and Pikeville, Ky., where small objects fell off shelves and a flower vase was shaken off a television set. Also felt in Catrons Creek, Loyall, and Poor Fork. In Greenville, Harrogate, and Rutledge, Tenn., felt by all; awakened, and alarmed a few; rattled loose objects, some swinging from southwest to northeast; houses trembled.

INTENSITY I TO IV IN TENNESSEE: Bristol, Bullsgap, Greenville, Gatlinburg, Knoxville, Jacksboro, Johnson City, Kingston, Lafollette, Lee Valley, Luther, Luttrell, Maryville, Morristown, New Market, Newport, Sevierville, and Tazewell.

INTENSITY I TO IV IN NORTH CAROLINA: Asheville, Canton, Leicaster, Marshall, Montreat, Robinsville, Shelby, and Waynesville.

INTENSITY I TO IV IN VIRGINIA: Gate City, Ewing, and Jonesville.

IV. McClain [260] 1954 JAN 2 02:25 83.7 Middlesboro, KY VI

Felt in Ky., Tn., Va., and N.C.

A. USEQ [395]

B. EQHUS [121]

V. Bollinger [33] 1954 JAN 1 21:25 83.7 Middlesboro, KY VI

A. EQHUS [198]

B. USEQ [395]

C. McClain [260]

VI. Moneymaker [281] 1954 JAN 1 9:25 p.m. Southern Appalachians VI

1954 January 1 9:25 p.m. Southern Appalachians, (VI) One strong earthquake shock, followed by a few seconds of trembling motion, then a second but much lighter shock, was felt over an extensive four-state area in the southern Appalachians. Questionnaire information indicates that the earthquake was felt from Murphy, North Carolina northward to the Kentucky-West Virginia state line and from Kingston, Tennessee eastward to Asheville, North Carolina, and at isolated points as far away as Shelby, N.C., 60 miles east of the main felt area. At Middlesboro, Ky., near the epicenter, the earthquake attained its greatest intensity (VI). There was general alarm among the people as buildings were strongly shaken, tables were propelled across floors and dishes, doors, windows and loose objects rattled. Minor damage attributed to the shock consisted of small cracks in foundations and the fall of loose bricks. In southwestern Virginia, the shock was felt at Gate City, Ewing, and Jonesville at intensities of IV or less. In eastern Tennessee, it was felt quite generally north of a line drawn from Kingston to Gatlinburg, the intensity ranging from V downward. Relatively few people seemed to recognize the disturbance as an earthquake, most of them attributing it to the explosion of a furnace, something striking the house, or a nuclear explosion at Oak Ridge.

- A. EOHUS [121]
- B. MacCarthy [241]
- C. Moneymaker [280]
- D. USEQ [395]

VIII. MacCarthy [241] 1954 JAN 1 About 09:25 East TN
 1954: January 1, about 09:25 hrs. East Tennessee. A large area east and north of Knoxville, Tenn. was affected. In Asheville, N.C., houses were shaken, according to newspaper accounts. A professional geologist reports that he felt it in Shelby, N.C., the most eastern point from which a positive report was received. No damage anywhere. Was recorded by the seismograph in Chapel Hill at 09:26 hrs.

IX. Varma [400] 1954 JAN 1 36.6 83.7 Middlesboro, KY VI
 A. USEQ [395]

I. TEIC 1954 JAN 14 p.m. 36.0 83.9 Knoxville, TN IV

Location: Knoxville, TN

Intensity: Houses shook, windows rattled @ Knoxville, TN

II. TVA [380] 1954 JAN 14 p.m. 36.0 85.9 Knoxville, TN IV

A. Moneymaker [280] 1954 JAN 14 Early p.m. Knoxville, TN

1954 January 14 "early afternoon" Knoxville--From one to three shocks, accompanied by a noise resembling a distinct explosion, were felt through Knoxville and suburban areas.

B. Moneymaker [281]

VI. Moneymaker [281] 1954 JAN 14 Early p.m. Southern Appalachians III

1954 January 14 "early afternoon" Southern Appalachians, (III) One to three light shocks, accompanied by a noise resembling a distant explosion or distant thunder, were felt throughout the city of Knoxville and the suburban areas. Houses shook and windows rattled for a few seconds. Some observers believed the shocks were caused by a large blast in some other locality. The location of a blast releasing enough energy to shake the area involved could not long remain undiscovered.

A. Moneymaker [283]

B. Moneymaker [280]

I. TEIC 1954 JAN 23 01:00 35.3 84.5 Etowah, TN 450 IV

Location: Etowah, TN; intensity

Intensity: Broke a window @ Etowah, TN; rattled dishes, doors, windows in Etowah, Englewood and Athens, TN

Extent: Local - SE TN; map; 450 sq. km.

II.

TVA [380]

1954 JAN 23 01:00 35.3 84.5 Etowah, TN V

A. Moneymaker [283]

1954 JAN 22

McMinn Co., TN

1. News-Sentinel (1/23/54), Knoxville, TN

2. Journal (1/23/54), Knoxville, TN

3. News-Free Press (1/23/54), Chattanooga, TN

4. Questionnaire Data

Athens: Felt by about half of the population at "about 8:55 p.m." The earthquake was a continuing trembling motion; its duration was "about 10 seconds". Dishes, doors, and windows rattled. The sound was a "muffled rumbling". The chief of police reported: "We have had some exaggerated reports, but this was really a very light quake with little or no damage."

Etowah: Felt by nearly everyone at 8:30 p.m. as a continuing trembling motion "similar to thunder". Duration only a few seconds. A few reported the rattling of doors and windows. The noise was like "thunder or an explosion".

Englewood: Felt by only a few at "approximately 8:00 p.m." Duration about 30 seconds to one minute". Dishes rattled. The noise was like "distant thunder". The postmaster reported: "There seem to be several questions of whether it was an earthquake or not. Personally, I did not notice it. But there have been enough people who have told me of it to convince me that there was a slight earth disturbance in the Englewood area."

Niota: Not felt.

Riceville: The postmaster reported: "Have not seen anyone that felt it."

B. USEQ [490]

C. Moneymaker [280] 1954 JAN 22 20:00 EST

1954 January 22 - 20h 00m-20h 00m-20h 55m EST Etowah-Athens--A light shock was felt by a large percentage of the residents at Etowah, Athens, Inglewood, and some smaller McMinn County villages. The intensity of the shock was greatest at Etowah, where houses shook so "violently" that the residents thought they were being run through by motor vehicles.

III. USGS [390]

B. EQHUS [121] 1954 JAN 22 p.m. 35.4 84.4 Athens and Etowah, TN V

Window broken at Etowah and houses shook violently at Athens, Tn.

1. USEQ [395]

C. EQHUS [120] [same as B. above]

D. USEQ [395] 1954 JAN 22 p.m. Athens and Etowah, TN V

January 22: (night). Athens and Etowah, Tenn. V. In Etowah tremor broke a window, and at the fire house the floor shook and windows rattled. In Athens houses shook violently and felt like a train in the distance.

IV. McClain [260] 1954 JAN 22 35.3 84.4 Near Etowah and Athens, TN V

A. USEQ [395]

B. EQHUS [121]

V. Bollinger [33] 1954 JAN 22 p.m. 35.3 84.4 Athens-Etowah, TN V

A. McClain [260]

B. USEQ [395]

VI. Moneymaker [281] 1954 JAN 22 8:00 p.m. Southern Appalachians V

1954 January 22 8:00 p.m. Southern Appalachians, (V) An earthquake shock was felt over much of McMinn County, Tennessee. Houses shook and windows rattled at Athens, Englewood, Etowah and nearby localities. The shock was strongest at Etowah, where houses shook so "violently" that occupants thought they were being run through by motor vehicles. Many observers reported an attending noise described variously as "a muffled rumbling", "a roaring sound like that of a fast train" and "like distant thunder." A questionnaire survey indicated that there was no damage anywhere in the area.

A. EQHUS [121]

B. Moneymaker [283]

C. Moneymaker [280]

D. USEQ [395]

IX. Varma [400]

1954 JAN 22 35.4 84.6 Near Etowah, TN

V

A. USEQ [395]

- I. TEIC 1955 JAN 6 20:30 36.6 82.2 Bristol, TN IV
- Location: Bristol, TN; intensity
- Intensity: Houses shook @ Bristol, TN, felt by many
- Extent: Only reports from Bristol and Knoxville where it was felt by people on upper floors in tall buildings (long period effects); an ellipse drawn enclosing Bristol and Knoxville would include approximately 7100 sq. km.
- II. TVA [380] 1955 JAN 6 20:30 36.6 82.2 Bristol, TN IV
- A. Moneymaker [283]
- Several people in Bristol, Tennessee-Virginia, reported feeling the ground "suddenly shake" at about 3:30 p.m. EST. Reports
- III. USGS [390]
- D. USEQ [395] 1955 JAN 6 15:30 Bristol, TN-VA IV
- January 6: 15:30. Bristol, Tennessee-Virginia. IV. Felt by many. Houses shook. Felt by few on upper floors of tall buildings in Knoxville, Tenn. (may be two separate shocks).
- IV. McClain [260] 1955 JAN 6 20:30 36.6 82.2 Bristol, VA-TN IV
- Felt by a few on upper floor of tall buildings in Knoxville, Tn.
- A. Bollinger [31] 1955 JAN 6 15:30 36.6 82.2 VA-TN 4700 IV
1. USEQ [395]
2. MacCarthy [244]
- B. USEQ [395]
- V. Bollinger [33] 1955 JAN 6 15:30 36.6 82.2 VA-TN 4700 IV

- A. Bollinger [31]
- B. MacCarthy [244]
- C. USEQ [395]

VI. Moneymaker [281] 1955 JAN 6 3:30 p.m. Southern Appalachians IV

1955 January 6 3:30 p.m. Southern Appalachians, (IV) A light shock was felt in the Bristol area of Tennessee and Virginia where many persons felt the ground "suddenly shake." The vibrations were sufficiently strong to shake houses quite perceptibly and to occasion much excitement in the residential sections. A slight "bump" (II) was felt at the same time in Knoxville by people on the upper floors of tall buildings.

- A. MacCarthy [244]
- B. Moneymaker [283]
- C. USEQ [395]

VIII. MacCarthy [244] 1955 JAN 6 3:30 p.m. Bristol, TN-VA IV

1955: Jan. 6: 3:30 p.m. According to U.S.E. this shock, of intensity about IV, was felt by many at Bristol, Tennessee-Virginia. Was also reported as having been noticed by a few in upper floors of tall buildings in Knoxville, Tennessee.

- A. USEQ [395]
- IX. Varma [400] 1955 JAN 6 36.6 82.2 Bristol, TN IV
- A. USEQ [395]

I. TEIC 1955 JAN 12 17:25 35.8 84.0 Maryville, TN 300 IV

Location: Maryville, TN

Intensity: Felt by many @ Maryville and Bluegrass, TN, definite shaking

Extent: Local - E TN; map; 300 sq. km.

II. TVA [380] 1955 JAN 12 17:25 35.8 84.0 Maryville, TN IV

A. Moneymaker [283] 1955 JAN 12 12:25 a.m. EST Blount and Knox Cos., TN

A light earthquake was felt in sections of Blount and Knox counties at 12:25 a.m. EST. The shock was felt at Maryville and Alcoa, in Blount County, and in the Blue Grass area of Knox County.

An observer at Maryville reported feeling the tremor at 12:25 a.m., "I was lying in bed reading. I first thought it was my furnace backfiring."

Those who felt the earthquake described it as "strong with a definite rumbling, roaring and shaking."

B. USEQ [395]

III. USGS [390]

D. USEQ [395] 1955 JAN 12 12:25 Blount and Knox Cos., TN IV

January 12: 12:25. Blount and Knox counties, Tenn. IV. Felt by many at Maryville and Bluegrass. "I first thought it was my furnace backfiring."

IV. McClain [260] 1955 JAN 12 17:25 35.8 84.0 Blount and Knox cos., TN IV

Felt at Blue Grass and Maryville, TN.

A. USEQ [395]

V. Bollinger [33] 1955 JAN 12 12:25 36.0 84.0 Blount and Knox Cos., TN IV

A. McClain [260]

B. USEQ [395]

VI. Moneymaker [281] 1955 JAN 12 12:25 a.m. Southern Appalachians IV

1955 January 12 12:25 a.m. Southern Appalachians, (IV) A brief tremor in Blount and Knox counties, was felt at Maryville and Bluegrass. It was described by Maryville residents as "strong with a definite rumbling, roaring and shaking." Another observer reported "I first thought it was my furnace backfiring."

A. Moneymaker [283]

B. USEQ [395]

IX. Varma [400] 1955 JAN 12 35.8 84.0 Alcoa, TN IV

A. USEQ [395]

I. TEIC 1955 JAN 25 19:31 35.9 83.9 Rockford, TN 1800 V

Location: Rockford, TN; location

Intensity: Coffee pot "danced" right off stove and spilled, loose objects upset, chair shook, dishes and windows rattled

Extent: Knox and part of Blount Cos., E TN; map; 1800 sq. km.

II. TVA [380] 1955 JAN 25 19:31 35.9 83.9 Knoxville, TN IV

A. Moneymaker [283]

1955 JAN 25 2:31 p.m. EST Knoxville, TN

1. Questionnaire data

Knoxville: A light shock distinctly felt by people in the higher stories of buildings. Felt in all sections of Knoxville. The newspaper office, Fire Department, and Weather Bureau were "flooded" with calls.

One observer was awakened by the vibrations. "The windows rattled and there was a rumbling sound. Another reported a loud rumble. I thought the windows were going to fall out. Our TV set went off for a few minutes." Dishes and pans rattled. "It seemed like the vibration was coming from under the house. I thought maybe something was wrong with the furnace." One observer reported "I heard a distinct rumble - more or less like thunder underground."

The shock was felt by numerous TVA employees in the Union and Arnstein Buildings.

Fountain City: Felt. A low rumble was heard.

Inskip: Felt.

John Sevier: Felt; some called newspaper and Weather Bureau offices.

Alcoa: Felt; several called newspaper offices.

Rockford: Distinctly felt.

Maryville: Felt by many.

Washington Heights (N.W. of Knoxville): strongly felt. One observer reported "It almost shook my chair from under me. And my building is on a concrete foundation.

Oak Ridge: Not felt.

The shock was recorded at St. Louis at about 2:34 p.m.(EST) and "registered 3.8" - a "very small tremor." A second even lighter shock was registered at 3:48 p.m.(EST) but a spokesman at Seismograph Station stated "It was so small I doubt if anyone noticed it."

2. Journal (1/26/55), Knoxville, TN

A mild earthquake shook sections of Knox and Blount counties at 2:33 p.m. Reports came from practically every section of Knoxville and Knox County and from Rockford, Alcoa, and Maryville in Blount County.

One sleeper who was awakened by the vibrations, reported "the windows rattled and there was a rumbling sound." Another observer reported "a loud rumble" and said "I thought the windows were going to fall out. Our TV set went off for a few minutes."

Comments of other observers:

"My dishes and pans rattled and it seemed like the vibration was coming from under the house"

"There was a rumble like a truck going down the street, but there was (sic) no trucks on the road"

"I heard a distant rumble - more or less like thunder underground"

"It was the hardest shake I ever felt"

"It felt like an earthquake. There was a rumble and a blast and more rumbling"

3. News Sentinel (1/26/55), Knoxville, TN

A light earthquake "jolted" parts of Knox and Blount counties on January 25, "at 2:31 p.m." Houses all over Knoxville and the suburban areas shook. Downtown buildings and factories were jarred. Office workers in upper stories of some buildings reported feeling a distinct shock. The shock was felt also at Maryville and Rockford in Blount County.

The tremor was recorded at St. Louis at 3:48 (sic) p.m.

Various observers reported the shock as follows:

"Rattled venetian blinds like the wind"

"A coffee pot danced right off the stove and spilled on the floor"

"The shock sounded like an explosion"

"A rumbling noise"

"It almost shook my chair from under me, and my building's on a concrete foundation"

"Our two year old son was playing in the den. He felt the shake and came screaming through the house to me. He was really scared."

"Even the ground outside seemed to move"

A "television set went off for a few minutes"

A lady "became alarmed when the mirror she was using began to distort her reflection"

B. USEQ [395]

III. USGS [390]

D. USEQ [395] 1955 JAN 25 14:34 Knoxville, TN IV

January 25; 14:34. Knoxville, Tenn. IV. Felt by many in Knoxville. Houses vibrated; windows and dishes rattled. Faint to moderate rumbling sounds heard by many. Newspaper and radio stations were flooded with calls. Reports include: "I thought the windows were going to fall out. Our TV set went off for a few minutes," and "It seemed like the vibration was coming from under the house. I thought maybe something was wrong with the furnace." At Washington Heights (northwest of Knoxville) the shock was strongly felt. One observer reported, "It almost shook my chair from under me, and my building is on a concrete foundation." Also felt by many at Maryville, and at Alcoa, Fountain City, Inskip, John Sevier, and Rockford.

IV. McClain [260] 1955 JAN 25 19:34 83.9 Knoxville, TN IV

A. USEQ [395]

V. Bollinger [33] 1955 JAN 25 14:34 36.0 84.0 Knoxville, TN IV

A. McClain [260]

B. USEQ [395]

VI. Moneymaker [281] 1955 JAN 25 2:34 p.m. Southern Appalachians 1800 IV

1955 January 25 2:34 p.m. Southern Appalachians, (IV) An earthquake shock was felt over about 700 square miles in Blount and Knox counties, Tennessee. The shock centered near the southern limit of Knoxville, was perceptible throughout the metropolitan area, including Inskip, Fountain City, Washington Heights, John Sevier and Bearden. In Blount County, it was felt at Maryville, Alcoa and Rockford. Throughout the area, suspended objects were set to swinging, loose objects were upset, windows and venetian blinds rattled and television reception was interrupted. Observers in south Knoxville reported explosive sounds but elsewhere a "rumble like underground thunder" was reported.

A. Moneymaker [283]

B. USEQ [395]

IX. Varma [400] 1955 JAN 25 36.0 83.9 Knoxville, TN IV

A. USEQ [395]

I. TEIC

1955 SEP 28 07:02 36.6 81.3 Piney Creek, NC 3500 VI

Location: Piney Creek, NC; intensity; near center of affected area

Intensity: A few loose bricks thrown from a chimney; 2 plate glass windows broken @ Piney Creek, NC, where many were awakened; also awakened many in Independence, Mouth of Wilson, Rugby and Volney, VA

Extent: NW NC - VA border area; map; 3500 sq. km.

II. TVA [380]

1955 SEP 28 07:02 36.6 81.3 Piney Creek, NC VI

A. Best [20]

1955 SEP 28 07:01:42 36.6 81.4 Ashe Co., NC-Grayson Co., VA

B. McCarthy [240]

1955 SEP 28 07:02 36.6 81.3 IV-V

On September 28, 1955, the Wilson-Lamison vertical seismograph operated by the University of North Carolina at Chapel Hill (35°54'10" N., 79°03'02" W.) recorded a small earthquake. A small iP phase was recorded at 07h 01m 41.5s GCT, and a larger iS phase at 07h 02m 06s, giving an S - P interval of 24.5s, corresponding to an epicentral distance of approximately 200 km. (no local travel time tables for this area were available.) It was later learned that a small shock had been felt about this time at Helton and Grassy Creek, Ashe County, North Carolina. To further investigate this occurrence some sixty post card questionnaires were sent to communities in the general vicinity. Returns were obtained from 21 places indicating that the earthquake had been noticed, and from 22 places indicating that it had not.

The "felt" area included most of Alleghany and the northern portion of Ashe County in North Carolina, all of Grayson and portions of Smyth and of Wythe counties in Virginia. On the map this area is enclosed by a dashed line. Two communities which reported that a feeble tremor was felt were well outside the main area, and separated from it by "not felt" regions. These were Nebo, in northern Smyth County, Virginia (postmaster), and North Wilkesboro, in Wilkes County, North Carolina (clipping from the Galax, Virginia Gazette). It was felt as far north as Wytheville and as far east as Galax in Virginia and, omitting North Wilkesboro, as far south as Whitehead and as far west as Lansing, both in North Carolina.

The greatest disturbance seems to have been near the common corner of Ashe, Alleghany, and Grayson counties, at about 36.6 N., 81.3 W. Here the maximum intensity was about 4 - 4 1/2 on the Modified Mercalli Scale. No definite reports of real damage were received, although it was reported on hearsay evidence that two plate glass windows were cracked at Piney Creek, North Carolina, and that a few loose bricks were thrown from a chimney elsewhere. In the epicentral area some reports mentioned two separate shocks, about one minute apart, with the second the stronger of the two. The earthquake was accompanied (and in some cases preceded) by a rumbling noise which, in several cases, was said to have ended in a thunderous or explosive roar. Windows, doors, and dishes rattled, and people were generally awakened.

One woman in Piney Creek, North Carolina, writes that her house "seemed to go into the air for about one inch, with all the dishes rattling."

This epicenter is not far from that of the August 6, 1885 earthquake at about 36.2 N., 81.1 W. The 1897 shock seems to have been the strongest of the three, "Earthquake History" giving its intensity as 5 to 6 on the Rossi-Forrel scale, and lists it as affecting about 20,000 square miles. That of 1885 is similarly rated at an intensity of 4 to 5, Rossi-Forrel, with no area mentioned. Contemporary newspaper accounts mention only the towns of Boone, Banner Elk, and Blowing Rock as being within the affected area, so that it cannot have been very extensive. The September 28, 1955 earthquake, with an MM intensity of 4-4 1/2

Epicenters from "Earthquake History of the United States", 1947 edition, where the date of the 1885 earthquake should read August 13. and a felt area of at least 1700 square miles, is thus about as strong as, but affected a greater area than, that of 1885, but did not equal, either in intensity nor in area affected, that of 1897.

Several others of the rather numerous southern Appalachian earthquakes fall on, or very close to, a line drawn through these three epicenters. Among them are the following: 35.2 N., 82.7 W., 35.9 N., 82.1 W., July 8, 1926; 36.2 N., 81.6 W., August 6, 1885; 36.6 N., 81.3 W., September 28, 1955; 36.9 N., 81.1 W., October 21, 1897; 37 N., 81 W., February 13, 1899, and 37.1 N., 80.7 W., May 3, 1897.

These ten epicenters, defining as they do a line across North Carolina and western Virginia, may perhaps indicate a weak, but still active zone of minor faulting.

C. USEQ [395]

III. USGS [390]

B. EQHUS [121] 1955 SEP 28 02:02 VA - NC Border 4400 V

Virginia-North Carolina border. Felt over approximately 1,700 square miles including most of Alleghany and northern Ashe counties in North Carolina, all of Grayson and parts of Smyth and Wythe counties in Virginia. Many were awakened and frightened. Rumbling noise was reported.

1. USEQ [395]

C. EQHUS [120] [same as B. above]

D. USEQ [395] 1955 SEP 28 02:01:42 VA - NC Border 4400 V

September 28: 02:01:42*. Virginia-North Carolina border. V. Felt over approximately 1700 square miles including most of Allegheny and the northern portion of Ashe counties in North Carolina, all of Grayson and parts of Smyth and Wythe counties in Virginia.

Awakened and frightened nearly all at Elk Creek. Rumbling noise like an explosion. Windows and dishes rattled. Felt by, awakened, and frightened many in Piney Creek, N.C. Reports were received of houses shaking, windows and dishes rattling, and roaring noises. Two plate glass windows were reported cracked. Felt by and awakened many at Independence, Mouth of Wilson, Rugby, and Volney (many alarmed), Va., where houses shook.

IV. McClain [260]	1955	SEP 28	07:01:42	36.6	81.4	NC - VA Border Area	4400	V
A. EOHUS [121]								
B. USEQ [395]								
V. Bollinger [33]	1955	SEP 28	02:01:42	36.6	81.3	NC - VA Border	4400	IV-V

A. MacCarthy [240]

B. McClain [260]

VIII.(a) MacCarthy [241]

*1955: September 28, about 02:01 hrs. North Carolina-Virginia border. Epicenter near 36.6 N., 81.3 W., intensity 4-4 1/2, felt over about 1700 square miles. Reported from 21 communities in North Carolina and Virginia. Felt throughout most of Ashe and Alleghany counties. Two shocks, about one minute apart, accompanied by a rumbling noise. Houses creaked, windows and dishes rattled, some few persons awakened. Recorded on the seismograph at Chapel Hill at 02:02 hrs. Described in E. Notes 27 (1956), pp. 1-2.

A. MacCarthy [240]

VIII.(b) MacCarthy [244]

1955	SEP 28	2:01 a.m.			Southern Grayson Co., VA	4400	IV-V
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1955: Sept. 28: 2:01 a.m. According to MacCarthy (1956), it was IV-V in intensity and was felt over some 1,700 square miles of Smyth, Wythe, Carroll, and Grayson counties in Virginia and Ashe, Alleghany, Surry, and Wilkes counties in North Carolina, with the epicenter in southern Grayson County. Many were awakened; houses shook, windows and dishes rattled, and roaring sounds were heard. USE brief description. It was recorded by the seismograph in Chapel Hill, N.C.

A. MacCarthy [240]

B. USEQ [395]

IX. Varma [400]

A. USEQ [395]

1955

SEP 28

36.6

81.3

Grayson Co., VA

V

I. TEIC 1956 SEP 7 13:36 36.2 83.8 Maynardville, TN 30,000 VI

Location: Maynardville, TN; center of area reporting greatest intensity and A/S's

Intensity: Dishes, jars, groceries shaken from shelves @ Cumberland Gap, Knoxville, Lafollette, New Tazewell, and White Pines, TN; @ Knoxville, furniture moved, a window panel shattered, pictures fell, one chimney "thrown down", plaster shaken from wall (10th floor); windows shattered @ Tazewell, TN

Extent: NE TN, extreme W NC, SW VA and SE KY; map; 30,000 sq. km.

Comment: A/S felt over some 20,000 sq. km.

A. Dewey [95] 1956 SEP 7 13:35 36.4 83.8

13:35:50.8; 36.445, 83.787; 5.0R; 4.1F;
Depth restrained; magnitude from felt area

II. TVA [380] 1956 SEP 7 13:36 36.2 83.8 Maynardville, TN VI-VII

Second shock at 13:49

A. Best [20] 1956 SEP 7 13:36:01 35.5 84.0 Eastern TN
& 13:49

B. Moneymaker [283] 1956 SEP 7

The following data on the Eastern Tennessee Earthquake of September 7, 1956, were obtained from the following sources.

1. Questionnaire forms completed by the postmasters at 69 localities.
2. Numerous clippings from daily and weekly newspapers.
3. Interviews with people in numerous localities.
4. Letters from, and telephone conversations with, interested parties.

There were two shocks, the first occurring at 8:35 (plus) a.m. EST, and the second at 8:48 (plus) a.m. EST. The first shock was much stronger (maximum about VI, Wood-Neumann) and was felt over a somewhat larger area. The maximum intensity of the second shock was not more than III (Wood-Neumann).

The epicenters of the two shocks were not located definitely. On basis of the writer's information, the first shock seems to have been centered somewhere in the Norris Reservoir area, perhaps in the neighborhood of Lat. $36^{\circ} 20' N$, Long. $83^{\circ} 45' W$. The epicenter of the second shock might, or might not, have been in the same locality. It apparently was somewhere between Knoxville and Middlesboro and between LaFollette and Tazewell.

TENNESSEE

Alcoa: Both shocks were felt by nearly everyone indoors.

We're no authority on earthquakes but both of those tremors certainly felt like earthquakes" said a Weather Bureau spokesman at the airport near Alcoa.

"Numerous citizens called the Daily Times seeking information about 'an explosion or earthquake' that was felt as far south as the Blount-Loudon county line."

The Maryville-Alcoa Daily Times, September 7, 1956

Andersonville: Both shocks were felt by people indoors. A merchant reported feeling the first shock very strongly and thinking it was a dynamite blast. He was out of doors when the second shock occurred and did not feel it.

Arthur: Both shocks were felt by nearly everyone. Each shock was attended by a "low rumbling" noise. Windows and dishes rattled. There was no damage.

Bearden: The shocks were felt generally throughout this suburb of Knoxville. A housewife who called the Knoxville News Sentinel "said she was knocked off her feet".

Bristol: According to the press, neither shock was reported felt at Bristol.

Caldervood: The postmaster reported that the first shock was felt by "4 families out of 40"; the second shock was not felt. No noise; no damage. "Only an earth tremor".

Caryville: The first shock was felt by nearly everyone; the second shock by about half of the people. The first shock was attended by a noise like thunder. Dishes, doors and windows rattled. There was no damage.

Chilhowee Dam: The motion and sound, if any, were obscured by construction activities at the dam. At the nearby village of Chilhowee the disturbance was not noticed as the people are accustomed to vibrations and sounds from the blasting at the dam site.

Clinton: "Two earth tremors were felt in Clinton Friday and immediately people began checking to see if there had been an explosion. "The first, and heaviest, quake came at about 8:30 and the second followed at 8:50 a.m. Local residents at first believed that the county road department was blasting at the quarry. "In the Mt. View community, Mr. and Mrs. J. R. Humphrey had their house on jacks and they thought they were losing it when the quakes came. One man said the quake was so bad at his house he grabbed the refrigerator thinking it might turn over. "Most people said they thought at first the quake was 'a big truck passing' or a 'train being made up', but when the second tremor was felt, they became alarmed." The first shock was the stronger.

Clinton Courier News, September 13, 1956

Corryton: Both shocks were felt by everyone indoors. A housewife reported three shocks and said the "pictures on her walls rattled and shook'.

Knoxville News Sentinel, September 7, 1956

Crab Orchard: Not felt.

Cumberland Gap: The postmaster reported that the first shock was felt by nearly everyone "at approximately 8:36" a.m. EST. The second shock was felt by very few. A rumbling sound accompanied the first shock. Windows and doors rattled. "It was reported that dishes and jars were shaken from shelves on our rural route 1 which extends about 16 miles down Highway 63."

Dandridge: Both shocks were felt by about half of the people. The first shock was accompanied by a noise like an explosion. Dishes, doors and windows rattled but there was no damage. "Most people said they thought it was an explosion."

Ducktown: Apparently, neither shock was felt. "Have found no one who felt either of the shocks here. No notice at all."

Elizabethton: Neither shock was felt.

Elk Valley: Nearly everyone in Elk Valley felt both shocks. Both shocks were attended by a noise like "far off blasting". Windows and doors rattled, but there was no damage.

Erwin: The earthquake "was not felt in Erwin, Tennessee."

Etowah: Not felt: "The shocks were not felt in this area."

Friendsville: About half of the people felt both shocks. Both shocks were attended by a "light rumble". No damage but windows, doors and dishes rattled. Mr. C. K. McDowell, postmaster reported, "I did not

Jellico: About half of the people felt the first shock and very few felt the second. No damage. Windows rattled. (F. M. Bray, Postmaster)

Johnson City:

(1). "No one in our office reported feeling the shocks." R. H. Moneymaker

(2). A clerk in the John Sevier Hotel reported that the earthquake was not felt in Johnson City. A few people "felt it after they heard about it on radio and television and read about it in the paper the next day."

Jonesboro: Not felt. "I've asked everyone I've come in contact with the past three days about this and no one seems to have heard or felt any disturbance in this section. I know here in the P.O. everything was as usual." Charlene M. Reece, P.M.

Kingsport: Not felt.

Kingston: Mr. Bill W. Horney, Postmaster, reported that neither shock was felt.

Knoxville

(1). The first shock came on quite abruptly and was completely over in three or four seconds. I was sitting at my desk on the fifth floor of the Union Building and, to me, the shock felt as though the building was suddenly thrust upward by a gas explosion or a compressed air blast. I noticed only a vertical motion; I failed to perceive any horizontal components the motion might have had. The light fixtures did not swing. I did not hear any noises, seismic or non-seismic. Others in the building reported feeling horizontal motions and hearing a rumbling noise and the rattling of windows and loose objects. It was 8:35 a.m. (EST) when I looked at my watch. I appraised the intensity at IV-V (Wood-Neumann). At 8:48 a.m., there was a second shock, much lighter than the first, but lasting about twice as long. I noticed no rumbling sound or the rattling of loose objects, doors and windows, but others in the building did. (II-III). B.C.M.

(2). Two men in the Union Building were talking over the telephone with their wives, one in Fountain City and one in north Knoxville, when the second shock occurred. In each case, the wife remarked about the shock just before it was felt by the husband in the Union Building.

(3). Comments from the Knoxville News Sentinel, September 7, 1956. "We were sitting in the living room and our washing machine was going," said Claude Pitner, south Knoxville, Taylor Road, "The washing machine began to shake, then we felt the shock. It felt like a bomb had exploded." "I've got a solid brick house out here and it really shook," said Elmer White, Remoc Road, Fountain City. "Our house shook throughout and it seemed like it was going to fall down, so severe was the first shock," said Mrs. E. L. Haun, 1800 Cornell Avenue. "The second shock, quake or whatever it was, was mild. The first one shook open my china cabinet doors. There was a dead subdued sound, as if it were under the surface of the earth. I thought at first our water tank in the basement had exploded. I tried to call the police, but I couldn't reach them."

"One woman who lives on Woodrow Avenue in Fountain City told police the shock knocked a cup of coffee from her hand and rattled the dishes on her table.

"Our switchboard was shaken and our light fixtures were rattling in the U.T. Administration Building," said Mrs. Frank Nelson, U.T. board operator.

"W. B. Bruce, principal of South High School said.... 'It was a rough shock out here at South High.'

The 'whole stadium' at U.T. was rocked by the first shock.

"A small radiator in a bathroom on East Fifth Avenue was reportedly shaken out of place.

"Mrs. William R. Wilson, 4837 Chambliss Ave. reported that she and her neighbors distinctly felt three shocks, the first one coming some time before 8:37. It was a light shock."

(4). Comments from the Knoxville Journal, September 8, 1956.

"Downtown buildings were shaken up and many persons inside the structures raced into the streets to see what had happened. Some said they feared there had been a major explosion.

"In the law office of Jenkins and Jenkins, on the 10th floor of the Bank of Knoxville Building, plaster was shaken from the walls when the "tremendous jar" occurred. The office was crowded with people who jumped 'in amazement' at the jar."

La Follette: Both shocks were felt. "The first shock coming about 8:37, was much stronger than the second, which occurred some 13 minutes later."

"There was no reported damage locally, although residents from all over town and throughout the county reported feeling the disturbance. One La Follette grocery store reportedly had some canned food rattled off the shelves.

La Follette Press, September 13, 1956.

Lake City: The shocks were felt by nearly everyone. The first shock was quite "hard".

Lenoir City: Felt by very few people. "I checked with several people inside the city and also several outside the city. Only two or three said they felt the shock. They did not know which shock it was they felt, since they did not notice the time. I did not notice anything unusual here at the office. I would say the majority of the people did not know anything about it until they heard it on the radio or saw it in the afternoon paper." George L. Bowman, P.M.

Loudon: Neither shock was felt.

Luttrell: Both shocks were felt by nearly everyone. There was no damage. There was a sound like dynamite west of the town. Windows rattled.

Madisonville: Apparently, neither shock was felt. "So far as I can learn, no one in this vicinity noticed the shock."

Maryville: Both shocks felt. "The tremors came during the annual convocation service in Wilson Chapel at Maryville College. A spokesman from the college said the students could feel the earth movements while sitting in chapel, but the new building was not damaged."

Maryville-Alcoa Daily Times, September 7, 1956

Mascot: Both shocks felt. A Mascot service station operator said "the quake shook the service station good".

Knoxville Journal, September 8, 1956

Maynardville: Both shocks were felt by nearly everyone. "In buildings, it felt like something very heavy had hit them." Doors and windows rattled. "No noticeable noise outside of buildings."

(The Union County Times for September 13, 1956, gives a general account of the earthquake, but does not mention that it was felt in either Maynardville or Union County.)

Morristown: Both shocks reported felt. No details.

Mountain City: Not felt. "Have contacted several people in surrounding areas none heard or felt shocks. However, there is a major construction project with considerable heavy blasting to which most of us have become accustomed. There may have been an earth tremor which we thought was another blast." James G. Muse, Postmaster.

Newport: "I have heard of only one or two people saying they felt the shock. None saying they heard it. It was very light here."

New Tazewell: Both shocks felt by nearly everyone, the first being attended by a noise "like a distant explosion". Damage slight, and limited to dishes broken when shaken from shelves. "I was standing by a desk when the first shock was felt. I could feel the floor moving before any noise was heard. This was followed by the rattling of doors, windows and falling of things in the apartments overhead. A number of people checked to see if their furnaces had blown up. The second was somewhat less felt and heard." (Postmaster)

Norris: The shocks were felt by nearly everyone. The first shock was strong enough to cause some alarm.

Oak Ridge: The first shock was felt by nearly everyone; the second shock less distinct. There was a considerable amount of excitement but no damage. The first shock was much the stronger and many Oak Ridgers thought the disturbance stemmed from a passing truck, an overheated water heater, the "turning on of an old refrigerator," and similar occurrences. No damage was done, although dishes were jarred out of place in some instances.

Comments from the Oak Ridger

"Here in Oak Ridge one or both of the tremors were felt in various parts of the city.

"Mrs. Harry Pruden reported: 'I heard a roar with the first one and thought it was an explosion.'

"The single shock felt by Mrs. Richard Aiken was described as 'like an old refrigerator turning on, but magnified many times.'

"Rev. Frank Ladner said he felt a sharp jolt for about two seconds. Then for about two minutes the whole house seemed to shake and his best comparison was that it was a sensation sort of like the ripples made in the water when a stone is thrown in. His wife thought a large truck was passing on the turnpike near them, but could see no truck.

"Another lady noticed her water heater vibrating and 'thought it was overheated full of steam'. She turned the hot water spigots to let off the steam.

"The dishes in a china cabinet in the home of Mrs. Carl Weeks were shaken out of place, and the whole house vibrated for several moments.

"Another observer reported: 'There was a rumble and the whole house shook at 8:35 a.m.'"

Oliver Springs: Both shocks felt; duration about 45 seconds. "E. Cagley, who lives two miles out of Oliver Springs on Big Mountain Road toward Wartburg felt the tremor so strong it frightened him. The tremor, of about 45 seconds duration, shook the whole house, and even the bed. 'There was a loud rumbling noise,' Cagley said."

The Oak Ridger, September 7, 1956

Oneida: The shocks were reportedly not felt.

Pioneer: The first shock was felt by nearly everyone, but the second shock went unnoticed. Dishes and windows rattled.

Pumpkin Center: (Little Tennessee River 7 miles downstream from Chilhowee, at the intersection of U.S. Highway 129 and State Highway 72). The first shock was light and felt by a few people. It was noticed by a few ladies sitting in a frame building housing a grocery store.

Rockwood: Neither shock was felt.

Rogersville: The first shock was felt by very few; the second shock was not felt.

Rutledge

(1). About half of the people felt both shocks. Doors, dishes, and windows rattled, and there was a noise like "a blast at a distance".

(2). A hunter standing on a rock west of Rutledge reported "All of a sudden the rock was shaking and it seemed to last 55 seconds or a minute. I first thought it was an explosion at a quarry nearby. Then the second shock came a few minutes later and I knew it wasn't a blast."

Sevierville: A few people felt the first shock and noticed the rattling of windows. R. M. Murphy, Postmaster

Shady Valley: Neither shock was felt.

Sneedville

(1). "No one noticed either shock." Ross C. Hopkins, P.M.

(2). I interviewed several people in Sneedville and found no one who claimed to have felt the shocks, but I was reliably informed that a few people in town noticed the first shock. B.C.M.

(3). The Union County Times for September 13, 1956, mentions Sneedville as one of the places where the shocks were felt.

Speedwell: Questionnaire not returned. Reports from other sources indicate that both shocks were felt by nearly everyone. No damage was reported.

Strawberry Plains: Mrs. Ruth Thompson reported feeling "three distinct tremors" which rattled windows and pictures hanging on walls. "It shook the whole house" she said.

Sweetwater: "No reports of a tremor felt in this section." E. T. Browder, P.M.

Tazewell:

(1). Both shocks felt and heard by nearly everyone. "A low rumbling sound" followed each shock. "Most of the people thought their furnace had exploded or either a heavy truck was passing." Windows rattled but there was no damage.

(2). "People shopping in Tazewell between 8 and 9 o'clock Friday morning wondered whether Oak Ridge had been struck by an atomic bomb or a large blast of T.N.T. had been set off in this community. Women getting hair do's in the Beauty salons, filling station customers, one and all felt the double shock from the earth tremors or Earthquakes which rattled dishes, shattered windows and shook buildings over a wide area from Rockwood to Pineville, the Tazewells, Speedville and Middlesboro."

Union County Times, September 13, 1956

Thornhill: The first shock was felt by nearly everyone; the second shock by a few. The first shock was described as a hard jolt by a man who was in a grocery store at the time. He was out of doors at the time of the second shock, and did not feel it.

Townsend: Both shocks were felt, the first by about half of the people and the second by very few. Windows rattled, but there was no damage.

Wartburg: First shock felt by very few. "Just an undulating movement of the floor." Second shock not reported.

KENTUCKY

Barboursville: The first shock was felt by nearly everyone; the second by about half of the people. Doors, dishes and windows rattled. There was no damage.

Corbin: The first shock was felt by about half of the people, but the postmaster did not know whether anyone felt the second shock.

Harlan

(1). According to the Harlan Daily Enterprise, "the shocks apparently missed Harlan County".

(2). Neither of the shocks is known to have been felt at Harlan. "I have been unable to find anyone that felt or heard the earthquake of September 7, in southeastern Kentucky." L. C. Ray, Postmaster

Hazard: Not felt. "Talk to local people no shock or noise of any kind felt." (sic)

Jackson: Not felt. "There is a Government project being worked here and they have been doing a lot of blasting. Had there been a shock I guess we would not (sic) noticed it." Bess T. Turner, Clerk in Charge

London: Neither shock was felt at London.

Manchester: Not felt. "I haven't found anyone who felt the shocks. There apparently was no noise or damage either. The persons with whom I discussed this matter hadn't heard of any reports on the shocks." E. Lyttle, P.M.

Middlesboro: Two distinct tremors were felt. There were no reports of damage but people in the area were sufficiently alarmed to call newspaper offices, radio stations and the police department. Apparently there was no sound with the first shock, but some people reported a rumble with the second. A "grandfather's clock" which had not worked for some time was started by the shocks, and continued to run for several moments.

Pikeville: Neither shock felt.

Pineville: Both shocks felt by numerous people. There was no damage.

Tyner: "I have not heard anyone say they felt the quake in this area. It surely did not reach here or someone would have commented." Clyde W. Rice, Postmaster.

Whitesburg: "No one seems to have felt or heard of any quake."

Williamsburg: One shock was felt. "There was only one shock felt and the time wasn't noticed, so I am assuming that the first shock is the one that was felt since it was the stronger of the two. It was felt by approximately a small percentage of the people and these report that it shook buildings and rattled the windows. No damage has been reported."

VIRGINIA

Ewing: Both shocks were felt and heard by nearly everyone. Windows and doors rattled, but there was no damage. "I was away but I checked with a number of people and it was felt by everyone I talked to. My clerk and rural carrier said it rattled the windows in the Post Office. The Rural Carrier said it was felt at his home 3 miles west of Ewing. Stronger in town, according to his wife and son. It seemed to be pretty general in this vicinity." A rumbling noise attended both shocks. There was no damage.

Gate City: Neither shock was felt.

Jonesville: "No one seems to know of either being felt here." W. F. Cox, Postmaster

Pennington Gap: The shocks reportedly were not felt. (Middlesboro, Ky. Daily News)

Rose Hill: "None that I heard of" felt either shock.

WEST VIRGINIA

Williamson: Mr. Wallace J. Varney, Postmaster, reported that neither shock was felt.

NORTH CAROLINA

Andrews: "Two persons in Andrews stated that they felt a light shock." Joe E. Ray, Postmaster at Murphy

Asheville

(1). Asheville Citizen, September 8, 1956

Both shocks were felt. "A number of people reported feeling one or both shocks as dishes danced and furniture rattled in homes. The first tremor was felt at 8:37 a.m. and lasted about five seconds. A second shock followed 13 minutes later. "The sharpest shock here was reported by Mrs. Paul Swann of Johnston Blvd. who said the shaking knocked down too vases in her home. She said the house floor shook so severely that she took her small son and ran outside.

"Mrs. H. G. Brookshire of 239 Bear Creek Rd. said she felt the first shock while still in bed, and it felt as if 'some huge person' had picked up the bed and shaken it once or twice.

"At 62 Courtland Ave., Mrs. Rosa B. Raye and her daughter, Mrs. Henri Henderson, felt the house jar and a couch Mrs. Raye was sitting on was felt to move.

"In the south section, Mrs. Arthur Thomas of 15 Ridge Ave. in Biltmore reported a distinct shock that shook furniture.

"The tremors in general were unnoticed by most people in the area."

(2). Johnson City Press-Chronicle, September 8, 1956.

"The Asheville Weather Bureau and telephone companies received numerous calls. The callers wanted to know 'What's up?', 'What's going on?', and 'What's happening?'"

(The best information I was able to get indicated that although a great many people felt one or both of the shocks, the percentage of the total population feeling a shock was small—perhaps less than 5%).

Bakersville: Not felt.

Bryson City: "Only one person in Bryson City that I was able to discover thought she felt a shock. A lady who lives near the highway reported that the windows of her house rattled. Although she thought it was due to a large truck passing, she went to the front door and looked out, seeing nothing unusual. She is uncertain about exact time." James K. Curtis, TVA Hydraulic Data Branch.

Burnsville: Not felt.

Canton

(1). "The earthquake shocks were not felt here at all." C. W. Burrell, Acting Postmaster.

(2). "One student reports he felt it, and says it 'felt like the chair in which I was sitting had been struck a light blow.'" Dr. Gerald R. MacCarthy, University of North Carolina, Chapel Hill

Cherokee: "Local people contacted know nothing of this disturbance except what they read in the paper next day." P.M., Cherokee, North Carolina

Fontana Dam: One shock was felt and heard. A TVA Public Safety officer noticed the shaking of the observation building and the rattling of the window panes and called the powerhouse to inquire if anything unusual had happened. This was the first shock; the second shock was not reported.

Franklin

(1). Robert A. Laurence, Regional Geologist, U.S. Geological Survey, who was in downtown Franklin with several other geologists, reported that the earthquake was not felt in Franklin. He said they knew nothing about it until they saw an account of it in an Asheville newspaper.

(2). "Despite your notation 'not felt', the local paper carried a front-page story, including personal accounts by three people. One student also reported feeling it there. Windows rattled and there were noises like 'rolling on iron-tired wheelbarrow' or like 'the washing machine in the basement starting up'". Dr. Gerald R. MacCarthy, University of North Carolina, Chapel Hill

Hot Springs: The postmaster at Hot Springs reported: "No one felt this quake here."

Marshall: The shocks were not felt at Marshall.

Mars Hill: A few people felt a shock at 8:36 a.m. It was attended by a noise "like distant thunder". "A few people reported that they heard one series of distant rumbling. Most did not hear anything." A. W. Huff, Postmaster.

Murphy

- (1). Mr. Joe E. Ray, Postmaster, reported that the shocks were not felt in Murphy.
- (2). An employee of the TVA at Murphy reported that a few people felt a shock.

Robbinsville

- (1). Both shocks were felt "by very few" people. Dishes, doors and windows rattled, but there was no seismic noise. "Delmas Shular, Postmaster
- (2). Both shocks felt, the first by nearly everyone; the second by very few.

Spruce Pine: Not felt.

Sylva: Only one person reported feeling a shock.

Tapoco: Only one light shock noticed. "One store clerk in Old Field Gap, 2 miles from (Tapoco) P.O. reported that canned goods shook in shelves." The shock was accompanied by a noise "like low thunder toward Slick Rock". Another reported a noise like that "when furnace kicks on".

Topton: Not felt. "No one has said anything about hearing or feeling a shock here." P.M.

Waynesville

- (1). "If a shock was felt or heard by any person or persons it was not general known. The first generally knowledge of the shock was from news reports." Enos R. Boyd, P.M. Actg.
 - (2). One student reports that his brother who "was on a mountain a few miles out of town distinctly felt the shock". Dr. Gerald R. MacCarthy, University of North Carolina, Chapel Hill
- Weaverville: "I have not heard of anyone feeling it in Weaverville, North Carolina. I did read of it in the Asheville, newspaper that it had been reported in this area." Howell W. Ratcliff, Acting Postmaster

C. USEQ [395]

Middlesboro: Felt by all; many alarmed. Both shocks felt. Newspaper and police switchboards swamped with calls. Houses shook; doors, windows, venetian blinds, and dishes rattled. Disturbed objects observed by many. A grandfather's clock which had not worked for some time was started by the shocks, and continued to run for several moments. No sound accompanied the first shock, but some reported a slight rumble with the second.

Williamsburg: Felt by many; few alarmed. One shock felt. Buildings and windows shook; loose objects rattled.

INTENSITY V IN NORTH CAROLINA:

Asheville: Both shocks felt by many; few alarmed. Weather Bureau, radio station, and newspaper switchboards flooded with calls. Vases knocked to floor and broken. Houses shook; windows and dishes rattled. Disturbed objects observed by several.

Robbinsville: Both shocks felt. The first by nearly all; the second by few. Buildings creaked; loose objects rattled.

INTENSITY V IN TENNESSEE:

Alcoa: Felt by nearly all indoors; many alarmed. Newspaper office flooded with calls from people seeking information about an explosion or earthquake. Two shocks, the first the strongest.

Andersonville: First shock was felt by nearly all; second shock by several.

Arthur: Both shocks felt by nearly all. Windows and dishes rattled. Low rumbling noise heard during earthquake.

Bearden: Both shocks felt by nearly all. Housewife reported she was "knocked off her feet."

Caryville: First shock felt by nearly all; second shock felt by only half the population. Windows, doors, and dishes rattled. First shock accompanied by noise like thunder.

Clinton: Felt by many; alarmed few. Two shocks, the first the strongest. Buildings creaked; loose objects rattled. Many believed it to be an explosion.

Corryton: Felt by all; many alarmed. Pictures on walls rattled and shook. Buildings creaked; loose objects rattled.

Cumberland Gap: First shock felt by nearly all; second felt by several. Windows and doors rattled. On Highway 63 dishes and jars shaken from shelves.

Elk Valley: Both shocks felt by nearly all. Windows and doors rattled. Sounds like "far off blasting" heard.

Fountain City: Felt by and frightened many. Police station switchboard flooded with telephone calls. One observer reported the shock knocked a cup from her hand. People rushed out of the Huskey Trading Center fearing the building was about to fall. Windows and dishes rattled. Both shocks felt.

Jacksboro: Both shocks felt by nearly all. People rushed from homes and buildings. Buildings shook; windows and dishes rattled. It was reported that a man standing on the street felt the pavement come up under his feet. A deep low rumble accompanied the first shock.

La Follette: Both shocks felt by nearly all. Canned goods in grocery store shaken from shelves.

Lake City: Felt by nearly all. Both shocks felt. The first the strongest.

Luttrell: Both shocks felt by nearly all. Windows rattled. Sounded like "dynamite west of the town."

Mascot: Both shocks felt by all; few alarmed. Buildings creaked; loose objects rattled. Thunderous sounds heard at beginning of shock.

Maynardville: Both shocks felt by nearly all. Doors and windows rattled. Sensation like heavy objects striking building.

New Tazewell: Both shocks felt by nearly all. Dishes shaken from shelves and broken. Floor moved; doors and windows rattled. One observer reported sounds of "falling things in apartment overhead." Many thought their furnaces had blown up. First shock was accompanied by a noise like a distant explosion.

Norris: Both shocks felt by nearly all. The first was strong enough to cause some alarm.

Oak Ridge: Both shocks felt by nearly all; many alarmed. Dishes shaken from shelves and broken. The first shock was the strongest. Houses shook; windows and doors rattled.

Pioneer: Felt by nearly all. Dishes and windows rattled. One shock felt.

Speedwell: Both shocks felt by nearly all.

Tazewell: Both shocks felt by and alarmed many. Buildings shook; loose objects rattled. Disturbed objects observed by many. Many thought their furnaces had exploded. Low rumbling sounds heard following each shock.

Thorn Hill: First shock felt by nearly all; second shock by few. Described as a hard jolt.

White Pines: Felt by many. Two shocks. Groceries shaken from shelves. Disturbed objects observed by several. Buildings creaked; loose objects rattled.

INTENSITY V IN VIRGINIA:

Ewing: Both shocks felt and heard by nearly all. Windows and doors rattled. A rumbling noise accompanied both shocks.

INTENSITY IV IN KENTUCKY: Pineville

INTENSITY IV IN NORTH CAROLINA: Fontana Dam, Franklin, and Tapoco (Old Field Gap 2 miles from).

INTENSITY IV IN TENNESSEE: Burlington, Calderwood, Crossville, Dandridge, Friendsville, Gatlinburg, Greeneville, Huntsville, Jefferson City, Jellico, Lenoir City, Maryville, Mentor, Oliver Springs, Rockford, Rutledge, Sevierville, Strawberry Plains, Townsend, Wartburg, and Washburn.

INTENSITY I TO III IN NORTH CAROLINA: Andrews, Bryson City, Mars Hill, and Sylva.

INTENSITY I TO III IN TENNESSEE: Bristol (near Tri-City Airport), Morristown, Newport, Pumpkin Center, Rogersville, Seymour, and Sneedville.

INTENSITY I TO III IN VIRGINIA: Ewing (3 miles west of).

IV. McClain [260] 1956 SEP 7 13:36:01 35.5 84.0 Near Knoxville, TN 21,500 VI
& 13:49:20.0

Felt in Tn., Ky. and N.C.

A. USEQ [395]

B. EQHUS [121]

C. Seismo. notes [340] 1956 SEP 7 13:35:57 Knoxville, TN

Knoxville, Tennessee, September 7, 1956—Two light earthquakes rocked Knoxville and wide area of eastern Tennessee, southeastern Kentucky, and western North Carolina. There were no immediate reports of injuries or damage. The Survey reports an earthquake at 13 35 57YsH, G.C.T., centered in eastern Tennessee.

V. Bollinger [33] 1956 SEP 7 08:36 35.5 84.0 East TN: 21,500 VI
& 08:49

- A. EQHUS [120]
B. McClain [260]
C. USEQ [490]

VI. Moneymaker [281]	1956	SEP 7	8:36	Southern Appalachians	25,900	VI
			& 8:49 a.m.			

1956 September 7 8:36 and 8:49 a.m. Southern Appalachians, (VI) A moderately strong two-shock earthquake was felt over an area of about 10,000 square miles in Tennessee, Kentucky, Virginia and North Carolina. The first shock was the stronger and was felt over a larger area than the second. The main shock was felt rather generally from Corbin, Kentucky southward to Murphy and Franklin, N.C., and from Rogersville and Newport, Tennessee westward to Wartburg. Both shocks were felt in a small outlying area around Asheville, N.C. In the Knoxville area where the maximum intensity prevailed, considerable excitement followed the initial shock, and numerous telephone calls were made to inquire about the event. Two men in a Knoxville office building were discussing the first shock with their wives, who were at home several miles northward, one at Powell and the other at Halls Cross Roads. In both cases, the second shock was felt by the ladies, and heard, via telephone, by their husbands briefly before it was experienced in the Knoxville offices. This shock is thought to have been centered somewhere between Knoxville and Middlesboro. The results of the writer's questionnaire survey are given in U.S. Earthquakes 1956, pp. 9-10.

- A. Seismo. notes [340]
- B. USEQ [395]
- C. EQHUS [121]
- D. McCarthy [244]
- E. McCarthy [241]
- F. Moneymaker [283]

VIII.(a)	MacCarthy [244]	1956	SEP 7	8:36	35.5	84	Eastern TN	21,500
				& 8:49				

1956: Sept. 7: 8:36 and 8:49 a.m. Epicenter near 35.5 N., 84 W., in eastern Tennessee. About 8,300 square miles were shaken. In Virginia, was felt only in the extreme southwestern corner, with a maximum intensity of about V at Ewing, where both shocks were noticed. Windows and doors rattled. Both shocks were accompanied by rumbling noises. Was also felt in adjacent parts of North Carolina, Tennessee, and Kentucky (U.S.E.).

A. USEQ [395]

VIII.(b) MacCarthy [241]

1956 SEP 8 08:40 83.8
& 08:53 36.3

1956: September 7 about 08:40 and 08:53 hrs. Two mild shocks affecting eastern Tennessee, western North Carolina, and adjacent parts of Kentucky. Recorded on seismographs at St. Louis, Mo.; Columbia, S.C.; Columbia University, N.Y.; and at Chapel Hill, N.C. These shocks were felt in the following places in North Carolina, according to information collected by Moneymaker (Berlen C. Moneymaker, personal letter) and the writer: Asheville, Canton, Franklin, near Waynesville, Andrews, Bryson City, Fontana Dam, Mars Hill, Robbinsville, Sylva, Tapoco, etc. At the time of writing, the epicenter has not been instrumentally located, but Moneymaker (personal letter) places it near 36°20'N., 83°45'W., calling this an "approximate and tentative" location. The shocks were generally accompanied by rumbling noises. No damage seems to have been reported anywhere. Generally described in the State newspapers.

A. Moneymaker (personal communication)

IX. Varma [400]

1956 SEP 7 36.0 84.0 Near Knoxville, TN

VI

felt radius = 95 km.

A. USEQ [395]

- I. TEIC 1957 JAN 25 18:15 36.6 83.7 Middlesboro, KY IV
- Location: Middlesboro, KY
- Intensity: Shook house, woke at least one from a nap in Noetown, a suburb of Middlesboro, KY
- II. TVA [380] 1957 JAN 25 18:15 36.6 83.7 Middlesboro, KY IV
- A. USEQ [395]
- B. Moneymaker [281]
- III. USGS [390]
- D. USEQ [395] 1957 JAN 25 13:15 Noetown, KY
- January 25: 13:15. Noetown, Ky. Press reported a light earthquake felt generally over Noetown, a suburb of Middlesboro. The shock was not felt in Middlesboro proper.
1. Unspecified news account
- IV. McClain [260] 1957 JAN 25 18:15 36.6 83.7 Noetown, KY VI
- A suburb of Middlesboro, Ky.
- A. USEQ [395]
- V. Bollinger [33] 1957 JAN 25 13:15 36.6 83.7 Middlesboro, KY IV
- A. McClain [260]
- B. USEQ [395]
- VI. Moneymaker [281] 1957 JAN 25 1:15 p.m. Southern Appalachians IV

1957 January 25 1:15 p.m. Southern Appalachians, (IV) The Middlesboro (Kentucky) Daily News reported a sharp local shock at suburban Noetown. One observer reported that "It about shook the back end of the house off." Another reported that "the jar woke her from a nap." Some reported a mild movement, others a strong jar. The shock was attended by a sound resembling that of an explosion or that caused by the fall of a heavy object.

A. USEQ [395]

B. Moneymaker [283]

I. TEIC 1957 APR 23 09:24 33.5 86.8 Birmingham, AL 53,000 VI

Location: Birmingham, AL; intensity

Intensity: @ Birmingham, AL, minor damage to several chimneys, small cracks in walls, loose objects shaken to floor, many awakened; slight crack in plaster wall @ Hayden, AL; many awakened throughout the extent of the felt area from Pulaski, TN to Bremen, GA

Extent: NE AL, extreme W GA, just across AL-TN border; map; 53,000 sq. km.

A. Dewey [95] 1957 APR 23 09:24 33.8 86.7

09:23:39.0; 33.770, 86.723; 5.0R; 4.2F; depth restrained; magnitude from felt area

II. TVA [380] 1957 APR 23 09:24 33.5 86.8 Birmingham, AL VI

A. Moneymaker [283] 1957 APR 23 3:24 a.m. CST North AL

1. Precip. in Tn. River Basin

"A slight earthquake shook a wide area in north Alabama at about 3:24 a.m. on April 23. It was reported that the tremor was felt as far north as Pulaski, Tennessee, and in some parts of north Georgia. The quake woke thousands of light sleepers and caused lots of talk, but no damage was reported."

2. Questionnaire Data

Athens, Alabama

"Felt" by "several".

"I have contacted a few people who say they are sure they heard the quake. Dishes, windows, doors and objects on bedside tables rattling - No damage was done. Most of them say the time was between 3 and 4 o'clock in the morning."

D. Luther Yarbrough, P.M.

Belle Mina, Alabama

Apparently not felt as the postmaster reported only, "No. Not that I know of."

615

Elkmont, Alabama

(Questionnaire not returned).

Gurley, Alabama

"Yes, at approximately 3:15 a.m. Only one reported feeling tremor. Tremor enough to rattle windows." The postmaster reported that no seismic noise was heard.

Hazel Green, Alabama

Not felt.

Meridianville, Alabama

"No. Haven't heard anyone say anything about it here at Meridianville."

New Market, Alabama

Some observers at New Market reported a noise; others did not.

Plevna, Alabama

"Yes. Most people slept through; the few I have heard mention it--vary from room shaking to shaking with slight roar--I definitely felt it and thought someone was in my room."
Lucile W. Hereford, Postmaster

Elkton, Tennessee

"No."

Howard W. Taylor, P.M.

Elora, Tennessee

No one felt the earthquake or reported hearing a noise.

Fayetteville, Tennessee

Apparently not felt, as the postmaster returned the questionnaire marked "No".

Frankewing, Tennessee

Irene Nipp, Assistant to the Postmaster, reported that the earthquake was not felt at Frankewing.

Prospect, Tennessee

Mr. and Mrs. J. W. Jones reported hearing a noise made by the rattling of loose objects, but they did not feel a tremor.

Pulaski, Tennessee

Felt by a few. Very light.

Taft, Tennessee

Not felt.

B. PRESS REPORTS

Birmingham, Alabama

"The tremblor woke thousands of light sleepers who promptly swamped newspapers, police, and state patrol officers to inquire, 'What was it?'. No damage was reported." "The pressure instrument" at the Weather Bureau "jumped about for a few seconds" as "windows rattled and walls shook". Some observers reported that "a low rumbling sound preceded the shock. Coal miners underground felt the shock very strongly and thought it was a mine explosion. Several people at Birmingham reported that houses were strongly shaken.

Bessemer, Alabama

Reported felt in press accounts from Birmingham. No details were given.

Boaz, Alabama

Felt. Boaz is mentioned in several press accounts, but no details were given.

Clay, Alabama

The Pulaski, Tennessee, Citizen mentioned several localities at which the earthquake was felt, including Clay, Alabama. As this locality is not shown on any Alabama map, there is a chance that the Citizen is in error.

Cullman, Alabama

Several press accounts mentioned Cullman among other localities at which the earthquake was felt. No details were given.

Decatur, Alabama

A Decatur fireman reported that he felt the building quiver and that his chair bounced a little. Nurses on duty at the hospital felt the vibrations and heard the noise. Several others reported feeling the shock and hearing a noise like thunder.

Grant, Alabama

Felt. A few people were awakened.

Guntersville, Alabama

The shock was felt by many. "It scared lots of people," but there was no damage. It was felt generally over Marshall County. Many were awakened by the shaking of their houses, and some "thought it was another tornado".

Huntsville, Alabama

"Hundreds of Huntsville residents were awakened by a slight tremor early Tuesday morning, but no damage was reported." Captain John N. Sims, a Redstone Arsenal surgeon, said the tremor was fairly strong and lasted from 10 to 15 seconds. He said it shook his whole house. Numerous other people reported that the tremor shook their homes, and some feared there had been an explosion at Redstone Arsenal.

Jasper, Alabama

Several press accounts mentioned Jasper among localities at which the earthquake was felt.

Oxford, Alabama

The shock was reported felt at Oxford.

Breman, Georgia

Felt. No further details

Forkville, Georgia

The earthquake was felt at this Coweta County locality.

Madras, Georgia (Coweta county)

Felt.

Newman, Georgia

Felt by several, but no damage was reported.

Raymond, Georgia (Coweta County)

Felt.

Rome, Georgia

"Several people were awakened when they felt houses tremble and some reported household items shaking."

Rose, Georgia (Coweta County)

Felt.

Pulaski, Tennessee

A light shaking and the rattling of loose objects were reported by a few people.

B. USEQ [395]

C. Best [20] 1957 APR 23 09:23:39 34.5 86.7 Northern AL

III. USGS [390]

B. EQHUS [121] 1957 APR 23 04:24 34.5 86.8 North AL 29,800 VI

Northern Alabama. Felt over 11,500 square miles of Alabama and Georgia. Slight damage to chimneys, cement and walls reported at Birmingham. At Newnan, Ga., many were awakened and alarmed. Thunderous earth sounds were heard in several places.

1. USEQ [395]

C. EQHUS [120] [same as B. above]

D. USEQ [395] 1957 APR 23 04:23:39 34.5 86.8 Northern AL 29,800 VI

April 23: 04:23:39*. Epicenter 34-1/2° north, 86-3/4° west, northern Alabama, W. Felt over an area of approximately 11,500 square miles of Alabama and Georgia. (See map, p. 11.) Maximum intensity (damage) VI at Birmingham.

INTENSITY (DAMAGE) VI IN ALABAMA:

Birmingham: Felt by, awakened, and alarmed many. Minor damage to several chimneys; one report of cement steps cracked in two; and several small cracks in walls. Table-top items tumbled to the floor. Telephone calls jammed switchboards at newspaper offices, police and fire stations, and the U.S. Weather Bureau. In a mine 2 miles underground an observer said "It was like something taking hold of you, shaking you hard. It seemed like a mine explosion. The air reversed itself like a rock fall or explosion."

INTENSITY (DAMAGE) V IN ALABAMA:

Bessemer: Felt by and awakened nearly all; many alarmed. Police switchboards swamped with calls from frightened residents. Buildings shook; loose objects rattled.

Bremen: Felt by nearly all; many awakened. "From the talk in general, it had the effect of a barrel or something rolling across the house." Buildings creaked; loose objects rattled. Thunderous rolling sounds heard.

Cullman: Felt by and awakened many. Creaking of buildings and rattling of loose objects heard by many.

Fultondale: Felt by, awakened, and alarmed many. Buildings creaked; loose objects rattled. Thunderous sounds heard by many.

Guntersville: Felt by, awakened, and frightened many. Houses shook. Some people thought it was a tornado.

Hayden: Felt by and awakened several. Slight crack in plaster wall of one building. Disturbed objects observed by several. Buildings creaked; loose objects rattled. Subterranean (rattling, roaring) sounds heard at beginning of earthquake.

Huntsville: Felt by and awakened many. Police switchboards swamped with calls from alarmed residents. Many feared there had been an explosion at Redstone Arsenal. Houses shook. Trembling motion.

Jasper: Felt by, awakened, and alarmed many. Buildings creaked; loose objects rattled. Police switchboards swamped with calls from frightened residents.

Scottsboro: Felt by and alarmed many. Houses shook; people ran into the streets.

INTENSITY (DAMAGE) V IN GEORGIA:

Newman: Felt by, awakened, and alarmed many. Venetian blinds and pictures swayed. Buildings creaked; loose objects rattled. Disturbed objects observed by several.

INTENSITY (DAMAGE) IV IN ALABAMA: Alexander City, Ashville, Athens, Blountsville, Boaz, Clay, Columbiana, Decatur, Double Springs, Gadsden, Gorgas, Grant, Graham, Gurley, Haleyville, Homewood, Hopewell (8 miles east of Heflin), Irondale, LaFayette, Mountain Brook, New Market, Oneonta, Oxford, Pell City, Pinson, Plevna, Roanoke, Sayre, and Tarrant.

INTENSITY (DAMAGE) IV IN GEORGIA: Buchanan, Dallas, Franklin, LaGrange, Rome, and Whitesburg.

INTENSITY (DAMAGE) I TO III IN ALABAMA: Anderson, Ashland, Fairfield, and Lanett.

INTENSITY (DAMAGE) I TO III IN GEORGIA: Forkville, Madras, Raymond, Rosco, and Rose.

IV. McClain [260]	1957	APR 23	09:23:	34.5	86.8	North AL	29,800	VI
					39.0			

Felt also in Ga.

A. EQHUS [121]

B. USEQ [395]

C. Seismo. notes [340]

Northern Alabama, April 23, 1957, 09:23:39 , GCT, 34-1/2°N, 86-3/4°W; felt in Alabama and Georgia (USGS).

1. USGS?

V. Bollinger [33] 1957 APR 23 04:24* 34.5 86.8 North AL 29,800 VI

A. EQHUS [120]

B. USEQ [395]

VI. Moneymaker [281] 1957 APR 23 3:24 a.m. Northern AL 28,500 VI

1957 April 23 3:24 a.m. Northern Alabama, (VI) This earthquake, centered in Morgan County, Alabama east of Decatur, was noticed over an area of more than 11,000 square miles in Alabama, Georgia, and Tennessee. The area affected was highly irregular in outline, extending from Newman, Georgia, to Muscle Shoals, Alabama, and from Bessemer, Alabama northward to Pulaski, Tennessee. In Tennessee, the shock was light (I-III) and was heard rather than felt. At Pulaski and Prospect, sleepers were awakened by the rattling of windows and loose objects but did not feel the vibrations. Across the state line in Alabama the shock was strong enough to awaken and frighten many at Guntersville, Huntsville, and Scottsboro and strong enough to be felt by many at Athens, Decatur, Grant, Gurley, and other localities in the Tennessee Valley. In the Birmingham area, miners two miles underground felt the shaking strongly and thought there had been a mine explosion. The effects of the earthquake are summarized by one investigator who stated that over the three-state area "the quake woke thousands of light sleepers and caused lots of talk, but no damage was reported."

A. Seismo. notes [340]

B. USEQ [395]

C. EQHUS [121]

D. Moneymaker [283]

IX. Varma [400] 1957 APR 23 33.5 86.8 Birmingham, AL VI

Felt radius = 98 km.

A. USEQ [395]

B. USCGS [??]

6 2 2

X. Docekal [100] 1957 APR 23 04:24 34.5 86.75 Northern AL 29,800 VI

A moderately strong shock in northern Alabama awakened many persons and did minor damage to walls and chimneys at Birmingham where the highest intensities were reported.

- A. USEQ [395]
- B. EQUUS [121]
- C. Seismo. notes [340]
- D. USGS [??]

I. TEIC 1957 MAY 13 14:25 35.8 82.0 Sevier, NC 20,500 VI

Location: Sevier, NC; intensity; location

Intensity: Plaster cracked @ Micaville and Nebo, NC; loose objects shaken from shelves @ Sevier, NC; near Woodlawn, NC, books fell from school library shelves; small cracks appeared in plaster @ Boiling Springs, NC

Extent: Western NC, extreme NW SC; map; 20,500 sq. km.

A. Dewey [95] 1957 MAY 13 14:25 35.8 82.1

14:24:51.1; 35.799, 82.142; 5.0R; 4.1F;

Depth restrained; magnitude from felt area

II. TVA [380] 1957 MAY 13 14:25 35.8 82.0 Sevier, NC VI

A. Moneymaker [283] 1957 MAY 13

1. Knoxville News-Sentinel (5/14/57), Knoxville, TN

EARTHQUAKE SHAKES WESTERN N.C. AREA

Asheville, N.C. May 14--An earthquake "big enough to scare people but not big enough to do any damage" shook up 10 western North Carolina counties yesterday.

Dr. Gerald R. McCarthy, professor of geology and geophysics at University of North Carolina, dubbed the quake just a scarer after checking the university seismograph.

The tremors were recorded at 9:25 a.m. about 175 to 200 miles from Chapel Hill, he said.

The quakes, rated as mild, lasted about five seconds.

Police and newspaper switchboards jammed up immediately as hundreds of people telephoned to find out what was happening.

Housewives reported that window panes rattled, chinaware bounced on the shelves and, in one case, plaster cracked on the walls. Some callers reported a rumbling sound.

Calls were recorded from Morganton area in Burke County, Shelby in Rutherford County, Rhodiss and Hickory in Catawba County and Linville Falls in Avery County. Rutherford, Lincoln, Madison, McDowell, Buncombe and Henderson County residents reported a slight shake.

2. Press-Chronicle (),

Mild 'Quake Shakes Areas of Carolina

ASHEVILLE, N.C., May 13 (AP)—An earthquake big "enough to scare people but not enough to do any damage" shook up 10 western North Carolina counties this morning.

Dr. Gerald R. MacCarthy, professor of geology and geophysics at the University of North Carolina, dubbed the quake just a scarer after checking the university seismograph.

The tremors were recorded at 9:25 a.m. about 175 to 200 miles from Chapel Hill, he said.

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Police and newspaper switchboards jammed up immediately as hundreds of people telephoned to find out what was happening. Housewives reported that window panes rattled, chinaware bounced on the shelves and, in one case, plaster cracked on the walls. Some callers reported a rumbling sound.

Calls were recorded from the Morganton area in Burke County, Shelby in Rutherford County, Rhodiss and Hickory in Catawba County and Linville Falls in Avery County. Rutherford, Lincoln, Madison, McDowell, Buncome, and Henderson County residents reported a slight shake.

3. Journal (5/14/57), Knoxville, TN

Mild Earthquake Hits Western North Carolina

HICKORY, N.C., May 13 (AP)—A slight earthquake today shook houses, rattled glassware and frightened residents of more than half a dozen western North Carolina counties.

Dr. Gerald R. MacCarthy, professor of geology and geophysics at University of North Carolina, said the university seismograph had recorded an earthquake at 9:25 a.m.

The quake was 160 to 175 miles from Chapel Hill, Dr. MacCarthy said.

"I guess it was enough to scare people but not enough to do any damage," he said.

Housewives in half a dozen counties reported that windows shook, chinaware danced on shelves and, in some instances, there was a rumbling sound.

4. Courier-Journal (5/14/57),

Quake Shakes Western Carolina

Hickory, N.C., May 13 (AP)—A slight earthquake today shook houses, rattled glassware, and frightened residents of more than half a dozen western North Carolina counties.

5. Herald Courier (5/14/57), Bristol, TN

Quake Shakes North Carolina

A slight earthquake today shook houses, rattled glassware and frightened residents of more than half a dozen western North Carolina counties.

Dr. Gerald M. McCarthy, professor of geology and geophysics at University of North Carolina, said the university seismograph had recorded an earthquake at 9:25 a.m.

6. Commercial Appeal (5/14/57), Memphis, TN

North Carolina Shakes

ASHEVILLE, N.C., May 13.—(AP)—An earthquake big "enough to scare people but not enough to do any damage" shook up 10 western North Carolina counties Monday morning. The tremors were recorded at 9:25 a.m. about 175 to 200 miles from the University of North Carolina at Chapel Hill. The quakes, rated as mild, lasted about five seconds.

7. Atlanta Journal (5/13/57), Atlanta, GA

Quake Shakes North Carolina Area

HICKORY, N.C., May 13—A slight earthquake Monday shook houses, rattled glassware and frightened residents of more than half a dozen western North Carolina counties.

B. USEQ [395]

C. Best [20] 1957 MAY 14 14:24:58 35.7 82.0 Western NC

III. USGS [390]

B. EQUUS [121] 1957 MAY 13 09:25 35.75 82.0 Western NC 21,000 VI

Western North Carolina. Slight damage consisting mostly of cracked plaster reported at Micaville and Nebo. Sprinkler pipe was shaken loose in factory. Loose objects fell and buildings shook. Many were frightened. Loud, roaring earth noises were heard in many places.

1. USEQ [395]

C. EQUUS [120] [same as B. above]

D. USEQ [395] 1957 MAY 13 09:24:58 Western NC 21,000 VI

May 13: 09:24:58*. Western North Carolina, W. Felt over an area of 8,100 square miles of western North Carolina. (See map, p. 13). Maximum intensity (damage) VI.

INTENSITY (DAMAGE) VI IN NORTH CAROLINA:

Micaville: Felt by nearly all. Plaster cracked. Windows and dishes rattled. Low rumbling sounds heard just before the vibration.

Nebo: Felt by all and frightened many. One report of cracked plaster. Suspended objects in store rattled and swayed. Loose screen shaken from window. Loud roaring noises; sensation like truck striking building.

Sevier (2 miles north of Woodlawn): Felt by and frightened all. Loose objects shaken from shelves; dust fell from ceiling. Loud roaring noise heard.

Woodlawn: Sudden heavy jar like explosion in basement felt at Thread City Service Station. Books fell from school library shelves 5 miles north of village. Sprinkler pipe shaken loose at factory; painters on ladder came down for fear of being shaken off. Loud rumbling noises heard.

5
2
3

INTENSITY (DAMAGE) V IN NORTH CAROLINA:

Ashford: Felt by and alarmed many. Windows, doors, and dishes rattled; explosive sounds heard.

Bakersville: Felt by all. Objects swung; windows and dishes rattled. Rumbling sounds heard just before and during earthquake.

Boiling Springs (2 miles south of): Felt. House quivered and small cracks appeared in the plaster.

Busick: Felt by nearly all. Old cracks in wall enlarged. Dishes and windows rattled; scales in grocery store "danced around."

Collettsville: Felt by nearly all. Houses creaked; windows and small objects rattled. It sounded as if "some one was rolling a heavy object over the floor."

Denver: Felt by nearly all. Windows rattled.

Hickory: Felt by and frightened many. Windows shook; chinaware "danced" on shelves; and in some instances there was a rumbling sound. Police stations and newspaper office switch boards swamped with calls.

Hudson: Felt by many; few alarmed. At the new Hudson High School crack noticed in cinder block wall and on the concrete bleachers of football stadium. (The cracks may have existed prior to the earthquake.)

Lincolnton: Felt by and frightened many. Newspaper offices and police and radio station switchboards swamped with calls. Houses shook; windows and venetian blinds rattled; floors trembled.

Lineville Falls: Felt by and frightened many. House shook.

Little Switzerland: Felt by all. Houses shook; windows rattled; cans moved on grocery shelves. A deep rumble was heard just prior to the tremor.

Morgantown: Felt by and frightened many. Houses shook; lamp was knocked from its stand. At the North Carolina School for the Deaf the earthquake was evident by the expression on the students' faces.

Pensacola: Felt by nearly all; some alarmed. Rumbling noises heard.

Shelby: Felt by and alarmed many. Houses shook violently. Doors, windows, and dishes rattled; floors vibrated. Doors shaken open and utility cabinet set to rocking.

Spruce Pine: Felt by and frightened many. People ran from homes and business buildings. A driver abandoned his truck believing "the whole mountain was coming down."

Swannanoa: Felt by all. Creaking of buildings and rattling of loose objects heard by all. Roaring sounds heard during earthquake.

INTENSITY (DAMAGE) IV IN NORTH CAROLINA: Asheville, Barnardsville, Banner Elk, Bat Cave, Belwood, Boomer, Burnsville, Casar, Cherryville, Claremont, Conover, Deep Gap, Elk Park, Fallston, Ferguson, Forest City, Glen Alpine, Grover, Henry River, Kings Creek, Lake Lure, Lattimore, Lenoir, Maiden, Marion, Marshall, Mars Hill, Minneapolis, Mooresboro, Newland, Newton, Old Fort, Patterson, Plumptree, Polkville, Rhodhiss, Ridgecrest, Stony Point (2 miles west of), Sugar Grove, Sunshine, Taylorsville (3 miles southeast of), Tryon, Valdese, Valle Crucis, Vilas, Weaverville, and Zionville.

INTENSITY (DAMAGE) I TO III IN NORTH CAROLINA: Alexander, Bald Creek (near Burnsville), Batton, Bill's Creek (8 miles northeast of Chimney Rock), Edneyville, Gastonia, Glenwood, Golden Valley, Iron Station, Mountain Home, Sherwood, Spindale, Todd, Whitnel, and Woodland (3 to 4 miles north of).

INTENSITY (DAMAGE) I TO III IN SOUTH CAROLINA: Greer and Spartanburg.

IV. McClain [260] 1957 MAY 14 14:24:58 35.7 82.0 NC 21,000 VI

Felt in S.C. and Tn.

A. EQHUS [121]

B. USEQ [395]

C. Seismo. notes [340] 1957 MAY 13 14:24:58 Western NC

Felt

1. USGGS (??)

V. Bollinger [33] 1957 MAY 13 09:24:58 35.8 82.1 Western NC-Marion 21,000 VI

A. EQHUS [120]

B. McCarthy [245] 1957 MAY 13 09:25: 35.8 82 14,400
32 EST

DESCRIPTIONS OF INDIVIDUAL EARTHQUAKES

May 13: Recorded on the seismograph at Chapel Hill at 09:25:32 EST, and on the one at Columbia at 09:27:2-1/2 EST. Felt over an elliptical area covering approximately 550 square miles. Apparent epicenter at about 35.8 N., 82 W., some seven miles north and slightly east of Marion. The maximum intensity seems to fault paralleling the foot of the Blue Ridge. It seems quite possible that the elongate high intensity area, which extends from eastern Buncombe northeasterly to northwestern Caldwell County, indicates that the disturbance was caused by a slight slippage along White's fault, or along a closely parallel one. If this is true, then the secondary high intensity area which centers in Cleveland County must either be an artifact produced by the use of incomplete data, or be due to a separate shock caused by a slip along another fault in that area. Such "twin earthquakes", as they are sometimes called, are not very common, but are known. It is generally supposed that in such a case the secondary shock is initiated by the triggering action of the vibrations from the primary shock setting off a slippage along the second fault which, as it were, is "all cocked and ready to let go." Unfortunately neither the descriptive data nor the records traced by the seismographs can decide the matter in this particular case.

C. USEQ [395]

VI. Moneymaker [281] 1957 MAY 13 9:25 a.m. Southern Appalachians 20,700 VI

630

1957 May 13 9:25 a.m. Southern Appalachians, (VI) A fairly strong earthquake centered in North Carolina near Lake James affected an area of more than 8,000 square miles mainly in the Carolinas. It was felt along the Tennessee state line for a distance of 60 miles and at localities as close to it as Zionville, N.C. Much of the eastern and of the Tennessee Valley Region is within the area affected, especially the headwaters of the Watauga and Nolichucky rivers and a large part of the upper French Broad basin.

A. Seismo. notes [340]

B. EQUUS [121]

C. USEQ [395]

D. MacCarthy [245]

E. Moneymaker [283]

IX. Varma [400] 1957 MAY 13 35.9 82.1 Mitchell Co., NC VI

Felt radius = 82 km.

A. USEQ [395]

I. TEIC 1957 JUN 23 06:34 35.9 84.1 Concord, TN 1500 V

Location: Concord, TN; intensity

Intensity: Windows rattled, some were awakened @ Concord, Dixie Lee Junction, and Oak Ridge, TN; awakened many in the Hardin Valley and Clinch River Valley

Extent: Throughout Hardin and Clinch River Valleys; map; 1500 sq. km.

A. Gordon [175] 1957 JUN 23 06:34 35.9 84.1

06:34:16.0; 35.946, 84.095; 5.0R
Depth restrained

II. TVA [380] 1957 JUN 23 06:34 36.5 84.5 Scott Co., TN V

A. Best [20] 1957 JUN 23 06:34:18 36.5 84.5 East-central TN

B. Moneymaker [283] 1957 JUN 23 East TN

1. Personal letter to L. M. Murphy

October 1, 1957

Dr. Leonard M. Murphy
Seismology Branch
U.S. Coast and Geodetic Survey
Washington 25, D.C.

Dear Dr. Murphy:

Yours of September 26, 1957, relative to the East Tennessee Earthquake of June 23, 1957, at approximately 1:35 a.m., Eastern Standard Time, has been received.

This earthquake occurred while I was on Formosa, but my alert and efficient secretary, Mrs. Mary Anne Lister, set out at once to collect information on the shock. She sent out questionnaires to postmasters, wrote letters to seismograph stations, and obtained information by telephone from the two local newspapers. Some of the information she collected was given to the Knoxville postmaster who had a Coast and Geodetic Survey questionnaire to fill out.

The information we have seems to indicate that the shock was felt by very few people outside of a fairly small rural area in the western and northwestern portions of Knox County. Within this area, the rural locality at which the shock was felt by many or most of the people includes Concord, Dixie Lee Junction, Hardin Valley, and the Clinch River Valley west and northwest of Hardin Valley. People along Buttermilk Road (on the Lovell Topographic sheet) felt the shock and one man reported that his children were "almost shaken out of bed".

On basis of my own noninstrumental information, I believe the shock was centered somewhere in the Hardin Valley area - near Lat. $35^{\circ} 56' N$; Long. $84^{\circ} 12' W$. (The most "violent" effects were reported at about Lat. $35^{\circ} 54' N$; Long. $84^{\circ} 14' W$, but I think the violence was perhaps exaggerated. I doubt that even children were "almost shaken out of bed".)

For what it is worth, I am sending you a summary of our data. In addition to the localities listed, I have some unconfirmed reports that the shock was felt at Powell Station, 3-1/2 miles east of the Clinton Topographic sheet.

If you get the records of the Oak Ridge seismograph (which I do not get) you should be able to tie down the center of this and other east Tennessee shocks much more closely than is possible from records from St. Louis, Missouri, Columbia, South Carolina, and Chapel Hill, North Carolina, and more distant stations. I have had very poor results in using the data from St. Louis, Chapel, and Columbia, to determine centers, as I usually come up with locations entirely outside of the affected areas.

Your location of 36.6° north, 84.6° west is much too far north and west to fit in with the data I have on the subject earthquake. I am enclosing three of our Topographic sheets, scale 1/24000, which show localities at which the shock was reported felt. My longitude-latitude locations are determined from these maps. I would appreciate hearing from you if you revise your center location. If you do not receive the Oak Ridge records, I believe you might arrange through channels to get them. Oak Ridge has always been such a secret project that I have never asked them for information, although I sometimes furnish information to Oak Ridgers.

I have some other data that might interest you. At the end of the year, I will forward you a summary of all earthquake information I have for the year.

Very sincerely yours,
Berlen C. Moneymaker
Chief Geologist

2. Summary of press and questionnaire data

PRESS DATA

Knox County

Concord - windows rattled.

Hardin Valley Section - "The earth shock started dogs barking and set chickens to squawking." People awakened. Children "were almost thrown from their beds".

Loudon County

Dixie Lee Junction - A man reported being awakened by the house "jumping" and the windows rattling.

Loudon

Not felt.

Maryville

Not felt.

"We know of no reports from Maryville or Blount County concerning this earthquake. Our local papers did not receive any reports."

James L. McTeer, Asst. Post

QUESTIONNAIRE DATA

Clinton

Felt by very few. Windows rattled "slightly". The earthquake was accompanied by a noise - "slight tremor such as light blast of thunder".

"I only found one who felt or heard the earthquake of the 12 or 15 that I questioned." R. A. Smith, PM

Friendsville

Not felt.

Kingston

Postmaster Bill W. Harvey reported that the earthquake was not felt at Kingston.

Lenoir City

Apparently not felt, although this locality is about five miles from Dixie Lee Junction.

George L. Bowma, Acting Postmaster, reported:

"I have checked and have found no one who felt an earthquake at the above time."

Oak Ridge

Van D. Hicks, Postmaster at Oak Ridge, reported that as far as he knows, the earthquake was not felt at Wheat or Oak Ridge.

Oliver Springs

Not felt.

C. USEQ [395]

III. USGS [390]

B. EQHUS [121] 1957 JUN 23 01:34 36.5 84.5 East-Central TN V

East-central Tennessee. Felt by and awakened many in the Hardin and Clinch River Valleys.

1. USEQ [395]

C. EQHUS [120] [same as B. above]

D. USEQ [395] 1957 JUN 23 01:34:18 36.5 84.5 West, east-central TN V

635
June 23: 01:34:18*. Epicenter 36-1/2° north, 84-1/2° west, east central Tennessee, W. V. Felt by and awakened many in the Hardin Valley and Clinch River Valley. Houses shook; windows rattled. Press reported children were almost thrown from beds. Intensity (damage) IV at Concord, Dixie Lee Junction, and Oak Ridge, where windows rattled and few were awakened.

IV. McClain [260] 1957 JUN 23 06:34:18 36.5 84.5 East-central TN

Felt in Hardin Valley and Clinch River Valley and at Concord, Dixie Lee Junction, Oak Ridge, TN.

A. EQHUS [121]

B. USEQ [395]

C. Seismo. notes [340] 1957 JUN 23 06:34:18 East-central TN

East central Tennessee, June 23, 1957, 06:34:18 GCT. Felt in Knox and Loudon counties (USGS).

1. USGS?

V. Bollinger [33] 1957 JUN 23 01:34:18 36.5 84.5 East TN V

A. EQHUS [120]

B. McClain [260]

C. USEQ [395]

VI. Moneymaker [281]

1957 JUN 23 1:30 a.m.

Southern Appalachians

V

1957 June 23 1:30 a.m. Southern Appalachians (V) A sharp local shock was felt in the southwestern section of Knox County and nearby sections of Anderson and Loudon counties. It seems to have been centered near Clinch River in or near the Hardin Valley community. In this locality where the shock was the strongest, dogs barked, chickens "squawked", people were awakened and frightened and children "were almost thrown from their beds." At Dixie-Lee Junction in Loudon County, people were awakened by the "jumping" of houses and the rattling of windows. The shock was felt at Concord, where windows rattled and at Oak Ridge where sleepers were awakened. At Clinton only one person out of twelve or fifteen interviewed felt or heard the disturbance.

A. Seismo. notes [340]

B. EQHUS [121]

C. USEQ [395]

D. Moneymaker [283]

636

IX. Varma [400]

1957 JUN 23

36.0

84.0

Near Knoxville, TN

V

A. USEQ [395]

I. TEIC 1957 JUL 2 09:33 35.6 82.6 Asheville, NC 22,000 VI

Location: Asheville, NC; intensity; near center of area reporting greatest intensity

Intensity: @ Asheville, NC; walls cracked, plaster cracked, a few chimneys reported damaged, plaster cracked in Swannanoa, NC; slight damage to buildings @ Enka, NC; @ Weaverville, NC; plaster cracked; one retaining wall cracked near Marshall, NC

Extent: W NC - extreme E TN; map; 22,000 sq. km.

II. TVA [380] 1957 JUL 2 09:33 35.6 82.6 Asheville, NC VI

A. Best [20] 1957 JUL 2 09:33 35.5 82.5 Western NC
:01.0

B. Moneymaker [283] 1957 JUL 2 4:35 a.m. EST Western NC

1. AP?

WESTERN NORTH CAROLINA EARTHQUAKE OF JULY 2, 1957

Asheville, N.C. "Residents of this mountain city were shaken up today by an early morning earthquake that rattled windows and dishes but apparently did no damage. The shock, accompanied by a thunder-like rumbling, came at 4:35 A.M. It was felt throughout the Asheville area and surrounding countryside. Thousands of telephone calls flooded offices of law enforcement agencies, radio stations and newspapers." AP

"An earthquake described by seismologists as 'very weak' shook buildings in western North Carolina and eastern Tennessee. The tremor, which was felt here for about a minute, appeared to be concentrated in the mountain area. It was not felt in Hickory, N.C., 85 miles east of here at the edge of the foothills. Radio Station WUNC here said it received several telephone calls about the earthquake from residents of western North Carolina and nearby areas of eastern Tennessee. There were no reports of damage. Residents of the area said the tremor was 'fairly heavy'." (Mrs. Evelyn Sinha, Seismologist at the University of North Carolina said it was "very mild, very feeble".) AP

"Western North Carolina residents from Murphy to Morganton reported a rumbling noise about 4:33 a.m. - described by some as like the sound of a distant explosion of dynamite." Gus Kooles of 21 Eola Avenue said the quake woke him from a sound sleep. "I thought at first, it was a flight of jets, but it was too resonant and shook the house too much."

City Manager J. Weldon Weir of Edwin Place said the shock awakened him in time to see a lamp on a bedside table rocking to and fro. "The tremor reportedly threw many dogs into howling panic but Mrs. Betty Cooper said her dog with a canine instinct began barking loudly a full five minutes before the earth trembled." (Asheville Citizen, July 3, 1957).

Madison County

"Sheriff E. Y. Ponder reported 'dozens of people' from all sections of the county said they felt and heard a series of 'jars' ranging over a period of about one minute." Erwin Hensly of the Bear Creek Section (2 miles southwest of Marshall) reported he felt his house shake so badly he thought the pillars were falling. He said he felt a strong jar about 4:30 a.m., followed by two or three more of diminishing intensity for a minute or slightly longer.

Haywood County

County Jailor Bill Plemmons (at Waynesville) reported hearing rumbling noises, which he believed to be caused by a train. He added that, as far as he knew, all of his prisoners slept through the tremor. (Asheville Citizen for July 3, 1957)

2. Asheville Citizen (7/3/57), Asheville, NC

THE WESTERN NORTH CAROLINA EARTHQUAKE OF JULY 2, 1957 (4:35 A.M. EST)

"A light tremor was felt in parts of the Asheville, North Carolina, area at about 4:35 a.m. on July 2. This was the third tremor reported in this area within the last year. It was intense enough to rattle windows and light objects but did no apparent damage."

C. USEQ [395]

D. McCarthy [245]	1957	JUL 2	04:33 EST	35.6	82.7	3100	V-VI
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July 2: Recorded on the seismograph at Chapel Hill at 04:33:(42) EST., and on the one at Columbia at 04:33:01. The phases were weak and ill-defined on both seismograms. It was felt over an elliptical area of 1200 square miles, or a little more. The apparent epicenter was near 35.6 N., 82.7 W., about ten miles southwest of Asheville. While it affected a much smaller area and, judging by the amplitudes recorded on the seismograms, was of considerably less magnitude, its maximum intensity in the epicentral area seems to have been at least as great as in the case of the May 13 shock. Some damaged chimneys and cracked plaster were reported from Swannanoa, and some cracked plaster noted at Weaverville, both in Buncombe County. The maximum intensity appears to have been about 5-1/2. Roaring or rumbling noises, frequently compared to the sound of thunder, were quite generally reported.

While positive reports were received from only three North Carolina counties--Buncombe, Haywood, and Madison--they represent some 30 individual replies from 17 different communities. In addition to these three counties, it seems very probable that portions of Transylvania and Henderson counties also felt the shock, although no positive reports were received from them. One report, which can scarcely be authentic, states that the shock was felt lightly at the village of Flag Pond, in Unicoi County, Tennessee. These reports are shown in Table 2. One rather striking thing about this tremor is that while it was reported by relatively few people, the majority of reports received give it a fairly high intensity rating. This was due to the time of occurrence, at about 4:33 a.m., when almost everyone was sound asleep so that, except where the shock was strong enough to awaken people, it went almost unnoticed. Actually, the low intensity portion of the felt area was probably considerably larger than the available data indicate.

Little more can be said concerning this shock except to note that the distribution of intensities--relatively high near the center, but falling off very rapidly with increasing distance--suggests that it must have had a very shallow focus. The small amplitudes on the seismograms indicate that relatively little energy was released and this, taken in connection with the relatively high epicentral intensity, also indicates a rather shallow depth of focus.

As with the May 13 shock, the areas of greatest apparent intensities--Swannanoa and Weaverville--are located eccentrically in respect to the center of the disturbed area. In view of the extremely limited and incomplete data available this seeming peculiarity probably has no significance.

TABLE 2

County	No. Localities Where Felt	Estimated Intensities	
		Maximum	Average
Buncombe	13	5 1/2 - 6	4
Haywood	3	4 - 4 1/2	4
Madison	1	2 1/2	2 1/2
Henderson	0	?	?
Transylvania	0	?	?

*Rounded to the nearest 1/2 degree of the M.M. scale.

E. Templeton [370] 1957 JUL 2 35.5 82.25 Asheville, NC VI

1. Bollinger [33]

2. EQHUS [120]
3. McClain, Unpub, (1978)
4. McClain [260]
5. Moneymaker [281]
6. TVA, unpub., (1977)
7. EQHUS [121]

III. USGS [390]

B. EQHUS [121] 1957 JUL 2 04:33 35.5 82.5 Western NC VI

Western North Carolina. Slight damage in Buncombe and Madison counties consisting of cracked chimneys, walls and plaster. Many were awakened and alarmed. Buildings and trees swayed visibly.

1. USEQ [395]

C. EQHUS [120] [same as B. above]

D. USEQ [395] 1957 JUL 2 04:33:01 Western NC

July 2: 04:33:01*. Western North Carolina, W. VI. Felt strongly in Buncombe and Madison counties where minor damage consisting of a few cracked chimneys, cracked walls, and cracked plaster was reported.

INTENSITY (DAMAGE) VI IN NORTH CAROLINA:

Asheville: Felt by, awakened, and alarmed many. Walls cracked; plaster cracked. Newspapers, radio stations, and police department reported hundreds of calls from frightened residents. Buildings shook; loose objects rattled. Rumbling, rolling sounds ending in a thump.

Marshall: Felt by, awakened, and alarmed many. Few people ran from homes. One retaining wall cracked. Houses shook; windows and dishes rattled. Extremely loud, thunderous, roaring sounds heard before the earthquake. Disturbed objects observed.

Swannanoa: Felt by and awakened many; few alarmed. A few chimneys damaged; plaster cracked. Visible swaying of buildings and trees. Buildings creaked; loose objects rattled. Moderately loud, thunderous sounds heard.

Weaверville: Felt by all; awakened and alarmed many. Plaster cracked. Pictures and mirrors swayed on walls. Dishes, doors, and windows rattled. Thunderous sounds heard by many.

INTENSITY (DAMAGE) V IN NORTH CAROLINA:

Alexander: Felt by, awakened, and alarmed many. Numerous calls to police and radio stations. Buildings creaked; loose objects rattled. Bed shook. Sounded like heavy dynamite explosion followed by a series of diminishing rumbles.

Barnardsville: Felt by all; awakened and alarmed many. Houses shook; windows and dishes rattled; walls creaked. Sounded like one big explosion and continuous rumbling roar for about 30 seconds.

Biltmore: Felt by and awakened many. House and bed vibrated. Sharp, thunderlike clap before earthquake. Vibrations like those of a passing truck.

Canton: Felt by, awakened, and alarmed many. Buildings shook; loose objects rattled. Roaring sounds heard.

Clyde: Felt by and awakened nearly all; many alarmed. Trembling motion.

Enka: Felt by many; several awakened; few alarmed. Slight damage to buildings. Disturbed objects observed by several. Thunderous sounds heard at beginning of the earthquake.

Leicester: Felt by all; awakened and alarmed many. Buildings shook; loose objects rattled. Walls creaked; dishes, windows, and doors rattled. Felt like heavy truck striking the house. Thunderous sounds heard.

Montreat: Felt by and awakened many. Houses creaked; loose objects rattled. Many thought it was thunder--some dynamite.

Mars Hill: Felt by and awakened many. Windows rattled; sounded like distant explosion.

Morganton: Felt by and awakened many. Rumbling sounds heard.

Murphy: Felt by and awakened many. Rumbling sounds heard.

Stocksville: Felt by and awakened nearly all. Windows rattled. Sounded like sharp clap of thunder or an explosion.

Waterville: Felt by and awakened nearly all. Dishes and windows rattled. A roaring sound like a high wind was heard and lasted for one or two minutes.

Waynesville: Felt by and awakened many. Buildings creaked; loose objects rattled.

INTENSITY (DAMAGE) IV IN NORTH CAROLINA: Andrews, Arden, Black Mountain, Candler, Cove Creek (about 6-8 miles from Dellwood, Haywood County), Hendersonville, Ridgecrest, Skyland.

INTENSITY (DAMAGE) IV IN TENNESSEE: Flag Pond.

INTENSITY (DAMAGE) I TO III IN NORTH CAROLINA: Bat Cave, Brevard, and Lenoir.

IV. McClain [260] 1957 JUL 2 09:33 35.5 82.5 Western NC VI
:01.0

Felt strongly in Madison and Buncombe Co., N.C.; damage at Flag Pond, Tn.

A. USEQ [395]

B. EQHUS [121]

V. Bollinger [33] 1957 JUL 2 04:33 35.6 82.7 Asheville, N.C. 3100 VI
:01.0

A. EQHUS [120]

B. McCarthy [245]

VI. Moneymaker [281] 1957 JUL 2 4:35 a.m. Southern Appalachians VI

1957 July 2 4:35 a.m. Southern Appalachians, (VI) This earthquake was centered in Buncombe County, North Carolina. It was reported felt in Tennessee only at Flag Pond, in Unicoi County, but it was felt widely over the southeastern section of the Tennessee Valley Region including much of the French Broad Drainage area. Some damage was reported at Swannanoa where chimneys were damaged; Weaverville where plaster was cracked, and at Marshall where a retaining wall was cracked.

A. USEQ [395]

B. EQHUS [121]

C. MacCarthy [245]

D. Moneymaker [283]

IX. Varma [400]

A. USEQ [395]

VI

Near Weaverville, NC

82.6

35.7

JUL 2

1957

I. TEIC	1957	NOV 7	36.0	84.0	Powell, TN	III
Location: Powell, TN						
Intensity: Light shock felt, one house rattled						
II. TVA [380]	1957	NOV 7	36.0	84.0	Powell, TN	IV
A. Moneymaker [281]						
B. Templeton [370]						
	1957	NOV 7	35.9	83.9	Powell, TN area	III
1. Moneymaker [281]						
VI. Moneymaker [281]	1957	NOV 7	12:15 a.m.		Southern Appalachians	III

One light shock felt by few at Powell, a station on the Knoxville-Jellico line of the Southern Railway. One observer reported that his 50-year old house rattled as noticeably as it did during the earthquake of September 7, 1956.

I. TEIC 1957 NOV 24 20:06 35.8 83.1 Hartford, TN 12,000 VI

Location: Hartford, TN; intensity

Intensity: @ Hartford, TN; slight damage to buildings, one report of a wall cracked, kitchen separated from rest of home, bottles overturned in showcase; dishes displaced @ Bryson City, NC; furniture moved in Cherokee, NC; @ Sylva, NC, heavy furniture moved; cracked window @ Gatlinburg, TN

Extent: SW NC - NE TN; map; 12,000 sq. km.

Comment: Maximum effects @ Hartford, TN - northern part of affected area

II. TVA [380] 1957 NOV 24 20:06 35.4 83.4 Bryson City, NC V-VII

A. Best [20] 1957 NOV 24 20:06:17 35.0 83.5 NC - TN Border

B. Moneymaker [283] 1957 NOV 24 3:07 p.m. EST Western NC - Eastern TN

1. Questionnaire Data

TENNESSEE

I. Blount County

1. Calderwood: Not felt.
2. Chilhowee: A rural station of Maryville. Questionnaire not returned. Information I received from other localities seems to indicate that the earthquake was not felt as far west in Tennessee as Chilhowee).
3. Townsend: "Have not found anyone that felt the shock."
4. Townsend area, Great Smoky Mountains National Park: Reported felt. (Arthur Stupka)
5. Tremont, Great Smoky Mountains National Park - Reported felt. (Arthur Stupka)
6. Walland: Not felt.

II. Cocke County

1. Cosby: Felt by about half of the population. It was attended by a "low rumbling like distant thunder", and rattled dishes and doors.
2. Cosby Ranger Station in Great Smoky Mountains National Park: Reported felt. (Arthur Stupka)
3. Del Rio: Felt by a few people who heard a sound like "low thunder, a rumbling sound".

The Postmaster reported, "I was about 15 miles south of Del Rio and I heard the trembling of the light earthquake very distinctly. At first, I thought it was thunder, but when the trembling was in the earth and not above, I realized it was a light earthquake." This observer, who did not state specifically where he was, must have been very near the North Carolina line, or even across it.

4. Hartford: Felt by nearly everyone. A roaring sound was heard; windows and dishes shook. "I was in the store and things about shook off the shelves 10 minutes of 3:00 p.m., November 24, 1957. Medicine all turned over in show case."

5. Newport: Not felt. "No reports; earthquake evidently confined to southeastern section of county - no shocks felt or reported in or near Newport, Tennessee."

III. Monroe County

1. Coker Creek Not felt. "I asked several people about the earthquake but nobody here heard it." Mamie Murphy (Postmaster)

2. Tellico Plains: Not felt.

IV. Polk County

1. Copperhill: Not felt.
2. Ducktown: Not felt.

3. Fanner: Not felt. "I can't find any one that heard the earthquake or felt the tremor. Sincerely yours, Emma Shearer, P.M."

V. Sevier County

1. Alum Cave Area (Great Smoky Mountains National Park): Felt.

James Smallshaw, TVA Engineer, reported:

"We were on the trail down from Mt. LeConte, near the Alum Cave parking area when this hit. It was about five or ten minutes after 3:00 p.m. There was no perceptible shake - just a rumble with a regular beat. We did not hear the second tremor. We were probably in the car by that time."

2. Elkmont (Great Smoky Mountains National Park): Felt. (Arthur Stupka)

3. Gatlinburg: The Postmaster reported that about half of the population felt the earthquake, and reported the rattling of doors, dishes and the like. A slight rumble was heard.

Fred Whittier of the Mountain Press reported by telephone that the earthquake was felt generally in Gatlinburg and in the Park area from Rainbow Falls on the north slope of Mt. LeConte to Cades Cove.

Arthur Stupka, Park Naturalist, furnished me the following statement:

"In reply to your letter of November 26th, the light earthquake of Sunday, November 24th, was apparently felt in all parts of the Great Smoky Mountains National Park. We have had reports from Cosby, Big Creek, and Cataloochee in the Eastern portion; Townsend and Tremont in the Western portion; and from Smokemont, Elkmont, and Park Headquarters. The greatest shock seemed to have centered around Gatlinburg, where there was at least one report of a cracked window. This was the only report of any damage caused by the tremor."

4. Pigeon Forge: Questionnaire not returned. (Rural station of Sevierville)

5. Pittman Center: Felt by nearly everyone. The shock was attended by "a heavy rumbling, fading in the distance. Some people wondered if there was an explosion somewhere."

"At the time of the earthquake of Sunday November 24, 1957 at 3:05 p.m. I was standing behind the pulpit of Hill's Creek Baptist Church preaching a funeral sermon. The floor of the platform and which I was standing distinctly shaken and there was a definite heavy rumbling noise which seemed to die away in the distance. I had the distinct impression there were two shocks separated by a short interval of time." Dr. R. F. Thomas

6. Sevierville "No". (Not felt).

North Carolina

I. Cherokee County

Hiwassee Dam: Questionnaire not yet returned by TVA Public Safety Officer Kyker. Probably not felt there.

II. Graham County

1. Fontana Dam: The Postmaster reported that nearly everyone felt the earthquake - in fact, everyone he talked to said they felt it. There was a rattling of dishes and windows, and a noise like "dynamite at a distance."

Lieutenant Frank W. Smiley, TVA Public Safety Officer and an experienced investigator, made a very thorough investigation for me. He reported that about half the people in the Fontana Dam - Fontana Village area felt the earthquake and heard a noise like distant thunder. He adds:

"There was some vibration of the house in which I live at 453 Fontana Road. I first thought it was thunder since it was threatening rain but decided it was not when the house began to vibrate. Although it was not felt by everyone it was very noticeable."

2. Tapoco (Cheoah Dam area): Reported not felt at Tapoco, but "Mr. Lakey, who works here at Tapoco, but lives between here and Bryson City on Highway 28, on the edge of Graham County next to Swain County, states that his wife noticed a slight shake and rumbling noise."

III. Haywood County

1. Big Creek Ranger Station (Great Smoky Mountains National Park): Felt. (Arthur Stupka)

2. Cataloochee (Great Smoky Mountains National Park): Felt. (Arthur Stupka)

3. Waterville: Felt by nearly everyone. Windows rattled. "Following the jar there was a noise like a rushing wind."

"The jar here lasted about 8 or 10 seconds, and the main thing that I noticed most was the venetian blinds beating against the window casings."

"There was no reported damage here." J. M. Roberts, Postmaster.

IV. Swain County

1. Smokemont (Great Smoky Mountains National Park): Reported felt. (Arthur Stupka)

2. Precip. in Th. River Basin

"An earthquake was felt in Swaim, Haywood, Cherokee, and Jackson counties in western North Carolina and at Gatlinburg, Tennessee, at about 3:10 p.m. on November 24. The tremor was strong enough to shake buildings and rattle windows but no damage was reported by the newspapers."

C. USEQ [395]

D. MacCarthy [245] 1957 NOV 24 15:07 35.4 83.8 Near Bryson City, NC 8800 V+

November 24: Recorded at Chapel Hill at 15:07:37 1/2 EST and at Columbia at 15:06:47. Felt over an irregular ellipse enclosing about 3400 square miles. The apparent epicenter was at approximately 35.4° N., 83.8° W., close to Bryson City. The maximum intensity seems to have been about 5 or slightly higher near Gatlinburg, Tenn., where a cracked window was reported. Rumbling and roaring noises were generally reported throughout the affected area.

This tremor was reported as felt in 39 different localities in eight North Carolina counties, and from five localities in three different Tennessee counties, as shown in Table 3. Although felt to within a few miles of the Georgia and South Carolina borders, this tremor does not seem to have been noticed in these states. The only damage reported was in the Gatlinburg, Tenn. (Sevier Co.) area, where a window is said to have been cracked. If the damage was actually caused by this earthquake (which seems a bit doubtful this would indicate that the region of greatest intensity was located close to the northwestern edge of the effected area, rather than towards its center.

Although the area over which it was felt is distinctly elliptical, the isoseisms outline a very irregular ellipse, with an eccentric elongate which follows rather closely the crest of the Smoky Mountains.

Despite the fact that it occurred shortly after 3:00 p.m. on a Sunday afternoon this earthquake was not too well reported. The weather was quite stormy over large part of the affected area and doubtless many people attributed the rumbling and shaking to thunder and hence did not notice that an earthquake was in progress.

TABLE 3

County	No. Localities Where Felt	Estimated Intensity	
		Maximum	Average
North Carolina			
Cherokee	4	4 1/2	4
Clay	4	4	3
Graham	4	4	3
Haywood	8	4	3 1/2
Jackson	8	4 1/2	3 1/2
Macon	4	4	3
Swain	5	4 1/2	3 1/2
Tennessee	1	3	3
Blount	1	1 1/2	1 1/2
Cocke	3	4(?)	3
Sevier	1	5(?)	(?)

*Rounded to the nearest 1/2 degree of the M.M. scale

III. USGS [390]

B. EQHUS [121] 1957 NOV 24 15:06 35.0 83.5 NC - TN border 10,600 VI

North Carolina-Tennessee border. Felt over approximately 4,100 square miles of North Carolina and Tennessee. At Hartford, Tenn., a wall cracked and kitchen separated from rest of house. Bottles overturned. Felt by nearly all in various towns in North Carolina (V). Furniture moved; objects fell.

1. USEQ [395]

C. EQHUS [120] [same as B. above]

D. USEQ [395] 1957 NOV 24 15:06 83.5 NC - TN border 10,600 VI
:17

November 24: 15:06:17*. Epicenter 35° north, 83 1/2° west, North Carolina-Tennessee border, W. Felt over an area of approximately 4,100 square miles of North Carolina and Tennessee. (See map, p. 15.) Maximum intensity (damage) VI occurred at Hartford, Tenn.

INTENSITY (DAMAGE) VI IN TENNESSEE:

Hartford: Felt by nearly all; several alarmed. Press reported slight damage to buildings; one report of wall cracked in NE-SW direction. Kitchen separated from rest of house, subsequently flooded by rain. Bottles overturned in showcase. Windows and dishes rattled. Disturbed objects observed by several. Roaring sounds heard.

INTENSITY (DAMAGE) V IN NORTH CAROLINA:

Almond: Felt by nearly all. Buildings creaked; loose objects rattled. Disturbed objects observed by one. Windows and doors rattled. Whistling sounds heard by several before earthquake. Trembling motion.

Balsam: Felt by nearly all; many alarmed. Buildings creaked; loose objects rattled. Disturbed objects observed by several. Felt like truck striking building. Roaring sounds heard.

Bryson City: Felt by and alarmed many. Buildings shook; loose objects rattled. Dishes displaced. Lights and chandeliers swung from ceilings; trees and wires to houses swayed. Sensation of a heavy truck striking house. Sounds like thunder.

Cherokee: Felt by all; some alarmed. Dishes and pans rattled; furniture moved. Heavy rumbling like thunder.

Dillsboro: Felt by nearly all. Houses shook; dishes rattled. Low rumbling sounds heard during earthquake.

Fontana Dam: Felt by nearly all. Houses vibrated; dishes and windows rattled. Noise like distant thunder or dynamite at a distance.

Franklin: Felt by all. Disturbed objects observed by many. Buildings shook; loose objects rattled. Sounded like rolling thunder. Some reported two shocks.

Marble: Felt by nearly all. Loose objects rattled; beds moved. Disturbed objects observed by several. Thunderous sounds heard by several. Trembling motion.

Stecoah: Felt by nearly all; few alarmed. Buildings shook; dishes, pans, and bottles rattled.

Sylva: Felt by many. Heavy furniture moved; buildings shook; dishes, windows, and doors rattled.

Waterville: Felt by all. Houses creaked; windows and dishes rattled; venetian blinds beat against window casing. Following the jar there was a noise like rushing wind.

Waynesville: Felt by nearly all. Windows and dishes rattled. A dull roar and jarring effect, like truck striking building.

Webster: Felt by nearly all; few alarmed. Dish fell from shelf. Disturbed objects observed by several. Houses creaked; windows and dishes rattled. Sounded as if a plane had passed through the sound barrier. Some reported a sharp cracking noise preceded the rumble.

INTENSITY (DAMAGE) V IN TENNESSEE:

Gatlinburg: Felt by half the population; few alarmed. One report of cracked window. Houses shook; doors and dishes rattled. Trembling motion. Two shocks felt.

Pittman Center (Sevierville): Felt by nearly all. Floor of pulpit in church distinctly shaken. Two shocks felt.

INTENSITY (DAMAGE) IV IN NORTH CAROLINA: Andrews, Clyde, Cullowhee, Gneiss, Greens Creek, Hayesville (6 miles from), Hazlewood, Lake Junaluska, Maggie, Murphy, Nantahala, Otto, Qualla (southeast of Cherokee), Robbinsville, Sapphire, Tuckasegee, and Whittier.

INTENSITY (DAMAGE) IV IN TENNESSEE: Cosby and Denton (near Bluffton).

INTENSITY (DAMAGE) I TO III IN NORTH CAROLINA: Bluff Creek, Cashiers, Hayesville, Hayesville (Shooting Creek Section), and Scaly. Great Smoky Mountains National Park: Big Creek Ranger Station, Cataloochee, and Smokemont.

INTENSITY (DAMAGE) I TO III IN SOUTH CAROLINA: Longcreek.

INTENSITY (DAMAGE) I TO III IN TENNESSEE: Del Rio, Del Rio (15 miles south of), and Newport. Great Smoky Mountains National Park: Alum Cave area, Cades Cove, Cosby Ranger Station, Deconaultee Ranger Station, Townsend, and Tremont.

IV. McClain [260]	1957	NOV 24	20:06	35.0	83.5	NC-TN border	10,600	VI
							:17.0	

Felt in S.C., N.C., Ga., and Th.

A. EOHUS [121]

B. USEQ [395]

V. Bollinger [33] 1957 NOV 24 15:06 35.5 83.5 NC - TN border 10,600 VI

A. USEQ [395]

B. EQUUS [120]

C. MacCarthy [245]

VI. Moneymaker [281] 1957 NOV 24 3:07 p.m. Southern Appalachians 9100 VI

1957 September 24 3:07 p.m. Southern Appalachians, (VI) A moderately strong earthquake centered in northwestern Jackson County, North Carolina affected an area of about 3,500 square miles in the Carolinas, Tennessee and possibly Georgia. In Tennessee, it was felt in Blount, Cocke and Sevier counties. It was strong at Hartford where merchandise was thrown from shelves and medicine bottles were overturned in a showcase. Some damage to houses was reported. In one house, a wall was cracked; in another, the kitchen was detached from the rest of the house. At Pittman Center, a minister preaching a funeral sermon felt shaking underfoot and heard a rumbling noise which seemed to die away in the distance. A trembling motion was felt at Gatlinburg by about half of the people, a few of whom were alarmed. The earthquake was felt also at Cosby, Denton, Del Rio and Newport.

A. USEQ [395]

B. EQUUS [121]

C. MacCarthy [245]

D. Moneymaker [283]

IX. Varma [400] 1957 NOV 24 35.0 83.5 Macon Co., NC VI

felt radius = 59 km.

A. USEQ [395]

I. TEIC 1958 MAY 16 22:30 35.6 82.6 Asheville, NC IV

Location: Asheville, NC

Intensity: Houses shook, windows rattled

II. TVA [380] 1958 MAY 16 22:30 35.6 82.6 Asheville, NC IV

A. USEQ [395]

B. Moneymaker [281]

III. USGS [390]

D. USEQ [395] 1958 MAY 16 17:30 Asheville, NC IV

Felt by many. Windows rattled.

IV. McClain [260] 1958 MAY 16 22:30 35.6 82.6 Asheville, NC IV

A. USEQ [395]

V. Bollinger [33] 1958 MAY 16 17:30 35.5 82.5 Asheville, NC IV

A. USEQ [395]

VI. Moneymaker [281] 1958 MAY 16 5:30 Southern Appalachians IV

1958 May 16 5:30 p.m. Southern Appalachians, (IV) A light tremor shook houses and rattled windows at Asheville, North Carolina. It was especially perceptible in the northern section of the city, where houses "shook all over."

A. USEQ [395]

B. Moneymaker [283] [no data available]

IX. Varma [400] 1958 MAY 16 35.6 82.6 Asheville, NC IV

A. USEQ [395]

I. TEIC 1959 APR 23 20:59 37.3 80.6 Eggleston, VA 4400 VI

Location: Eggleston, VA; intensity; near center of affected area

Intensity: A chimney toppled in Eggleston, VA, groceries fell from shelves, small trees thrown across railroad tracks, pictures knocked off walls, knick-knacks fell to floor; merchandise thrown from shelves @ Bluff City, VA; @ Hoges Chapel, VA, pictures fell from walls, articles from store shelves; cracked windows, knocked bottles from shelves in Pearisburg, VA; @ Pembroke, VA, slight damage to a building, plaster on walls cracked, 3 to 4 rows of bricks fell from chimneys, canned goods off grocery shelves

Extent: SW VA - part of WV; map; 4400 sq. km.

A. Dewey [95] 1959 APR 23 20:59 37.4 80.7

20:58:39.5; 37.395, 80.682; 1.0R; 3.8F

Depth restrained; magnitude from felt area (Nuttli [311])

II. TVA [380] 1959 APR 23 20:59 37.3 80.7 Giles Co., VA VI-VII

A. USEQ [395]

B. Herald Courier (4/24/59), Bristol, TN

C. Best [20] 1959 APR 23 20:58:41 37.5 86.5 WV

D. Bollinger [35] APR 23 15:59 Giles Co., VA 7800 VI

Bent Mountain, VA—INTENSITY I-III. (USE, 1959);

Blacksburg, VA: One "fairly good shake," then a couple of seconds of quietness, and "another shake." Rattled windows and chandeliers. (RT 4/24/59) (IV);

Intensity IV. (USE, 1959);

Bluff City, VA: Felt by and alarmed many. Two shocks about 1 or 2 seconds apart. Bumping motion. Buildings creaked; loose articles rattled; merchandise thrown from shelves. Pendulum on scales swung. Roaring subterranean noises. (USE, 1959) (V);

Eggleston, VA: "The heaviest trembling centered in Giles County where the chimney toppled at the Norfolk and Western station at Eggleston and groceries fell from the shelves of a general store." Shocks described as "minor but lively for this section of the country." Near Eggleston small trees were thrown across the Virginian Railway tracks and a freight train was halted until workmen could clear the road. Clerk at Eggleston general store said the shock "didn't last but about three seconds but everything seemed to shake." Lightweight items were knocked from the store shelves. One man said he thought it was going to shake the house down." A man on a hillside "saw the barn shaking." (RT 4/24/59) (VI);

Many alarmed. (Eppley, 1965);

Felt by and alarmed many. A few bricks fell from a chimney. Pictures knocked off walls. Knickknacks fell to the floor. Buildings creaked. Light pole and power lines shook. Rocking motion in north-south direction. Moderately loud subterranean sounds heard by many. (USE, 1959);

Glenn Lyn, VA--Intensity IV. (USE, 1959);

Goldbond, VA--Intensity IV. (USE, 1959);

Hoges Chapel, VA: Felt by many. Abrupt onset; trembling motion. Buildings creaked; loose objects rattled; pictures fell from walls; articles fell from store shelves. (USE, 1959) (V);

Ironton, VA--Intensity I-III. (USE, 1959);

Kimballton, VA--Intensity I-III. (USE, 1959);

Long Spur, VA--Intensity I-III. (USE, 1959);

Maggie, VA--Intensity I-III. (USE, 1959);

McCoy, VA--Intensity IV. (USE, 1959);

Mechanicsburg, VA--Intensity I-III. (USE, 1959);

Narrows, VA: Felt. (DA 4/24/59);

Intensity IV. (USE, 1959);

Newport, VA--Intensity I-III. (USE, 1959);

Orchard Hill, VA--Intensity IV. (USE, 1959);

Pearisburg, VA: Shock almost shook the dishes off the shelves. "It really rattled them." Sheriff's office flooded with calls after the trembling. "Circuit Court was in session and the impact caused brief confusion in the courtroom but did not disrupt court." Many thought the shock was dynamiting at a nearby construction job. Giles Memorial Hospital employees thought there had been an explosion in the boiler room. (RT 4/24/59);

Felt by nearly all. Bottles rattled and fell from shelves; floor vibrated; rattled and cracked windows. Shook and rattled dishes. Abrupt onset; trembling motion. (USE, 1959) (V);

Pembroke, VA: Man eating dinner said, "It shook the coffee out of my cup.... I thought a trailer had hit the side of the house." Sound "like a muffled explosion." (RT 4/24/59);

Felt by and alarmed many. Slight damage to building. Plaster on walls cracked. Three to four rows of bricks fell from chimneys. Abrupt onset; trembling motion. Buildings creaked and loose objects rattled. Canned goods fell off store shelves; general direction of falling objects--west. Several heard subterranean sounds. (USE, 1959) (VI);

Poplar Hill, VA--Intensity IV. (USE, 1959);

Pulaski County, VA: Reports of the trembling but not as numerous as in Giles County. (RT 4/24/59) (IV);

One thought it was pressure cooker exploding. No damage but many questions. Thought a jet breaking the sound barrier. House shook. Shelves in refrigerator rattled. Felt in a sitting car and thought to be the wind rocking the car or some children pulling on the rear bumper. Woman lying on bed felt the trembling and looked under the bed to see if the dog was scratching. Town treasurer heard the office door rattle and thought it was stuck. (ST 4/24/59);

Intensity IV. (USE, 1959);

Rich Creek, VA--Intensity IV. (USE, 1959);

Ripplenead, VA--Intensity IV. (USE, 1959);

Roanoke, VA: Felt by several who "weren't sure what they were experiencing." One man and his wife said their living room floor "seemed to move up and down." He thought it was an earthquake; she said it was the furnace. A "rumbling noise" heard. Lasted less than a minute. (RT 4/24/59);

Intensity IV in Williamson Road area. Intensity I-III for Roanoke. (USE, 1959);

Staffordville, VA--Intensity IV. (USE, 1959);
 Thessalia, VA--Intensity I-III. (USE, 1959);
 Whitehorse, VA--Intensity I-III. (USE, 1959);
 Lindsie, WV--Intensity IV. (USE, 1959);
 Rock Camp, WV--Intensity I-III. (USE, 1959).

EXTENT:

Felt from Blacksburg to Narrows. (DA 4/24/59)
 Strongest in Giles County (MM 4/30/59)
 "Shook a wide area of southwest Virginia." (RTD 4/24/59) (DNR 4/24/59)
 Recorded by the Coast and Geodetic Survey in Washington, the University of North Carolina at Chapel Hill and by a portable seismograph of the Virginia Tech geology department. (NJ 4/24/59) Felt over about 1,100 square miles of Virginia and West Virginia. Chimneys damaged. Wall plaster cracked. Articles fell from shelves. Pictures knocked off walls. (Eppley, 1965)

1. Times (4/24/59), Roanoke, VA
2. USEQ [395]
3. EOHUS [121]
4. Daily Advance (4/24/59), Lynchburg, VA
5. Southwest Times (4/24/59), Pulaski, VA
6. Montgomery News Messenger (4/30/59), Christiansburg, VA
7. Times-Dispatch (4/24/59), Richmond, VA
8. News-Journal (4/24/59), Radford, VA
9. Bollinger [35]

III. USGS [390]

B. EQHUS [121] 1959 APR 23 15:59 37.5 80.5 WV - VA border 2900 VI

Virginia-West Virginia border. Felt over approximately 1,100 square miles of Virginia and West Virginia. Many alarmed at Eggleston and Pembroke. Chimneys damaged; wall plaster cracked. Articles fell from shelves; pictures knocked off walls. Also felt at Lindsie, W. Va.

1. USEQ [395]

C. EQHUS [108] [same as B. above]

D. USEQ [395] 1959 APR 23 15:58:41 37.5 80.5 VA - WV border 2900 VI

April 23: 15:58:41*. Epicenter 37-1/2° north, 80-1/2° west, Virginia-West Virginia border, W. Felt over an area of approximately 1,100 square miles. Maximum intensity (damage) VI in Giles County, Va., where several chimneys were damaged, plaster on walls cracked and articles fell from shelves.

059

INTENSITY (DAMAGE) VI IN VIRGINIA:

Eggleston: Felt by and alarmed many. A few bricks fell from a chimney. Small trees fell across railroad tracks. Pictures were knocked off walls; knickknacks fell to the floor; groceries fell from shelves in store. Buildings creaked; light pole and power lines shook. Rocking motion in north-south direction. Many residents heard moderately loud subterranean sounds at the same time they felt the earthquake.

Pembroke: Felt by and alarmed many. Slight damage to buildings; plaster on walls cracked; 3 or 4 rows of bricks fell from several chimneys. Abrupt onset; trembling motion. Buildings creaked; loose objects rattled. Canned goods in stores fell from shelves; general direction of falling objects--west. One resident reported "it shook the coffee out of my cup." Subterranean sounds heard by several.

INTENSITY (DAMAGE) V IN VIRGINIA:

Bluff City: Felt by and alarmed many. Two shocks about 1 or 2 seconds apart. Bumping motion. Buildings creaked; loose articles rattled; merchandise thrown from shelves. Pendulum on scales swung. Roaring subterranean sounds heard.

Hoges Chapel: Felt by many. Abrupt onset; trembling motion. Buildings creaked; loose objects rattled; pictures fell from walls; articles fell from store shelves.

Pearisburg: Felt by nearly all. Bottles rattled and fell from shelves; floor vibrated; rattled and cracked window. Shook and rattled dishes. Abrupt onset; trembling motion.

INTENSITY (DAMAGE) IV IN VIRGINIA: Blacksburg, Glen Lyn, Goldbond, McCoy, Narrows, Poplar Hill, Radford, Rich Creek, Ripplemead, Orchard Hill, Staffordville, and Williamson Road area.

INTENSITY (DAMAGE) IV IN WEST VIRGINIA: Lindsie.

INTENSITY (DAMAGE) I TO III IN VIRGINIA: Bent Mountain, Ironton, Kimballton, Long Spur, Maggie, Mechanicsburg, Newport, Roanoke, Thessalia, Whitehorse.

INTENSITY (DAMAGE) I TO III IN WEST VIRGINIA: Rock Camp

V. Bollinger [33]	1959	APR 23	20:58 :41.0	37.5	80.5	VA - WV border	7800	VI
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A. Bollinger [31] [same as above]

1. USEQ [395]
2. MacCarthy [244]

B. EOHUS [120]

C. MacCarthy [244]

D. USEQ [395]

VIII. MacCarthy [244]	1959	APR 23	3:38:41	37.5	80.5	VA - WV border	2900	VI
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1959: April 23: 3:38-41. According to U.S.E. the epicenter was near 37-1/2 N., 80-1/2 W., on the Virginia-West Virginia border. It was felt over some 1,100 square miles. The maximum intensity was VI, in Giles County, where a few chimneys were damaged, some plaster fell, and light articles were shaken from shelves. At Eggleston (VI), pictures were dislodged from walls, groceries and various knicknacks were shaken from shelves. At Pembroke (VI) bricks fell from a few chimneys and plaster on walls was cracked. At Hoge's Chapel (V) pictures were also dislodged and goods fell from shelves. At Pearisburg (V) bottles were thrown to the floor and windows were cracked. It was felt with intensity IV at Blacksburg, Glen Lyn, Goldbond, McCoy, Narrows, Poplar Hill, Radford, Rich Creek, Ripplemead, Orchard Hill, Staffordville, etc. It was also felt, with intensity I to III, at Bent Mountain, Ironton, Kimballton, Long Spur, Maggie, Mechanicsburg, Newport, Roanoke, Thessalia, and Whitehorse. Several West Virginia localities also report the shock. In many places it was accompanied by rumbling sounds.

A. USEQ [395]

IX. Varma [400]

1959 APR 23 37.5 80.2 Monroe Co., WV VI

Felt radius = 30 km.

A. USEQ [395]

B. Seismo. notes [340]

1959 APR 23 20:58:41 37.5 80.5 VA - WV border

Virginia-West Virginia border, April 23, 1959, 20:58:41 GCT, 37-1/2°N., 80-1/2°W. Slight damage in Giles County, Virginia (USGS).

1. USGS?

661

I. TEIC 1959 JUN 13 01:00 35.4 84.3 Tellico Plains, TN 3200 IV

Location: Tellico Plains, TN; intensity; center of felt area

Intensity: Felt by nearly everyone in Madisonville, Mount Vernon and Tellico Plains, TN; dishes, doors, windows rattles; near Vonore, TN, "water disappeared in wells"

Extent: Extreme SE TN - SW NC; map; 3200 sq. km.

II. TVA [380] 1959 JUN 13 01:00 35.4 84.3 Tellico Plains, TN IV

A. USEQ [395]

B. Moneymaker [283]

1. Questionnaire

July 6, 1959

Dr. Gerald R. MacCarthy
Department of Geology and Geophysics
The University of North Carolina
Chapel Hill, North Carolina

Dear Dr. MacCarthy:

I have yours of June 30 relative to the light earthquake of June 12, 1959. I have now also rather complete questionnaire data. The attached map, clipped from Esso Standard Oil Company's Tennessee-Kentucky road map, shows the felt area as accurately as the available information permits. It was felt in the extreme western portion of Cherokee County.

The time is still uncertain as no one checked a timepiece at the time of the shock. The press reported it as about 8:30 PM EST. Time estimates, made 3 days to a week later, range from about 8:00 PM to 8:30 PM. One observer noted that estimates ranged from 8:00 PM to 8:30 PM but gave his estimate as 8:30 PM.

The following is a summary of the questionnaire information.

Tennessee

Blount County

Tallassee - "not felt to my knowledge"

Loudon County

Greenback - felt by very few as a "light quiver"-"only two people of approximately 50 questioned reported feeling any tremor at all".

Harold T. Hammontree, Postmaster

Philadelphia - felt by very few. Time of shock "estimate only 8:10 PM", noise - "yes-just a small but steady roar - a rumbling in the distance just a strange sound different from sounds of planes, etc., but all over, could not tell what direction the sound came from".

A. B. Waller, Postmaster

McMinn County

Athens - not felt. "This matter was checked with Radio Station WLAR and the Daily Post-Athenian and they did not receive a report from any listener or reader".

Jim Buttram, Postmaster

Englewood - felt by very few. A noise like thunder and a rattling of windows. "Seemed to be noticed by about 25% of population."

Etowah - felt by very few. "A heavy jar".

Roy D. Hotsclaw, Postmaster

Niota - "not felt at Niota, Tennessee".

Monroe County

Coker Creek - (questionnaire not returned)

Madisonville - felt by nearly all. "Windows rattled and a "rumble more like blasting. I was sitting on the porch and it seemed to start in the distance and go on farther. Some people felt there were two distinct quakes but I did not have that sensation."

Mary S. Franklin, Postmaster

Mount Vernon - felt by nearly everyone; a loud rumbling sound; doors and windows rattled. "The noise and jar sounded very close".

Eugene F. Snider, Postmaster

Sweetwater - not felt

Tellico Plains.

(a.) The postmaster reported that the shock was felt by nearly everyone, "similar to a big blast." "Dishes, doors and windows rattled." "Some said it was 8:30 but between 8:00 and 8:30".

(b.) Miss Grace Mitchell
Notary Public, reported that the shock was felt by three fourths of the population and that it was accompanied by a "low rumbling noise like thunder underground". Dishes rattled and windows rattled "very much" - I have heard and felt several tremors and I believe this was an earthquake".

Vonore - felt by very few, "vibration of buildings" dishes, doors and windows rattled. "Water disappeared in wells".
Louise Kennedy

Polk County

Copperhill - "none of a half-dozen persons interviewed felt or had heard of any shock here".

Ducktown - "very slight"; felt by very few.
"a very slight shake".

Farner - felt by nearly all; dishes, doors and windows rattled; sounded like "low thunder for several seconds".

North Carolina

Cherokee County

Hiwassee Dam - T.V.A. Public Safety Officer reported that the shock was not felt at the dam.

Unaka - questionnaire not returned yet.

Graham County

Tapoco - not felt.

2. Unspecified newspaper acct.

Tellico Plains Earthquake of 1959, June 12 at 8:15 P.M. (?) Jolt Felt by Fisherman, Too

Tellico Plains, Tenn., June 13 (Special)—A rumbling and a rattling of dishes started Miss Grace Mitchell, well-known notary public, at supper last night.

"The windows rattled, too," she said today. "I have known of other earth tremors, but this one was the heaviest. It was at about 8:50 p.m. It jarred the house."

She said she heard later it was felt as far as Madisonville and at points in the mountains.

Fishermen at a hotel thought someone had fallen out of bed, she said.

3. Moneymaker's personal notes??

1959 JUN 12

Tellico Plains, TN

Between 8:00 and 8:30 P.M. an earthquake centered near Tellico Plains and Mount Vernon (35 21'N., 84 20'W.) perceptibly affected an area of more than 900 square miles in Monroe, Polk, McMinn, Loudon, and Blount counties, Tennessee and Cherokee County, North Carolina. It was felt over an elongated, north-south trending elliptical, area 50 miles long and up to 25 miles wide, extending from Loudon southward to Ducktown and from Etowah eastward to White Oak Flat (see map). In the epicentral area, and especially at Mount Vernon and Tellico Plains where the intensity was IV or slightly higher, nearly everyone felt the shock and heard a loud rumbling noise and the rattling of dishes, doors, and windows. Other localities within the area of perceptibility include Farmer (III), Madisonville (III), Vonore (III), Ducktown (II), Englewood (II), Etowah (II), Philadelphia (II), and Greenback (II), Tennessee and Patrick (II), and Violet (II), North Carolina. There was no damage to structures, but water reportedly disappeared from wells at Vonore, Tenn.

III. USGS [390]

D. USEQ [395] 1959 JUN 12 20:00 - 20:30 Tellico Plains, TN 2300 IV

June 12: (between 20:00 and 20:30). Tellico Plains, Tenn. IV. Felt over an area of about 900 square miles of Monroe, Polk, McMinn, Loudon, and Blount counties, Tenn., and Cherokee County, N.C. At Tellico Plains and Mount Vernon, nearly everyone felt the shock; doors, windows, and dishes rattled; loud rumbling noise heard. Also felt at Ducktown, Englewood, Etowah, Farmer, Greenback, Madisonville, Philadelphia, and Vonore, Tenn.; and Cherokee County, N.C.

IV. McClain [260] 1959 JUN 13 01:15 35.4 84.3 Tellico Plains, TN 2300 IV

Felt in several cities of east TN and Cherokee Co., NC.

A. USEQ [395]

B. EQUUS [121]

V. Bollinger [33] 1959 JUN 12 20:15 35.4 84.3 Tellico Plains, TN 2300 IV

A. McClain [260]

B. USEQ [395]

VI. Moneymaker [281] 1959 JUN 12 8:00-8:30 p.m. Southern Appalachians IV

667 1959 June 12 between 8:00 and 8:30 p.m. southern Appalachians (IV) A sharp shock centered near Tellico Plains, Monroe County, affected an area of about 900 square miles in Blount, Loudon, McMinn, Monroe and Polk counties, Tenn. and Cherokee County, N.C. At Tellico Plains, it was felt by nearly everyone as windows, doors and dishes rattled. A noise, "a low rumbling sound like thunder underground," accompanied the shock. At Mount Vernon, nearly everyone felt the shock and heard a low rumbling sound. One observer reported that "the noise and the jar sounded very close." The shock was felt and heard by nearly everyone at Madisonville and by some at Ducktown, Englewood, Etowah, Farmer, Greenback, Philadelphia, and Vonore, Tennessee and by a few in western Cherokee County, N.C.

A. USEQ [395]

B. Moneymaker [283]

IX. Varma [400] 1959 JUN 12 35.4 84.3 Tellico Plains, TN IV

A. USEQ [395]

I. TEIC 1959 JUL 7 23:17 37.3 80.7 Pearisburg, VA IV

Location: Pearisburg, VA

Intensity: Dishes, windows, loose objects rattled @ Bluff City, Goldbond, Newport, Pearisburg and Pembroke, VA

II. TVA [380] 1959 JUL 17 23:17 37.3 80.7 Giles Co., VA IV

A. USEQ [395]

B. Bollinger [35] 1959 JUL 17 18:20 Giles Co., Va 1300 IV

Bluff City, VA: Felt by many. (USE, 1959) (IV?);

Hoges Chapel, VA: Felt. (USE, 1959);

Goldbond, VA: Dishes and windows rattled. (USE, 1959) (III);

Kimballton, VA: Felt. (USE, 1959);

Newport, VA: Felt by many. (USE, 1959) (IV?);

Pearisburg, VA: Residents shaken by an earthquake--the third in three months. Windows and homes shook and cupboard dishes rattled. Golfers said "the earth shook under them."

Windows rattled and dishes clattered. Brief. Caused no injuries or damage. (DA 6/8/59);

Started at 6:20 p.m. and lasted no more than a second. Brought memories of April 23 shock. (DNR 6/8/59);

Pembroke, VA: Windows shook and dishes rattled. (RT 6/8/59) (IV);

Felt by many. Abrupt onset; trembling motion. Moderately loud subterranean sounds. (USE, 1959);

Ripplemead, VA: Felt. (USE, 1959).

1. USEQ [395]

2. Daily Advance (*6/18/59), Lynchburg, VA3. Daily News Record (*6/8/59), Harrisonburg, VA

C. Templeton [370]	1959	JUL 7	37.4	80.7	Giles County, VA	IV
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1. Bollinger [33]

III. USGS [390]

D. USEQ [395]	1959	JUL 7	18:17		Giles Co., VA	IV
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July 7: 18:17. Giles County, Va. Maximum intensity (damage) IV. No damage reported. Felt by many at Bluff City, Newport, and Pembroke, where windows and loose objects rattled. Abrupt onset; trembling motion. Moderately loud subterranean sounds heard. Dishes and windows rattled at Goldbond and Pearisburg. Also felt at Hoges Chapel, Kimballton, and Ripplemead.

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V. Bollinger [33]	1959	JUL 7	18:17	37.4	80.7	Giles Co., VA	1300	IV
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A. Bollinger [31] [same as above]

1. USEQ [395]

2. MacCarthy [244]

B. MacCarthy [244]

C. USEQ [395]

VIII. MacCarthy [244]	1959	JUL 7	6:17 p.m.		Giles Co., VA	IV
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1959: July 7: 6:17 p.m. According to U.S.E. the epicenter was in Giles County, probably not far from that of the April 23 shock. Maximum intensity was IV, with no damage reported. Was felt by many at Bluff City, Newport, Pembroke, Goldbond, and Pearisburg, where windows, dishes, etc., rattled. It was also felt, but more lightly, at Hoge's Chapel, Kimballton, and Ripplemead.

A. USEQ [395]

IX. Varma [400]

1959

JUL 7

37.3

80.7

Giles Co., VA

IV

A. USEQ [395]

I. TEIC 1959 AUG 12 18:06 34.8 86.6 Meridianville, AL 10,000 VI

Location: Meridianville, AL; intensity

Intensity: @ Hazel Green, AL; bricks shaken from chimneys; in Meridianville, AL, a chimney and a newly constructed concrete block building were damaged; groceries thrown from shelves in New Sharon and Huntsville, AL

Extent: N AL - S TN border area; map; 10,000 sq. km.

A. Gordon [175] 1959 AUG 12 18:06 34.8 86.6

18:06:01.4; 34.789, 86.562; 5.0R; 3.8F

Depth restrained; magnitude from felt area (Nuttli [311])

II. TVA [380] 1959 AUG 12 18:06 34.8 86.6 Meridianville, AL VI-VII

A. USEQ [395]

B. Moneymaker [283] 1959 AUG 12 12:08 34.9 86.6 AL - TN 7300

1. Summary of Questionnaire Data

Alabama

Jackson County, Alabama

Estillfork: Not felt

Holly Tree

Hytov: Not felt

Paint Rock: Not felt

Princeton: Felt by school children who noticed the rattling of windows. I-II

Woodville: Not felt

Limestone County, Alabama

Athens: Felt by many. Dishes rattled, flower pots on the floor danced; houses vibrated; some reported that houses were jarred. Mistaken for a slammed door and a jolt caused by a delivery truck. Few believed it was an earthquake. I-II

Belle Mina: Not felt

Capshaw: Not felt

Elkmont: Felt by nearly everyone; dishes, doors, and windows rattled. II-III

Moorestown: Not felt

Tanner: Felt by about half of the people; doors and windows rattled. II-III

Madison County, Alabama

Chase: Felt by nearly everyone; doors and windows rattled; pictures on the wall were set swinging. It felt as if the Post Office was about to roll off of its foundation. III-IV

Gurley: Not felt, although it was heard about a mile north of Gurley.

Harvest: Felt by about half of the people. Dishes, doors and windows rattled. Duration a second or two. III

Hazel Green: Felt by nearly everyone; dishes, doors and windows rattled; loose objects thrown from shelves; bricks shaken off of chimneys. School children "hopped up" from their seats, but the teachers restored order and resumed instruction. The Postmaster thought a truck had rammed the building and got her keys and left the building. She estimated the duration 30 seconds or less. Ceiling beams, 6" x 8" timbers in a store, shook like they coming down". "The sound seemed to come from inside the earth and brought with it a severe jarring effect". People fled from homes. IV - V - VI

Huntsville: Felt by many; mistaken for static firing of rockets at Redstone Arsenal. Felt over entire city. Houses "shook all over for several seconds". "A mirror trembled violently". Pictures on the wall rattled and windows vibrated. Felt in the airport tower. II - III - IV

Madison: Felt by nearly everyone. Windows rattled. II - III

Meridianville: Felt by nearly everyone. Dishes, doors, and windows rattled; pictures swung. A chimney and a newly constructed concrete block building were damaged. V - VI

New Hope: Not felt.

New Market: Felt by nearly everyone. Doors and windows rattled, "Everything shook and rattled". III

New Sharon: Felt by nearly everyone. School children raced into the yard when the building shook violently. People fled from homes and canned goods were thrown from shelves in a grocery store. The ceiling in the store "wavered" and the entire building appeared to buckle. A roaring sound attended the shock; a flock of chickens fluttered about excitedly and sought shelter in the hen house. Estimated duration 30-40 seconds. VI

Normal: Felt by about half the people. Windows and doors rattled. Some fled from their houses; some saw and felt brick buildings shake. A "great rumble" was heard through buildings. IV - V

Owens Cross Roads: Felt by few as a sort of vibration. II+

Ryland: Felt slightly by few as a sort of vibration. II - III

Toney: Felt by nearly everyone; dishes, doors and windows rattled. III

Walnut Grove (5 miles east of Hazel Green): Felt as a jolt; one observer thought a tractor had hit the side of his house. III -IV

Morgan County, Alabama

Decatur: Not reported felt.

Laceys Spring: Felt by a few; dishes, doors and windows rattled. II - III

Valhermoso Springs: Felt by a few; dishes, doors and windows rattled. II - III

Tennessee

Bedford County, Tennessee

Shelbyville: Not felt

Coffee County, Tennessee

Tullahoma: Not felt or heard.

Franklin County, Tennessee

Belvidere: Not felt.

Cowan: Not felt; would have been mistaken for blasting.

Decherd: Not felt.

Estill Springs: Felt by a few; windows rattled. II

Huntland: Not felt

Winchester: Felt, Windows rattled. The windows in the radio station could be heard rattling over the air. II - III

Giles County, Tennessee

Ardmore: Felt by a few; dishes and windows rattled. II - III

Elkton: Felt by about half the population. Windows rattled. II - III

Frankewing: Felt by a few; houses shook and windows rattled. II - III

Pulaski: Felt by about half the people and more strongly on the east side of the city than elsewhere. Dishes, doors and windows rattled. II - III

Lincoln County, Tennessee

Dellrose: Felt by about half of the people. Dishes and windows rattled; the glass letter case at the post office shook and rattled. III

Elora: Felt by a few; dishes, doors and windows rattled. II - III

Fayetteville: Felt by several; a loud rumbling noise was heard. Houses were shaken considerably III

Howell: Felt by a few; windows rattled. II - III

Kelso: Felt by nearly everyone; dishes and doors rattled. II - III

Mulberry: Felt by about half of the people; dishes and windows rattled. II - III

Petersburg: Not felt.

Taft: Felt by about half of the people; dishes, doors and windows rattled. A loud noise attended the shock. III

Marshall County, Tennessee

Belfast: A few people felt a light tremor; dishes rattled. II

Lewisburg: Not felt.

Moore County, Tennessee

Lynchburg: Felt by a few; dishes rattled. II

2. Precip. in Th. River Basin

A minor earthquake was felt in the southern part of Lincoln and Giles counties, Tennessee, and in the northern part of Madison County, Alabama, at 12:08 p.m. on August 12, 1959. The tremor rattled windows and dishes, vibrated buildings, and jolted canned goods off shelves at a grocery store in the New Sharon Community, four miles west of Hazel Green, Madison County, Alabama. However, no property damage was reported.

3. TVA Memorandum

A minor earthquake was felt in south Lincoln and Giles counties in Tennessee and north Madison County, Alabama, on Wednesday August 12, at 12:06 p.m.

There were reports that the tremor was felt as far south as Huntsville, Alabama; north to Fayetteville, Tennessee; west to Pulaski, Tennessee; and east to Winchester, Tennessee. The quake evidently had its center near the Alabama-Tennessee state line between Huntsville and Fayetteville. Observers within the shock area said the mild earthquake sounded like a very heavy truck or jet plane passing. Others said the noise resembled the roar of distant thunder.

The tremor rattled windows and dishes, vibrated buildings, and jolted canned goods off shelves at a grocery store in the New Sharon Community, four miles west of Hazel Green, Alabama. However, no property damage was reported.

The quake was recorded at the Spring Hill College seismograph station, Mobile, Alabama, at 12:08 p.m., according to the Reverend Louis Eisele, director of the seismograph. Eisele was credited in newspaper articles as stating that "Small activity of this kind has been going on for over 50 years in the area affected yesterday, although most of the activity has been somewhat smaller. It is caused when fault zones (cracked in the earth's surface) shift and relieve strain, which would cause a major earthquake if it were not released. There is nothing to get worried about. This activity was mild, although there have been other small quakes in the area from time to time which have toppled chimneys and knocked plaster off the walls of houses." Eisele said Tennessee has experienced a number of stronger earthquakes than this one during the past 20 years.

Heaviest jolts of the quake evidently occurred near the New Sharon Community, four miles west of Hazel Green in Madison County, Alabama. At a grocery store in this community canned goods were toppled off shelves.

4. Lincoln County News (8/13/59, Fayetteville, TN)

Earthquake Shakes Residents in The Lincoln County Area

Many persons in this area noticed the mild earthquake which shook Lincoln County a little after noon Wednesday, but caused no damage that has been reported.

The tremor started at 12:08 p.m. according to the Rev. Louis Eisele, director of the seismograph station at Spring Hill College, Mobile, Ala., where the quake was officially recorded.

Reports came in from as far south as Huntsville, Ala., and ranged from Winchester, Pulaski, and Fayetteville. The quake evidently had its center in the southern part of Lincoln County.

Many residents of this area called this paper and reported the incident. A farmer on "the ridge" reported that he timed the quake and that it lasted for 35 seconds. Many said that it felt like a big truck passing. Some residents of the county called Huntsville, believing that a test explosion, or an unscheduled explosion had taken place at the missile center there.

Mr. Eisels said small activity of this kind has been going on in this area for the past 50 years. It is caused when "fault zones shift and relieve strain which would cause a major earthquake if it were not released" he said.

Eisele said Tennessee has experienced a number of stronger earthquakes than this one during the past 20 years.

5. The Pulaski Citizen (8/12/59), Pulaski, TN

Wednesday Tremor Rocked County; Sound Comparable Truck or Jet Plane

Floors Quivered and Dishes Rattled in Many Homes Near Noon Hour

A minor earthquake centered in south Lincoln County shook homes in Giles County Wednesday and sent residents in the Southern section into their yards to seek the cause of the disturbance that lasted less than a minute.

The tremor started at 12:08 P.M. according to the Rev. Louis Eisele, director of the seismograph station at Spring Hill College, Mobile, Ala, where the quake was officially recorded.

Reports from the southern area of Giles County indicated the tremor extended throughout that area to Pulaski, and residents ran into their yards expecting to see jet planes in the sky or heavy trucks traveling at fast rate along the highways and rural roads.

In the Elkton community, Mrs. Grady Ezell, correspondent for The Pulaski Citizen, reported that she was seated at the telephone getting news for the paper when the floor of the residence began quivering and the noise that accompanied the movement sounded like heavy trucks were rolling down the road.

"I ran to the door to see what was happening and no vehicles were in sight and the tremor had passed. We're just happy that we are all right," Mrs. Ezell said.

Charlie Puckett of the same community also investigated the origin of the noise thinking it resulted from the passing of a "mighty heavy truck" and deciding that "this was an earthquake."

In the Prospect community, residents went through the same procedure to determine the origin of the tremor. Mrs. J. W. Jones said the noise resembled a roar of distant thunder that lasted only a short time and ended any question about the roar caused by trucks or airplanes.

Mrs. David Howard in the same community reported the windows of their home rattled so hard and with so much noise that she went into the yard to see if the television antenna had been blown down. Another Prospect resident, Mrs. William Brown reported dishes in her kitchen rattled and rumbling was noted in the section.

"In fact, " Mrs. Jones said, "if the rumbling had lasted any longer I guess we would have run for our lives".

Reports of jarred homes came in from as far south as Huntsville, Ala., and ranged from Winchester, Pulaski, and Fayetteville. The heaviest jolts were reported to have occurred in south Lincoln County and north Madison County, Alabama.

Mrs. J. M. Abernathy of the Owl Hollow community, east of Pulaski, said "the tremor was accompanied by an unusually loud rumble. It sounded like a very heavy truck or an airplane breaking the sound barrier, and it was different from anything I had ever heard."

Eisele, director of the seismograph station at Spring College, Mobile, Ala., was credited in The Nashville Tennessean as stating that "Small activity of this kind has been going on for over 50 years in the area affected yesterday, although most of the activity has been somewhat smaller. It is caused when fault zones (cracks in the earth's surface) shift and relieve strain which would cause a major earthquake if it were not released."

"There is nothing to get worried about. This activity was mild although there have been other small quakes in the area from time to time which have toppled chimneys and knocked plaster off the walls of houses."

Eisele said Tennessee has experienced a number of stronger earthquakes than was one during the past 20 years.

6. Unspecified news accounts

7. The Huntsville Times (8/12/59), Huntsville, AL

8. Commercial Appeal (), Jackson, TN ??

Tremor Reported in Several Areas - Shake is Felt in Gibson and Madison Counties

Jackson, Tenn., Aug. 19.-- Residents in widely-scattered communities of West Tennessee reported feeling a house-shaking tremor and hearing an explosion-like sound about 5:00 p.m. Wednesday.

The reports came from people at Adair and Pope in Madison County and Fruitland and Medina in Gibson County.

The Tennessee Highway Patrol office here said it had received no reports of explosions or plane crashes. Neither had the Federal Aviation Agency station here, but an FAA communicator offered the explanation that the sound may have been caused by a jet plane breaking the sound barrier.

9. Press-Scimitar (8/13/59), Memphis, TN

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Mild Quake Felt in 3 Counties

Fayetteville, Tenn.—Residents of three counties in Tennessee and one in North Alabama were jarred yesterday by a minor earthquake, but no injuries or property damage were reported.

The tremor was believed centered just south of this Lincoln County town near the Alabama border. Limited to a 55-mile radius, it also was felt in Huntsville, Ala., and in Franklin and Giles counties, Tenn.

The quake, recorded at 12:08 p.m. by the Spring Hill College seismograph in Mobile, Ala., lasted about 20 seconds.

10. Leaf Chronicle (8/13/59), Clarksville, TN

Minor Quake Felt in State

Fayetteville, Tenn. (AP)—Residents of three counties in Tennessee and one in north Alabama were jarred Wednesday by a minor earthquake, but no injuries or property damage were reported.

The tremor was believed centered just south of this Lincoln County town near the Alabama border. Limited to a 35-mile radius it was also felt in Huntsville, Ala., and in Franklin and Giles counties, Tenn.

The quake, recorded at 12:08 p.m. by the Spring Hill College seismograph in Mobile, Ala., lasted about 30 seconds.

Children fled from a school at Hazel Green, Ala., about three miles south of the Tennessee line, where the quake was felt, but classes were quickly resumed.

A Fayetteville resident said it sounded "like a jet plane breaking the sound barrier."

11. Tennessean (8/13/59), Nashville, TN

Minor Tremor Hits Southstate

No Damage Reported; Heaviest Jolt Felt in Lincoln County

A minor earthquake centered in south Lincoln County, Tennessee, shook thousands of homes mile radius yesterday but caused no reported damage.

The tremor started at 12:08 p.m. according to the Rev. Louis Eisele, director of the seismograph station at Spring Hill Mobile, Ala., where the - was officially recorded.

Reports from as far south as - Ala., Pulaski, and Fayetteville, Tenn.

The U.S. Weather Bureau in Nashville said no tremors were recorded here.

Flood of Inquiries

Although Eisele termed the quake minor and not extremely unusual for the area, residents in at least four Tennessee and Alabama counties flooded radio and newspaper offices with inquiries about the tremors, which lasted less than a minute.

The heaviest jolts occurred in south Lincoln County, Tennessee, and north Madison County, Alabama.

At Fayetteville, about 16 miles north of the Alabama border, many residents reported their homes shaken by what sounded like a "jet plane breaking the sound barrier."

The rumble sent children out of a school building at Hazel Green, Ala., about three miles south of the Tennessee border. Plans for temporary evacuation of the school were withdrawn after a recurrence of the tremor appeared unlikely.

Canned goods were jarred from shelves in a grocery store at New Sharon, Ala., a mile south of the Tennessee border.

Believed Missile Test

In Huntsville, the quake was believed to be an explosion test at nearby Redstone Arsenal sending many from their homes and buildings into the - in search of the disturbance.

Bill Levsiter, announcer at radio station WCTT at Winchester, Franklin County, said "I noticed the tremor while I was making a broadcast. I could hear our station windows rattling over the air. The building itself didn't shake, but it sounded like somebody was beating on the window screens for near 39 seconds.

Mrs. Rebecca Towry of Fayetteville, reported, "I didn't know what it was. It shook my house considerably and when I called around to some of my neighbors they said theirs had been shaken too."

Mrs. J. M. Abernathy, Giles County, correspondent for the Nashville Tennessee at Pulaski, said the tremor was accompanied by "an unusually loud rumble."

"It sounded like a very heavy truck or an airplane breaking the sound barrier," she said. "It was different from anything I had ever heard."

Nothing Unusual

Eisele, who states world-wide readings on the Spring Hill college seismography, said, "Small activity of this kind has been going on for over 50 years in the area affected yesterday, although most of the activity has been somewhat smaller. It is caused when fault zones (cracks in the earth's surface) shift and relieve strain which would cause a major earthquake if it were not released."

"There is nothing to get worried about. This activity was mild, although there have been other small quakes in the area from time to time which have toppled chimneys and knocked plaster off the walls of houses."

Eisele said Tennessee has experienced a number of stronger earthquakes than this one during the past 20 years.

12. Sun-Democrat (8/13/59), Paducah, KY

Minor Quake Jars Tennessee, Alabama

Pulaski, Tenn., Aug. 13 (UPI)—Earth tremors shook parts of Tennessee and Northern Alabama shortly after noon yesterday but caused no damage. The Spring Hill College seismograph at Mobile, Ala., recorded a minor earthquake centered near here.

Shocks were felt over most of Giles and Lincoln counties in Tennessee and in the Huntsville, Ala., area.

13. Times (8/13/59), Florence, AL

'Quake Jars Huntsville

Huntsville, Ala., (AP)—An earthquake which jarred Huntsville and the northern part of Madison County Wednesday was described as minor, with no damage reported.

The Rev. Louis Eisele, director of the seismograph station at Spring Hill College, Mobile, Ala., said the quake affected a radius of approximately 25 miles.

Wednesday's quake was only the second ever recorded in Alabama. The first was recorded April 23, 1957, and it shook much of North Alabama and North Georgia.

Eisele said "Huntsville is in a region that has been weakly active for a number of years and will have little earthquakes once in a while."

The North Alabama area is included in five regions of the United States which Dr. Charles F. Richter, of the California Institute of Technology, has charted as "high risk" areas where earthquakes are concerned.

14. The Decatur Daily (8/13/59), Decatur, AL

15. Commercial Appeal (8/13/59), Memphis, TN

Light Earthquake Hits Giles County

Pulaski, Tenn., Aug. 12. (UPI)—Giles and Lincoln County residents Wednesday reported earth tremors shortly after noon.

Meanwhile at Mobile, Ala., the seismograph at Spring Hill College recorded a "very minor" earthquake in the area, which includes Huntsville, Ala.

Father L. J. Eisele, seismologist, said the seismograph recorded the waves at 12:08 p.m.

The shocks were reported in all sections of Giles County.

Father Eisele described the quake as of a non-destructive nature.

The seismologist said the quake had an origin time of 12:08 p.m.

The tremor probably was felt over a 20-mile radius, he said, but was not severe enough to do any damage except rattle dishes and window panes.

16. News-Free Press (8/13/59), Chattanooga, TN

Earthquake Tremors Felt in 3 Counties

Fayetteville, Tenn. (AP)—Residents of three counties in Tennessee and one in north Alabama were jarred Wednesday by a minor earthquake, but no injuries or property damage were reported.

The tremor was believed centered just south of this Lincoln County town near the Alabama border. Limited to a 35-mile radius, it also was felt in Huntsville, Ala., and in Franklin and Giles counties, Tenn.

The quake, recorded at 12:08 p.m. by the Spring Hill College seismograph in Mobile, Ala., lasted about 30 seconds.

Children fled from a school at Hazel Green, Ala., about three miles south of the Tennessee line when the quake was felt, but classes were quickly resumed.

Bill Lassiter, announcer at radio station WCDT in Winchester, said "you could hear our station windows rattling over the air. It sounded like somebody was beating on the window screens."

A Fayetteville resident said it sounded "like a jet plane breaking the sound barrier."

17. Moneymaker [Personal notes??]

1959	AUG 12	12:08	35.0	86.6	Hazel Green, AL	7300
		p.m. CST				

1959 August 12 12:08 p.m. CST Hazel Green, Ala.

At 12:08 p.m., a sharp earthquake centered near Hazel Green, Alabama, (34° 57'N., 86° 36'W.) was felt over an area of 2800 square miles in Alabama and Tennessee. This area of perceptibility, as shown on the accompanying map as an irregular oval, includes portions of four counties in Alabama and five counties in Tennessee. It extends from Belfast Tennessee southward to Valhermoso Springs, Alabama, and from Estill Springs and Winchester westward to and beyond Pulaski. In the epicentral area, where the maximum intensity of VI was attained, the shock was felt by nearly everyone. Many, especially school children, were alarmed; and some ran out of buildings. At Hazel Green, loose objects were thrown from shelves and bricks were thrown from chimneys. At New Sharon, people were alarmed and ran from buildings; a flock of frightened children fluttered to shelter; and canned goods were thrown from shelves. At Meridianville, a new concrete block building and one chimney were damaged. Other localities where the shock was reported felt include Normal (), Chase (IV), Gurley (IV), Huntsville (IV), Elkmont (III), Harvest (III), Lacey's Spring (III), Madison (III), New Market (III), R (III), Tanner (III), Toney (III), Valhermoso Springs (III), Owens Cross Roads (II) and Princeton (II). Alabama; Ardmore (III), Dellrose (III), Elktion (III), Elora (III). Estill Springs (III), Fayetteville (III), Frankewing (III), Howell (II), Kelso (III), Mulberry (III), Pulaski (III), Taft (III), Winchester (III), Belfast (II), and Lynchburg (II), Tennessee.

III. USGS [390]

B. EQHUS [121]	1959	AUG 12	13:06	35.0	87.0	AL-TN border	7300	VI
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Alabama-Tennessee border. Felt over 2,800 square miles of Alabama and Tennessee. Slight damage to chimneys and building at Hazel Green and Meridianville. At New Sharon, people rushed from buildings and canned goods were thrown from shelves. At Huntsville, Ala. wall plaster cracked.

1. USEQ [395]

C. EQHUS [120] [same as B. above]

D. USEQ [395]	1959	AUG 12	13:06:07	35	87	AL-TN border	7300	VI
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August 12: 13:06:07*. Epicenter 35 north, 87 west, Alabama-Tennessee border, W. Felt over an area of approximately 2800 square miles of Alabama and Tennessee. Maximum intensity (damage) VI. Recorded by the Saint Louis seismograph.

INTENSITY (DAMAGE) VI IN ALABAMA:

Hazel Green: Felt by nearly all. Bricks shaken from chimneys. "Ceiling beams shook like they were coming down." People fled from their homes. Dishes, doors, and windows rattled. Moderately loud roaring sounds heard.

Meridianville: Felt by nearly all. A chimney and a newly constructed concrete block building were damaged. Dishes, doors, and windows rattled.

New Sharon: Felt by all. School children raced into yard when building shook violently. People fled from homes. The ceiling in a grocery store "wavered," and the entire building appeared to buckle; canned goods thrown from shelves. A roaring sound accompanied the shock.

INTENSITY (DAMAGE) V IN ALABAMA:

Huntsville: Felt by many. Two shocks felt. Groceries thrown from shelves—falling in northeast direction. Slight cracking of plaster on walls. Pictures and mirrors displaced. Rapid onset; trembling motion. Thunderous sounds heard.

Normal: Felt by and alarmed many. People fled from homes. Windows and doors rattled; buildings shook. Rumbling sounds heard.

INTENSITY (DAMAGE) IV IN ALABAMA: Athens, Chase, Elkmont, Laceys Spring, Madison, New Market, Princeton, Tanner, Toney, Valhermoso, and Walnut Grove.

INTENSITY (DAMAGE) IV IN TENNESSEE: Artmore, Belfast, Delrose, Elkton, Estill Springs, Elora, Fayetteville, Frankewing, Howell, Kelso, Lawrenceburg, Lynnville, Mulberry, Prospect, Pulaski, Taft, and Winchester.

INTENSITY (DAMAGE) I TO III IN ALABAMA:

Belle Mina (2 miles north of), Gurley (1 mile north of), Harvest, Owens Cross Roads, and Ryland.

INTENSITY (DAMAGE) I TO III IN TENNESSEE

Minor Hill and Owl Hollow.

IV. McClain [260] 1959 AUG 12 18:06 35.0 87.0 AL-TN border 7300 VI
:07.0

A. USEQ [395]

B. EQUUS [121]

C. Seismo. notes [340] 1959 AUG 12 After 12:00 p.m. TN

Tennessee, August 12, 1959, Earth tremors shook parts of Tennessee and northern Alabama shortly after noon, but caused no damage.

V. Bollinger [33]

1959 AUG 12 13:06:07 35.0 87.0 AL-TN border 7300 VI

A. EQUUS [120]

B. McClain [260]

C. USEQ [395]

VI. Moneymaker [281]

1959 AUG 12 12:08 p.m. Northern AL 7300 VI

1959 August 12 12:08 p.m. Northern Alabama, (VI) A moderately strong earthquake centered near Hazel Green, Alabama was felt over an area of 2800 square miles in Alabama and Tennessee. The area affected included parts of four counties in Alabama and six in Tennessee, extending from Valhermosa Springs, Alabama northward to Belfast, Tennessee and from Estill Springs westward to Pulaski, Tennessee. In Alabama, the earthquake was strongest in north central Madison County at Hazel Green, New Sharon, and Meridianville, where it was felt by nearly everyone. Buildings were strongly shaken, loose objects were thrown out of place, walls and chimneys were damaged, and windows, dishes and doors rattled. The shock was almost as strong at Huntsville and Normal, but much lighter at 16 other localities canvassed by questionnaire. The maximum intensity in Tennessee (IV) was experienced in central Lincoln County, where it was felt by nearly everyone. At Fayetteville, "houses were shaken considerably" and a loud rumbling noise was heard; at Dellrose, the glass letter case in the post office shook and rattled. The shock was quite perceptible at Winchester, where the rattling of windows in the radio station could be heard over the air, and at Pulaski, where about half the people felt it. It was reported felt by some at Lawrenceburg, about 18 miles west of the mapped limit of the main felt area. Other localities reporting a shock of intensity (III-IV) include Kelso, Estill Springs, Ardmore, Elkton, Elora, Prospect, Frankewing, Howell, Mulberry, Taft, Lynnville, Belfast and Lynchburg. It was felt less strongly at Owl Hollow (in Tims Ford reservoir area, Franklin County) and Minor Hill, Giles County. No damage was reported from any locality in Tennessee.

A. Seismo. notes [340]

B. EQHUS [121]

C. USEQ [395]

D. Moneymaker [283]

IX. Varma [400] 1959 AUG 12 35.0 87.0 Limestone Co., AL VI

Felt radius = 48 km.

A. USEQ [395]

B. EQHUS [121]

686

I. TEIC 1959 AUG 21 17:20 37.3 80.7 Pearisburg, VA 600 IV

Location: Pearisburg, VA; intensity

Intensity: Windows, loose objects rattled @ Pearisburg and Pembroke, VA

Extent: Giles Co., SW VA; map; 600 sq. km.

II. TVA [380] 1959 AUG 21 17:20 37.3 80.7 Giles Co., VA IV

A. USEQ [395]

B. Bollinger [35] 1959 AUG 21 00:15 Giles Co., VA 1600 IV

Eggleston, VA: Felt. (USE, 1959);

Mechanicsburg, VA: Felt. (USE, 1959);

Pearisburg, VA: The fourth earth tremor in 4 months rocked Giles County but no injuries or damage. Shock occurred between 12:15 and 12:20 a.m. and was felt over the entire county. One resident thought one of his children had fallen out of bed. (RT 8/22/59) (IV);

"A slight earth tremor" in the central Giles County area about midnight. Lasted only a few seconds. Centered near Pearisburg. Telephone switchboards flooded with calls requesting information on the tremor. (DA 8/21/59);

Windows and loose objects rattled. (USE, 1959);

Pembroke, VA: Intensity IV. Windows and loose objects rattled. Abrupt onset; trembling motion. Moderately loud subterranean noises. (USE, 1959).

1. USEQ [395]

2. Times (8/22/59), Roanoke, VA

3. Bollinger [35]

III. USGS [390]

D. USEQ [395] 1959 AUG 21 12:20 Giles Co., VA IV

August 21: 12:20. Giles County, Va. Maximum intensity (damage) IV at Pearisburg and Pembroke, where windows and loose objects rattled. Abrupt onset; trembling motion. Moderately loud subterranean sounds heard. Also reported felt at Eggleston, and Mechanicsburg.

V. Bollinger [33] 1959 AUG 21 12:20 37.4 80.7 Giles Co., VA 1600 IV

A. Bollinger [31] [same as above]

1. USEQ [395]

2. MacCarthy [244]

B. MacCarthy [244]

C. USEQ [395]

VIII. MacCarthy [244] 1959 AUG 21 12:20 p.m. Giles Co., VA IV

1959: Aug. 21: 12:20 p.m. According to U.S.E. the epicenter was again in Giles County. The maximum intensity was about IV at Pearisburg and Pembroke, where windows and loose objects rattled, and subterranean noises were heard. Was also reported, but as lighter, at Eggleston and Mechanicsburg.

A. USEQ [395]

IX. Varma [400] 1959 AUG 21 37.3 80.7 Giles Co., VA IV

A. USEQ [395]

I. TEIC	1960	JAN 3	07:30	35.9	82.1	Spruce Pine, NC	1500	IV
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Location: Spruce Pine, NC; A/S (?); intensity; location

Intensity: Rattled dishes, some awakened, buildings shook @ Spruce Pine, NC

Extent: W NC; map; 1500 sq. km.

Comment: Possible A/S @ Spruce Pine on JAN 4

II. TVA [380] 1960 JAN 3

A. Moneymaker [283]

1. G. R. McCarthy (written communication)

Department of Geology and Geography
The University of North Carolina
Chapel Hill

January 7, 1960

Mr. Berlen C. Moneymaker
Tennessee Valley Authority
614 Union Building
Knoxville, Tenn.

Dear Mr. Moneybags:

I [sic] regards to the N.C. "earthquake" of the early hours of January 3rd:

So far I have had "felt reports" from: Spruce Pine, Newland, Bakersville, Little Switzerland, Marion, Penland, Nebo, Micaville, Ingalls and Plumtree, with "not felt" answers from Elk Park, Cranberry, and Minneapolis. The Spruce Pine fire chief reports he saw a "flare like an explosion" at the time of the tremor.

We did not pick up any trace of the disturbance (which is variously stated as 2:33 and as 3:33 A.M.) on our seismograph, although there was a low level of microseismic activity present and, judging [sic] by the effects reported, we should have. This fact, plus the nearly linear N-S distribution of the "felt" reports plus the Spruce Pine report of a "flare" (the weather map shows overcast skies in that area) lead me to think that it was not a tectonic earthquake at all, but probably the shock wave from a large meteor. This is, at the moment, only a tentative conclusion, and if I get any evidence to the contrary, I will let you know.

About 10:30 P.M. on Friday, January 1, a very spectacular meteor, travelling from South to North, passed over Chapel Hill, but without making a sound. Perhaps another one of the same sort, but low enough to give a strong shock wave, created the disturbance on the 3rd.

Most sincerely,
Gerald R. MacCarthy

2. Avery Journal (1/7/60), Newland, NC

Earth Tremor

Sunday morning at 2:33 a.m. persons felt what they thought to be an explosion nearby.

It was later learned that the vibration was caused by an earth tremor which was felt in Avery, Mitchell, and McDowell counties. The tremor lasted approximately 15 seconds. No damage was reported.

3. Tri-County News (1/7/60), Spruce Pine, NC

Earthquake Struck Local Area at 2:33 Sunday A.M.

An earthquake struck the area comprising Mitchell, Avery, McDowell, and part of Buncombe, according to reports by J. W. Tappan, night fireman at Spruce Pine Fire Department, who was on duty and heard the roar in the ground and felt the tremor at 2:33 a.m. Sunday.

On account of a heavy dynamite blast that had occurred in Spruce Pine New Year's eve, the Spruce Pine Fire Dept. received numerous telephone calls to ask if there had been another blast. Since this area had an earthquake about three years ago in the middle of the day, many people were familiar with the sound and effect of an earth tremor and realized what it was. Mr. Tappan made a rapid survey and found no damage from the earthquake.

J. W. Riddle of Spruce Pine, who lived many years in California and being quite familiar with earthquakes, was awakened by the roar and the rattle of dishes and the receding roar as the earth tremor passed on through the mountains. Tappan figured that the tremor lasted 10 to 15 seconds and was stronger than the one which hit this area three years ago.

A second light tremor was reported in the vicinity of Spruce Pine Monday night.

4. Charlotte Observer (1/4/60), Charlotte, NC

Mountains 'Shook Up' By Tremor

Spruce Pine--(UPI)--An earth tremor rumbled [sic] through the North Carolina mountains early Sunday and flooded the police switchboard here with calls from alarmed residents of a three-county area.

"It was a big shake, then a rumble and then it faded out," said Police Sgt. J. W. Tappan. "We've had calls coming in all morning from a 40-mile area," he added.

Spruce Pine, a mining community, is perched in the ridge of mountains running along the North Carolina-Tennessee state line.

Tappan said there were no reports of damage "but everybody's all shook up. The whole three-county area had a good shake-up."

The Spruce Pine fire station "felt like it had just been lifted off the ground and rattled," Tappan said.

The tremor, timed at 3:33 a.m. lasted only about 10 seconds, Tappan reported.

5. Press (1/5/60), Johnson City, TN

Spruce Pine Feels Slight Earth Tremor

Spruce Pine, N.C.--The North Carolina mountains here rumbled early Sunday with an earth tremor.

The switchboard at Police Headquarters was flooded with calls from residents from three counties. The tremor was noticed over a 40-mile radius of the city.

Spruce Pine is a mining community perched on a ridge of mountains running along the line between North Carolina and Tennessee.

No damage was reported from the tremor which occurred at 3:33 a.m. and lasted about 10 seconds.

6. Citizen (no date), Asheville, NC

Earthquake - Meteor - or "Sonic Boom"? Asheville Citizen

But Not From Dynamite - Mitchell, McDowell, Avery Report Brief Earth Tremor

Spruce Pine--An earth tremor of 10 to 15 seconds duration hit this Mitchell County town at 2:33 a.m. Sunday, rattling windows and shaking buildings, although no immediate damage was reported. Persons in adjoining McDowell and Avery counties also reported the movement.

Night Fireman J. W. Tappan said the tremor was slightly stronger than a tremor that hit the area almost three years ago.

It was only three days ago that the town was rocked by a New Year's Eve dynamite blast triggered by two teenagers "ringing in the new."

Calls Sunday flooded the fire department from other areas including Newland, Bakersville, Little Switzerland, Marion, and Penland. Some worried citizens called wanting to know if more dynamite had been exploded.

Tappan said he made a check of Spruce Pine and found no buildings damaged, no broken windows and no one injured.

"At first I thought a boiler in the other part of the building had blown up," he said. "Then I realized it was a tremor. I guess it lasted 10 to 15 seconds."

7. Herald-Courier (1/4/60), Bristol, VA

Earth Tremor Rumbles Through Spruce Pine

Spruce Pine, N.C. Jan. 3 (UPI)--An earth tremor rumbled through the North Carolina mountains early Sunday and flooded the police switchboard here with calls from alarmed residents of a three-county area.

"It was a big shake, then a rumble and then it faded out," said Police Sgt. J. W. Tappan. "We've had calls coming in all morning from a 40-mile area," he added.

Spruce Pine, a mining community, is perched in the ridge of mountains running along the North Carolina-Tennessee state line.

Tappan said there were no reports of damage "but everybody's all shook up. The whole three-county area had a good shake-up."

The Spruce Pine fire station "felt like it had just been lifted off the ground and rattled," Tappan said.

The tremor, timed at 3:33 a.m., (EST) lasted only about 10 seconds, Tappan reported.

8. News-Sentinel (1/4/60), Knoxville, TN

Tremor Shakes Hills

Spruce Pine, N.C., Jan. 4 (UPI)—An earth tremor rumbled through the North Carolina mountains early Sunday.

"It was a big shake, then a rumble and then it faded out," said Police Sgt. J. W. Tappan. "We had calls coming in from a 40-mile area."

Spruce Pine is perched in the Blue Ridge Mountains.

Tappan said there were no reports of damage.

III. USGS [390]

D. USEQ [395] 1960 JAN 3 02:30

Avery, McDowell &
Mitchell Cos., NC

VI. Moneymaker [281]

1960 JAN 3 2:33 a.m.

Southern Appalachians

IV

1960 January 3 2:33 a.m. Southern Appalachians, (IV) A tremor of 10 to 15 seconds duration was felt in Mitchell, Avery and McDowell counties, North Carolina. Information collected by the writer indicates that it was felt at Spruce Pine; at six other localities within a radius of a few miles of that town; and in two outlying areas, one at Newland and the other including Marion and Nebo. Newland is 14 miles northeast of Spruce Pine and Marion is 16 miles southeast of it. An observer described the tremor as "a big shake, then a rumble, then it faded out." Another "was awakened by the roar of the tremor." Some observers attributed the disturbance to such non-seismic causes as a possible dynamite blast, shock waves from a supersonic aircraft, and shock waves from an unseen passing meteor; others thought it was an earthquake. The information available suggests that the tremor might have been a light earthquake centered near Spruce Pine. A second light shock was reported at Spruce Pine on the night of January 4 but no details were given. Neither shock was felt in Tennessee, but both apparently were centered and felt in the headwaters of the Nolichucky drainage basin. (Tri-County News, Spruce Pine, Jan. 7, 1960; Avery Journal, Newland, Jan. 7, 1960).

1. Tri-County News (1/7/60), Spruce Pine, NC
2. Avery Journal (1/7/60), Newland, NC

January 3: 02:30. Avery, McDowell, and Mitchell counties, N.C. A tremor rumbled through the mountains of North Carolina, rattling windows, shaking buildings, and alarming residents. No damage was reported. (Not recorded by the seismograph of the University of North Carolina—probably of artificial origin.)

I. TEIC 1960 FEB 9 14:00 35.4 82.4 Edneyville, NC V

Location: Edneyville, NC

Intensity: Plaster fell, windows and dishes rattled, buildings shook

Extent: Edneyville and Sugarloaf sections of Henderson Co., NC; 300+ sq. km.

Comment: Other shocks reported previous 2 days - only FEB 9 event recorded @ Chapel Hill seismograph

II. TVA [380] 1960 FEB 9 14:00 35.4 82.4 Edneyville, NC VI

Other shocks in sequence of artificial origin?

A. USEQ [395]

B. Best [20] 1960 FEB 9 14:00:06.0 Henderson Co., NC

III. USGS [390]

D. USEQ [395] 1960 FEB 9 09:00:06 Henderson Co., NC

February 7-9: Henderson County, N.C. Four tremors, accompanied by rumbling thunderlike noise, shook the residents of Edneyville and Sugar Loaf sections of Henderson County. Plaster fell; windows and dishes rattled; and buildings shook. The first shock was reported at 22:20, February 7; the second and third at 03:30 and 20:30, February 8; and the fourth at 09:00:06, February 9. These tremors, with the exception of the one on the 9th, which was recorded on the seismograph of the University of North Carolina, were probably of artificial origin.

1. UNC seismograph

IV. McClain [260] 1960 FEB 9 14:00 35.3 82.5 Henderson Co., NC
:06.0

A. USEQ [395]

V. Bollinger [33] 1960 FEB 7-9 22:20, 35.4 82.5 Henderson Co., NC
03:30, 20:30,
09:00

695

Except for shock on Feb. 9 probably of artificial origin

A. USEQ [395]

IX. Varma [400]

1960

FEB 9

35.4

82.4

Henderson Co., NC

IV

A. USCGS?

I. TEIC 1960 APR 15 10:10 35.8 84.0 Alcoa, TN 3900 V

Location: Alcoa, TN; intensity

Intensity: Many awakened, houses shook, doors, windows, dishes rattled

Extent: E TN; map; 3900 sq. km.

II. TVA [380] 1960 APR 15 10:10 35.8 84.0 Near Alcoa, TN V

A. USEQ [395]

B. Moneymaker [283] 1960 APR 15 5:12 a.m. EST Eastern TN

1. Summary of questionnaire data

Blount County

Alcoa: Felt by nearly everyone; shook houses, rattled doors, windows and dishes. Attended by a noise like thunder.

"J. B. Gardner, Postmaster - Alcoa, Tennessee"

Friendsville: Felt by few; houses shook slightly and windows rattled. There was a rumbling noise with it.

Louisville: Felt by about half of the people. Houses shook; doors and windows rattled. The noise was "like a blast— Quite few persons I talked to said it woke them up".

Maryville: Felt by nearly everyone. Houses shook. A noise like thunder was heard.

Mentor: Felt, by about half of the people. Houses were shaken, and doors and windows rattled.

Pumpkin Center: Felt and heard by nearly everyone. "I knew it was an earthquake and not a jet plane, because it kept on, and on. I felt the trembling motion." People were awakened by the noise and by the vibrations.

Rockford: Felt by several, as houses shook, doors and windows rattled. It was attended by "a low rumbling thunder".

Tallassee: "Felt by most all early risers". Dishes, doors and windows rattled. Houses shook and a "thunderous" noise was heard.

Townsend: Not felt; that is "not that I can hear of".

Belle Emert P. M.

Knox County

Fountain City: Felt and heard. Robert McDonald, off Jacksboro Pike atop Black Oak Ridge was awakened by the noise and thought his children were out of bed. When he found the children in bed and asleep, he thought no more of the disturbance until later in the day when he heard reports of the earthquake.

Knoxville: Felt in all parts of the metropolitan area. A few individual reports indicate personal reactions to the shock.

Berlen C. Moneymaker, 4037 Stillwood S.W. "I did not feel the tremor but I heard it. I noticed the very rapid vibration of a table lamp near the bed and I heard a strong roaring noise which appeared to be to the west of the house. The vibrations lasted a few seconds and the roaring sound continued for a few seconds. The whole thing lasted, I estimate, not more than 5 to 8 seconds at the most. My first reaction was that a train was passing nearby, but I soon realized that there was no train passing, and that the passing of a train does not cause the table lamp to rattle."

Ashley Mack, 2230 Laurel Ave. Miss Mack reported that she was awakened by the noise. The rattling of the house was at first mistaken for the slamming of a door.

John S. Rozek was attending Mass at the Church of the Holy Ghost on Central Avenue at the time of the shock. Mr. Rozek reported that he did not feel the vibrations, but he heard the creaking of the beams overhead and an outside rumbling sound.

Mrs. Arpie Fowler, Fontana Street heard the noise, especially the rattling of the house - but felt no vibrations.

Bruce Whitlock, 2449 East Fifth Avenue. Mr. Whitlock heard the rattling of the house and thought that someone was opening and closing the front door. He examined the door and found it locked and by then all was quiet.

John Voorhees, Brandau Drive, South Knoxville, heard a brief rumble, which he estimated lasted 2 seconds. He heard the rattling of windows.

Miss Vivian Williams, Chapman Highway, just east of Brown's Mountain, some 4-1/2 miles southeast of the Gay Street Bridge over the Tennessee River. Miss Williams felt a jolt and heard the windows and doors rattling. She did not hear a rumbling or roaring sound.

Mr. Wylie A. Bowmaster, Timberlake Road, some 2.5 miles southwest of Knoxville. Mr. Bowmaster reported hearing a very noticeable rumble, then felt vibrations which ceased before the rumbling noise died away. The whole disturbance lasted only a few seconds.

Mascot: Not felt. "I have asked several people and none report they felt the earthquake of April 15, 1960."

F. I. Mins - Acting Postmaster

Powell: Not felt, according to

R. K. Black, P. M. 4-20-60.

Loudon County

Greenback: "Felt by almost everyone who was awake and awoke several people". Houses shook, doors, windows, and dishes rattled. It was accompanied by a low rumbling, like thunder".

Harold I. Hammontree, Postmaster

Lenoir City: "I have not found any person who felt the earthquake".

George L. Bowman, P. M.

Not felt.

McMinn County

Athens: Felt by a few who noticed houses shaking and heard a rumbling sound.

Englewood: Reported not felt by postmaster. Other sources suggest that it was noticed but not recognized by a few.

Etowah: Not felt.

Monroe County

Madisonville: Felt by about half of the people who were awake and by those easily awakened. Houses shook, and dishes, doors, and windows rattled. The shock was attended by a "sort of a roar"

Mary S. Franklin

Mount Vernon: Felt by nearly everyone. Houses shook and doors and windows rattled. A rumbling noise accompanied the shock.

Eugene L. Snider, Postmaster

Sweetwater: Not felt.

Tellico Plains: Felt by a few at Tellico Plains and also in a "rural section approximately four miles from Tellico Plains". It was attended by a noise "similar to low thunder".

Vonore: Felt by about half of the people, who heard a slight rumbling. Houses shook.

Polk County

Benton: Not felt.

Sevier County

Sevierville: Not felt.

Seymour: Not felt.

2. News-Sentinel (4/15/60), Knoxville, TN

Weather Bureau Building Shaken

Some sort of shock, apparently an earth tremor, was felt in the Knoxville-Maryville-Alcoa area at about 5:10 a.m. today.

"It shook our building and we heard a roar like thunder," said John Thach of the Weather Bureau. He said it was recorded there at 5:12 a.m.

"It sounded like a hard bolt of thunder," said Mrs. Charles Timmons of Maryville. She clocked it at 5:10, as did several others.

"It jolted our house and awakened my husband and me," said Mrs. Paul D. Frazier, 100 W. Redbud Dr. "Then the house quivered after the jolt."

Mr. Thach quoted a Chapman Highway man as telling the Weather Bureau he heard a "swooshing sound" at the time of the tremor.

Other reports came from Sutherland Ave. and the Clinton Highway section.

"All our windows were jolting and quivering," said Mrs. Frank Hogan, 1527 Hillwood Dr., South Knoxville.

Berlen C. Moneymaker, TVA geologist, said he is reasonably certain the shock was caused by an earthquake. He called it a "light shock." He said it was very similar to one which rattled windows in about the same area at 2:32 p.m., Jan. 25, 1955.

3. Journal (4/16/60), Knoxville, TN

Earth Tremor Shakes Area Around Knox

An apparent earth tremor, the first reported here in more than five years, awakened persons and rattled windows in the Knoxville-Maryville area at 5:10 a.m. yesterday. No damage was recorded by the shock reported by Berlen C. Moneymaker, Tennessee Valley Authority Geologist, to have centered south of Fort Loudon Lake between Knoxville and Maryville. Moneymaker said official reports on the shock will not be complete for several days but that there was no doubt it was caused by an earthquake.

John Thach, on duty at the weather station, felt the shock and recorded it at 5:12 a.m. Others in the Maryville area had felt the jolt at 5:10 a.m.

Several persons reported a sound accompanied the shock. Mrs. Charles Timmons, Maryville, said it was "like a bolt of thunder." A Chapman Highway man told the weather bureau he heard a "swooshing sound" at the time of the tremor.

Moneymaker said the shock had been felt north of Fountain City by residents on Black Oak Ridge. He said the shock was similar to one felt here in almost the same area at 2:53 p.m., Jan. 25, 1955.

4. Elizabethton Star (4/15/60)

Some sort of shock, apparently an earth tremor, was felt in the Knoxville-Maryville-Alcoa area at about 5:10 a.m. today.

"It shook our building and we heard a roar like thunder," said John Thach of the Weather Bureau. He said it was recorded at 5:12 a.m.

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Mr. Thach quoted a Chapman Highway man as telling the Weather Bureau he heard a "swooshing sound" at the time of the tremor.

Other reports came from Sutherland Ave. and the Clinton Highway section.

III. USGS [390]

B. EQHUS [121] 1960 APR 15 05:10 35.75 84.0 East TN 3400 V

Eastern Tennessee. Felt by nearly all and awakened many. Houses shook; loose objects rattled.

1. USEQ [395]

C. EQHUS [120] [Same as B. above]

D. USEQ [395] 1960 APR 15 05:10:10 Eastern TN 3400 V

April 15: 05:10:10*. Eastern Tennessee. Felt over an area of approximately 1300 square miles of eastern Tennessee. Maximum intensity (damage) V. Recorded by the seismograph at the University of South Carolina.

Intensity (Damage) V in Tennessee:

Alcoa: Felt by nearly all; many awakened. Houses shook; doors, windows, and dishes rattled. Accompanied by a thunderlike noise.

Greenback: Felt by nearly all who were awake; several awakened. Houses shook; doors, windows, and dishes rattled. Accompanied by a rumbling noise like thunder.

Knoxville: Felt by nearly all; many awakened; few alarmed. Houses shook; windows, dishes, and doors rattled. Table lamp vibrated. Rumbling sounds heard by many.

Madisonville: Felt by about half the population; awakened many. Houses shook; doors, dishes, and windows rattled. The shock was accompanied by a "sort of a roar."

Maryville: Felt by nearly all; many awakened. Houses shook. Thunderlike noises heard by many.

Mount Vernon: Felt by nearly all. Houses shook; doors and windows rattled. A rumbling noise accompanied the shock.

Pumpkin Center: Felt and heard by nearly all; many awakened by the noise and vibrations. Trembling motion.

Tallassee: Felt by nearly all. Houses shook; windows, doors, and dishes rattled. Thunderous noises heard by many.

Intensity (Damage) I to IV in Tennessee:

Athens, Englewood, Fountain City, Friendsville, Louisville, Mentor, Rockford, Tellico Plains, Vonore, and Walland.

1. USC seismograph

IV. McClain [260] 1960 APR 15 10:10 35.8 84.0 Near Knoxville, TN 3400 V

A. USEQ [395]

B. EQHUS [121]

V. Bollinger [33] 1960 APR 15 05:10 35.8 84.0 East TN 3400 V

A. EQHUS [120]

B. USEQ [395]

C. McClain [260]

VI. Moneymaker [281] 1960 APR 15 5:10 a.m. Southern Appalachians 3400 V

1960 April 15 5:10 a.m. Southern Appalachians, (V) A light earthquake shock attended by a strong roaring noise and lasting 4 to 8 seconds was felt and heard over an area of 1300 square miles in the eastern Tennessee counties of Knox, Loudon, McMinn, and Monroe. The area affected, extending from the Black Oak Ridge section of Fountain City southward to Englewood and from near Loudon eastward to Calderwood, was a somewhat distorted ellipse 65 miles long and 25 miles wide. Over this entire area, houses shook: doors, dishes, windows, lamps, and other objects rattled, and light sleepers awoke. Although the earthquake was centered near Greenback (V), it was felt with almost equal force at Alcoa, Louisville, Madisonville, Pumpkin Center and Tallassee. Other localities reporting the shock at lower intensities were Athens, Englewood, Fountain City, Friendsville, Knoxville, Maryville, Mount Vernon, Mentor, Rockford, Tellico Plains, Vonore, and Walland. As experienced in West Knoxville, the shock was characterized by high frequency vibrations and a loud roaring noise resembling that made by a fast train. The noise continued for a few seconds after the perceptible vibrations ceased.

A. EQHUS [121]

B. USEQ [395]

C. Moneymaker [283]

IX. Varma [400]

1960 APR 15 35.8 84.0 Alcoa, TN

V

A. USCGS?

I. TEIC 1963 JAN 17 11:40 37.3 80.1 Salem, VA 2600 IV

Location: Salem, VA; A/S; intensity

Intensity: Buildings shook, windows, loose objects rattled

Extent: SW VA; map; 2600 sq. km.

Comment: A/S @ Roanoke, Salem, VA; felt report from Bristol, VA about 150 km outside of felt area

II. TVA [380] 1963 JAN 17 11:40 37.3 80.1 Salem, VA IV-V

A. USEQ [395]

B. Moneymaker [283] 1963 JAN 17 6:40 & 9:26 a.m. EST VA - TN - NC

1. Kingsport News (1/18/63), Kingsport, TN

Two Tremors Shake Southwest Virginia

Roanoke (AP)—Southwest Virginia took an early morning stretch Thursday from Bristol to Roanoke when two mild earthquakes vibrated through the region.

A seismological station at Virginia Tech registered the apparently harmless earth tremors at 6:40 and 9:26 a.m.

The college station, part of a national monitoring network still under construction, was the only unit to report the shocks Thursday, making it difficult to determine the origin of the disturbance with much precision.

However, the director of the station, Tech geologist Charles Sears, said the quakes occurred southwest of Blacksburg at a distance of 120 to 140 miles, placing them near the Virginia, Tennessee and North Carolina borders.

A Washington seismograph less sensitive than Tech's did not record the tremors, Dr. Sears said. An official at network headquarters said stations at Chapel Hill, N.C., and St. Louis, Mo., would be queried about the incident.

Two or more stations in different locations must register a disturbance before its precise location can be "fixed," similar to the way the unknown location of a broadcasting station is pinpointed.

The tremors, each lasting about 20 seconds, never got much beyond the window-rattling stage.

Dr. Sears said they were about 700 times less intense than the earthquake last September which wiped out a village in Iran.

Residents in the Bristol, Blacksburg and Roanoke areas reported feeling the quakes.

"Everything was shaking," said Mrs. Fred Brumfield of Glenvar (Rt. 3, Roanoke).

"There was a deep rumbling noise, I didn't know what it was. It wasn't the sound of a jet breaking the sound barrier and it was awfully early for them to be doing work on Interstate 81," she said.

The Rev. J. W. Hatton, who lives nearby, said it felt as if "several trucks were going by the house at the same time. But instead of just shaking the windows, they shook everything."

"The whole house quivered. I thought my furnace was going to blow up," said Mrs. J. H. Stratton in describing the first tremor.

2. News-Sentinel (1/18/63), Knoxville, TN

Quakes Jostle Tri-State Area

Roanoke, Va., Jan 18 (AP)—Two mild earthquakes caused tremors yesterday centered in an area where Virginia meets the border of Tennessee and North Carolina.

The tremors were recorded at 6:40 a.m. and 9:26 a.m. by a seismograph at Virginia Tech at Blacksburg.

Charles Sears, a geology professor at Tech, said the tremors each lasted about 20 seconds. He termed the earthquakes "mild."

3. Press-Chronicle (1/18/63), Johnson City, TN

Earthquakes jar 3-state border

Roanoke, Va. (AP)—Two mild earthquakes caused earth tremors yesterday centered in an area where Virginia meets the border of Tennessee and North Carolina.

The tremors were recorded at 6:40 a.m. and 9:26 a.m. yesterday by a seismograph at Virginia Tech at Blacksburg.

Charles Sears, a geology professor at Tech, said the tremors each lasted about 20 seconds. He termed the earthquakes "mild."

4. Personal Correspondence

C. Bollinger [35] 1963 JAN 17 06:40 & 09:26 Salem, VA 9900 IV

Blacksburg, VA: Tremors recorded on Virginia Tech seismograph at 6:40 and 9:26 a.m. Felt in Blacksburg. (RT 1/18/63) (III);

First shock felt by few. Buildings creaked and loose objects and windows rattled. (USE, 1963);

Bristol, VA: Felt. (RT 1/18/63);

Christiansburg, VA—Felt. (USE, 1963);

Radford, VA: One person "heard what sounded like an explosion but decided it must have been a car backfiring," about the time the second tremor was reported. Shocks described as "thunder" "an exploding furnace," "interstate trucks rumbling by," and "the cat knocking something over in the basement." (BS 1/24/63) (IV);

Roanoke, VA: "Everything was shaking." "There was a deep rumbling noise. I didn't know what it was. It wasn't the sound of a jet breaking the sound barrier." It felt as if "several trucks were going by the house at the same time. But instead of just shaking the windows, they shook everything." "The whole house quivered. I thought my furnace was going to blow up." (RT 1/18/63) (IV);

The shocks "were scary." "The ground just started shaking...and the coal on top of the pile began rolling down the side." (BS 1/24/63);

Salem, VA: "IV - Felt by several. Buildings creaked; loose objects and windows rattled. Abrupt onset; trembling motion." (USE, 1963).

EXTENT:

From Bristol to Roanoke with epicenter some 120 to 140 miles southwest of Blacksburg near the Virginia, North Carolina, Tennessee borders. Tremors each lasted about 20 seconds and rattled windows. (RT 1/18/63);

Highest Intensity IV. Center at Salem, Va. (USE, 1963)

1. Times (1/18/63), Roanoke, VA

2. USEQ [395]

3. Bollinger [35]

III. USGS [390]

D. USEQ [395]	1963	JAN 17	06:40:26.8 & 14:26:50.8	Salem, VA	IV
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January 17: 06:40:26.8*, 14:26:50.8*. Salem, Va. IV. Felt by several. Buildings creaked; loose objects and windows rattled. Abrupt onset; trembling motion. North of Glenvar, "everything was shaking." Deep rumbling noises heard. During second shock, ground shook and coal on top of pile rolled down other side. The first shock was by few at Blacksburg where buildings creaked and loose objects and windows rattled. At Roanoke, house quivered and some thought furnace had blown up. Also felt at Christiansburg and Bristol. Recorded by seismograph at Virginia Polytechnic Institute.

IV. McClain [260]	1963	JAN 17	11:40 :26.8 19:26:50.8	Salem, VA	IV
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A. USEQ [395]

V. Bollinger [33]	1963	JAN 17	06:40 :26.8	Salem, VA	9900 IV
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A. USEQ [395]

VI. Moneymaker [281]	1963	JAN 17	6:40 & 9:26 a.m.	Southern Appalachians	IV
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1963 January 17 6:40 and 9:26 a.m. Southern Appalachians, (IV) Two light shocks centered in southwestern Virginia were felt at Blacksburg, Christiansburg, Roanoke, and Salem, Virginia and Bristol, Tennessee-Virginia.

A. Moneymaker [283]

B. USEQ [395]

IX. Varma [400]

A. USEQ [395]

1963

JAN 17

37.3

80.1

Salem, VA

IV

I. TEIC 1963 OCT 28 22:39 36.6 81.0 Ennice, NC 5900 V

Location: Ennice, NC; intensity; near center of area where A/S was reported; near center of felt area

Intensity: Goods fell from shelves @ Ennice, NC; houses shook, windows, dishes rattled over most of the affected area; furniture shifted slightly @ Fries, VA, lamp upset

Extent: SW VA - NW NC border area; map; 5900 sq. km.

Comment: A/S @ Galax, VA, Sparta, Glade Valley, NC

II. TVA [380] 1963 OCT 28 22:39 36.6 81.0 Ennice, NC VI

A. USEQ [395]

B. Moneymaker [283]

1. Herald Courier (11/3/63), Bristol, VA

Seismograph at VPI Tells When. . .The Mountains Move

BLACKSBURG, Va. (AP)—The mountains of western Virginia move now and then, and faith has little to do with it.

When it happens it shows up on the Virginia Polytechnic Institute seismograph as an earthquake. Even if the movement was minute enough to get past a man's senses, it would still be recorded at the VPI seismographic station. The latest shaking was given the Galax area last Monday and it was the usual mild - mannered mountain earthquake.

Dr. Charles B. Sears, director of the seismographic station, says there's very little to worry about. The earth in the Southern Appalachian chain has been moving about off and on for years and no loss of life or serious damage has been recorded.

One of the best - remembered earthquakes occurred in the Giles County area in 1959. Several chimneys were toppled, trees fell across a railroad line and windows shook and rattled, but there was no general damage.

Dr. Sears describes these mountain 'quakes as "a readjustment of slippage below the surface," which means, that the mountains move.

The movements are slight most of the time. "If you were real still," Dr. Sears says, "You probably could feel it." The VPI seismograph can pick these subtle motions, up, though. Even a "very small movement"—say, 100,000th of an inch.

When they got as noticeable as the one in the Galax area on Monday the phones started ringing at police stations and at the seismographic station at VPI.

Dr. Sears says earthquakes in the mountains aren't becoming more frequent. "The only thing is that now we have the instruments to pick them up."

In recent years, sonic booms have been mistaken for earthquakes in the western Virginia area. They don't show up on the seismograph but residents have complained of being bumped out of bed by them.

The VPI station, monitoring mountain movements and other earth disturbances as far away as Japan, has been in full operation since September 1962.

Dr. Gerald MacCarthy, professor of geology and geophysics at the University of North Carolina at Chapel Hill, is also interested in Appalachian earthquakes. He agrees that the mountains "are still moving around to some extent."

But Dr. MacCarthy claims that the mountain 'quakes rarely ever get as tough as others which occur in the Piedmont section of Virginia.

"Some of the strongest Virginia earthquakes have been in the area between Charlottesville and Richmond," he said. The mountain disturbances are more numerous but not shocking.

2. Journal (10/29/63), Knoxville, TN

Officials Note Earth Tremors

Galax, Va., Oct. 28 (AP)—Officials at Virginia Tech in Blacksburg said three slight earth tremors were recorded on their seismograph Monday for the Galax area of Grayson County in Southwest Virginia.

A Tech spokesman said that only one of the tremors, recorded about 5:40 p.m., was strong enough to be noticeable without a seismograph. The tremor apparently was strongest in the Fries community, 15 miles from here.

Many area residents noticed the tremor, and one woman reported that it knocked a lamp off the table in her home.

Earth tremors have been recorded previously in Southwest Virginia.

3. Press-Chronicle (10/29/63)

Earth tremors hit southwest Virginia area.

GALAX, Va. (AP)—A fourth earth tremor struck this southwest Virginia community Monday.

The tremor, of short duration, shook the town at 8:57 p.m.

One person said, "you could feel the sidewalks shaking under your feet."

There were no reports of damages.

Earlier, three tremors in Grayson County were recorded on the seismograph at Virginia Tech at Blacksburg.

4. News-Sentinel (10/29/63), Knoxville, TN

Tremors Felt in Galax Area

GALAX, Va., Oct. 29 (AP)—A fourth earth tremor struck this Southwest Virginia community yesterday.

The tremor, of short duration, shook the town at 8:47 p.m. EST. One person said, "You could feel the sidewalks shaking under your feet." There were no reports of damages.

Earlier yesterday three earth tremors in Grayson County were recorded on the seismograph at Virginia Tech at Blacksburg.

A Tech spokesman said that only one of the tremors, recorded about 5:40 p.m., was strong enough to be noticeable without a seismograph.

C. McCarthy [246] 1963 OCT 28 22:38:35 36.7 91.0 VA - NC

During the late afternoon and evening of October 28, 1963, a series of small earthquake shocks was felt along the extreme western portion of the border between Virginia and North Carolina, centering not far from 36.7 N, 91.0 W. According to news reports the center of the disturbance must have been close to Galax, Virginia, locality 7 on the accompanying map. The records made by the seismographs at Blacksburg, Va., and at Chapel Hill, N.C., are consistent with this position, although they do not permit a more accurate location.

The main shock was recorded at Blacksburg at 22:38:35 G.C.T. (5:38:35 p.m., E.S.T.) according to Dr. Charles E. Sears, Director of the V.P.I. Seismic Station (personal letter) and at Chapel Hill at 5:38:46 p.m. It of course occurred a few seconds earlier than these times; the best estimate is 5:38:18 p.m., plus or minus perhaps two seconds. Most localities reported a second, somewhat weaker shock a couple of minutes later, and a few mention a still feeblener one between these two. This group of tremors, hereinafter referred to as the "5:40 group," was followed at about 8:57 p.m. by an aftershock which was apparently the second strongest of the entire series. Only the first shock was recorded at Chapel Hill.

A brief questionnaire was distributed throughout the disturbed area, from which a surprisingly large (85%) return was received. The information thus obtained was used in preparing the map, Figure 1, and in estimating the strength of the shocks. Since few people distinguished between the three earliest shocks, they were lumped together and treated as one event.

As may be seen from the map, the tremors were felt over portions of Grayson, Carroll, and (one report) Wythe counties, Virginia, and portions of Ashe, Alleghany, Surry, Wilkes, and (one report) Yadkin counties, North Carolina. The area thus affected comprised about 1300 square miles, and is enclosed on the map with a solid line. This, with the exception of a small region in western Surry County, is in form of a rather smooth ellipse, somewhat elongated NE-SW, parallel to the structural grain of the Appalachian region, as is usual with earthquakes in this area. The smaller and more irregular area included within the larger ellipse, and shown in the figure by a dotted line, is that in which the 8:57 shock, as well as at least one of the 5:40 group, was felt. This subregion includes about 300 square miles. The only two places which reported the 8:57 shock and which did not also specifically mention the earlier group were Ivanhoe, locality 37, in Wyth County, Virginia, and Laurel Springs, locality 57, in Alleghany County, North Carolina. The southeastern edge of the main elliptical area lies almost exactly along the line of the great normal fault which White (1950) has indicated as marking the eastern margin of the uplifted Blue Ridge block. This fault, or at least some major structural feature in exactly the same position as the fault suggested by White, apparently functioned as a partial barrier to the transmission of seismic energy. Only in northwestern Surry County did enough of this energy "leak" across this barrier to be noticed and, in so doing, to produce the small irregular pattern of "felts" in western Surry County. None of this is inconsistent with a slight movement along a Blue Ridge border fault, although, if such were the case, one would expect the area of greatest disturbance to be at, or very close to, the supposed fracture and not, as is apparently the case, some twenty miles northwest of it. All in all, it seems much more likely that the active fault responsible for these shocks is in the Galax area and that, as suggested above, the linear structural feature responsible for the Blue Ridge Front served as a barrier which checked the propagation of seismic energy toward the Southeast.

At Emnace (locality 55) food packages are said to have been shaken from shelves; at Galax (locality 7) a concrete driveway is said to have been cracked, although this seems doubtful in view of the fact that no other effects of this magnitude are mentioned, nor did the Galax Gazette speak of such an event in its description of the earthquake; near Fries (locality 6) one instance of slight shifting of furniture was reported. Other than this, nothing even remotely approaching damage seems to have been reported. Typical descriptive comments are:

Windows and dishes rattled—it sounded like a plane breaking the sound barrier—just a shock and a rumble—resembled thunder in its most intense form—I thought a truck had struck my house—there was just a jar and a roaring sound—most people here thought at first they had furnace trouble—some houses creaked and groaned—there were loud explosive noises—it sounded like distant blasting—only a few people were frightened, mostly women and children, etc., etc.

Taken at their face value, these comments seem to imply—for a small area around Galax, Fries, Ennice, and Lowgap (locality 45)—an earthquake with an intensity close to V on the modified Mercalli Scale.* All effects reported from elsewhere seem consistent with intensities of IV or less.

The Southern Blue Ridge area has, in the past, been the site of numerous small earthquakes (MacCarthy: 1956a, 1956b, 1958). Any tremor which produced effects no more marked than those accompanying a fair-sized thunderstorm, or which resembled the sonic boom of a swift-flying jet (common similes in the case of these recent shocks), is likely to be mistaken for such by almost everyone. Probably if all such tremors were noticed and reported, at least one small earthquake every one or two years would be on record from this area of the southern Appalachians.

*IV. Hanging objects swing. Vibration like passing of heavy trucks, or sensation of a jolt like a heavy ball striking the walls. Standing motor cars rocked. Windows, doors, dishes rattle. Glasses clink. Crockery clashes. In the upper range of IV wooden walls and frames creak. V. Felt outdoors; direction estimated. Sleepers awoken. Liquids disturbed; some spilled. Small unstable objects displaced or upset. Doors swing, close, open. Shutters, pictures move. Pendulum clocks stop, start, change rate.

1. MacCarthy [235]
2. MacCarthy [240]
3. MacCarthy [245]
4. White [405]

III. USGS [390]

B. EQHUS [121]	1963	OCT 28	17:39	36.7	81.0	Near Galax, VA	3400	V
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Near Galax, Va. Felt over an area of approximately 2,300 square miles of Virginia and North Carolina. Felt by all and frightened many at Galax and Oldtown. People fled from buildings at Sparta and Glade Valley, N. C. Rumbling earth noises were heard.

INTENSITY (DAMAGE) IV IN VIRGINIA:

Elk Creek: Felt by few. Windows rattled. Earth sounds heard which sounded like a plane. Short duration.

Fancy Gap: Felt by many. Houses shook. Rumbling-roaring sounds heard. "Most thought it was thunder or furnace trouble."

Independence: Felt by several. Houses shook; dishes rattled. Rumbling earth sounds heard.

Ivanhoe: Felt by nearly all. Windows rattled. Felt second shock only.

Woodlawn: Felt by several. Windows rattled; buildings creaked.

INTENSITY (DAMAGE) IV IN NORTH CAROLINA:

Lowgap: Felt by several. Dishes and windows rattled. First shock sounded like an explosion. 3 shocks felt.

Scottville: Felt by many. Dishes rattled; floors vibrated slightly. Noises heard like thunder or a blast.

State Road: Felt. Windows rattled. "Thought jet was passing over." Tremor was of short duration.

INTENSITY (DAMAGE) I-III IN VIRGINIA: Cana, Hillsville, Lamsburg, and Snowville.

INTENSITY (DAMAGE) I-III IN NORTH CAROLINA: Dover, Jonesville, Laurel Springs (20:57), McGrady, Piney Creek, and Traphill.

1. MacCarthy [246]

IV. McClain [260] 1963 OCT 28 22:38 36.7 81.0 Galax, VA 3400 V

:35.0

1963 OCT 29 01:57 36.7 81.0 Galax, VA V

A. USEQ [395]

B. EOHUS [121]

C. Bollinger [31] 1963 OCT 28 22:38 36.7 81.0 Galax, VA 3400 V

Aftershocks

V. Bollinger [33] 1963 OCT 28 22:38 36.7 81.0 Galax, VA 3400 V

Aftershocks

A. USEQ [395]

B. Bollinger [31]

IX. Varma [400]

1963 OCT 28 36.7 81.0 Near Galax, VA V

A. USEQ [395]

B. MacCarthy [246]

I. TEIC 1964 JAN 20 13:38 35.9 82.3 Pensacola, NC 600 IV

Location: Pensacola, NC; intensity; location

Intensity: Windows rattled @ Pensacola, NC

Extent: W NC; map; 600 sq. km.

II. TVA [380] 1964 JAN 20 13:38 35.8 82.3 Pensacola, NC IV

A. USEQ [395]

B. Moneymaker [281]

III. USGS [390]

D. USEQ [395] 1964 JAN 20 08:37:52.0 Cane River, NC area IV

January 20: 08:37:52.0*. Cane River, N.C. area. IV. A slight tremor was reported felt at Burnsville, Cane River, Pensacola (windows rattled), and Spruce Pine. Recorded by the seismograph at Virginia Polytechnic Institute, Blackburg, Va.

1. VPI seismograph

IV. McClain [260] 1964 JAN 20 13:37 :52.0 35.9 82.2 Cane River, NC IV

A. USEQ [395]

V. Bollinger [33] 1964 JAN 20 08:37 :52.0 35.8 82.2 Cane River, NC IV

A. USEQ [395]

7/8

- VI. Moneymaker [281] 1964 JAN 20 8:38 a.m. Southern Appalachians IV
- 1964 January 20 8:38 a.m. Southern Appalachians, (IV) This light tremor was felt at Cane River, where it was noticed by the students at Cane River High School, and at Burnsville, Pensacola, and Spruce Pine. The area affected was small and limited to Mitchell and Yancey counties in the headwaters of the Nolichucky River, near the eastern extremity of the Tennessee Valley Region.
- A. Moneymaker [283] [no data available]
- B. USEQ [395]
- IX. Varma [400] 1964 JAN 20 35.9 82.2 Yancey Co., NC IV
- A. USEQ [395]

I. TEIC 1964 FEB 18 09:31 34.5 85.5 Menlo, GA 2100 V

Location: Menlo, GA; intensity

Intensity: Awakened many @ Menlo, Rising Fawn, Summerville, GA; @ Mentone, AL; doors swung open, loose objects rattled, "rock fell from chimney"; dishes fell from shelves @ Menlo, GA

Extent: NW GA - NE AL border; map; 2100 sq. km.

A. Gordon [175] 1964 FEB 18 09:31 34.7 85.4

09:31:10.4; 34.665, 85.392; 1.0R; 4.0B

Depth restrained; magnitude from Bollinger [38]

II. TVA [380] 1964 FEB 18 10:31 34.6 85.6 Mentone, AL VI

A. USEQ [395]

B. Moneymaker [283] 1964 FEB 18 04:31 34.8 85.5 AL - GA V
:11.5 EST

This earthquake, centered at Lat. 34.8 N., Long. 85.5 W. was felt in De Kalb County, Alabama, and Chattooga, Dade and Walker counties, Georgia. It was felt also at Tanner, Limestone County, Alabama (I-III), some 60 (+) miles west of the main felt area. The maximum intensity, V, prevailed at Lyerly and Menlo in Georgia where the shock was felt by nearly everyone and occasioned general alarm. The intensity was IV at Mentone, Alabama and at Rising Fawn, Summerville, and Trenton, Georgia. Everywhere the onset was abrupt and followed by a trembling motion.

*Tanner is about 60 miles west of De Kalb County and 75 miles west of any place reporting the shock.

III. USGS [390]

C. EQHUS [120] 1964 FEB 18 04:31 34.8 85.5 AL - GA border V

1964. February 18. Alabama-Georgia border. Felt by and awakened nearly all residents at Lyerly and Menlo, Ga.; many were alarmed. Dishes fell from shelves at Menlo. Also felt in De Kalb County, Ala. Magnitude 4.4.

IV. McClain [260] 1964 FEB 18 10:31 34.8 85.5 De Kalb Co., AL

Felt in Ga. mb = 4.4, h = 15 km.

A. USEQ [395]

V. Bollinger [33] 1964 FEB 18 04:32 34.8 85.5 GA - AL border V
:11.5 :11.6

mb = 4.4

A. Long, L. T. (personal communication)

B. USEQ [395]

VI. Moneymaker [281] 1964 FEB 18 4:31 a.m. Northern AL V

1964 February 18 4:31 a.m. Northern Alabama, (V) This shock affected an area including parts of Dade, Walker, and Chatooga counties, Georgia and De Kalb County, Alabama. It was felt at Tanner, Limstone County, Alabama, about 75 miles west of the main felt area.

1. Moneymaker [283]

2. USEQ [395]

IX. Varma [400] 1964 FEB 18 34.8 85.5 Dade Co., AL V

A. USEQ [395]

I. TEIC

1964 JUL 28 19:45 36.0 84.0 Inskip, TN

III

Location: Inskip, TN

Intensity: Light shock

II. TVA [380]

1964 JUL 28 19:45 36.0 84.0 Inskip, TN

A. USEQ [395]

1964 JUL 28 2:45 p.m. EST Knoxville, TN

A light shock, at about 2:45 or 2:50 P.M., EST, was reported to the press and to the TVA Geologic Branch from the Inskip-Norwood area of northwest Knoxville.

Carson Brewer, Knoxville News Sentinel, reported several calls from the area affected, but the exact time of the shock was not mentioned. It was in the neighborhood of 2:45 or 2:50 P.M. E.S.T.

1. Brewer, C. - personal comm.??

III. USGS [390]

1964 JUL 28 Early p.m. Knoxville, TN

D. USEQ [395]

July 28: (early afternoon). Knoxville, Tenn. A light shock was reported from the Inskip-Norwood area of northwestern Knoxville at an unspecified hour in the early afternoon.

IV. McClain [260]

1964 JUL 28 36.0 83.9 Knoxville, TN

A. USEQ [395]

1964 JUL 28 p.m. 36.0 84.0 Knoxville, TN

V. Bollinger [33]

A. USEQ [395]

B. McClain [260]

VI. Moneymaker [281] 1964 JUL 28 Early p.m. Southern Appalachians III

1964 July 28 "early afternoon" Southern Appalachians, (III) A light shock was reported to the press and to the writer from the Inskip-Norwood area of northwestern Knoxville. The event occurred in the early afternoon but the exact time was not reported.

A. Moneymaker [283]

B. USEQ [395]

IX. Varma [400] 1964 JUL 28 36.0 83.9 Knoxville, TN II

A. USEQ [395]

I. TEIC 1964 OCT 13 16:30 36.0 83.9 Knoxville, TN III

Location: Knoxville, TN

Intensity: Light shock

II. TVA [380] 1964 OCT 13 16:30 36.0 83.9 Knoxville, TN

A. USEQ [395]

B. Moneymaker [283] 1964 OCT 13 11:30 A.M. EST Knoxville, TN III

A light shock (III) was felt at the University of Tennessee and at Maplehurst Park and in some office buildings in the business district, including the Union Building. One of those who experienced the shock was Ray Martin, an employee of the TVA Geologic Branch.

III. USGS [390]

D. USEQ [395] 1964 OCT 13 11:30 Knoxville, TN

October 13: 11:30. Knoxville, Tenn. A light shock was reported felt at the University of Tennessee, at Maplehurst Park, and in the TVA offices of the Union Building.

IV. McClain [260] 1964 OCT 13 16:30 35.9 83.9 Knoxville, TN

A. USEQ [395]

V. Bollinger [33] 1964 OCT 13 11:30 36.0 84.0 Knoxville, TN

A. USEQ [395]

B. McClain [260]

VI. Moneymaker [281] 1964 OCT 13 11:30 a.m. Southern Appalachians III

1964 October 13 11:30 a.m. Southern Appalachians, (III) A light shock was reported felt at Knoxville by a few at the University of Tennessee, at Maplehurst Park, and in offices in the Union Building. (20, 34).

A. Moneymaker [283]

B. USEQ [395]

IX. Varma [400]

A. USEQ [395]

1964

OCT 13

36.0

83.9

Knoxville, TN

II+

I. TEIC 1966 AUG 24 06:00 35.8 84.0 Alcoa, TN 800 IV

Location: Alcoa, TN; location

Intensity: Rattled windows, awakened a few light sleepers

Extent: E TN; map; 800 sq. km.

II. TVA [380] 1966 AUG 24 06:00 35.9 83.9 Knoxville, TN IV

A. Moneymaker [283] 1966 AUG 24 1:00 A.M. EST Knox-Blount Cos., TN

1. News-Sentinel (8/24/66), Knoxville, TN

What it Was an Earthquake, Mayhap

The earth may have shook a bit about 1 a.m. today in the Knox-Blount County area.

The Weather Bureau received reports of an "explosion" or some sort of disturbance from West Knoxville, Maryville and Walland about the same time.

B. C. Moneymaker, TVA geologist, said it may have been a small earthquake.

2. Maryville-Alcoa Times (8/25/66), Maryville, TN

Was it a Plan or Earthquake?

A reported shake in the earth about 1 a.m. Wednesday was either a small earthquake or a jet plane cracking the sound barrier, Tennessee Valley Authority geologist B. C. Moneymaker said today.

Reports from Maryville, Alcoa, Walland and West Knoxville of an earth tremor are being investigated by TVA. Moneymaker said complaints from such a wide area indicate the shake was either a jet plane or an earthquake.

Investigators have found no clues or damage in the area. Although several small quakes have occurred this century, the last one causing damage was in 1886. The top of a chimney collapsed in Knoxville.

TVA has no seismograph to register earthquakes.

III. USGS [390]

D. USEQ [395] 1966 AUG 24 01:00 Eastern TN IV

August 24: 01:00. Eastern Tennessee. IV. The following report was received from Mr. Berlen C. Moneymaker, Tennessee Valley Authority, Knoxville, Tenn.:

A light shock attended by a light rumbling sound was felt from west Knoxville southward to Alcoa, Maryville, and Walland. It was characterized by a trembling motion lasting several seconds and strong enough to awaken light sleepers and to rattle windows. Occurring at the time it did, the disturbance was felt by only a small fraction of the population. I am convinced it was a light shock of seismic origin.

1. Moneymaker ?? personal communication ??

IV. McClain [260] 1966 AUG 24 06:00 35.9 83.9 Knoxville, TN IV

A. USEQ [395]

V. Bollinger [33] 1966 AUG 24 01:00 36.0 84.0 Knoxville, TN IV

A. McClain [260]

B. USEQ [395]

VI. Moneymaker [281] 1966 AUG 24 1:00 a.m. Southern Appalachians IV

1966 August 24 1:00 a.m. Southern Appalachians, (IV) A light shock attended by a low rumbling noise was felt and heard from South Knoxville southward to Alcoa, Maryville, and Walland. It was characterized by a trembling motion lasting several seconds and strong enough to rattle windows and to awaken light sleepers. Occurring at the time it did, the disturbance was felt or otherwise noticed by only a small fraction of the population.

A. Moneymaker [283]

B. USEQ [395]

IX. Varma [400] 1966 AUG 24 35.8 84.0 Alcoa, TN IV

A. USEQ [395]

I. TEIC	1968	MAR 8	05:38	37.3	80.8	Narrows, VA	10,000	V
Location:	Narrows, VA; intensity; location							
Intensity:	@ Bluefield, VA - WV, a sewer line was reported broken in 2 places; a relay controlling street lights was thrown in Narrows, VA; window cracked @ Allisonia, VA							
Extent:	SW VA - S WV; map; 10,000 sq. km.							
A. Dewey [95]	1968	MAR 8	05:38	37.3	80.8			
05:38:15.7; 37.281, 80.774; 7.7; 4.1J								
Magnitude from Jones [222]								
II. TVA [380]	1968	MAR 8	05:38	37.3	80.7	Giles Co., VA		V-VI
A. PDE [320]								
B. Bollinger [30]	1968	MAR 8	05:38 :15.2	37.3	80.8	Narrows, VA	8300	IV

ABSTRACT

The Narrows, Virginia earthquake of March 8, 1969 was located at 37.3 N., 80.8 W., with an origin time of 05:38.15.2 GMT. The Eastern Tennessee crustal model of Steinhart and Meyer (1961) was employed for this location, and the resulting travel-time residuals for seven stations showed a standard deviation of 0.4 second. This fit to the observed travel times implies that the Eastern Tennessee model may be more appropriate for the region than the standard Jeffreys - Bullen crustal model. Macroseismic data for the earthquake gave a maximum intensity (MM) of IV and a felt area of approximately 3200 square miles.

Introduction

On March 8, 1968 at forty minutes after midnight, some 3200 square miles of the New River valley in Virginia and West Virginia were subjected to the jolting motions of an earthquake. This area in the central Appalachians was experiencing another of the moderate tremors which occur at irregular intervals and are characteristic of the minor seismicity of the region.

Because the local earthquakes of this region have received very little study, it was thought that an investigation of this event was in order. The study would also be an aid to a better understanding of the tectonics and crustal structure of this complexly folded and faulted region.

Location

The first motion of the P wave from this earthquake was clearly recorded by the Blacksburg, Virginia (BLA) standard station short-period instruments as a compression to the southeast. The long-period seismograms showed a very impulsive event on the horizontals some 4 seconds after the onset of the P wave (figure 1). This latter event also carried considerable energy in the vertical direction as evidenced by saturation of the Sprengnether visual recorder record from approximately 4 to 8 seconds after the p arrival (figure 2). Interpretation of a 4-second S-P interval and the directions of first motion indicates an epicenter some 35 to 40 kilometers to the northwest of Blacksburg.

The seismicity of the Blacksburg region is shown in figure 3 and tabulated in table 1. The historical seismic activity is seen to be on the west slope of the New River valley in the Narrows-Pulaski-Wytheville locale. Thus, the seismicity of the region and the preliminary instrumental data indicated the Narrows, Virginia area as a probable location for the epicenter.

The preliminary epicentral parameters for this shock were determined by the USC&GS as:

Location:	37.0 N., 80.5 W.
Origin:	05:38:15.1 GMT
Depth:	31 km \pm 8 km
Stations used:	7
Standard Error:	1.5 sec
Magnitude (M):	3.9 (1 station)

This places the epicenter some 25 kilometers to the south-southwest of Blacksburg and does not agree with the northwest location as indicated by the BLA seismograms. Since the USC&GS routinely uses the standard 33 km crustal model of Jeffreys-Bullen, it was thought that a crustal model more appropriate for the region might resolve this difficulty. Accordingly, seismograms were requested from the observatories operating in the area. These records were read and the resulting arrival times used in Geiger's method epicentral program employing the crustal structure for Eastern Tennessee of Steinhart and Meyer (1961).

The computations (table 2) gave the lowest standard deviation of the travel-time residuals (0.4 second) for a surface focus. A tabulation of the input data and computer results is shown in table 3. The epicentral parameters thus obtained are selected for this shock which is herein designated as the Narrows, Virginia earthquake of March 8, 1968.

Note that these parameters place the epicenter some 38 kilometers west-northwest of Blacksburg at station-to-epicenter bearing of 292. The bearing calculated from the short-period seismograms (table 4) is 280. With the structural complexity of the region this is taken as reasonable agreement.

TABLE 1

SEISMICITY FOR THE LOCALE OF THE NARROWS,
VIRGINIA EARTHQUAKE OF MARCH 8, 1968

Year	Date	N. Lat.	W. Long.	Local Time	Locality	Area sq. mi.	Inten. or Mag.	Ref.*
1897	May 3	37.1	80.7	12:18	Pulaski, Va.	150,000	VI	1, 2
1897	May 31	37.3	80.7	13:58	Giles Co., Va.	280,000	VIII	1, 2
1987	Oct 21	36.9	81.1	22:20	Wytheville, Va.	20,000	V	1, 2
1898	Feb 5	37	81	15:	Pulaski- Wytheville, Va.	—	IV	2
1898	Nov 25	37	81	15:	Pulaski- Wytheville, Va.	—	IV-V	2
1899	Feb 13	37	81	04:30	Pulaski- Wytheville, Va.	30,000	V	1, 2
1902	May 17	37-1/4	80-3/4	23:	Pearisburg, Va.	—	—	2
1959	Apr 23	37-1/2	80-1/2	15:59	Waiteville, W. Va.	1.100	VI	1, 2
1959	Jul 7	—	—	18:17	Giles Co., Va.	—	IV	1, 2
1959	Aug 21	—	—	12:20	Giles Co., Va.	—	IV	1, 2
1964	Nov 25	37.4	81.5	02:50	Kimball, W. Va.	—	3.6	1

Publ. of ESSA, C&GS: U. S. Earthquakes, 19XX; Earthquake History of the U.S., Part 1; Preliminary Determination of Epicenters cards. McCarthy, G.R. (1964). "A descriptive list of Virginia earthquakes through 1960." Jour. of the Elisha Mitchell Scientific Soc., 17 (1), 93-114.

TABLE 2
SUMMARY OF EPICENTER DETERMINATIONS

Source	Depth	Lat.		Long	Origin	No. Sta.	Std. Dev.
		N	W				
C&GS	31	37.04	80.54	05:38:15.1	7	1.05	
VPI	0	37.28	80.84	05:38:15.2	7	0.38	
VPI	20	37.20	80.68	05:38:16.5	7	1.69	
VPI	40	37.20	80.67	05:38:18.1	7	1.69	

A tabulation of the arrival times of the various phases at the stations employed in the epicentral determination is given by table 5. The fit of these data to the Steinhart and Meyer (1961) surface focus travel-time curves is shown in figure 4. Stations deleted because of excessive residuals (3 sec) were GEO, ROC, CLE, and WSC. These stations had emergent arrivals and/or difficulty in phase identification. Sufficient arrival-time data were not available for this shock to conduct traveltime studies. Also, because of this limited amount of data and the quality off it with the Steinhart and Meyer (1961) structure, the crustal model of Minear (1967) was not utilized. The station distribution for the epicentral determination is shown in figure 5.

Depth of Focus

The previously discussed epicentral calculations indicate a very shallow focal depth for this earthquake. A shallow depth is supported by the high-frequency content of the seismograms and the appearance of secondary body wave phases. There is, however, no way to accurately fix the depth of focus. (Subsequent to this earthquake, auxiliary stations have been installed at Narrows and at Pulaski.)

Macroseismic Data

The writer and Dr. C. E. Sears visited the Narrows area the same morning of the earthquake occurrence. Discussions with the residents there and in the surrounding communities revealed that no damage had been done, but that most people had been awakened by the tremors, and had heard earthquake sounds of long enough time duration to convince them that they were not experiencing a sonic boom. Several had made estimates of the time interval of shaking, while others noted two distinct phases to the vibration. In the town of Narrows, a relay controlling the street lights on several blocks was apparently thrown by the earthquake vibrations causing them to go out, but no damage was done to the lighting system.

Questionnaires were subsequently mailed to 100 communities in the general area to which there were 74 replies. Of the replies, 17 felt reports were received. A list of these communities is given in table 6. Intensities I-III are not differentiated and, because of the late hour of the shock, the actual felt area may be larger than indicated. Intensity IV was assigned to those places noting the rattling of dishes, windows, etc., where the majority of respondents were awakened by the shock. The contoured area (figure 6) results in a felt region of approximately 3200 square miles. Unconfirmed damage reports consisted of broken sewer line at a home in Bluefield Va. and cracks in a cement flower box attached to a house in Pembroke, Va. An unsolicited report from Boone, North Carolina told of being awakened by the rattling of dishes.

Magnitude

A scale for the assignment of magnitudes to local earthquakes does not exist for this area. The USCGS reports a M of 3.9 from the measurements at WMO some 1650 kilometers distant. The Gutenberg and Richter (1956) relationship of, $M = 1 + 2/3 I$

would indicate a magnitude of 3.7. Here again there are no studies to indicate the validity of this relationship for the region.

Conclusions

1. The Eastern Tennessee crustal model of Steinhart and Meyer (1961) appears more appropriate for the location of local earthquakes in Virginia than the standard Jeffreys-Bullen crustal model.
2. The March 8, 1968 Narrows, Virginia earthquake was located at,
37.3 N., 80.8 W.,
0 = 05:38:15.2 GMT,
with a standard deviation of 0.4 second for the travel-time residuals of the seven stations utilized in the determination.
3. Macroseismic data indicate a maximum intensity (MM) of IV and a felt area of 3200 square miles.

Acknowledgements

This research was sponsored by the National Science Foundation under Grant GA-1654. Grateful acknowledgement is due to Dr. M. L. Goodwin, who wrote the epicenter location program and to the station directors for the kind loan of their seismograms.

TABLE 3

TABULATION OF INPUT DATA AND COMPUTER RESULTS

DATE: 03/08/68 ASSUMED DEPTH: 0 km

TRAVEL-TIME DATA USED AT LESS THAN 1000 KM:

Vel., 6.17, 6.70, 8.10 km/sec; Intersections, 135.0 and 249.9 km; Intercepts, 1.7 and 8.2 sec

EPICENTER OF VIRGINIA EARTHQUAKE: Time, 05:38:15.81 GMT; Latitude, 37.2843 N., 80.8410 W; Standard Deviation, 0.37544; No. Trials, 3.

Station	Distance km	Distance deg	Arrival Time GMT	Travel Time sec	Deviation sec
BLA	38.4162	0.3455	05:38:22.20	6.39	0.1664
CP0	463.5713	4.1692	05:39:21.50	65.69	0.2804
ORT	345.3042	3.1055	05:39:06.70	50.89	0.0806
CHC	220.7386	1.9852	05:38:50.50	34.69	0.0167
MLF	364.5327	3.2785	05:39:09.50	53.69	0.5082
SCP	468.4299	4.2129	05:39:21.50	65.69	-0.3195
OXF	832.0801	7.4834	05:40:06.00	110.19	-0.7165

TABLE 4

MEASUREMENTS OF THE FIRST HALF-CYCLE OF Pg AT BILA

Component	Amplitude mm	Half-Period sec	Direction
Z	28	0.3	Compression
N-S	2	0.3	South
E-W	11	0.4	East

1. Gutenberg, B. and C. F. Richter (1956). "Earthquake Magnitude, Intensity, Energy and Acceleration" (Second Paper), Bull. Seism. Soc. Am., 46, 105-145.

2. Minear, John W. (1967). Research directed toward the study of seismicity in the southeastern United States, Final Report, Project VELA-UNIFORM, AFCL-67-0069, Research Triangle Inst., North Carolina, 62 pp.

3. Steinhardt, John S. and Robert P. Meyer (1961). "Explosion studies of Continental Structure," Carnegie Inst. of Wash. Publ. 622, Wash., D.C. 347.

TABLE 5

ARRIVAL TIMES, NARROWS, VIRGINIA EARTHQUAKE, MARCH 8, 1968

(NOTE: Times in minutes and seconds after 05 GMT)

Station	Distance km	Pn	Pg or P*	Sn or S*	Sg or Lg
BILA	38.4		38 22.2		38 26.4
CHC	220.7		38 50.5		39 14.6
ORT	345.3	39 06.7	39 12.4	39 44.5	39 50.0
MLF	364.5	39 14.0	39 20.0	39 53.5	40 03.0
CFO	463.6	39 21.5	39 30.4	40 12.4	40 25.0
*SCP	468.4	39 21.5	39 26.0		40 22.0
*OXF	832.1	40 06.0		41 30.0	42 07.0

*Readings obtained from C&GS.

TABLE 6

LIST OF FELT AREAS AND INTENSITY

Virginia	Intensity (MM)	West Virginia	Intensity (MM)
Allisonia	I-III	Alderson	I-III
Blacksburg	I-III	Mullens	I-III
Bland	I-III	Peterstown	I-III
Bluefield	IV		
Christiansburg	I-III	North Carolina	
Dublin	I-III	Boone	IV
Hillsville	I-III		
Narrows	IV		
Pearisburg	IV		
Pembroke	IV		
Pulaski	I-III		
Radford	I-III		
Wytheville	I-III		
C. Bollinger [35]	1968	MAR 8	00:38
		Narrows, VA	8300
			IV

1. Questionnaire Data

Allisonia, VA: (Lying down, 1st floor, new brick building. Felt by others.) "The window cracked, but my friend...3 miles below us...in framed (stone) house [said] it felt like the house raised up and seemed like the pots and pans were coming out of the cabinets. It made a terrible noise." (III);

Blacksburg, VA: USE Intensity IV. (III), [?];

Bland, VA: "I would like to report that we experienced the earthquake Friday morning. It shook the windows, and even the pictures on the wall. We live about 5 miles from Mechanicsburg and about 20 miles from Bluefield. We have talked to a number of people. Some heard it and some didn't." (Personal Communication, D. S. Miller, 1968) (III);

Bluefield, VA: (Indoors, 1st floor, lying down, frame building. Felt by others, not respondent.) "Houses shook-windows rattled slightly." Damage: "Break in sewer line.... Broke two places inside house and outside also." (IV);

Christiansburg, VA: (III);

Dublin, VA: (Felt by others, not by respondent.) "No noises heard." No damage. (III)

Hillsville, VA: (Indoors, lying down, 1st floor, old frame building. Felt by respondent, not by others.) "Felt house tremble. No known damage." (III);

Mechanicsburg, VA: (Felt by others, but not by respondent who was in Bastion, Va., about 20 mi SE of Mechanicsburg) "I understand several people in the [Mechanicsburg] area felt the quake." (II);

Narrows, VA: (Indoors, lying down, 2nd floor, old frame building. Felt by respondent, others.) Awakened "by either the noise or the motion. Heard only the noise of items in the house rattling. There appeared to be two distinct periods of movement." No damage. (IV);

FIELD REPORT. "No damage had been done but...most people had been awakened by the tremors, and had heard earthquake sounds of long enough duration to convince them that they were not experiencing a sonic boom. Several had made estimates of the time interval of shaking, while others noted two distinct phases to the vibrations. In the town of Narrows, a relay controlling the street lights on several blocks was apparently thrown by the earthquake vibrations causing them to go out, but no damage was done to the lighting system";

Pearisburg, VA: (Lying down, 1st floor, new frame building. Felt by respondent, others.) "A muffled explosion like sound followed by quakes." Damage: "None to our residence that I've found. I notice mortar had fallen from around a couple of beams in our church building." (IV);

Pembroke, VA: (Indoors, lying down, 1st floor, brick building. Felt by respondent, others.) "Rumbling followed by explosive-type noise. Cracks in cement flower box attached to house." (IV)

Pulaski, VA: (Indoors, lying down, 1st floor, new frame building. Felt by respondent, others.) "Something woke me up at that approximate time but I do not know that it was the earthquake. Two persons I know were awake at the time stated, and felt the quake. These persons were in different houses about a quarter of a mile apart. Both thought that the noise and vibration were caused by a malfunction of the oil furnace. Both described the vibration as a fluttering rumble similar to a malfunctioning oil furnace. No damage was noted." (USE Intensity IV) (III);

Radford, VA: (USE Intensity IV) III [?];

Wytheville, VA: (1st floor, lying down, old brick building. Felt by others, not by respondent.) "Doors and windows rattled (briefly)." (III);

Boone, NC: "My family was awakened at 12:39 or 12:40 by the rattling of dishes in our house. I have also had reports from one or two others in this area who felt the tremors." (IV);

Alderson, WV: (Indoors, lying down, 2nd floor, old frame building. Felt by others, not by respondent.) Felt by a couple on the north side of town. Their house was shaken and a roar was heard. No one found on the south side of town who noticed it. (III);

Mullens, WV: (Not felt by respondent. "Perhaps" felt by one other.) "One individual says mirror fell from wall about this time." (III);

Peterstown, WV: (Indoors, lying down, 1st floor, new brick building. Felt by respondent, others.) "I have a large water pitcher sitting in a bowl on my chest of drawers and the pitcher rattled in the bowl." No damage. (III);

NOT FELT AREAS:

NOT FELT IN VIRGINIA:

Altavista, Amonate, Bassett, Bastian, Bedford, Big Stone Gap, Blue Ridge, Buchanan, Burkes Garden, Catawba, Chatham, Clifton Forge, Cloverdale, Covington, Danville, Eagle Rock, Ferrum, Fosters Falls, Fries, Galax, Glasgow, Glen Wilton, Gretna, Harrisonburg, Healing Springs, Independence, Marion, Martinsville, Montvale, New Castle, Petersburg, Richmond, Roanoke, Rural Retreat, Salem, Shawsville, Simpsons, Sugar Grove, Tazewell, Tiptop, Troutville, Waynesboro, Woolwine.

NOT FELT IN WEST VIRGINIA:

Buckhannon, Gap Mills, Gilbert, Kimball, Lewisburg, Maben, Matoaka, Maxwelton, Ronceverte, Sweet Springs, Union, Waiteville, War, Welch, White Sulphur Springs.

a. Miller (1968) (personal communication)

b. USEQ [395]

III. USGS [390]

D. USEQ [395]	1968	MAR 8	00:38	37.0	80.5	VA	8300	IV
			:15.1					

March 8: 00:38:15.1*. Epicenter 37.0° north, 80.5° west, Virginia, W. Magnitude 3.9. IV. Felt over approximately 3,200 square miles of the New River Valley in Virginia and West Virginia. A paper by G. A. Bollinger states: "The writer and Dr. C. E. Sears visited the Narrows area the same morning of the earthquake occurrence. Discussions with the residents there and in the surrounding communities revealed that no damage had been done... In the town of Narrows, a relay controlling the street lights on several blocks was apparently thrown by the earthquake vibrations, causing them to go out, but no damage was done to the lighting system... Unconfirmed damage reports consisted of a broken sewer line at a home in Bluefield, Va., and cracks in a cement flower box attached to a house in Pembroke, Va." Intensity IV effects were also noted at Blacksburg, Narrows, Pearisburg, Pulaski, and Radford, Va., and Boone, N.C.; intensity I-III at Allisonia, Bland, Christiansburg, Dublin, Hillsville, and Wytheville, Va., and Alderson, Mullens, and Peterstown, W. Va.

1. Bollinger [30]

2. Sears ??

IV. McClain [260] 1968 MAR 8 05:38 37.3 80.8 Near Narrows, VA
:15.0

m = 3.9

A. PDE [320]

B. Bollinger [31] 1968 MAR 8 05:38:15 37.3 80.8 Narrows, VA 8300

m = 3.9

1. Bollinger [30]

C. Seismo. notes [340] 1968 MAR 8 05:38 37.0 80.5
:15.1

Virginia, March 8, 1968. 05h38m15.1s, 37.0°N, 80.5°W, focal depth about 31 km (USCGS). Felt in southwestern Virginia and border regions of West Virginia and North Carolina. People awakened by "terrific" impact at Pearisburg. Felt slightly at Bluefield, West Virginia. Earthquake noise heard at Pulaski. No damage or surface effects were noted by Dr. Bollinger or Dr. Sears of Virginia Polytechnical Institute who toured the epicentral area in the vicinity of Peterstown, West Virginia; Rich Creek and Narrows area. Magnitude 3.9 (CGS).

1. USGS?

V. Bollinger [33] 1968 MAR 8 05:38:15 37.3 80.8 Narrows, VA 8300 IV

m = 4.1

A. Bollinger [35]

B. Bollinger [31]

C. USEQ [395]

VI. Moneymaker [281] 1968 MAR 8 12:38 a.m. Southern Appalachians 8300 IV

1968 March 8 12:38 a.m. Southern Appalachians, (IV) This earthquake was centered near Narrows, Virginia and affected about 3,200 square miles in the New River Valley of Virginia and West Virginia. It was noticed but perhaps not felt at Boone, N.C. where a sleeper was awakened by the rattling of dishes.

A. Bollinger [30]

B. USEQ [395]

IX. Varma [400] 1968 MAR 8 37.0 80.5 Montgomery Co., VA IV

A. Bollinger [30]

B. USEQ [395]

I. TEIC 1969 JUL 13 21:51 36.0 83.9 Knoxville, TN 55,000 VI

Location: Knoxville, TN; A/S; intensity

Intensity: A few bricks in chimney shaken loose @ Jefferson City, TN; in Knoxville, TN, furniture moved, cracked plaster and concrete, picture shaken from wall; small objects shifted @ Rutledge, TN; some plaster cracked, small objects overturned, felt in Seymour, TN

Extent: E TN - SW NC and parts of extreme SW VA and SE KY; map; 55,000 sq. km.

Comment: A/S's @ Knoxville, TN

A. Gordon [175] 1969 JUL 13 21:51 36.1 83.7

21:51:09.8; 36.119, 83.688; 1.0R; 4.2B

Depth restrained; magnitude from Bollinger [38]

II. TVA [380] 1969 JUL 13 21:51 36.0 83.9 Knoxville, TN VI

741

A. PDE [320]

B. Best [20] 1969 JUL 13 21:51:09 36.1 83.7 TN

m = 3.5; h = 1 km.

C. Moneymaker [283] 1969 JUL 13 4:51 p.m. EST Eastern TN

1. Questionnaire Data

Kentucky

Blackey: Felt by 10 or 12 persons "just as a slight tremor."

Cawood: Not reported as felt.

Hazard: Felt. Buildings vibrated briefly. Duration estimated as only 5 to 10 seconds.

Jenkins: No one reported feeling or hearing the earthquake.

Lynch: Not felt.

Whitesburg: Felt by several. Dishes and glassware rattled. A sound "Rumbling—as distant thunder" was reported.

North Carolina

Asheville: Noticed by very few. A centerpiece slid across the table.

Burnsville: Felt by few; loose objects rattled.

Hot Springs: Felt by a few.

Marshall: A few people felt a light quake—not heavy enough to rattle dishes or windows.

Mars Hill: Felt by a few. Slight rattling of loose objects.

Murphy: Felt by several; windows and gutters shook slightly. Duration estimated 3 or 4 seconds.

Robbinsville: Felt by several. One observer noticed the floors of his house shaking. Another observer said it sounded like a big truck going by.

Spruce Pine: No one in the Spruce Pine area reported feeling or hearing the earthquake.

Topoco: Felt and heard by a very few. Doors and windows rattled.

Tennessee

Alcoa: Felt by several but apparently occasioned little excitement and no damage.

Blountville: A light shock was felt by a few. Houses shook for several seconds.

Bristol: Felt. Most observers reported the perceptible shaking of their houses for several seconds. Police stations and newspaper offices received many telephone calls.

Cherokee Dam: Felt.

Cumberland Gap: Not felt.

Douglas Dam: Felt.

Elizabethton: Felt by many. Houses shook; windows, doors, and loose objects rattled. Felt by most people favorably situated, but not by those walking. Some reported a "sidewise motion."

Erwin: Felt by very few. "A very slight earth tremor."

Fort Loudoun Dam: Felt. The operator in the power house said it caused vibrations throughout the control room. He was frightened at first, believing that the equipment was malfunctioning.

Gatlinburg: Reported not felt by postmaster.

Grassy Cove: Felt. Houses vibrated.

Greenback: Felt by about half the people in the community. Doors, windows, and loose objects rattled. A "low rumble" was heard.

Greeneville: Felt by several in various sections of the city.

Harriman: Not reported felt in Harriman and vicinity.

Hartford: Felt by few. Dishes, doors, and windows rattled. "This area has been under road construction for several years and a lot of dynamiting--so I think the people have gotten used to the noise and didn't notice this much. Most of the people who felt the quake were sitting on a couch it seems."

Jacksboro: Felt by only a few who noticed the rattling of dishes glassware, doors, and windows. A rumbling sound was reported by some observers.

Jefferson City: Felt by nearly everyone. Houses strongly shook.

Johnson City: Houses shook for several seconds. The sound resembled that of large trucks passing on the highway. Light fixtures vibrated.

Kingsport: Felt at the airport and in the city. One observer noticed her table shake.

Kingston: Felt by only a few.

Knoxville: Abrupt onset followed by very strong trembling motion felt by nearly everyone. Houses strongly shaken; loose objects rattled. Duration 5 to 10 seconds. "Furniture jumped up and down." A few claims of cracked plaster and concrete unsubstantiated. A picture was reportedly shaken from the wall. People were excited but not frightened. Many were thrilled at feeling their first earthquake.

LaFollette: Felt by a few. Houses seemed to jar as after an explosion but of longer duration. The shock was attended by a noise "like distant thunder that kept building up in loudness then gradually getting weaker."

Lake City: Felt by many. Houses shook and loose objects rattled.

Lenoir City: Felt by a few. Dishes and glassware rattled. One observer reported: "I felt the earthquake Sunday afternoon while at home. The house seemed to shake. As far as I could tell it only lasted a matter of seconds."

Loudon: Felt by very few. Doors and windows rattled.

Louisville: Felt and heard. Floors vibrated.

Madisonville: Felt by a few. Several people reported the rattling of windows, dishes, and other loose objects.

Maryville: Felt by several.

Maynardville: Felt by nearly everyone. Doors and windows rattled. A rumbling noise was reported by some.

Morristown: Several felt and heard the shock. "The earth shook perceptibly.

Mountain City: Not felt.

Mount Vernon: Not felt.

New Market: Felt by most people who reported strong shaking motion. Golfers reported that the ground motion caused a golf ball to roll.

Newport: Felt by about half of the people. Doors and windows rattled. "Quake apparently felt most in triangle formed by confluence of Pigeon and French Broad Rivers.

Oak Ridge: Felt by some. One observer thought a heavy truck had rumbled by.

Oliver Springs: Reportedly not felt.

Potter Ford: Felt. One observer reported that "a large rock on which he and his wife were relaxing began to dance 'like foam rubber' and continued for about half a minute."

Roan Mountain: Not felt.

Rogersville: Felt by nearly everyone. Dishes and glassware rattled. A noise like thunder was reported.

Rutledge: Felt by nearly everyone. Doors and windows rattled and a rumbling sound was heard.

Sneedville: Felt by nearly everyone. Dishes, glassware, doors, and windows rattled. A roaring sound was heard.

Sweetwater: Felt by only a few people.

Tallassee: Felt by nearly everyone. Very light.

Tazewell: Felt by a few who reported the rattling of dishes, glassware, doors, and windows.

Townsend: Felt by few. "The earthquake was very light. A few people heard it, but no damage was done."

Virginia

Abingdon: Felt by a few. One observer stated that "the house quivered."

Appalachia: Not felt.

Big Stone Gap: Felt by approximately 10 percent of the population. Dishes, glassware, doors, and windows rattled. The shock "was very mild."

Cedar Bluff: Not felt.

Chilhowie: Not felt.

Damascus: Not felt.

Dante: Not felt.

Gate City: Felt by a few. The "shake felt like distant blasting."

Jonesville: Reported felt by about 50 percent of the population. Dishes and glassware rattled.

Lebanon: Not felt.

Marion: Not felt.

Norton: Not felt.

Pennington Gap: "Felt by everyone who was inside buildings." Dishes, glassware, and windows rattled.

St. Paul: Felt. Dishes and glassware rattled. It sounded "as if two objects had come in contact suddenly."—"depending on what people were doing and where they were at the time. I did not realize it had happened. Was playing golf. Wife was at home. The information above is as she reported."

Tazewell: "We find no one who felt the shock."

Wise: "If felt, no one was aware that it was an earthquake."

Tennessee (Intensity V)

Clinton: Felt by all in home; all frightened. Loud rattling of windows, doors, and dishes. Building creaked "very much." Trees and bushes shook. Faint earth noises.

Jefferson City: Felt by many and frightened few in community. Houses shook; dishes rattled. Hanging objects swung moderately. Moderate earth noises. "Several zinc mines in area reported some loose rock had fallen. Has also been reported that a few bricks in chimneys were shaken loose."

Knoxville: Felt by all and frightened few. Windows and doors rattled. Building shook. "Loud rumble, as thunder."

Madisonville: Felt by all in home. Small objects shifted. Windows, doors, and dishes rattled; floor rattled. Faint earth noises.

Rogersville: Felt by all. Windows, doors, and dishes rattled. Earth noises like thunder.

In Safety Program

Oren H. Myers is operator of the Oak Ridge seismic station and William McClain is senior researcher. Both are in the ORNL Health Physics Division.

ORNL has had the station for two years, because research is being done on earthquakes in relation to the nuclear safety program. The study is involved in making nuclear reactors quake-proof.

"The epicenter is the point of the earth's surface straight above the focal point of the earthquake," Sundberg said.

"It was calculated that the focal point of the main quake Sunday was at a considerable depth, probably more than 18 miles below the surface."

"Our people have been told that the main quake was felt as far away as Hazard, Ky., and Asheville, N.C."

6. Oak Ridger (7/14, 7/17/69), Oak Ridge, TN

7/14/69 Even Quake Can't Shake Heat Wave

Not even an earthquake could break the current heat wave.

Weatherman had held out some hope late last week for a respite early this week from the 90 and near 90 temperatures.

There was some little relief from the severe humidity on Saturday but otherwise the string of hot days continues bringing one of the most prolonged periods of heat in recent years.

An earth tremor was recorded in this area early Sunday evening, but despite that the high temperature predicted for Tuesday is 95.

The predicted high today is 91 and the low for tonight will be 70.

The earthquake occurred around 5:52 p.m. Sunday and shook portions of East Tennessee, North Carolina, and Virginia.

The U.S. Weather Bureau's Essa Earthquake Center in Rockville, Md., classified the tremor as minor, saying it registered 4.5 on the Richter Scale.

There was no reading on the seismographs at Oak Ridge National Laboratory since the device is geared to record earthquakes at a distance and any tremor within a radius of 100 miles of the laboratory will "knock out" the machine. Although the center of the quake was reported as being in East Tennessee, later findings, as reported by O. H. Myers, of ORNL, located the center in western North Carolina. According to the Earthquake Center, the exact location won't be pinpointed for several days.

There was no severe damage—although a resident of Knoxville reported a seven-foot break in her concrete patio in the Chilhowee Hills section and others complained of pictures falling from the walls. There were also a number of Knoxvilleans whose homes were jarred for from 30 seconds to two minutes. One home on Asheville Highway received cracked walls. Damage in the other states was believed to be minimal.

In Oak Ridge, one resident of the Garden apartments reported feeling the tremor and his first impression was that a heavy truck had rumbled by.

7/17/69 Quake's Center At Concord

That earthquake Sunday in this area was much closer than originally thought.

Information obtained from eight seismostations, including one located at Oak Ridge National Laboratory, has placed the center of the earthquake, which occurred at 5:51 p.m. Sunday, at six and one-half miles south by southwest of Concord Park and two miles east of Ft. Loudon Dam (plus or minus).

The epicenter is the place on the surface of the earth directly above the center of the earthquake.

It was first thought that the center was located in western North Carolina.

The information obtained from the seismostations was calculated by the arrival time of the shock which was fed into the national Essa Earthquake Center at Rockville, Md.

Since the main earthquake, two members of the health physics division at ORNL, Orin H. Myers, operator of the local seismostation and William McClain, senior researcher, have recorded four after shocks.

The most powerful of these after shocks was 1-2000 of the original tremor which registered at Rockville as 4.5 on the Richter Scale.

The first was registered on the scale at 8:47 p.m. Sunday; the second 2:45 a.m. Monday; the third and strongest, which read 1 on the scale, at 5:12 a.m. Monday; and the last at 5:32 a.m. of that same day.

The focal point of the earthquake is believed to be at least 18 miles below the earth's surface. This assumption was based on the fact that the shock was felt as far away as Hazard, Ky., and Ashville, N.C.

7. Loudon County Herald (7/17/69),

Earthquake Felt In County

A number of Loudon Countians reported feeling the earthquake that shook much of East Tennessee and parts of Virginia and North Carolina about 5:52 Sunday afternoon.

Berlin Moneymaker, a Tennessee Valley Authority geologist, of Knoxville said it was a "brief, very strong, very pronounced earth tremor." The quake lasted about 30 seconds. Scientists said it will be several days before the center of the quake can be determined.

Local law enforcement authorities said that no injuries or damage was reported locally.

8. News-Free Press (7/14/69), Chattanooga, TN

Strong Earth Tremor Hits Tennessee

KNOXVILLE (AP)—The earth tremor which shook portions of East Tennessee, North Carolina and Virginia Sunday may have been centered in east Tennessee, officials at the Oak Ridge National Laboratory have concluded.

The U.S. Weather Bureau's Essa Earthquake Center in Rockville, Md., classified the tremor as minor, saying it registered 4.5 on the Richter Scale. However, a spokesman for the Oak Ridge Laboratory said the tremor's magnitude was "beyond the bounds" of equipment there which is similar to the Weather Bureau's measuring devices.

This doesn't mean the tremor was particularly severe, but it may indicate its center was in the east Tennessee area, Laboratory official O. H. Myers explained.

The weather bureau in Knoxville said it has received reports indicating the tremor lasted 30 seconds to two minutes. A TVA geologist described the phenomenon as a "brief, very strong, very pronounced earth tremor."

It was strong enough in Knoxville to produce at least one cracked patio and to cause pictures to fall from several walls. Damage in the other states was believed to be minimal.

9. Chronicle (7/17/69), Crossville, TN

Cumberland County Feels Earth Tremor

A slight earth tremor was felt late Sunday afternoon in parts of Virginia, North Carolina and East Tennessee, including Cumberland County.

The weather bureau earthquake center at Rockville, Md., said the tremor, occurring about 4:52 p.m. local time, registered 4.5 on the Richter scale, which is considered minor.

Berlen Moneymaker, a Tennessee Valley Authority geologist, said in Knoxville that the tremor, lasting from 30 seconds to two minutes, was a "brief, very strong, very pronounced earth tremor."

The quake was felt as far west as Nashville and as far east as Graham County, N.C. It was the first to be felt in the area since April 15, 1960.

Reports in Cumberland County came from the Grassy Cove Community and from Catoosa Wildlife Management Area, in the vicinity of Potter's Ford.

Bill O'Dell of Crossville said a large rock on which he and his wife were relaxing in Catoosa began to dance "like foam rubber," and continued for about half-a-minute. Carolyn Kemmer said homes vibrated in Grassy Cove.

There must have been other instances throughout the county, as throughout East Tennessee, but there was no damage from the quake reported in any of the states affected.

10. Daily Post-Athenian (7/14/69), Athens, TN

Tremor hits East Tennessee area

KNOXVILLE (AP)—The earth tremor which shook portions of East Tennessee, North Carolina and Virginia Sunday may have been centered in East Tennessee, officials at the Oak Ridge National Laboratory have concluded.

The U.S. Weather Bureau's Essa Earthquake Center in Rockville, Md., classified the tremor as minor, saying it registered 4.5 on the Richter Scale. However, a spokesman for the Oak Ridge Laboratory said the tremor's magnitude was "beyond the bounds" of equipment there which is similar to the weather bureau's measuring devices.

750

This doesn't mean the tremor was particularly severe, but it may indicate its center was in the east Tennessee area. Laboratory official O. H. Myers explained.

The Weather Bureau in Knoxville said it has received reports indicating the tremor lasted 30 seconds to two minutes. A TVA geologist described the phenomenon as a "Brief, very strong, very pronounced earth tremor."

It was strong enough in Knoxville to produce at least one cracked patio and to cause pictures to fall from several walls. Damage in the other states was believed to be minimal.

11. Post (7/14/69), Chattanooga, TN

Earth Tremor Centers In East Tennessee

KNOXVILLE (AP)—The earth tremor which shook portions of East Tennessee, North Carolina and Virginia Sunday may have been centered in East Tennessee, officials at the Oak Ridge National Laboratory have concluded.

The U.S. Weather Bureau's Essa Earthquake Center in Rockville, Md., classified the tremor as minor, saying it registered 4.5 on the Richter Scale. However, a spokesman for the Oak Ridge Laboratory said the tremor's magnitude was "beyond the bounds" of equipment there which is similar to the weather bureau's measuring devices.

This doesn't mean the tremor was particularly severe, but it may indicate its center was in the east Tennessee area, Laboratory official O. H. Myers explained.

The Weather Bureau in Knoxville said it has received reports indicating the tremor lasted 30 seconds to two minutes. A TVA geologist described the phenomenon as a "Brief, very strong, very pronounced earth tremor."

It was strong enough in Knoxville to produce at least one cracked patio and to cause pictures to fall from several walls. Damage in the other states was believed to be minimal.

12. Asheville Citizen (7/14/69), Asheville, NC

Earth Tremor Recorded

An earth tremor, centered on the North Carolina-Tennessee border, was reported Sunday evening by residents of Western North Carolina and Eastern Tennessee.

No damage was reported.

The National Earthquake Information Center in Rockville, Md., computed a magnitude of 4.5 on the Richter Scale for the tremor. This is considered mild.

The bureau's seismograph indicated the exact time of the tremor to be 5:52 p.m.

Jack Shuler of Robbinsville, former Graham County sheriff, said the tremor lasted a few seconds but he added: "It was a rough one." Shuler said the floors of his house were shaking but apparently no damage was done.

Another Graham County resident, Osborne Sawyer, said he heard the tremor at his house 11 miles east of Robbinsville. "It sounded like a big truck going by," he said.

13. Maryville-Alcoa Times (7/14/69), Maryville, TN

Tremor shakes East Tennessee

KNOXVILLE (AP)—The earth tremor which shook portions of East Tennessee, North Carolina and Virginia Sunday may have been centered in East Tennessee, officials at the Oak Ridge National Laboratory have concluded.

The U.S. Weather Bureau's Essa Earthquake Center in Rockville, Md., classified the tremor as minor, saying it registered 4.5 on the Richter Scale. However, a spokesman for the Oak Ridge Laboratory said the tremor's magnitude was "beyond the bounds" of equipment there which is similar to the weather bureau's measuring devices.

This doesn't mean the tremor was particularly severe, but it may indicate its center was in the East Tennessee area, Laboratory official O. H. Myers explained.

The Knoxville Weather Bureau said the tremor occurred at 5:52 p.m., EDT, and added it received reports the shock wave lasted 30 seconds to two minutes.

Berlen Moneymaker, chief Tennessee Valley Authority geologist, described the phenomenon as a "brief, very strong, very pronounced earth tremor."

The Weather Bureau in Knoxville said it has received reports indicating the tremor lasted 30 seconds to two minutes. A TVA geologist described the phenomenon as a "Brief, very strong, very pronounced earth tremor."

14. Herald Courier (7/14/69), Bristol, TN

Mild Earth Tremor Hits Bristol Area

A mild earth tremor shook Bristol, East Tennessee and Southwest Virginia yesterday but apparently there was no damage. The U.S. Weather Bureau's earthquake center at Rockville, Md., confirmed that a mild earthquake had struck the region.

The bureau's seismograph indicated the tremor struck at 5:52 p.m.

The tremor registered 4.6 on the Richter Scale, which is considered mild. The bureau was unable to determine the center of the tremor.

Julian Burroughs said he was in a home on Florida Avenue when the tremor occurred. "It shook the house," Burroughs said.

Larry Barker was at the home of William E. Melton on Route 3 Blountville. He said the tremor shook the house for about 12 seconds.

Both Bristol police departments said the tremor caused no reported damage.

The tremor also occurred in parts of North Carolina.

Some areas in Southwest Virginia, including Lee and Wise counties, reported residents felt the tremors.

15. Kingsport Times (7/14/69), Kingsport, TN

Mild Earthquake Felt In Area, No Damage

A mild earthquake hit the Kingsport area, along with other parts of East Tennessee, Southwest Virginia and North Carolina, around 5:51 p.m. Sunday.

Several area residents noticed the tremors, but no damage had been reported as a result of the minor quake.

Jerry Johnson, meteorologist at the Tri-City Airport Weather Bureau, said the tremors were noted at the airport, and the bureau had received several calls from concerned residents.

Mrs. Carter Crymble, 1348 Linville, said she was checking a road map for a route to Boston when she felt the table upon which she was leaning shake.

She said she told her husband, "I believe it's an earthquake." She did not know exactly how long the quake lasted, but said it was "several seconds."

Johnson said a national earthquake information center in Maryland had confirmed that the area had experienced tremors registering 4.5 on a Richter Scale, characterizing a mild quake. The center of the tremors was placed along the North Carolina-Tennessee border, Johnson said.

The last time the area felt tremors of that magnitude was on April 14, 1969, according to the earthquake center records.

In even a mild earthquake, some landslides can usually be expected in rough terrain like that is found in this area, Johnson said. He said the Weather Bureau would like to hear from anyone who observed landslides or other changes in the earth's surface as a result of the tremors.

16. Daily News (7/14/69), Middlesboro, KY

Earth tremor Felt in Hazard

HAZARD, Ky. (UPI)—State police today said a minor earth tremor was felt late Sunday here.

Buildings vibrated briefly, but no damage was reported.

Troopers said the quake lasted only 5 to 10 seconds.

The quake was the first reported in Kentucky since last December, when tremors were felt over a wide area of the state. The 1968 quake was centered in southeastern Illinois.

17. Press-Chronicle (7/15/69), Johnson City, TN

Little damage reported...

Mild earthquake strikes in area

A mild earthquake, lasting 10 or 12 seconds, struck Upper East Tennessee and Southwest Virginia Sunday just before 6 p.m.

The earth tremor was felt in Johnson City, Bristol and other areas in the region.

The U.S. Weather Bureau's earthquake center at Rockville, Md., confirmed the mild 'quake which recorded a 4.6 on the Richter Scale. The bureau's seismograph indicated the tremor struck at 5:52 p.m.

The bureau was unable to determine the center of the earthquake.

Rutledge: Felt by all. Windows, doors, and dishes rattled. Earth noises. Small objects shifted. Hanging objects swung moderately.

Seymour: Felt by all and frightened many in community. Trees and bushes shook; some plaster cracked. Small objects shifted, overturned, and fell. Windows, doors, dishes, rattled. Moderate to loud earth noise.

Tennessee (Intensity I-IV)

Athens: Felt by few. Slight rattling of windows and creaking of building.

Dandridge: Felt by several. Windows, doors, and dishes rattled. Loud earth noises.

Huntsville: Felt by very few. Windows, doors, and dishes rattled.

Jonesboro: Felt by two persons at home.

Sevierville: Felt by very few. Windows rattled. Moderate earth noises.

North Carolina (Intensity I-IV)

Andrews: Felt by few. Windows, etc., rattled.

Brevard (3 miles north of): Felt by all four in home. Slight shaking of floor. Buildings creaked; loose objects rattled. Very faint rumbling noise.

Cherokee City: Felt in home. Slight tremor in building.

Franklin: Felt by very few in community. Faint earth noises.

Virginia (Intensity I-IV)

Ewing: Felt by several. Windows, doors, and dishes rattled. Houses shook slightly, as if wind was blowing very hard.

Pound: Felt by one person. Slight rattling of windows and dressing table.

Georgia (Intensity III)

Blue Ridge: Felt by several. Hanging objects swung moderately east and west.

Kentucky (Intensity I-IV)

Elkhorn City: Felt by very few. Building creaked.

Gamaliel: Felt by several in community.

Hickman: Felt by several and frightened few in community. Buildings creaked.

Loyall: Felt by many. Trembling effect.

Middlesboro: Felt by very few.

2. Moneymaker's Personal Notes?

The East Tennessee Earthquake of July 13, 1969, centered at Lat. 36.1 N, 83.7 W affected perceptibly an area of more than 13,000 square miles in Tennessee, Virginia, Kentucky, North Carolina and Georgia. The felt area, as mapped from questionnaire data, extends from Saltville, Virginia southwestward to Blue Ridge, Georgia, and from Middlesboro, Kentucky southeastward to Asheville, N.C. In addition to this area, the earthquake was felt in one sizeable outlying area including Hazard, Blockey and Whitesburg, Kentucky and Pound, Virginia, and at some isolated localities, including Elkhorn City, Loyall, and Gomoliel, Kentucky and Grassy Cove and Potter Ford in Cumberland County, and Huntsville, in Scott County, Tennessee. It was reportedly felt also at Hickman, on the Mississippi River, in extreme southwestern Kentucky, some 300 miles distant from the epicenter.

The greater part of East Tennessee was perceptibly affected at intensities ranging downward from a maximum of V. Localities experiencing the higher, though not necessarily equal, intensities are all in East Tennessee. They are:

Jefferson City: Felt by nearly everyone and occasioned some fright. Buildings were strongly shaken, causing the rattling of dishes and other loose objects and the pendulation of suspended objects. "Felt very strongly. Vibrations seemed to go through the house from east to west. It felt like three shocks in rapid succession. We thought it was an explosion in the mine and it felt like we were right over it." Seismic sounds were heard by some.

New Market: A strong shaking motion felt by nearly everyone. Golfers reported feeling a strong motion which caused a golf ball to roll.

Knoxville: Felt by nearly everyone. The abrupt onset was followed by a very strong and rapid trembling motion, which continued for some 5 to 10 seconds. Loose objects rattled and furniture "jumped up and down." There was no damage. People were excited but not frightened; many were thrilled at feeling their first earthquake. A loud rumbling noise resembling distant thunder was heard by some observers.

Seymour: Felt by nearly everyone and occasioned some momentary fright. Dishes, doors, windows, and loose objects rattled, knickknacks were overturned. Trees and shrubbery shook. There was no damage except possibly a case or two of cracked plaster. Loud seismic sounds were reported by some observers.

Rutledge: Felt by nearly everyone. Houses were strongly shaken, causing doors and windows to rattle. Loose objects were shifted and suspended objects were set to swinging. A rumbling sound was heard by some.

Rogersville: Felt and heard by nearly everyone. Dishes, glassware, doors and windows rattled. The earthquake was attended by a noise resembling thunder.

Sneedville: Felt and heard by nearly everyone. Houses shook and dishes, glassware, doors and rattled. A roaring sound was reported.

Morristown: Felt and heard by nearly everyone, as houses shook and loose objects rattled. "The earth shook perceptibly."

Maynardville: Felt by nearly everyone. Houses shook. Doors and windows rattled. A rumbling sound was reported by some observers.

Clinton: Felt by nearly everyone. Buildings were strongly shaken, causing dishes, doors, windows, and loose objects to rattle. Creaking sounds were heard in some buildings. Doors, windows, dishes, and loose objects rattled. Trees and shrubbery shook. Low seismic sounds were reported. (V)

Dandridge: Felt and heard by many as houses shook, doors and windows rattled, and chinaware clattered. Loud seismic noise were heard by some.

Questionnaire data from 40 other localities in Tennessee indicate that the earthquake was .

3. TVA Memorandum

To: Edwin H. McCain

From: Curtiss Hewlett

Date: August 18, 1969

Subject: WEATHER SUMMARY - KINGSTON AREA - JULY 1969

July 6 Thunderstorm

Tornado like winds accompanied by moderate rainfall struck in isolated areas of the basin on Sunday, July 6. The most significant damage resulting from this storm was in the vicinity of Harriman, Midtown, and Kingston, Tenn. Many trees were either uprooted or broken by the strong winds. Extensive damage was done to power and telephone line equipment. In many cases utility service was not restored until the following Wednesday afternoon. A detailed report is included in the attached newspaper clippings.

July 13 Earthquake

Only a few Kingston residents reported experiencing the July 13 earthquake that was centered near Fort Loudoun Dam, just seventeen miles east-southeast of Kingston. The center or focal point of the earthquake was about eighteen miles below the surface. Perhaps this great depth explains why residents near the "epicenter" were able only to detect a slight disturbance. As illustrated in the enclosed clipping the epicenter of a earthquake is the point of the earth surface straight above the focal point of the earthquake.

The Fort Loudoun Dam operator on duty during the earthquake said he felt the disturbance as it caused vibrations throughout the control room at the dam. These vibrations frightened him momentarily as he thought they were caused by equipment at the dam.

Ft. Loudoun Dam Superintendent Nelson experienced the earthquake while in the Knoxville Ft. Sanders Hospital waiting room. He said the floor shook as if a heavy truck was traveling in the area.

Another TVA employee reported feeling the earthquake as he was servicing equipment at the TVA Alcoa, Tenn. power switch yard.

Nancy Baird, employee of the Lenoir City Banner newspaper experienced the earthquake as she was sitting at a concrete picnic table at the Ft. Loudoun Dam Park. She said it sounded like an explosion with a very short duration. According to Miss Baird this earthquake did not seem as strong as another she felt approximately a year ago, perhaps in the month of September. This earthquake struck while she was working alone in the second floor of a building in Lenoir City. It shook the building with such force that she fled to the street for fear of her life.

The editor of the Monroe County Citizens Democrat newspaper in Madisonville, Tenn. said he was in Illinois on July 13 but he had received several reports of the earthquake rattling windows in his area.

The effect of the July 13 earthquake was so slight over the Kingston Area that most area residents, when interviewed, could not recall a disturbance of any type on that date. Of the ten newspapers contacted only three had acknowledged the July 13 earthquake in their publications. Area personnel checked over all of the Kingston recorder charts for July 13 and found no evidence where a recorder had been significantly disturbed by the subject earthquake.

July 27 Windstorm

Strong damaging winds hit the Sweetwater and Crossville area on July 27. A complete report is included in the two attached clippings.

Attached are newspaper clippings from:

THE SWEETWATER VALLEY NEWS
THE KNOXVILLE NEWS-SENTINEL
THE LOUDON COUNTY HERALD
THE OAK RIDGER
THE HARRIMAN RECORD
THE CROSSVILLE CHRONICLE

4. Knoxville Journal (7/14/, 7/18/69), Knoxville, TN

(7/14/69) Quake Rocks Area, Little Is Damaged

A mild earthquake Sunday shook most of East Tennessee, southwestern Virginia and western North Carolina, according to officials at the Environmental Science Services Administration Earthquake Center in Rockville, Md.

The quake, which occurred at 5:52 p.m., apparently caused little damage.

Scientists at Rockville said the quake registered 4.5 on the Richter scale on seismographs, the device used for determining the intensity of earthquakes. A reading of 8 is considered severe.

SEVERAL DAYS

They said it would be several days before the center of the quake is determined.

Berlen Moneymaker, a Tennessee Valley Authority geologist, of Knoxville, said it was a "brief, very strong, very pronounced earth tremor."

The quake lasted from 30 seconds to two minutes according to reports from area law enforcement agencies. The Tennessee Highway Patrol in Kingsport indicated that the center might have been somewhere between Knoxville and Kingsport.

Mrs. Guy Moran, 209 Grata Road, told The Journal her patio was cracked by the tremor. She said the break would measure seven feet in length.

Mrs. Moran said the walls were cracked in two bedrooms at the home of her son, Cleo, who lives on Asheville Highway in the county.

"Our furniture just jumped up and down," Mrs Moran added.

Mrs Moran's home is in the Chilhowee Hills section of East Knoxville.

The quake was felt as far west as Nashville, and as far east as Graham County, N.C., according to Associated Press.

NO LAKE DISTURBANCE

Area boatdock operators indicated no disturbance on the lakes, and a TVA spokesman said it would be several days before they could determine any changes in lake levels due to the quake.

The Journal received numerous telephone calls from area residents concerning the quake. The callers indicated the quake seemed to start in the east and move westerly.

O. H. Myers of Oak Ridge National Laboratory said the seismograph there registered the earthquake at 5:51:19. The quake's magnitude was beyond the bounds of the equipment. He said this was the first tremor in the region since April 15, 1960.

Nathan S. "Sam" Dougherty, engineer and seismologist, used a seismolog-type seismograph to measure the quake at Fort Sanders Presbyterian Hospital, part of which rests on the Chapultepec dolomite and part on the Copper Ridge dolomite.

Dougherty said the frequency of the shock was 49.5 cycles per second; amplitude .00165 inches; velocity .461 inches per second; acceleration .333 inches per second squared; energy ratio .0597.

This information might help somebody pinpoint the epicenter, Dougherty said. His work as an engineer-seismologist has mostly to do with the effect of explosions in excavation, and with the effect of machinery and other vibrations on structures.

*Eastern Daylight Time.

7/18/69 Quake Centered Near Dam

The seismic station at Oak Ridge National Laboratory has pinpointed the epicenter of an earthquake which shook East Tennessee Sunday as about two miles east of Fort Loudoun Dam.

The laboratory in announcing this Thursday said four minor tremors have been recorded since Sunday's disturbance.

The National Earthquake Center in Rockville, Md., said the major tremor recorded 4.6 in the Richter scale, a device for measuring the severity of earthquakes. A 4.6 reading is regarded as mild.

Laboratory officials said the quake was calculated to have occurred at about 18 miles below the earth's surface. The tremor was felt over most of East Tennessee and in southeastern Kentucky and western North Carolina.

The quake caused little damage and there were no reports of any injuries.

5. News-Sentinel (7/14/, 7/17/69), Knoxville, TN

7/14/69 Earth 'Jealous'

Mild Quake Rocks Wide E-T Area

The earth perhaps registered its dissatisfaction with all the attention being given the moon by demanding some attention itself yesterday.

An earthquake, called "mild" by the National Earthquake Information Center in Rockville, Md., shook parts of East Tennessee, North Carolina and Eastern Kentucky yesterday, but apparently caused little damage.

The Weather Bureau at McGhee Tyson Airport issued a bulletin at 7 last night reporting the mild tremors hitting the area at 5:51 p.m., and lasting between 30 seconds and two minutes. The Maryland center reported the tremors registered 4.5 on the Richter Scale. The center indicated it could not pinpoint the geographic center of the quake, but that it originated in the earth's crust, which is not more than 24 miles thick in the area.

Second Quake

Some callers reported to The News-Sentinel that they felt another tremor around 5 this morning. However, the reports could not be confirmed.

A spokesman for Oak Ridge National Laboratory said yesterday's tremor was "beyond the bounds" of the seismograph instrument there. ORNL official O. H. Myers said this did not mean the tremor was particularly severe, but that it may indicate its center was in the East Tennessee area.

Mr. Myers said the earthquake bent the sensitive instrument before a full reading could be obtained. He said, however, he was able to get the exact arrival time of the quake as 5:51 p.m.

'Brief, Strong'

Berlen Moneymaker, a TVA geologist, said the tremor was a "brief, very strong, very pronounced one." He said it would take days to find out where the center of the quake was located.

The Center in Rockville recorded a reading of 4.6 on the Richter Scale for the Bristol area, where residents reported the tremor strong enough to make items "bounce around on the floor." A reading of 8 is considered severe, according to Mr. Myers.

The earth had its last shaking spell in this area last Nov. 20 when tremors were strong enough to break the seismograph at Oak Ridge and set chairs and tables dancing in some houses. However, the Maryland center reported its last recorded earthquake in the area to be April 15, 1960, and the last one to cause any damage here in 1957.

(7/17/69) Four Tremors Followed Sunday Earthquake

All Recorded by Seismic Station at Oak Ridge

OAK RIDGE, July 17 (Special)—Four aftershocks of Sunday's main earthquake in the Knoxville area were recorded by the seismic station at Oak Ridge National Laboratory. This was made known today by David Sundberg, ORNL director of public information.

The focal point of the main quake at 5:51 p.m. Sunday was within a range of 6 1/2 miles south by southwest of Concord Park and two miles east of Fort Loudoun Dam. That range is within a leeway of seven miles.

Very Minor

The location was calculated on the basis of the arrival time of the initial shock wave by readings at different seismic stations in the Southeast, including the one at Oak Ridge National Laboratory.

Since then there have been four aftershocks recorded at ORNL: at 8:47 p.m. Sunday and on Monday at 2:45 p.m., 5:13 a.m. (the strongest of the afterquakes), and at 6:32 a.m.

The main aftershock had a magnitude of only one-two thousandth of the magnitude of the main quake, so was very minor. Because of the extreme sensitivity of the Oak Ridge Lab device, it was able to detect these very minor earth tremors. The reading on the main quake did coincide almost exactly with those calculated by the eight stations and fed into the national earthquake information center in Rockville, Md.

"But we do not know if the others (other stations) detected these aftershocks," said Sundberg. "Oak Ridge National Laboratory's device may be the only one which detected them, so far as we know."

The U.S. Geological Survey reported yesterday that another slight tremor occurred in the same area yesterday.

The 'quake, at 5:15 a.m., was much smaller than the one on Sunday, the service said, "and not noticed by many people." There was apparently little damage from the quake. However, Mrs. Paul Adams, 1912 Forest View Road, said the tremor cracked a couple of walls at her residence.

Bill Jennings, Johnson City Press-Chronicle political writer, said he felt the 'quake on the other side of Boone Lake near DeVault Bridge. He commented that it shook the house for a few seconds and sounded like several large trucks passing in the highway at first. But, having been through earthquakes in Japan, it took him only a few seconds to recognize what was occurring.

The only sign left of the earthquake that he could find was a pipe knocked from an ash tray.

Arthur Kelsey, 813 Cloudland Drive, said he felt the tremor for "10 to 15 seconds." He noticed a light fixture vibrating, he said.

Hanes Lancaster Jr., 711 S. Mountain View Circle, felt the 'quake and called the flight service at Tri-City to find out that a slight earthquake had occurred.

Julian Burroughs, Bristol, said he was at home on Florida Avenue when the tremor struck. "It shook the house," Burroughs said.

Larry Barker, who was at the home of William E. Melton, Rt. 3, Blountville, said the tremor shook the house for about 12 seconds.

The Johnson City Police Department and Washington County Sheriff's office said they had no reports of damage. No damage was reported to either of the Bristol police departments either.

The tremor also shook parts of Western North Carolina.

Some areas in Southwest Virginia, including Lee and Wise counties, reported that the tremor was felt.

18. Daily Gazette-Mail (7/14/69), Morristown, TN

Earth Tremor Felt Here, No Damage

A brief earth tremor was felt in Morristown late Sunday afternoon, but the quake caused no reported damage. Shortly before 6:00 p.m. yesterday the earth shook perceptibly.

The quake apparently had its center somewhere in East Tennessee between Knoxville and Kingston.

The quake registered 4.5 on the Richter scale on the seismograph at Rockville, Maryland, site of the Environmental Science Service Administration Earthquake Center.

A reading of 8 is classified as severe.

The Morristown area is in one of the major fault lines in this country, along which earthquakes are most likely to occur.

The tremor was felt as far west as Nashville and as far east as Graham County, N.C., according to the Associated Press. It lasted from 30 seconds to 2 minutes, depending on the location.

It was apparently more severe west of Morristown than here. A Morristown man sitting in his parked car in Knoxville said today that the car shook so severely he thought it had been struck by another vehicle.

A more severe earth tremor here about fifteen years ago tumbled mirrors off walls and cracked walls.

19. Sun (7/14/69), Greeneville, TN

Earth Tremor Reported Here

Greeneville got a few small jolts from a minor earth tremor that shook parts of three states Sunday at about 4 p.m.

Several people from different parts of town reported feeling the tremor. One man who gave his address as W. Vann Rd. said that his house got "a pretty rough shake."

No one in Greeneville reported any damage from the tremor. But the Associated Press reported that in Knoxville at least one patio was cracked and pictures were shaken off the walls of several homes.

The tremor was felt in East Tennessee, North Carolina, and Virginia. The center of the disturbance was believed to be in East Tennessee, because the Oak Ridge Laboratory reported the most severe jolts.

According to the Knoxville Weather Bureau, the tremor lasted from 30 seconds to two minutes.

The U.S. Weather Bureau's Essa Earthquake Center in Rockville, Md., classified the tremor as "minor."

D. USEQ [395]

III. USGS [390]

C. EQHUS [120] 1969 JUL 13 16:51 36.1 74.3* East TN 51,900 V

1969. July 13. Eastern Tennessee. Felt in Tennessee, North Carolina, Virginia, Kentucky, and Georgia. Slight damage occurred at Jefferson City, Tenn., where a few bricks loosened on chimneys and some rocks fell in zinc mines. At Knoxville, plaster and concrete cracked, houses shook strongly, and furniture jumped up and down. Plaster cracked at Seymour and small objects fell from shelves. No damage occurred outside Tennessee. Magnitude 3.5.

1. USEQ [395]

D. USEQ [395] 1969 JUL 13 16:51 36.1 83.7 Eastern TN 51,900 V
:09.4

July 13: 16:51:09.4*. Epicenter 36.1° north, 83.7° west, eastern Tennessee, W. Magnitude 3.5. V. Felt over approximately 20,000 square miles of Tennessee, North Carolina, Virginia, Kentucky, and Georgia (see fig. 3). At Jefferson City, some rocks fell in several zinc mines, and a few chimney bricks were shaken loose. Plaster and concrete reportedly cracked at Knoxville; plaster cracked at Seymour.

INTENSITY V IN TENNESSEE:

Clinton: Windows, doors, and dishes rattled loudly; building creaked strongly. Trees and bushes shook.

Jefferson City: Felt by nearly everyone; frightened few. Houses shook strongly. "Several zinc mines in area reported some loose rock fell. There were reports that a few bricks in chimneys were shaken loose."

Knoxville: Felt by nearly everyone. Abrupt onset, followed by a very strong trembling motion. Houses shook strongly; furniture jumped up and down. Picture fell from wall. A few claims of cracked plaster and concrete.

Maynardville: Felt by nearly everyone. Doors and windows rattled. Rumbling noise heard.

New Market: Felt by most. Strong ground motion noted. Golfers reported that ground motion caused a golf ball to roll.

Rogersville: Felt by all. Thunderous earth noises.

Rutledge: Felt by all. Small objects shifted. Earth noises heard.

INTENSITY IV IN TENNESSEE:

Athens, Blountville, Bristol, Dandridge, Elizabethton, Fort Loudon Dam, Greenback, Hartford, Huntsville, Jacksboro, [data missing]

shall, Mars Hill, Robbinsville, and 11 miles east of, and Waynesville.

INTENSITY I-III IN KENTUCKY:

Blackey, Elkhorn City, Gamaliel, and Middlesboro.

INTENSITY I-III IN VIRGINIA:

Abingdon and Gate City.

INTENSITY I-III IN GEORGIA:

Blue Ridge.

July 14: 06:15. Knoxville, Tenn. The press reported this shock was much smaller than that of July 13 and that it was not noticed by many people.

E. PDE [320]	1969	JUL 13	21:51 09.4	36.1	83.7	TN
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M = 3.5; h = 1 km (G); felt in parts of Ky., N.C., Th., Va.

IV. McClain [260]	1969	JUL 13	21:51 :09.4	36.1	83.7	East TN
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M = 3.5; felt in parts of Ky., northeast Th. and Va.

	1969	JUL 14	09:13 :14.5	36.1	83.7	East TN
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A. PDE [320]

B. ORT station records

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V. Bollinger [33] 1969 JUL 13 16:51 36.1 83.7 Knoxville-Jefferson City, TN 51,900 V

M = 3.5

A. USEQ [395]

B. McClain [260]

1969 JUL 14 06:15 36.0 84.0 Knoxville, TN

VI. Moneymaker [281]

1969 JUL 13 4:51 p.m. Southern Appalachians VI

1969 July 13 4:51 p.m. Southern Appalachians. (VI) A moderately strong earthquake was felt over an area of about 20,000 square miles in Tennessee, Kentucky, Virginia, North Carolina, and Georgia. A questionnaire canvass indicated that it was felt from Murphy, N.C. northward to Saltville, Va. and from Asheville, N.C. westward to LaFollette, Tenn. A small outlying felt area in Kentucky includes Hazard, Blackey and Whitesburg. In addition to these two areas, the shock was felt at several points well beyond their limits, including Blue Ridge, Ga., Grassy Cove, Potter Ford and Huntsville, Tenn., Middlesboro, Loyall, Elkhorn City, and Gamaliel, Ky. and Pound, Va. The shock was strongest in the Knoxville-Jefferson City area, where the abrupt onset was followed by a strong trembling motion. Nearly everyone felt the motion as houses were strongly shaken and "furniture jumped up and down." There were a few unconfirmed reports of cracked plaster and concrete. People were excited but not frightened and some actually were thrilled at "feeling their first earthquake." The epicenter was located at Lat. 36.1 N., Long. 83.7 W., about 15 miles northeast of Knoxville. Reference No. 38 presents a very complete account of the earthquake and a map slightly different from one drawn by the writer. 1969 JUL 14 6:15 a.m. Southern Appalachians III

1969 July 14 6:15 a.m. Southern Appalachians, (III) A mild aftershock of the July 13 earthquake was felt by a few at Knoxville.

A. USEQ [395]

B. Moneymaker [283]

IX. Varma [400] 1969 JUL 13 36.1 83.7 Knoxville Co., TN V

Felt radius = 129 km.

1969 JUL 14 36.0 83.9 Knoxville, TN II

A. USEQ [395]

I. TEIC 1969 JUL 24 18:10 36.0 83.9 Knoxville, TN III

Location: Knoxville, TN

Intensity: Light shock @ Knoxville, TN, felt in tall office buildings

Comment: A/S to JUL 13 event (?)

II. TVA [380] 1969 JUL 24 18:10 36.0 83.9 Knoxville, TN

A. USEQ [395]

B. Moneymaker [283]

A single light shock was reported felt in office buildings in the business section of Knoxville. One report that came directly to me was by David Dickey who felt and heard the disturbance in his office.

1. David Dickey (personal communication)

III. USGS [390]

D. USEQ [395] 1969 JUL 24 13:10 Knoxville, TN III

July 24: 13:10. Knoxville, Tenn. III. People in tall buildings reported feeling this shock.

V. Bollinger [33] 1969 JUL 24 13:0 36.0 84.0 Knoxville, TN III

A. USEQ [395]

VI. Moneymaker [281] 1969 JUL 24 1:10 p.m. Southern Appalachians III

1969 July 24 1:10 p.m. Southern Appalachians, (III) Another mild shock felt by a few in tall office buildings in the business section of Knoxville.

A. Moneymaker [283]

B. USEQ [395]

III-IV

Knoxville, TN

83.9

36.0

JUL 24

1969

IX. Varma [400]

A. USEQ [395]

I. TEIC 1969 NOV 20 01:00 37.4 80.9 Elgood, WV 322,000 VI

Location: Elgood, WV; intensity; location

Intensity: @ Collinsville, VA, cornice shaken from building; @ Glen Lyn, VA, cracked walls in old concrete block house, cracked, fallen plaster, pictures knocked down, few bricks knocked off chimney, many windows broken; some plaster fell, pictures fell from wall, dishes from shelves @ Rich Creek, VA; near Garrett, KY, cracked a chimney, broke light fixtures in mobile home; hanging gas heater shaken down, picture knocked from wall @ Catlettsburg, KY; @ Athens, WV, plaster cracked, windows cracked, small objects shifted, "slight damage"; "part of flue fell" @ Camp Creek, WV; broken windows @ Elgood, WV, objects knocked from shelves; objects knocked off shelves @ Kelleysville, WV; furniture shifted, books and lamps fell off table @ Mill Point, WV; @ Oakvale, WV; windows were broken

Extent: S OH to EC GA, E TN - KY to W NC - VA; map, (Bollinger [35]); 322,000 sq. km.

A. Gordon [175] 1969 NOV 20 01:00 37.4 80.9

01:00:09.3; 37.449, 80.932; 2.5; 4.6B

Magnitude from Bollinger [38]

II. TVA [380] 1969 NOV 20 01:00 37.4 80.9 Elgood, WV VI-VII

A. PDE [320]

B. Best [20] 1969 NOV 20 01:00:09 37.4 81.0 WV

m = 4.3; h = 3 km.

C. Moneymaker [283]

1. News and Observer (11/20, 11/21/69), Raleigh, NC

(11/20/69) Earthquake Jolts Raleigh, Southeast States

An earthquake centered near the Virginia-West Virginia border, some 250 miles northwest of Raleigh, shook this city and an eight-state area shortly after 8 p.m. Wednesday, causing slight property damage but no reported injuries.

The tremor registered a 4.5 reading on the 10-point maximum Richter scale used to record the severity of earthquakes.

The quake spawned tremors felt in a large part of the Southeast. The shocks extended from Cincinnati to Athens, Ga., hitting also in the Carolinas, Virginia, Kentucky and Tennessee.

The heaviest hit area was apparently in Giles County, Va., a mountain area, where the tremors lasted 18 minutes.

Giles County Deputy Sheriff Roy Montgomery said widespread minor damage was caused throughout the country. Plaster was knocked from walls and ceilings and windows were broken in many homes.

The National Earthquake Center at Rockville, Md., said it was working to put together a reading on the quake, which lasted as long as half an hour in some areas. It began at 8 p.m. EST.

Officials at Rockville put the epicenter of the quake 60 miles west of Roanoke, Va., and 70 miles southwest of Charleston, W. Va.

A technician at Virginia Tech. at Blacksburg said "it was quite a shake" but the Raleigh weather bureau called it "slight."

The tremor lasted for 30 seconds in Asheville, and for approximately 10 seconds in Raleigh.

At Statesville, police officer Willard Parker said his stucco house was canted to the north as a result of the tremor. There were reports of telephone poles down in Statesville and Asheville.

The tremor was felt throughout central and western North Carolina and produced a flood of phone calls to police stations, newspapers and radio and TV stations.

The mountain resort area at Boone reported two separate tremors during driving winds and snow. Students in high rise dormitories at Appalachian State University said the shaking was quite intense.

The News and Observer switchboard received dozens of calls within a short period following the tremor.

The tremor came about two and a half hours after a storm front passed through Raleigh at 5:30 p.m. producing high gusty winds and light rain.

Felix Barker, 2302 Beech Ridge Road, said "I was on the second floor of my home and thought the house was going to fall down."

He said he checked with his next-door neighbor, Shelby Alford, 2300 Beech Ridge Road, and was told "I was resting and I was almost knocked out of bed."

Mrs. Barbara Coit, of Woodland Road seven miles south of Raleigh, said, "The whole house shook and a few things fell off the table."

Attorney Tom Bolch of Raleigh: "I was sitting on the cotton-picking couch and it felt as if someone was shaking it."

A resident of Falls of the Neuse Road north of the city limits: "I felt my whole house shake."

Percy Daniels of 315 East Jones St., who has been suffering from heart trouble, said he felt the bed begin to tremble and thought he was having another heart attack.

A housewife in the Cameron Park section said, "I thought a big truck had gone by on the street."

At the U.S. Weather Bureau at Raleigh-Durham Airport, veteran forecaster Jim Hosey said he felt what he thought was a tremor. "I felt the building shake," he said.

Hosey said he was sitting down at the time. "I got up and went to the next room, and asked the guy there if he felt anything," Hosey said, "He told me he was standing up, and didn't feel anything."

Mrs. Robert Hanley, who lives at 1916 Reid Ave. in the Five Points area of Raleigh, said, "I felt a tremor. It felt like something hit the house. The lampshades were jiggling back and forth."

Mrs. Hanley said the tremor was felt on both floors of the house. "I talked to people at Royal Hills (off U.S. 70 West) and they felt it too," she reported.

Mrs. J. Crawford Biggs of Wake Forest Road; "I thought the house was falling down—couldn't figure out what it was since the wind wasn't blowing hard. It didn't break anything, just shook the house."

C. Ervin Stone, manager of the Ambassador Theater here, said he was sitting in the theater in his chair when he began to shake. "I thought my heart was acting up," he said.

The Raleigh Police Department reported that 150 to 200 persons called to ask the cause of the earth tremor. P. R. Bryant police radio dispatcher said the calls began coming in shortly after 8 p.m.

A spokesman for Carolina Power and Light Company said the disturbance did not cause any problems with electrical installations in the Raleigh area.

The tremor was felt on the third floor of the three-story News and Observer Building.

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G. E. Hook of 1801 Fairview Road, one of a number of persons who called The News and Observer to report the tremor, said that "several of my neighbors felt it, too, and came out into their yards."

"It almost shook the flowers off the tables," said Mrs. John Bailey of Blount Street.

Mrs. Robert Newcomb of 2520 E. Lake Drive first noticed the tremor when "the bed started shaking."

"The house trembled for a couple of seconds," said F. D. Smith of 4505 Leaf Court.

Doug Redman of 1627 Sutton Drive said it felt like his house "shook for three or four seconds."

"It felt like the bed was pulling out from under me," said Mrs. J. R. Ferrell of 2318 Lyon St. in West Raleigh.

Alvin Stephens of Lake Wheeler Road said the tremor "shook my house."

A State Highway patrol radio station at Williamston said that reports from troopers between 8 p.m. and 8:15 p.m. revealed that power lines were drawn in Hyde County. Whether this was connected with the earth tremor could not be determined immediately.

The patrol radio station also said that Radio Station WCTB in Roanoke Rapids was knocked off the air shortly after 8 p.m.

A trooper at Rocky Mount said a tremor was felt "very strongly" there.

A trooper in Pinetops reported to the Williamston station shortly after 8 p.m. that "there are heavy winds and a lot of noise, but I haven't heard of any damage."

The Wilson Police Department reported that two residents in the vicinity of Wilson Memorial Hospital phoned in to report they felt a tremor shortly after 8 p.m. There were no reports of phone line troubles.

The Carolina Telephone and Telegraph Company at Tarboro, which serves a large segment of Eastern North Carolina, said the only report of phone trouble it had Wednesday night was that a tree had fallen in a Rocky Mount yard and put a phone at that home out of service.

(11/21/69) Our Little Quake Was Only a 'Wink' Quake, Mountains Linked

The little earthquake which Wednesday night gently shook Raleigh and other parts of North Carolina and the Southeast was only the feeble creaking of a very old but once great mountain system--the Appalachians--trying to settle its ancient bones a little more comfortably into the earth's deep crust.

Compared to the cataclysmic upheavals of the earth's stone skin millions of years ago, when the great mountain systems of the world were carved, the little happening centered in southwestern Virginia Wednesday night had about the same force and destructiveness as a winked eye.

But it was not ever thus along the Appalachians. Once they were a tiger among mountains. Some 300 million years ago they towered as high as the Rockies and maybe as high as India's great Himalayas, tallest mountains in the world. The king of the Himalayas, the world's champ, Mt. Everest, towers 29,028 feet. North Carolina's Mt. Mitchell is 6,683, highest in the southeastern United States.

The Appalachians must have produced some mighty quakes in their day. But times and erosion have taken care of all that. Now there's only a feeble flutter every few years. Wednesday night's was one of them, so say the books and records and geologists consulted Thursday.

The last previous quake felt in North Carolina was Nov. 9, 1968, and it wasn't a product of the Appalachians. The tremor felt in the western part of this state then resulted from a quake in Illinois which shook 20 states.

But there have been native-born quakes which left their little geological footnotes. One was at Skyland, in western North Carolina, Feb. 21, 1916, according to Dr. Jasper Stuckey, retired state geologist. That one registered 7 on the Richter scale and was felt over 200,000 square miles.

A second was centered 15 miles south of Brevard Oct. 20, 1924. It was between 5 and 6 on the Richter scale. A third occurred near Brevard Nov. 2, 1928, but there was no record of its strength.

"All those carried shocks stronger than those felt Wednesday," Dr. Stuckey said. "And of course there were more shocks which were never felt or recorded."

The Wednesday quake, centered in mountainous Giles County, Va., only broke a few dishes and windows and cracked a little plaster. And the most it could ring up on the Richter scale was 4.75.

The Richter scale measures how much the ground rises and falls during a quake. According to Joel Watkins, professor of geology at UNC Chapel Hill, the ground in Giles County rose and fell only about 1-100,000th as much as it did in the great Alaska quake on Good Friday in 1964. Or the 1906 San Francisco quake. Or the big one in Chile in May, 1960 when 5,700 persons died. In Alaska 131 died. In San Francisco 700.

Fire and tidal waves are a major cause of death in big quakes. Giles County's would hardly have caused a ripple in a bathtub. Compared to Giles County's 4.75 rating on the Richter scale, big quakes such as those just mentioned have had readings around 8.5.

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That applies generally to the great quake holocausts of all time such as the one at Shensi, China Jan. 24, 1556 in which 830,000 persons were killed. Or more recently at Tokyo, Japan, where 143,000 died Sep. 1, 1923. Or at Agadir, Morocco where 12,000 were killed Feb. 29, 1960.

Earthquakes, from Shensi to Giles County, and regardless of their strength, are caused by the same thing--the slipping and fracturing and settling of the great rock of the earth's skin. The resultant trembling or quaking of the globe's surface is what causes the damage. Plus tidal waves and fire.

Quakes occur along what geologists call fault lines, or fractures in the big "surface" rock. Some quakes occur as deep as 500 miles down inside the earth. Others in the mountains ranges under the sea. But most occur no more than 40 or 50 miles down.

There are two such faults in the southeastern United States. One, about 50 miles wide, runs down the Appalachians from around Giles County, Va., to eastern Alabama. It produced the quake felt there Wednesday.

The other fault in the Southeast centers on Charleston, S.C. There, in 1886, occurred a quake which nearly destroyed the city. It was the most destructive quake ever known in the Southeast.

Why would a quake occur in Charleston, so far from the mountain fault line? And why so violently and so recently? For as the old earth reckons things, 1886 is only about a gnat's blink ago.

There has been speculation in geological treatises and tomes that something may be happening on the ocean depths somewhere off the coast of South Carolina. Something like maybe a new mountain range forming.

But geologically speaking it seems to be a touchy subject. "I would rather not talk about it," said Prof. Watkins. "I would rather not speculate."

Dr. Jasper Stuckey, retired State geologist and geology teacher at N.C. State is considered a local authority on earth faults and tremors.

He was a small boy when what he considers the greatest tremors felt in this area came Aug. 31, 1886.

"But being a boy, I wouldn't have given the tremors the importance they deserved," he said of the Charleston quake.

He said Raleighites, who can remember as far back as 1915, may recall other "feelable" shakes.

He said three of these had their centers in North Carolina. "One at Skyland in western North Carolina occurred Feb. 21, 1916, and was felt over 200,000 square miles. It had an intensity of 7.

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One on Oct. 20, 1924, 15 miles south of Brevard, had an intensity of between 5 and 6 and was felt over 56,000 square miles. The third which occurred near Brevard on Nov. 2, 1928, was felt over 40,000 square miles; but there is no record of its intensity.

"All those carried shocks which were stronger than those felt last night. And of course there were many more earthquakes or shocks which were never felt," said Dr. Stuckey. He said he only yesterday discovered information showing there were 100 shocks recorded in North Carolina between 1774 and 1959.

Dr. Stuckey said records show the tremors from the New Madrid, Mo., earthquake of 1811 were felt quite strongly in Raleigh.

Local geologists agree that most quakes are caused by slippages of the earth along faults, or cracks, in the earth.

Dr. Stucky called attention to the earth fault which extends from near Oxford to a point just beyond Cary and passes just west of the Angus Barn through Holly Springs and to the old courthouse site outside Sanford.

"As you drive along you can notice that the exposed rocks, instead of being uniform and even, are broken and chewed. This is known as the Jonesboro fault. There is no record of any activity along this fault, since white man came here."

Dr. Leith also said he did not believe last night's quake had any effect whatsoever on the Jonesboro fault, which he said has existed for around 200 million years. "We don't need to worry about this one," he said.

Last night's quake, not only was the talk of the town this morning. It was the brunt of the coffee-cup gatherings, the jokes, the jests and, in some cases, sincere remarks that the quake was the result of "man's fooling around on the moon."

(11/21/69) 'Spasm,' Tears In 1886 Quake

Last Raleighites called their neighbors after feeling earthquake tremors.

Eighty-three years ago, when tremors from the Charleston, S.C., quake hit Raleigh it was far more dramatic.

One lady had a convulsion; another had a spasm in the street and had to be overcome and carried inside by two men, according to a newspaper account in The News and Observer of Sept. 1, 1886.

This was the day after the Charleston quake which leveled buildings and killed 60 persons in the South Carolina city.

In Raleigh, the city felt six distinct shocks between 9:50 and 10:45 p.m. on Aug. 31, followed by three more shocks at 12:55, 4:15 and 8:30 a.m.

"Yesterday, we had much excitement," the reporter wrote. "Many people did not sleep at all and many of those who did retire passed a restless night disturbed by hard dreams."

Considerable effort was required to prevent panic stricken convicts from escaping from prison in Raleigh.

A report from Chapel Hill noted: "Old South still stands erect and none of the old walls are torn down. But the boys emptied the rooms and then made more fuss than was made for them.

C. M. Roberts, "keeper of the capitol," said he felt his bed move as if someone had shaken it by the head and foot. The chandelier rattled, along with the windows. He said he could feel the earth "heave and wave and shudders seemed to pass through the massive building."

In the auditor's office, books were thrown to the floor. Bottles on the shelves in Williams and Haywood Drugs crashed to the floor.

The reporter said some Raleighites described the quake as "like strokes of a machine. Buildings got up to a regular, rhythmic swing and everything in them appeared to fairly dance."

"Some claimed buildings moved. But there might have been optical illusions. Chimneys were thrown down to the ground at several homes."

Many of the citizens were so frightened they loaded into wagons and drove into the countryside away from the danger of falling buildings.

The reports from various points in the Raleigh area were brought primarily by messengers. Several mentioned that "women cried."

Gov. A. M. Scales, a Rockingham native, was interviewed "on his porch." He said the earthquake sounded "like cannon only not quite as loud."

He said he had never before felt such a case of "utter helplessness."

And a report from Chapel Hill, then and now the seat of learning, said, "Looking glasses quivered. Crockery rattled and philosophers were confounded."

2. Raleigh Times (11/20, 11/21/69), Raleigh, NC

(11/20/69) Geologists List New Quake As Sixth Felt in Raleigh

Last night's earthquake which rattled dishes and caused some Raleighites to think they were suffering heart attacks was the first such experience in the lives of much of the population.

But older citizens may recall as many as five other tremors in varying degrees with the most severe shake spreading from the Charleston, S.C., quake of August 31, 1886.

The center of last night's quake was located 60 miles west of Roanoke, Va., and registered 4.75 on the Richter Scale, according to officials at National Earthquake Center at Rockville, Md.

The tremor was felt in eight states.

"Anywhere else but in Eastern United States, this probably would have gone unnoticed," said the spokesman, adding that a 6.5 quake is considered destructive. The 1964 Alaska earthquake registered 8.5.

What caused last night's tremor which caused neighbors to call neighbors and the apprehensive to call the police department and which caused Bell Telephone Co. here to be swamped for about 10 minutes?

Dr. Joel Watkins, associate professor of geology at the University of North Carolina at Chapel Hill, said it's his theory that there was a shifting of rocks in the Appalachians.

"The Appalachians represent an old mountain chain which at one time was much bigger and much more active in the sense that the rocks were moving about. Now it is essentially dead but these rocks still shift about a little occasionally," he said.

Dr. Carlton J. Leith, acting head of Geosciences Department at N.C. State University, said there has been little earthquake activity in this area recently and that is responsible for so much interest in last night's quake.

"Earthquake vibrations can travel great distances. A good earthquake can be felt around the world. So there is nothing unusual in the fact that we felt this one. What is unusual is that it happened at all."

He said most quakes are caused by slippage of the earth along faults. In volcanic areas, such as Japan, quakes are caused by volcanic rumblings.

3. Winston-Salem Journal (11/21/69), Winston-Salem, NC

Wednesday's Tremor Not So Strange

Appalachian Fault Slipped a Little

The earthquake that shook people from Cincinnati to Atlanta Wednesday evening seems to have been centered within a few miles of Elgood, W. Va.

An unlikely sounding place, you might say, for anything earthshaking to happen.

Not so to a geologist. Elgood is in Summers County, which, along with adjoining Giles County, Va., "is right on the edge of the folded Appalachians," according to Dr. Charles Sears.

Sears, director of the seismographic station at Virginia Polytechnic Institute, spent yesterday afternoon in the field. His crew, he said, was combing the area northeast of Narrows, Va., the center of a notable quake in March 1968.

That section of the Appalachians, according to Dr. John DeNoyer of the U.S. Geological Survey, "was strongly deformed about 250 million years ago." What resulted, in the 20 miles beneath the earth's surface, was folds something like those under an old man's chin. The spaces between layers are called faults.

As time passes, the layers tend to slip and slide, gradually finding a comfortable position in which to sit out eternity.

Early movements tend to be drastic, sometimes squeezing layers of rock upward into mountains. Geologists use California and its infamous San Andreas fault as an example of this kind of "young" activity.

There are old fault in the western Appalachians, Sears said yesterday, the biggest of which is the St. Clair fault. It moves, but not as radically or as often as its youthful California counterpart.

The Earthquake Information Center in Rockville, Md. estimated the magnitude of Wednesday's quake at 4.7 on the 10-point Richter scale. By contrast, a quake in Giles County in May 1897 is estimated to have had a magnitude of 8. The March 1968 tremor registered 3.9.

Some confusion developed in reports of the latest tremor because of a second measurement used. The intensity of the shock is measured at various points and is registered on a Richter scale of 12.

Thus, the Richter reading of 4.5 recorded Wednesday evening in Cincinnati was not in conflict with the magnitude estimate of 4.7.

Sears said yesterday that tremors strong enough to be felt happen about once a year in the region. In between, however, the VPI seismograph, which amplifies movement 50,000 times, detects several slight tremors. It also picks up earthquakes--natural and man-made--all over the world. What actually happened Wednesday remains a matter of speculation. Geologists consulted by the Journal tend to agree that the earthquake was relatively shallow, by which they mean five to 15 miles down.

Sears said it could have been a movement of as little as a fraction of an inch or as much as several inches. It probably extended several miles along a fault, he said. By comparison, there was movement along a 300-mile stretch during the 1966 San Francisco earthquake.

Both DeNoyer and Waverly Pearson, a federal geophysicist in Rockville, stressed the distinction between earthquakes west and east of the Rockies. Eastern earthquakes are generally mild, they said, but felt over a vast area. In the West, by contrast, they are violent and confined.

The extreme example of an eastern earthquake, according to Denoyer, who is assistant director of research for the Geological Survey, happened in New Madrid, Mo., in 1811 and 1812. Tremors from that one were felt as far away as Boston and Charleston, S.C.

Wednesday's quake seemed to cause more excitement in Winston-Salem and Dayton, Ohio, than it did in Giles County. A sheriff's deputy in Pearisburg, seat of Giles County, said the tremor caused some joking, but little else. In Winston-Salem, switchboards at city hall and the Journal were overloaded for an hour.

Familiarity seems to be part of the answer. Detectable tremors are relatively common in southwestern Virginia and adjoining parts of West Virginia and Tennessee.

They are rare in the Piedmont, according to Dr. G. R. McCarthy, a former UNC seismologist. Quakes of Wednesday's magnitude happen about twice a century. There are several faults under the Piedmont, according to McCarthy, but they are inactive.

Why the Piedmont felt Wednesday's tremor as it did may have been explained by DeNoyer. "They are felt more on unconsolidated materials," he said, less on firm ground, less yet on solid ground." Thus, he said, people in a valley or plain, where the ground is loose, feel a shock that may be undetectable on a solid mountain outcropping nearer the source.

4. News-Sentinel (11/20/69), Knoxville, TN

Earthquake Felt in 8-State Area

The Tri-State area apparently came through last night's earthquake with nobody hurt and only minor damage. But it was exciting while it lasted.

Something shifted in the underground rock structure of the Appalachians a second or two after 8 last night. And people in an 8-state area from Ohio to Georgia felt the shock.

Shakes Wide Area

The epicenter of the quake was about 60 miles west of Roanoke, Va., and about 70 miles southeast of Charleston, W. Va., the National Earthquake Center at Rockville, Md., reported.

This would put it about 75 miles northeast of the northeastern tip of Tennessee. Upper East Tennesseans felt the quake more sharply than Knoxvilleans.

Puzzled citizens phoned Weather Bureau offices, newspapers and radio stations in Ohio, West Virginia, Virginia, Kentucky, Tennessee, North Carolina, South Carolina and Georgia.

July Quake Really Felt

The Weather Bureau station at McGhee Tyson Airport received several calls shortly after 8.

The quake registered 4.75 on the Richter scale, heaviest in the area since a reading of 5 was recorded near Galax, Va., in 1963. But a much heavier quake hit the area May 31, 1897, registering 8 on the Richter scale, according to the National Earthquake Center.

An earthquake in July this year registered 3.5, but was felt more by Knoxvilleans than the one last night because the center of it was near Knoxville.

The disastrous 1964 Alaska quake registered 8.5. A quake of 6.5 is considered destructive, Earthquake Center spokesmen say.

Some Blame Moon Walk

In Virginia, Giles County Deputy Sheriff Roy Montgomery said there was considerable minor damage. At Glenlyn, Police Chief Erving Miles said plaster was knocked off nearly every wall in his house. Many windows - including display windows--were broken.

Two separate tremors were reported in the mountains at Boone, N.C., amid driving wind and snow.

Guests said the largest building in Kingsport, the eight-story Downtowner Hotel, swayed.

"All of a sudden the floor started vibrating and a picture on the wall started rocking," said Desk Sgt. Wilma Campbell of the Carter County sheriff's office. "I thought there was something that was going to blow up."

Many residents of Eggbornsville, Va., blamed the quake on the Apollo 12 moon mission.

"The last time them fellers walked on the moon, it rained almost every day for three weeks and washed away half the countryside," said Mrs. Betty Mills, 82. When the Apollo 12 moonship landed, she said, "I just knew something terrible was going to happen."

'Nice Little Quake'

Gov. Arch Moore, Jr. of West Virginia said he felt the Governor's Mansion move at Charleston. he said the tremor "made my desk jump two inches."

Father Edward Bradley, associate professor of physics at Xavier University, Cincinnati, called the tremor "a nice little earthquake."

5. Journal (11/20/69), Knoxville, TN

Moderate Earthquake Felt In Knoxville, Wide Area Of South

A moderate earthquake shook wide areas of the Southeast Wednesday night and was felt in Knoxville and East Tennessee.

No damage or personal injuries were reported locally.

It resulted in a flood of telephone calls to The Knoxville Journal and the U.S. Weather Bureau at McGhee Tyson Airport.

The seismograph at Oak Ridge National Laboratory was "knocked out" at 8:01 p.m., geophysicist William C. McClain said. "This is fairly common when the epicenter is within a 200-mile radius of Oak Ridge. The fact that it did not damage the machine indicates that it was smaller than the one felt here last July which registered 3.5 on the Richter scale," McClain said.

TOPPLE CHIMNEYS

A spokesman at the National Earthquake Information Center in Rockville, Md., said seismographs had placed the epicenter of the tremor in the Roanoke, Va., area. It registered 4.75 on the scale.

A quake with a reading of 5.5 is usually severe enough to topple chimneys and cause other damage. A reading of 4.75 is considered a "moderate" tremor.

First reports placed the epicenter in the Anna, Ohio, area.

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Wednesday night's earthquake was also felt in Virginia, North Carolina, South Carolina, Georgia, Ohio and Kentucky.

One of the first people to call The Journal was Knox County Finance Commissioner William Tallent, who reported the shock waves shook his house in Sequoyah Hills.

A similar report was made by Mrs. W. D. Hixon, 1415 Lantana Lane, in Norwood.

A Greenville man, Howard McNeese, said the quake lasted about 30 seconds and shook the doors of his house and the objects on several tables. Calls were also received from Newport, Morristown, Bristol and Kingsport.

Mr. and Mrs. John Fox of Pigeon Forge were spending the night at the Holiday Inn in Morristown when they felt two tremors about 30 seconds apart, they said.

"The whole building shook," Fox, general manager of Goldrush Junction at Pigeon Forge said.

The seismograph at Oak Ridge was unattended at the time. Officials rushed back to the machine Wednesday night.

New equipment has been ordered and will be installed in about three weeks. It will reportedly record such earthquakes without being knocked out.

6. Charlotte Observer (11/20/69), Charlotte, NC

Whatever It Was, It Shook The Carolinas

What apparently was a mild earth tremor shook an area stretching at least from West Virginia to Athens, Ga., at about 8:10 Wednesday night.

Weather bureaus, newspapers and radio and television stations were flooded with calls.

There apparently was no damage, and the tremor was so mild that occupants in some large buildings felt nothing.

Most of those who felt the tremor were occupants of single-family dwellings. Most reported that windows and dishes rattled and that some overhead light fixtures swayed slightly.

D. Bollinger [35] 1969 NOV 19 20:00 Elgood, WV 324,000 VI

1. Questionnaire Data

FELT AREAS

FELT WITH INTENSITY I-II IN VIRGINIA:

Amelia Court House (USE Intensity IV), Churchville, Clifton Forge, Clinchport, Emporia, Floyd, Fredericksburg, Harrisonburg, Lexington (USE Intensity IV), Pennington Gap, Stuart (USE Intensity IV), Warm Springs

FELT WITH INTENSITY I-II IN GEORGIA:

Greensboro (USE Intensity IV), Jesup, Milledgeville

FELT WITH INTENSITY I-II IN KENTUCKY:

Berea, Dwarf, Grayson, Greenup, Harlan, Loyall, Madisonville, Manchester, Williamstown

FELT WITH INTENSITY I-II IN NORTH CAROLINA:

Carthage, Henderson, Hudson, Norwood, Oxford, Sanford, Sylva (USE Intensity IV), Wake Forest, Whiteville

FELT WITH INTENSITY I-II IN OHIO:

Bainbridge, Cambridge, Dayton, Friendship, Lancaster, Marietta, Nelsonville, Norwalk

FELT WITH INTENSITY I-II IN SOUTH CAROLINA:

Bethune, Landrum, Rock Hill (USE Intensity IV), Seneca

FELT WITH INTENSITY I-II IN TENNESSEE:

Bean Station, Ducktown, Jefferson City, Tazewell

FELT WITH INTENSITY I-II IN WEST VIRGINIA:

Glenville, Grafton, Kermit, Madison, Ripley, West Hamlin, Weston

FELT WITH INTENSITY III IN VIRGINIA:

Abingdon (USE Intensity V), Altavista, Amherst (USE Intensity IV), Appomattox (USE Intensity IV), Big Island, Blackstone, Bristol, Brooke, Burkeville, Chatham, Christiansburg (USE Intensity V), Clarksville, Culpeper, Damascus, Danville, Dublin, Fancy Gap, Farmville, Gordonsville, Gretna, Grundy, Gum Spring, Hillsville (USE Intensity IV), Jonesville, Keysville, Lebanon,

Lovington, Marion (USE Intensity IV), Martinsville (USE Intensity IV), Pearisburg, Petersburg, Radford (USE Intensity V), Roanoke, Rocky Mount (USE Intensity V), St. Paul, South Boston, South Hill, Staunton (USE Intensity IV), Tazewell (USE Intensity V).

FELT WITH INTENSITY III IN KENTUCKY:

Hyden, Maysville (USE Intensity IV), Middlesboro, Mount Olivet, Oliver Hill, Owenton (USE Intensity IV), Prestonsburg (USE Intensity IV), Salyersville, West Liberty (USE Intensity IV)

FELT WITH INTENSITY III IN NORTH CAROLINA:

Asheville (USE Intensity IV), Biscoe, Blowing Rock, Burnsville (USE Intensity V), Chapel Hill, Charlotte (USE Intensity V), Durham (USE Intensity IV), Elkin, Elk Park, Forest City, Franklin, Greensboro (USE Intensity IV), Highlands, High Point, Kannapolis, Lincolnton, Marshall, Mocksville, Monroe, Mount Airy, Murphy, North Wilkesboro, Pittsboro, Reidsville (USE Intensity IV), Rosman, Shelby, Statesville (USE Intensity IV), West Jefferson, Winston-Salem (USE Intensity IV)

FELT WITH INTENSITY III IN OHIO:

Jackson (USE Intensity IV), Logan, Oak Hill, Peebles

FELT WITH INTENSITY III IN SOUTH CAROLINA:

Aiken, Anderson (USE Intensity IV), Camden (USE Intensity IV), Chesnee, Clinton, Gaffney (USE Intensity V), Greenville (USE Intensity IV), Greer, Lancaster (USE Intensity IV), Pickens (USE Intensity V), Spartanburg (USE Intensity IV), Union (USE Intensity V), Woodruff

FELT WITH INTENSITY III IN TENNESSEE:

Elizabethton (USE Intensity IV). Erwin, Greenville (USE Intensity IV), Johnson City (USE Intensity V), Knoxville, LaFollette, Morristown (USE Intensity IV), Mountain City (USE Intensity IV), Newport (USE Intensity IV), Rogersville (USE Intensity IV)

FELT WITH INTENSITY III IN WEST VIRGINIA:

Alderson, Ansted, Bluefield (USE Intensity IV), Clendenin, Gilbert, Huntington (USE Intensity IV), Kellysville, Keystone, Marlinton (USE Intensity IV), Millstone, Minnehaha Springs, Pennsboro, Philippi, Point Pleasant (USE Intensity V). Princeton, Rainelle, Ravenswood, Rock Cave, Saint Marys (USE Intensity IV), Salem, Spencer, Sutton, Sweet Springs, Thomas, Wayne (USE Intensity IV), White Sulphur Springs, Williamson (USE Intensity V)

FELT WITH INTENSITY I-III IN VIRGINIA (USE, 1969):

Bedford, Culpeper, Eggbornsville, Farmville, Jonesville, Lovingston, Palmyra, Petersburg, Roanoke, Spotsylvania

FELT WITH INTENSITY I-III IN GEORGIA (USE, 1969):

Albany, Athens, Blairsville, Canton, Carnesville, Clayton, Dacula, Dallas, Gainesville, Hartwell, Madison, New Holland, Rutledge, Shady Dale

FELT WITH INTENSITY I-III IN KENTUCKY (USE, 1969):

Barbourville, Beattyville, Booneville, Hyden, Leburn, Morehead, Shelbyville

FELT WITH INTENSITY I-III IN NORTH CAROLINA (USE, 1969):

Boone, Bryson City, Cornelius, Franklinton, Littleton, Matthews, Pineville, Staley, Timberlake, Whittier

FELT WITH INTENSITY I-III IN OHIO (USE, 1969):

Athens

FELT WITH INTENSITY I-III IN SOUTH CAROLINA (USE, 1969):

Chester, Piedmont

FELT WITH INTENSITY I-III IN TENNESSEE (USE, 1969):

Dandridge, Maynardville, Rutledge

FELT WITH INTENSITY I-III IN WEST VIRGINIA (USE, 1969):

Elizabeth, Greenville, Hamlin, Madison, Piedmont, Ripley, Sarton, Sharon, Streeter, Wayside, Weston

FELT WITH INTENSITY IV IN VIRGINIA (USE, 1969):

Bland, Buckingham, Cleveland, Cumberland, Halifax, Hanover Court House, Independence, Lunenburg, New Castle, Richmond, Rustburg, Salem

FELT WITH INTENSITY IV IN GEORGIA (USE, 1969):

Augusta, Clarkesville, Cumming, Decatur, Haddock, Hiawassee, Jefferson, Lexington, Toccoa, Watkinsville

FELT WITH INTENSITY IV IN KENTUCKY (USE, 1969):

Frenchburg, Inez, Jackson, Louisa, Owingsville, Sandy Hook

FELT WITH INTENSITY IV IN NORTH CAROLINA (USE, 1969):

Bakersville, Brevard, Danbury, Ellerbe, Fletcher, Haydenville, Morgantown, Raleigh, Selma, Waynesville

FELT WITH INTENSITY IV IN OHIO (USE, 1969):

Gallipolis, Portsmouth

FELT WITH INTENSITY IV IN SOUTH CAROLINA (USE, 1969):

Abbeville, Chesterfield, Edgefield, Greenwood, Kershaw, Laurens, Newberry, Saluda, York

FELT WITH INTENSITY IV IN TENNESSEE (USE, 1969):

Blountville, McKenzie, Martin, Memphis, Sneedville

FELT WITH INTENSITY IV IN WEST VIRGINIA (USE, 1969):

Birch River, Buckhannon, Charleston, Clay, Cool Ridge, Cornstalk, Ellison, Gassaway, Grafton, Pax, Prenter, Shady Spring

FELT WITH INTENSITY IV IN VIRGINIA (USE, 1969):

Blacksburg, Boydton, Foster Falls, Indian Valley, Rural Retreat, Wise

FELT WITH INTENSITY V IN GEORGIA (USE, 1969):

Cleveland

FELT WITH INTENSITY V IN KENTUCKY (USE, 1969):

Hazard, Irvine

FELT WITH INTENSITY V IN NORTH CAROLINA (USE, 1969):

Gastonia, Laurel Springs, Rutherfordton, Warrenton, Wilkesboro

FELT WITH INTENSITY V IN SOUTH CAROLINA (USE, 1969):

Valhalla

FELT WITH INTENSITY V IN TENNESSEE (USE, 1969):

Kingsport

FELT WITH INTENSITY V IN WEST VIRGINIA (USE, 1969):

Ballard, Ballengee, Coopers, Dawson, Dunns, Flat Top, Forest Hill, Gilliam, Itmann, Jumping Branch, Lewisburg, Logan, Meadow Creek, Pineville, Pipestem, Ramp, Wyco

Chase City, VA: (Indoors, sitting, 1st floor, frame building. Felt by respondent, others.) "Sounded as if there had been an explosion, then the house seemed to react as if this had taken place in the basement." No damage. (IV);

Collinsville, VA: "Press reported a cornice was shaken from building." VI. (USE, 1969) (IV);

Galax, VA: (Indoors, standing. 1st floor, brick building. Felt by respondent, others—"almost everyone I've talked to.") "A dull rumbling followed by house trembling then a heavier rumbling noise." No damage.;

Gate City, VA: Indoors, sitting, 1st floor, brick building. Felt by respondent, others. "Dishes rattled. Something in the attic fell. Thought at first it was a blast, as they are installing a sewer system but realized it was 8 p.m. Was reading paper at the time. Some people say that it cracked walls—I haven't examined my house as yet. Think damage, if any, was light." (USE Intensity V) (IV);

Glasgow, VA: (Indoors, lying down, 1st floor, old brick building. Felt by respondent, others.) "Very much like the sound of a high speed jet at high altitude or some other booming effect. A long rolling roar causing the entire house to shake and the furniture to shake and [bang?] (drop-leaf table top against legs)." (IV);

Glen Lyn, VA: FIELD REPORT. Interviewed: Postmaster, three residents, one homeowner. Earthquake effects: Cracked walls in old concrete block house; newer brick homes on either side not damaged. Several reports of cracked and fallen plaster, objects knocked off shelves, pictures knocked down, estimates of three "jolts" or vibrational phases. Report of one case of a few bricks knocked off a chimney and of a large boulder rolled onto railroad tracks. (V);

"Felt by all and frightened many. Few instances of rocks rolling from mountains. Press reported plaster was knocked off nearly every wall in one house. Many windows, including display windows, were broken." VI. (USE, 1969);

Hot Springs, VA: (Felt by others, but not by respondent, who was out of town.) "I have talked with a few persons who felt the quake. All have described noises such as furnace explosions or sonic booms or aircraft. Windows were shaken as were dishes and other household objects. I have not found anyone who felt the tremor in Hot Springs. The closest was at Healing Springs, Va., approximately 4 miles SW of Hot Springs." The respondent includes also the observations of a woman who lives about 5 miles SW of Hot Springs: "I was setting in a chair in our living room...when I felt the chair shift slightly sideways, two different times. The second time moments after the first. It felt as though it shifted from North to South." (IV);

Independence, VA: (Indoors, sitting, 1st floor, frame building. Felt by respondent, others.) "The building quivered and pictures on wall rattled. We first thought the oil furnace was causing the trouble." No damage. (IV);

Lynchburg, VA: (Indoors, sitting, 1st floor, frame building. Felt by respondent, others.) "Rumble, like a heavy truck passing in front of home." No damage. (IV);

Narrows, VA: (Indoors, sitting, 1st floor, old building. Felt by respondent, others—"At least 50 telephone calls") "Approached from northerly direction passing with great rumble in my house in a seemingly southern route. Rumbling noise lasted approximately 30 seconds." Damage: "None at my residence." (III-IV);

FIELD REPORT. Interviewed: Policeman, two secretaries in Town Hall. Earthquake Effects: General awareness but no damage reports.;

Pulaski, VA: (Indoors, standing or sitting, 1st floor, new frame house. Felt by respondent, others.) "It was felt by all four members of my family in different parts of the house. One was in the basement which has concrete flood and block walls. Many persons in all parts of the town felt it. (Some did not.) Noise was a deep, irregular rumble, sustained for a period of about 10 seconds. The noise appeared to have direction, coming from my left rear, or approximately North. Windows and pictures on walls rattled. A continuous vibration was set up in the grandfather clock chimes. It struck its regular chimes later. In the basement, a picture leaning against the wall was visibly in motion as it was bumped away from the wall toward the [vertical]. A piece of candy lying on a coffee table in the basement vibrated off the table. No visible damage. We are a family of four, two adults, two children (13 and 11). All four recognized this as an earthquake and had assembled at the back door before the shaking stopped. I made notes of this in expectation of your letter." (USE Intensity V) (IV);

Rich Creek, VA: (Indoors, sitting, 1st floor, concrete block building. Felt by respondent, others.) "Rumbling noise and the building shaking. Some plaster fell down, pictures fell from the wall, and some dishes from the cabinets." (V); FIELD REPORT. Interviewed: Store owner, postmaster, two residents. Earthquake Effects: One plate glass store window broken—breakage witnessed by two waitresses in restaurant across street. No other store windows in the same block broken. One previously broken (and taped) store window on edge of town shaken out. Several reports of broken and fallen plaster and items knocked off shelves. No headstones disturbed in cemetery. (USE Intensity VI);

Richlands, VA: (Indoors, sitting, 1st floor, new brick building. Felt by respondent, others.) "At time thought autos might have run together." No damage. (IV);

Salem, VA: (Indoors, sitting, 1st floor, old frame building. Felt by respondent, others.) "Sounded like a small gas explosion in furnace.... A rumbling and vibrating feeling immediately afterward." (IV);

Warsaw, VA: (Indoors, standing, 1st floor, old frame building. Felt by respondent, others.) "Sounded like thunder or sonic boom. Building shook and rattled as if buffeted by heavy wind." No damage. (IV);

Wytheville, VA: (Indoors, sitting, 1st floor, old frame building. Felt by respondent, others.) "Rumbling sounds, seemingly from concrete basement. Jars and bottles rattled in cabinet and the noise was very noticeable. Noise seemed to come before actual movement occurred." No known damage. (USE Intensity V) (IV);

Cattlettsburg, KY: (Indoors, sitting, 1st floor, old frame building. Felt by respondent, others.) "A rumbling noise and a sound as of rushing wind; almost like a jet plane passing over. Dishes rattled and a rocking chair started rocking. One business place had a hanging gas heater shaken down and started a fire, but damage was not extensive. Heard that someone had a picture shaken off the wall but do not know for certain that this is so." (USE Intensity V) (IV);

Garrett, KY: (Indoors, sitting, 2nd floor, old native stone building. Felt by respondent, others.) Thought for a moment a low flying plane in trouble. Cracked a chimney in one home. Broke light fixtures in a mobile home. (IV);

Pikeville, KY: (Lying down, 1st floor, old frame building. Felt by respondent, others.) No noises. Damage: "Very minor--dish broken--lamp shaken off--window cracked. Not at my house but from others." (IV);

Pineville, KY: (Indoors, sitting, 2nd floor, old brick church. Felt by respondent, others.) "Violent shaking--shaking of pipes in pipe organ--feared furnace explosion. No known damage." (USE Intensity V) (IV);

Whitesburg, KY: (Indoors, lying down, 1st floor, frame and brick house. Felt by others, but not by respondent who was in meeting where the noise probably drowned the rumble) "Quote, 'It sounded like a car had run into the corner of my house, the house really shook.'" (USE Intensity I-III) (IV);

Asheboro, NC: (Indoors, standing, 1st floor, brick building. Felt by respondent, others.) "Was in bathroom. Sound like that of a blast. First thought that furnace...in basement had blown up! No noticeable damage, but quite frightening." (IV);

Canton, NC: (Indoors, 1st floor, frame building. Felt by respondent, others.) "I was setting in a recliner chair which moved across the floor approximately 6 inches. No noises other than rumbling within my home." Damage: "None that I know of definitely. One lady says that her foundation was cracked during the quake.";

Hendersonville, NC: (Indoors, sitting, 1st floor, old frame building. Felt by respondent, others.) "No earthquake noise--some rattling of loose items in house and slight creaking of timbers." No damage. (IV);

Hickory, NC: (Indoors, lying down, 1st floor, new brick building. Felt by respondent, others.) "A rumbling and shaking such as may be experienced if standing beside a fast moving train." Damage: "None to my home." (IV);

Lake Lure, NC: (Indoors, lying down, 1st floor, new frame building.) "Heavy rumble. Shook house and everything inside. Preceded by vibrations. House seemed to move sideways." No apparent damage. (IV);

Marion, NC: (1st floor, new brick building. Felt by respondent, others.) "Slight tremors around 8:10 p.m., lasting for about 4 seconds dwindling to practically nothing...then, more violent tremors lasting about 6 seconds. I was sitting in living room when first tremors were felt and quickly rose and called it to the attention of other family members that we were having an earthquake. To my knowledge there was no damage in this area, and it was felt by most everyone except those in vehicles at the time." (IV);

Salisbury, NC: (Indoors, standing, 1st floor, concrete building. Felt by respondent, others.) "In back of building 130 feet long. Rumbling that sounded like 2-ton truck running overhead. No apparent damage." (IV);

Taylorsville, NC: (1st floor, old brick building. Felt by respondent, others.) "A slight rumbling noise as if some item such as a furnace was about to blow up." No damage. (IV);

Columbia, SC: Respondent to intensity questionnaire did not feel the earthquake or know anyone who did. A private communication (L. G. Barre, Dept. of Physics and Astronomy, University of South Carolina) from that city gave the following: One man "took a flashlight to see if his house was still correctly located on the pillars." Another "felt or thought that his house lifted vertically for a second making a hair-raising experience for his family." Another "had crystal broken in his home." Office of Department of Physics and Astronomy of the University of South Carolina "from 8:00 to 12:00 was almost like the ticket office at Grand Central." Have been two more shocks in Charleston between then and November 30. (USE Intensity I-III) (IV);

Athens, WV: "Felt by all and frightened many. Plaster and windows cracked. Damage slight. Small objects shifted. Loud earth noises." VI. (USE, 1969) (IV);

Camp Creek, WV: "Felt by all. Part of the flue fell. 'Up and down motion. Dish on table danced.' Loud rumble." VI. (USE, 1969) (IV);

Clay, WV: (Felt by others, but not by respondent.) "Noises from furniture and house vibrations. Plate glass windows cracked the next day in the Ben Franklin Store, Main Street, Clay, W. Va." (V);

Elgood, WV--FIELD REPORT. Interviewed: Storekeeper, two residents. Earthquake Effects: Reports of several broken windows, general alarm, objects knocked off shelves. (USE Intensity VI) (V);

Elkins, WV: (Indoors, sitting, 1st floor, old stone building. Felt by respondent, others.) "Noise sounded like a furnace blowing up or a plane breaking the sound barrier, and it really shook the whole church building I was in." No damage. (USE Intensity V) (IV);

Fairmont, WV: (Not felt by respondent or others he knew, but newspaper account returned with questionnaire.) "Several Fairmont area residents reported feeling last night's mild earthquake. [At a] church...persons reported violent movement of a clock on the wall. Members of the congregation said they thought a furnace in the church had blown up."

Hinton, WV: (Felt by others but not by respondent. Clipping from the Hinton Daily News included.) Newspaper report said "At first I thought I was having a dizzy spell as the picture on the TV screen seemed to shake, but soon everything seemed normal again, so I thought no more about it, but then the telephone started ringing." First caller said, "My wife and I ran out of the house and we noticed lights coming on in homes all around us as people came out on their porches to see what was happening." Another man claimed, "My bed started shaking." He and his wife "both thought something had happened to the furnace and ran downstairs to check. We then went outside and found most of our neighbors standing on the sidewalk or in the street talking about the tremors." Another thought a freight train was passing his home and rushed out of the house, but there was no train. At a church service the building started shaking but, "No one left as most thought something had happened to the furnace." At another church the building shook but the service was not interrupted. The shaking was felt by everyone in the new county hospital building. A woman thought her home was being shaken by a big truck passing and told her husband, "That must be the biggest truck that ever passed." (USE Intensity V) (IV);

Kellysville, WV--FIELD REPORT. Interviewed: Postmaster, two residents. Earthquake Effects: General awareness, objects knocked off shelves, no damage reports. (IV);

Lerona, WV: "Felt by all; most extremely upset. Plaster and windows cracked. Telephones out of order. 'Several windows broken in the Pipestem State Park.' Loud earth noises." VI. (USE, 1969);

Linn, WV: (Indoors, sitting, 1st floor, frame building. Felt by respondent, others.) "A vibrating feeling like...heavy thunder or a heavy truck makes when crossing a bridge if one was on bridge. Was watching TV, it flickered for a few seconds as well as the light, like lightning causes or ignition from some motor vehicles causes on TV. Some described as a jarring feeling." No damage. (VI);

Mill Point, WV: (Felt by others but not by respondent.) "One lady told me it sounded like her automatic washer was vibrating--no other noises reported. No damage reported--some furniture shifted--books and lamps fell off tables." (III-IV);

Mullens, WV: (Outdoors, standing on front porch of home. Felt by respondent, others.) "A rumbling sound such as a large freight train coming toward you and causing ground vibration. The sound and vibrations increased in intensity such as a rumbling. This passed in a few seconds and faded away. The house shook very noticeably." No known damage. (IV);

Oakvale, WV: (Indoors, sitting, 1st floor, old frame church. Felt by respondent, others.) "There was a loud tremor followed by two lighter ones. The building shook as if it would cave in. There apparently wasn't any damage. A few reported broken windows. Oakvale is in a valley at the foot of East River Mountain, which joins Bland County--and talking to people who live back against the mountain, everyone seemed to have felt it." (V);

Parsons, WV: (Sitting, one story brick building. Felt by others, but not by respondent.) "Thud noise, and had the feeling that the house was moving." (USE Intensity I-III) (IV);

Peterstown, WV--FIELD REPORT. Interviewed: Two different store owners. Earthquake Effects: General awareness but no damage reports. (III-IV);

Princeton, WV--FIELD REPORT. Interviewed: Policeman, two county employees at County Court House. Earthquake Effects: No damage reports, some residents not aware of earthquake. (III);

Welch, WV: (Indoors, sitting, 2nd floor, old brick building. Felt by respondent, others.) "Sounded like a very strong wind, windows rattled, and the building trembled quite badly." (III-IV);

NOT FELT AREAS

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NOT FELT IN VIRGINIA:

Charlottesville, Front Royal, Goshen, Leesburg, Louisa, Luray, Madison, New Market, Newport News, Onancock, Quantico, Richmond, Ruckersville, Virginia Beach, Winchester, Woodstock

NOT FELT IN ALABAMA:

Fort Payne, Gadsden, Huntsville, Roanoke

NOT FELT IN DELAWARE:

Milford, Wilmington

NOT FELT IN GEORGIA:

Atlanta (USE Intensity I-III), Baxley, Bremen, Brunswick, Columbus, Cordele, Dalton, Douglas, Dublin, Eastman, Glennville, Hogansville, Jackson, Louisville, Martinez, Rome, Savannah, Statesboro, Sylva, Thomas, Vidalia

NOT FELT IN INDIANA:

Berne, French Lick, Indianapolis, Lawrenceburg, Muncie, North Vernon, Richmond, Santa Claus, Scottsburg, Terre Haute, Vincennes

NOT FELT IN KENTUCKY:

Bowling Green, Campbellsville, Carrollton, Cumberland, Danville, Elizabethtown, Fairview, Falmouth, Flemingsburg, Glasgow, Irvington, Lebanon, Lexington, Louisville, Millersburg, Monticello, Mt. Sterling, Mt. Vernon, Owensboro, Somerset, Williamsburg, Winchester

NOT FELT IN MARYLAND:

Annapolis, Baltimore, Bel Air, Cambridge, Grantsville, Hagerstown, Leonardtown, Oakland, Salisbury

NOT FELT IN NEW JERSEY:

Lakehurst, Newark, New Brunswick, Sussex

NOT FELT IN NEW YORK:

Corning, Gowanda, Hornell, Jamestown, Olean, Watkins Glen

NOT FELT IN NORTH CAROLINA:

Belhaven, Clinton, Elizabeth City, Fayetteville, Greenville, Jacksonville, Kenansville, Kinston, Lumberton, Manteo, Morehead City, New Bern, Rich Square, Rocky Mount, Wilmington

NOT FELT IN OHIO:

Ashtabula, Bowling Green, Canton, Chillicothe (USE Intensity I-III), Cincinnati (USE Intensity IV), Circleville, Cleveland, Columbus, Greenville, Ironton, Lima, Lisbon, Lorain, Mansfield, Marion, McArthur, McConnelsville, Mt. Vernon, Newark, New Lexington, Steubenville, West Union, Woodsfield, Youngstown

NOT FELT IN PENNSYLVANIA:

Altoona, Bethlehem, Blossburg, Bradford, Butler, Camptown, Clearfield, Coudersport, Erie, Harrisburg, Indiana, Johnstown, Lancaster, Lewistown, Meadville, Philadelphia, Pittsburgh, Pottsville, Reading, Reynoldsville, Scranton, Tionesta, Uniontown, Wilkes-Barre, Williamsport.

NOT FELT IN SOUTH CAROLINA:

Allendale, Beaufort, Charleston, Cheraw, Florence, Georgetown, Kingstree, Myrtle Beach, Walterboro

NOT FELT IN TENNESSEE:

Carthage, Cleveland, Gatlinburg, Jamestown, Jellico, Lynchburg, Madisonville, Maryville, McMinnville, Monteagle, Monterey, Murfreesboro, Nashville, Norris, Oak Ridge, Portland, Red Boiling Spring, Sevierville, Shelbyville, Soddy, Sparta, Spring City

NOT FELT IN WEST VIRGINIA:

Bartow, Clarksburg, Fairmont, Franklin, Mannington, Moorefield, Mouth of Seneca, Petersburg, Smithfield, Summersville, Valley Head, West Union.

Bollinger and Hopper, 1970.

a. USEQ [395]

2. Bollinger [34]

E. USEQ [395]

III. USGS [390]

C. EQHUS [120]	1969	NOV 19	20:00	37.4	81.0	Southern WV	259,000	VI
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1969. November 19. Southern West Virginia. Felt over all or parts of West Virginia, Virginia, Georgia, Kentucky, North Carolina, South Carolina, Tennessee, Ohio, and Maryland. Slight damage in the form of cracked plaster and broken windows, was noted in West Virginia at Athens, Camp Creek, Elgood, and Verona, and in Virginia at Glen Lynn and Rich Creek. In addition, a few bricks fell from a chimney at Glen Lyn, Va. In one house, plaster fell from nearly every wall; walls of an old concrete block house cracked. According to the press, a cornice was shaken from a building at Collinsville, Va. Magnitude 4.3.

D. USEQ [395]	1969	NOV 19	20:00	37.4	81.0	WV	259,000	VI
			:09.0					

1969. November 19: 20:00:09.0*. Epicenter 37.4° north, 81.0° west, West Virginia, W. Magnitude 4.3. VI. Felt over approximately 100,000 square miles of West Virginia, Virginia, Georgia, Kentucky, North Carolina, South Carolina, Tennessee, Ohio, and Maryland (see fig. 4). Only minor damage was sustained. It consisted chiefly of cracked and fallen plaster and broken windows at Athens, Lerona, and Elgood, W. Va., and Glen Lyn and Rich Creek, Va. A paper by Bollinger and Hopper, Virginia Polytechnic Institute, states: "Field Surveys were conducted by the authors and Professor C. E. Sears on November 20-21, 1969. In addition to touring the epicentral region, the Virginia towns of Narrows, Rich Creek, and Glen Lynn, and the West Virginia towns of Kellysville, Elgood, Peterstown, and Princeton were visited. Earthquake damage observed during this survey...was of very limited occurrence and confined to old and structurally weak buildings."

INTENSITY VI IN WEST VIRGINIA:

Athens: Felt by all and frightened many. Plaster and windows cracked. Damage slight. Small objects shifted. Loud earth moises.

Camp Creek: Felt by all. Part of flue fell. "Up-and-down motion. Dish on table danced." Loud rumble.

Elgood: Felt by and frightened all. General alarm. Several windows broken. Objects knocked off shelves (VPI survey).

Lerona: Felt by all; most extremely upset. Plaster and windows cracked. Telephones out of order. "Several windows broke in the the Pipestem State Park." Loud earth noises.

INTENSITY VI IN VIRGINIA:

Collinsville: Press reported a cornice was shaken from building.

Glen Lyn: Felt by all and frightened many. Few instances of rocks rolling from mountains. Press reported plaster was knocked off nearly every wall in one house. Many windows, including display windows, were broken. Walls cracked in old concrete block house. Several reports of cracked and fallen plaster, objects knocked off shelves, and pictures knocked down. Report of a few bricks knocked off a chimney and of a large boulder rolling onto railroad tracks. (VPI survey).

Rich Creek: Felt by and frightened all. Hanging objects swung violently. One plate glass store window broke; several reports of broken and fallen plaster and items knocked off shelves (VPI survey). Loud earth noises.

INTENSITY V IN WEST VIRGINIA:

Ballard, Ballengee, Coopers, Dawson, Dunns, Elkins, Flat Top, Forest Hill, Gilliam, Hinton, Itmann, (windows cracked), Jumping Branch, Lewisburg, Logan (very light plaster cracks), Meadow Creek, Pineville, Pipestem (plaster cracks), Point Pleasant, Ramp (damage slight), Williamson, and Wyco.

INTENSITY V IN VIRGINIA:

Abingdon, Blacksburg, Boydton, (6 miles west of), Christiansburg, Foster Falls, Gate City, Indian Valley, Pulaski, Radford, (several reports of plaster damage in vicinity), Rocky Mount, Rural Retreat (3 miles northeast of), Tazewell (window already cracked now completely broken), Wise, and Wytheville.

INTENSITY V IN GEORGIA:

Cleveland.

INTENSITY V IN KENTUCKY:

Catlettsburg, Hazard, Irvine, and Pineville.

INTENSITY V IN NORTH CAROLINA:

Burnsville, Charlotte, Castonia (plaster cracked), Laurel Springs, Rutherfordton (10 miles west of), Warmneton, and Wilkesboro.

INTENSITY V IN SOUTH CAROLINA:

Gaffney, Pickens (window and plaster cracked), Union, and Walhalla.

INTENSITY V IN TENNESSEE:

Johnson City and Kingsport (few cracks in plaster).

INTENSITY IV IN WEST VIRGINIA:

Birch River, Bluefield, Buckhannon, Charleston, Clay, Cool Ridge, Cornstalk, Ellison, Gassaway, Grafton, Huntington, Marlinton, Pax, Prenter, Saint Marys, Shady Spring, and Wayne.

INTENSITY IV IN VIRGINIA:

Amelia Court House (3 miles south of), Amherst, Appomattox, Bland, Buckingham, Cleveland, Cumberland, Grundy, Halifax, Hanover Court House, Hillsville, Independence, Lexington, Lunenburg, Marion, Martinsville, New Castle, Richmond, Rustburg (6 miles east of), Salem, Staunton, and Stuart.

INTENSITY IV IN GEORGIA:

August, Clarkesville, Cumming, Decatur, Greensboro, Haddock (1.2 miles north east of), Hiawassee, Jefferson, Lexington, Toccoa, and Watkinsville (2 1/2 miles south of).

INTENSITY IV IN KENTUCKY:

Frenchburg, Inez, Jackson, Louisa, Maysville, Owenton, Owingsville, Prestonburg, Sandy Hook, Stanton, and West Liberty.

INTENSITY IV IN NORTH CAROLINA:

Asheville, Bakersville, Brevard, Danbury, Durham, Ellerbe, Fletcher, Greensboro, Haydenville, Morgantown, Raleigh, Reidsville, Selma, Statesville, Sylva, Waynesville, and Winston-Salem.

INTENSITY IV IN SOUTH CAROLINA:

Abbeville, Anderson, Camden, Chesterfield, Edgefield, Greenville, Greenwood, Kershaw, Lancaster, Laurens, Newberry, Rock Hill, Saluda, Spartanburg, and York.

INTENSITY IV IN TENNESSEE:

Blountville, Elizabethton, Greeneville, McKenzie, Martin, Memphis, Morristown, Mountain City, Newport, Rogersville, and Sneedville.

INTENSITY IV IN OHIO:

Cincinnati, Gallipolis, Jackson, and Portsmouth.

INTENSITY I-III IN WEST VIRGINIA:

Elizabeth, Greenville, Hamlin, Madison, Parsons, Piedmont, Ripley, Sarton, Sharon, Spencer, Streeter, Wayside, and Weston.

INTENSITY I-III IN VIRGINIA:

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Bedford, Culpeper, Eggbornsville, Farmville, Harrisonburg, Jonesville, Lovington (1 mile west of), Palmyra, Petersburg, Roanoke, and Spotsylvania.

INTENSITY I-III IN GEORGIA:

Albany, Athens, Atlanta, Blairsville, Canton, Carnesville, Clayton, Dacula, Dallas, Gainesville, Hartwell, Madison, New Holland, Rutledge, and Shady Dale.

INTENSITY I-III IN KENTUCKY:

Barbourville, Beattyville, Booneville, Booneville, Hyden, Leburn, Manchester, Morehead, Shelbyville, and Whitesburg.

INTENSITY I-III IN NORTH CAROLINA:

Boone, Bryson City, Cornelius, Franklinton, Littleton, Matthews, Murphy, Pineville, Staley, Timberlake, and Whittier.

INTENSITY I-III IN SOUTH CAROLINA:

Aiken, Chester, Columbia, and Piedmont.

INTENSITY I-III IN TENNESSEE:

Dandridge, Maynardville, and Rutledge.

INTENSITY I-III IN OHIO:

Athens, Chillicothe, Dayton, and Marietta.

INTENSITY I-III IN MARYLAND:

West Hyattsville.

E. PDE [320] 1969 NOV 20 01:00 37.4 81.0 WV
:09.0

M = 4.3; h = 3. km.; slight property damage in southern W. Va. and in Giles Co., Va. Felt in Ga., Ohio, Ky., Md., N.C., S.C., Tn., Va., and W. Va. Mag. 4.? (CGS) ??

IV. McClain [260] 1969 NOV 20 01:00 37.4 81.0 Southern WV
:09.0

8
0
0

h = 3 km.; felt in Va., Ga., Ohio, Ky., Md., N.C., S.C., W. Va., Tn.

A. PDE [320]

V. Bollinger [33] 1969 NOV 20 01:00 37.4 81.0 Elgood, WV 324,000 VI
:10.3

m = 4.6

A. USEQ [395]

B. Bollinger [35]

VI. Moneymaker [281] 1969 NOV 19 8:00 p.m. S. Appalachians 259,000 V

1969. November 19. 8:00 p.m. Southern Appalachians. (V) The Elgood, West Virginia earthquake was felt over about 100,000 square miles in nine states.

About 5,000 square miles of northeastern Tennessee and nearly all of the eastern section of the Tennessee Valley Region were affected. A light shock was felt by many in Knoxville and vicinity, and at Pigeon Forge. From these two localities northward in Tennessee, the intensity was IV or less.

- A. Bollinger [35]
- B. Seismo. notes [340]
- C. Moneymaker [283]
- D. USEQ [395]

IX. Varma [400]	1969	NOV 19	37.4	81.0	Mercer Co., WV	VI-
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felt radius = 289 km.

- A. Bollinger [35]
- B. USEQ [395]

I. TEIC 1969 DEC 13 10:20 35.2 83.1 Glenville, NC 11,000 V

Location: Glenville, NC; intensity

Intensity: Most awakened @ Glenville, NC and Pickens, SC; windows, doors, and dishes rattled

Extent: SW NC - NW SC border area; map; 11,000 sq. km.

A. Dewey [95] 1969 DEC 13 10:19 35.0 82.8

10:19:29.7; 35.036, 82.846; 5.9; 3.7J
Magnitude from Jones [222]

II. TVA [380] 1969 DEC 13 10:20 35.0 83.0 SC-NC border V

A. PDE [320]

B. Best [20] 1969 DEC 13 10:19:34 35.1 83.0 NC

h = 33 km

C. USEQ [395]

D. Moneymaker [281]

III. USGS [390]

C. EQHUS [120] 1969 DEC 13 35.1 83.0 Western NC 9100 V

1969. December 13. Western North Carolina. Felt principally in the western sections of North and South Carolina. Intensity V at Glenville, N.C., and Pickens, S.C., where most were awakened, a few were frightened.

1. USEQ [395]

D. USEQ [395] 1969 DEC 13 05:19 35.1 83.0 NC 9100 V
:34.3

December 13: 05:19:34.3*. Epicenter 35.1 north, 83.0 west, North Carolina. W. V. Felt over approximately 3,500 square miles of western sections of North and South Carolina. At Greenville, N.C., felt by and awakened all in community; frightened few. Sound like sonic boom was heard. At Pickens, S.C., felt by and awakened many in community; frightened few. Windows, doors, and dishes rattled slightly. Moderate rumbling earth noises. Intensity IV effects at Franklin, N.C., and at Anderson, Greenville, Greer, and Slater, S.C. Intensity I-III at Asheville, Brevard (south of, Rosman Tracking Station), Columbus, and Sylva, N.C.

E. PDE [320] 1969 DEC 13 10:19 35.1 83.0 NC
:34.3

h = N; felt at Franklin, Columbia, and Sylvia, N.C. and Greenville and Pickens, S.C.

IV. McClain [260] 1969 DEC 13 10:19 35.1 83.0 Eastern NC
:34.3

A. PDE [320]

∞
Q
N

V. Bollinger [33] 1969 DEC 13 05:19 35.1 83.0 Southwestern NC
:34.3 V

A. USEQ [395]

VI. Moneymaker [281] 1969 DEC 13 5:20 a.m. Southern Appalachians 6500 IV

1969 December 13 5:20 a.m. Southern Appalachians, (IV) An earthquake centered near Lake Sapphire in North Carolina was perceptible over an area of 2,500 square miles in the Carolinas. In North Carolina, it was felt at Asheville, Brevard, Franklin, Greenville and Sylva in the French Broad and Little Tennessee River basins and at Columbus. In South Carolina, it was felt at Anderson, Greenville, Greer, Pickens, and Slater.

A. Seismo. notes [340]

B. USEQ [395]

IX. Varma [400] 1969 DEC 13 35.1 83.0 Transylvania Co., NC
V

A. USEQ [395]

I. TEIC 1970 AUG 11 06:14 38.4 81.8 St. Albans, WV 3000 IV

Location: St. Albans, WV; location

Intensity: Felt; USEQ [395] indicates MMI IV

Extent: S WV; map; 3000 sq. km.

Comment: Computed epicenter (USGS) apparently outside felt area

II. TVA [380] 1970 AUG 11 06:14 38.4 81.7 South Charleston, WV IV

A. Seismo. notes [340] 1970 AUG 11 06:14 38.4 82.3 WV

:25.5

West Virginia, August 11, 1970, 06h14m25.5s, 38.4°N, 82.3°W, focal depth about 33 km restricted (USGS). Felt at Hamlin, Eskdale and Charleston area.

1. USGS

B. USEQ [395]

III. USGS [390]

D. USEQ [395] 1970 AUG 11 01:14 38.4 82.3 WV IV
:25.5

August 11: 01:14:25.5 (06.14). Epicenter 38.4° N., 82.3° W., West Virginia, at a restrained depth of 33 km. Int. IV at Charleston, Eskdale, Hamlin, Hurricane, and St. Albans. Questionnaire canvass was conducted by G. A. Bollinger, Virginia Polytechnic Institute and State University, Blacksburg, Va.

1. Bollinger - questionnaire survey??

V. Bollinger [33] 1970 AUG 11 06:14 38.4 82.3 Charleston-Hamlin-Eskdale, WV IV
:25.5

A. PDE [320]

IX. Varma [400]

1970

AUG 11

38.4

82.3

Cobell Co., WV

IV

A. USEQ [395]

I. TEIC 1970 SEP 10 01:41 36.1 81.7 Blowing Rock, NC 14,000 V

Location: Blowing Rock, NC; intensity

Intensity: @ Blowing Rock, NC, an oil tank fell from side of building, coffee spilled from cups, wall pictures knocked askew; porch roof loosened slightly at joining with main structure @ Boone, NC; small objects shifted @ Newhope, NC, picture fell from wall; @ Zionville, NC, basement wall cracked

Extent: NW NC; map; 14,000 sq. km.

A. Dewey [95] 1970 SEP 10 01:41 36.0 81.4

01:41:05.2; 36.020, 81.421; 1.0R; 3.1B

Depth restrained; magnitude from Bollinger [38]

II. TVA [380]

V-VI

A. PDE [320]

B. USEQ [395]

C. McClain [260]

III. USGS [390]

C. EQUUS [120] 1970 SEP 9 20:41 36.1 81.4 Northwestern NC 4600 V

Northwestern North Carolina. Slight damage occurred at Zionville and Boone. Intensity V also was assigned to effects at Blowing Rock, Deep Gap, Newhope, Patterson, and Sugar Grove. Felt also at Independence, Va., and Trade, Tenn.

1. USEQ [395]

D. USEQ [395] 1970 SEP 9 20:41 36.1 81.4 NC 5200 V
:10.0

206

Sept. 9: 20:41:10.0 (Sept. 10, 01:41). Epicenter 36.1 N., 81.4 W., North Carolina, at a restrained depth of 33 km. Int. V. Felt over about 5,200 sq. km. (2,000 sq. mi.) of northwestern North Carolina. A few isolated felt reports also were received from the Winston-Salem region. At Zionville, near the Tennessee-North Carolina border, a basement wall cracked. At Boone, a few kilometers southeast of Zionville, a porch roof loosened slightly creating cracks. G. A. Bollinger (see previous paragraph) assisted in the collection of felt data.

INTENSITY V IN NORTH CAROLINA:

Blowing Rock: Felt by and frightened all. Press reported law enforcement agencies were flooded with calls. An oil tank fell from the side of a building onto a parked car. Coffee spilled from cups; wall pictures were knocked askew. Two fairly violent, loud, explosive-like shocks within seconds of each other. Most thought their furnaces had exploded.

Boone: Felt by all in immediate area. Porch roof loosened slightly at joining with main structure, creating cracks sufficient to allow water to leak through. Sensation of two successive dynamite blasts. Noticeable heaving of floor.

Deep Gap: Felt by all. Awakened and frightened few in home and community.

Newhope: Felt by several and awakened few. Small objects shifted; picture fell from wall.

Patterson: Felt by all in community. Building vibrated; loose objects rattled.

Sugar Grove: Felt by all in community. Frightened some.

Zionville: Felt by many and frightened few in community. Basement wall cracked. Loud, booming earth noises. "Like a deep explosion with loud muffled sound and moderate vibration for a few seconds."

INTENSITY IV IN NORTH CAROLINA:

Creston, Crumpler, Glendale Springs, Grassy Creek, Jefferson, Madison, North Wilkesboro, Sparta, Todd, Valle Crucis, Warrensville, and West Jefferson.

INTENSITY IV IN VIRGINIA:

Independence.

INTENSITY I-III IN NORTH CAROLINA:

Boonville, Clemmons, Ferguson, Fleetwood, Julian (Price Campground, Blue Ridge Parkway), Lansing, Linville, Newland, Wallburg, Walnut Cove, Wilbar, and Winston-Salem.

INTENSITY I-III IN TENNESSEE:

Trade.

E. PDE [320] 1970 SEP 10 01:41 36.1 81.4 NC
:10.0

h = N; felt northwestern N.C.

IV. McClain [260] 1970 SEP 10 01:41 36.1 81.4 Northwestern NC 4600

m = 2.5; felt in NW. N.C.

A. PDE [320]

B. ORT Station Records

C. USEQ [395]

V. Bollinger [33] 1970 SEP 10 01:41 36.1 81.4 Northwestern NC 4600 V
:14.0

A. PDE [320]

B. USEQ [395]

VI. Moneymaker [281] 1970 SEP 9 8:41 p.m. Southern Appalachians V

1970 September 9 8:41 p.m. Southern Appalachians, (V) An earthquake shock centered in Wilkes County, North Carolina was felt from the Tennessee-North Carolina State line eastward to Winston-Salem and from the Virginia-North Carolina boundary southward to Patterson. A wall allegedly was cracked at Zionville on the western extremity of the shock's perceptibility. At Boone, a floor "heaved" and the roof of a porch was separated from the house far enough to occasion leakage. (Earthquake Information Bulletin, Jan.-Feb. 1971, Vol. 3, No. 1, page 24; 14).

A. EIB vol. 3, No. 1, p. 24?

B. Seismo. notes [340]

IX. Varma [400]

1970

SEP 9

36.1

81.4

Wilkes Co., NC

V

A. USEQ [395]

I. TEIC	1971	JUL 13	03:03	36.0	84.3	Oak Ridge, TN	5800	IV
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Location: Oak Ridge, TN; intensity; center of felt area

Intensity: Houses jarred, door, windows rattled @ Oak Ridge, TN; house shook @ Oakdale, TN

Extent: E TN; map; 5800 sq. km.

II. TVA [380]	1971	JUL 13	02:03	35.0	83.0	Knoxville, TN		III-IV
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A. Moneymaker [283]

1. Oak Ridger (7/13/71), Oak Ridge, TN

In Clinton, the police department reported no record of any shock.

In Knoxville the tremors were felt in the areas of Colonial Village, East High School, West High School, Fountain City, Inskip, Lonsdale, Norwood and areas of West Knox County.

The Knoxville Flight Service and the Control Tower at McGhee Tyson Airport indicated no knowledge on the tremor.

2. Morgan County News (7/22/71), Wartburg, TN

Tremor Felt in Oakdale Area

Parts of Morgan County felt the effects of a slight earthquake, according to reports from Oakdale residents.

The tremor started about 10:03 p.m. July 12 and lasted a few seconds, according to the reports.

"The house shook as when big trucks go by," said Mrs. Z. L. Ardary of Oakdale. "I knew it was something different, though, and I pulled the shades to see if I could tell what it was."

"There were vibrations and a rumbling noise," said another Oakdale resident. "It lasted for several seconds."

"It sounded like a clap of thunder that will jar your house," said Betty Jane Wright. "I went outside to see if it were going to rain but the stars were out and it was a clear night."

"It felt and sounded as if someone were rolling a big log through the basement," explained Russell Langley, son of Mr. and Mrs. W. E. Langley.

Other parts of East Tennessee felt the quake, according to reports. Residents of Knoxville, Knox County, and Oak Ridge reported the tremor lasted as long as one minute, while some said it lasted only a few seconds. Seismologists at the Oak Ridge National Laboratory reported a "very minor reaction" on its instruments in a five-to-10 mile area of Oak Ridge.

Apparently the quake was very light with very mild readings on the seismographs. One seismologist estimated it had an intensity of two or three on the 12 point Mercalli Scale. Damage normally starts at six or seven on this scale. Another expert estimated the tremor would register between three and four on the Richter scale, a very mild reading.

"The tremor was rather local and very brief with only one shock," said Berlen C. Moneymaker, retired TVA geologist. "It was felt in parts of Knox and Anderson counties and areas of Roane County which were suitably situated. The tremors in this area are usually limited to a few miles."

"Actually this was not officially an earthquake," explained William C. McClaine, geophysicist at Oak Ridge National Laboratories. "To be an official earthquake it must be reported by at least three participating seismologists of the US Coast and Geodetic Survey Network of Cooperating Stations. This one was not."

Cause of the tremor was attributed to a shift in rock masses. "This is due to some movement of rock mass in the earth's crust," Moneymaker said. "It may happen close to the surface or fairly deep."

"It is a very minor adjustment of bedrocks of the area and a continued settlement," McClain said. The two said there is no way of predicting when this will happen.

No injuries or property damage was reported.

3. Journal (7/13/71), Knoxville, TN

Tremor Felt in ET Area

Portions of Knoxville, Knox County and Oak Ridge were shaken shortly after 10 p.m. Monday by a mild but distinct earthquake, according to Berlen C. Moneymaker, retired chief geologist for the Tennessee Valley Authority.

Moneymaker, who makes a hobby of seismological studies, said he felt the tremor at exactly 10:94 p.m. at his home on Stillwood Drive. He estimated the tremor would register between three and four on the Richter-scale--a very mild reading.

The Journal newsroom received numerous calls from residents reporting the tremor in Solway Community and the business district of Oak Ridge.

The Oak Ridge Police Department reported calls relating the tremor in Solway Community and the business district of Oak Ridge.

The Oak Ridge Police Department said some callers reported the tremor lasting as long as one minute, while others said it lasted only 15 seconds. Moneymaker described the quake as a "brief, one-shock tremor."

Seismologists at the Oak Ridge National Laboratory reported a "very minor reaction" on its instruments in a five-to-10-mile area of Oak Ridge at 10:03.16 p.m.

No personal injuries or property damage was reported.

The tremor appeared to be local in scope. The State Highway Patrol and the National Weather Service reported no knowledge of the tremor.

The Knoxville Flight Service and the Control Tower at McGhee Tyson Airport also indicated no knowledge on the tremor. Flight Service also made a radio check with London, KY., Airport and Crossville Airport.

"It is not unusual for tremors to be this isolated," Moneymaker said. He indicated he had records documenting as many as 50 such earthquakes since 1950.

"We had one several years ago that was reported only in Alcoa and the Bluegrass section of the west Knox County," he added.

Most callers reported their doors and windows rattled by the vibration.

4. News-Sentinel (7/13/71), Knoxville, TN

Light Quake Ripples Under Knox

A very light earthquake shook the Knox-Anderson County area shortly after 10 last night but apparently caused no damage.

"It didn't amount to anything," said Berlen C. Moneymaker, retired TVA Geologist who has studied earthquakes in this area for many years.

Low Intensity

"It was one shock, rather abrupt. It lasted almost no time at all. I'd say a second or two," Mr. Moneymaker said.

He estimated it had an intensity of two to three on the 12-point Mercalli Scale. Damage normally starts at six or seven on this scale. Mr. Moneymaker said he felt the tremor at 10:04 p.m. at his home, 4037 Stillwood Drive.

Felt at Oak Ridge

William C. McClain, Geophysicist at Oak Ridge National Laboratory, said the quake was "very small" and seemed to be "right in this immediate vicinity." He timed it at 10:03 p.m.

Mr. Moneymaker estimated a shift in rock masses some 10 miles below the surface caused the tremor.

5. Moneymaker [personal notes??]

A light earthquake shock, centered somewhere in the Oak Ridge area, was felt over several hundred square miles of East Tennessee. Press reports and a telephone canvass indicate that the disturbance was felt or otherwise noticed in an elliptical area extending from Knoxville westward to Emory Gap and Oakdale, and from Clinton southward to-----outside of this area, and was reported by-----at Philadelphia, Lafollette, and -----.

The shock came on as a single jolt and was soon over. It caused no damage and occasioned very little excitement.

At Harriman, Oakdale, and Oak Ridge the shock was noticed by nearly everyone but elsewhere it passed unnoticed by a large fraction of the population. In Knoxville it was light and of short duration, but it was noticed in all parts of the city and suburbia areas. At Oakdale, "the house shook as when big trucks go by". "It felt and sounded as if someone were rolling a big log through the basement." At Oak Ridge it was "felt mostly in the Woodland section and around the Solway Bridge, but also in the business section. The shock was described as "resembling an explosion," "a clap of thunder," "a concussion" and "varying degrees of shaking." "it jarred the house and rattled the doors and windows for a few seconds and quit all at once. The Oak Ridge Police Department received 30 to 40 calls and the radio station WATO received about 100 calls.

00-10

The intensity was IV at localities in the felt area and I - III in the peripheral area.

Ref. U.S. Eq. 1971 p. 13

Press: Morgan County News, July 22, 1971

Knoxville Journal, July 13, 1971

Knoxville News-Sentinel, July 13, 1971

The Oak Ridger, July 13, 1971

East Tennessee earthquake of July 12, 1971 at 10:03:16 E.D.T. (795 mi)

A light (III- IV) brief earthquake shock felt over parts of Anderson, Knox, Loudon, Morgan, and Roane counties. It occasioned no damage and very little excitement. The following information was obtained by a telephone survey and from the press accounts in several papers.

1. Clinton: Ms. Ellen Woodside, reported for the Oak Ridger quoted the chief of police as saying he had received no calls about the shock. The shock was so light at Clinton as to be largely overlooked.
2. Harriman: Felt by nearly everyone. It was preceded by a rumble which started low and kept getting louder and finally culminated in an abrupt sharp shock.
3. Kingston: Felt by many as a single brief shock
4. Knoxville: A very brief shock was felt in all sections of Knoxville: Fountain City, Inskip, Norwood and Lonsdale on the north, Colonial Village on the south, and in East Knoxville and West Knoxville.
5. Oakdale: Felt by many. "The house shook as when big trucks go by. I knew it was something different though, and I pulled the shades to see if I could tell what it was".

There were vibrations and a rumbling noise. It lasted for several seconds.

"It sounded like a clap of thunder that will shake your house. I went outside to see if it were going to rain but the stars were out and it was a clear night".

"It felt and sounded as if someone were rolling a big log through the basement".

7. Oak Ridge: Felt mostly in the Woodland section, and across the Solway Bridge, but also in the business section. The shock was variously described as resembling an explosion, a clap of thunder, a "concussion" and "varying degrees of shaking". Felt also in the west and east end of the city. Duration estimated at 5 to 20 seconds.

An observer reported that she felt the house shake, but thought at first it could have been a plane breaking the sound barrier or a sudden thunderstorm. All the neighbors came out into their yards but we never thought of an earthquake until we heard it on the radio.

"The house vibrated slightly"

One observer "heard what sounded like a long roll of thunder and felt the house shake". The Police Department received 30-40 calls and the Oak Ridge radio station WATO received 100 calls.

"It jarred the house and rattled the doors and windows for a few seconds and quit all at once".

"Felt the house shake for about five seconds".

"The house moved a little".

"People in a meeting felt a concussion".

Heard a sudden noise like a freight train. The noise, which did not increase or decrease lasted for 20 seconds and although the house did not shake, observer had a feeling of vibration—a sort of quiver.

8. Oliver Springs: Felt, but the shock was very light.

9. Solway area: Felt rather generally.

10. West Knox County: Felt in western Knox County, but specific areas are not indicated by the press.

B. USEQ [395]

III. USGS

D. USEQ [490]

1971 JUL 12 21:03

Eastern TN

5200

V

July 12: 21:03 Eastern Tennessee V Felt from Knoxville west to Oakdale, and from LaFollette south to Philadelphia, an area covering approximately 5,200 sq. km. (2,000 sq. km.) of eastern Tennessee. Strongest at Kingston, Knoxville, and Oakdale, but no damage was sustained. Int. IV at Concord (doubtful report), Emory Gap, Friendsville, Harriman, Louisville, Oliver Springs, and Philadelphia. Int. I-III at LaFollette, Lenoir City, Loudon, Mooresburg, and Petros.

V. Bollinger [33] 1971 JUL 12 21:03 East TN IV

A. USEQ [395]

I. TEIC 1971 OCT 9 16:44 35.7 83.5 Gatlinburg, TN 8500 V

Location: Gatlinburg, TN; intensity

Intensity: Broken china, canned goods shaken from shelves near Cosby, TN; goods shaken from shelves of stores and homes in Gatlinburg, TN

Extent: E TN - W NC; map; 8500 sq. km

A. Gordon [175] 1971 OCT 9 16:43 35.8 83.4

16:43:32.7; 35.795, 83.371; 8.3; 3.7B
Magnitude from Bollinger [38]

II. TVA [380] 1971 OCT 9 16:44 35.7 83.5 Gatlinburg, TN VI

A. PDE [320]

B. Seismo. notes [340] 1971 OCT 9 16:43 35.86 83.47 TN
:33.8

Tennessee, October 9, 1971, 16h43m33.8s, 35.86 N, 83.47 W, focal depth about 18 km (ERL). Computation based on local crustal model. Ranger at Greenbriar Station near Cosby reported shock broke about \$100 worth of china and a Cosby store reported canned goods tipped from shelves. Goods also reported shaken from shelves of stores and homes in Gatlinburg and in Oconaluftee, North Carolina (Press). Magnitude 3.4 (ERL).

1. Unspecified news account

C. Moneymaker [283] 1971 OCT 9 11:43 a.m. EST Sevier Co., TN

1. Summary of Questionnaire Data

Great Smoky Mountains Earthquake of October 9, 1971 - 11:43 a.m. E.S.T. Mag. 3.4, depth 18 km. A light earthquake shock affected a large area in the Great Smoky Mountains National Park and a peripheral zone of variable width. It occurred at 11:43 a.m. E.S.T. (12:43 p.m. E.D.T.) and apparently was centered somewhere in the park in Sevier County, Tennessee. Slight damage was reported, but it was limited to the area between Gatlinburg and Cosby. The available information, obtained by a questionnaire survey, press accounts, and a letter from the National Park Service is summarized below.

I. Tennessee outside of the Great Smoky Mountains National Park

1. Cosby: Felt
2. Gatlinburg: Felt by many or nearly everyone. "We believe it was a little tremor. It lasted a few seconds. Some people said they heard a roar too and they thought it was from a plane, perhaps a sonic boom."
- "I was in a car at the time and did not feel it, but I saw people running out of buildings to find out what happened.
- "Everyone in the area seems to have been shaken. My wife said our house shook and dishes rattled." Above quotations - Willi Ogle, Chief of Police, Gatlinburg.
- "It was a low rumble and got a little louder. It was quite a sizeable tremor, but lasted only a few seconds." Glen Branam, Dispatcher, Res. Tennessee. Hwy. 73 - Heard rumble and his home was shaken.

81-82

3. Hartford: Felt. One lady reported damage to her kitchen stove and light wires, but did not specify the nature of the damage.
4. Jones Cove: Felt by many. Several residents made telephone calls to the Sheriff's office in Sevierville. No damage was reported.
5. Pigeon Forge: Felt by nearly everyone. The effects of the shock were reported to be about the same as in Gatlinburg.
6. Pittman Center: Felt by nearly all. No damage reported.
7. Sevierville: Not felt.
8. Townsend: The shock was felt by a few people who reported that it was attended by a rumbling sound.

II. Great Smoky Mountains National Park (1320 mi²)

- A. In Tennessee
 1. Elkmont Ranger Station: Felt
 2. Greenbriar Ranger Station: Felt

3. Tremont Ranger Station: Felt

B. In North Carolina

1. Oconaluftee Ranger Station: Felt

C. North Carolina

1. Bryson City: Questionnaire not returned

2. Fontana Dam: Not felt

3. Maggie: Felt by a few

U.S. National Oceanic and Atmospheric Administration gives the epicenter at Lat. 35.9°N, Long. 85.3°W, North Carolina. That point is not in North Carolina, not in the Great Smoky Mountains National Park, and not even in the "felt area." It is some 3.5 mi. northeast of Sevierville, Tenn.

2. News-Sentinel (10/2, 10/10/71), Knoxville, TN

10/10/71 Gatlinburg Shaken by Brief Earth Tremor

No Damage Reported; Quake Felt Over Smokies

GATLINBURG, Oct 9 (Special)—The Gatlinburg area was shaken by an earth tremor Saturday afternoon, but only slight damage was reported. The police and fire department began getting anxious calls about 1 p.m.

"We believe it was a little tremor," said Police Chief Willie Ogle. "It lasted a few seconds. Some people said they heard a roar too and they thought it was from a plane, perhaps a sonic boom.

Federal Aviation Authority officials at the McGhee Tyson Airport control tower said they knew of no aircraft in the vicinity at that time that could have caused sonic booms.

Saw People Running

A check with the National Weather Service, also at McGhee Tyson Airport, revealed that officials there had not had any reports of earth tremors.

William McClain, Knoxville, geophysicist for Oak Ridge National Laboratory, Saturday night said the seismograph recorded the tremor at 12:43 p.m. He estimates it was between 3 and 4 on the Richter scale, normally measured from 1 to 10.

"We cannot do much more than estimate the magnitude, and it was probably no more than 3 or 4, probably closer to 3," he said, "and seemed to be centered near Gatlinburg. The southern Appalachian region is a mild earthquake zone."

'Minor Adjustment'

"This means we can continue to expect the little tremors, and, on very rare occasions, something larger. This just represents a minor adjustment of the deep crustal rocks."

The next closest seismograph (to Oak Ridge) is at St. Louis.

"I was in a car at the time and didn't feel it," Chief Ogle said, "but I saw people running out of buildings to find out what happened. Several girls who were at a secretaries' convention here ran over to me to ask about it."

"Everyone in the area seems to have been shaken. My wife said our house shook and dishes rattled."

"A man in here from Pigeon Forge said they had the same thing."

At Sevierville, Miss Marie Bashor said she did not feel any tremor there.

The Sevier County sheriff's office had calls from Jones Cove, Tenn. 73, "and all around," but none in Sevierville.

Park Office Gets Calls

Glenn Branam, a dispatcher of Great Smoky Mountains National Park, said he was in his stone home on Tenn. 73 when he heard a rumble and his home was shaken. "It was a low rumble and got a little louder," he said. "It wasn't a sonic boom."

Branam, 51, said he was born and raised in the mountains and that this wasn't his first experience with tremors there. "I've felt some before," he said. "To my knowledge, this was the heaviest ever."

After he went to work at 3 p.m. he got more calls on it.

The dispatcher on duty at the time of the tremor was Homer Smith, who logged it as occurring at 12:45 p.m. EDT.

"Mr. Smith got over 100 calls," said Branam. "The park building shook too. Most of the tremor seemed to be in this area and along Tenn. 73, but we had a call from Oconaluftee on the North Carolina side, where it was less severe.

No Injuries Reported

"I would say it was quite a sizeable tremor, but lasted only a few seconds.

"Some dishes were broken at the Greenbriar station, and some groceries on shelves at Sizemore store outside the park were shaken off. That was below Greenbriar.

"We didn't have any reports of anyone being injured."

3. Journal (10/11/71), Knoxville, TN

Great Smokies Shaken By Light Tremor

GATLINBURG—A light earth tremor shook the Great Smoky Mountains Saturday, breaking some dishes, but causing no serious damage, the U.S. Park Service reported.

Oak Ridge National Laboratory geophysicist William McClain said the seismograph at ORNL recorded the tremor at 12:43 p.m. He estimated it was between 3 or 4 on the Richter scale, measured from 1 to 10.

Park Rangers said the tremor lasted approximately two seconds.

It was reported from Cosby on the Tennessee side of the park and from Oconaluftee on the North Carolina side, as well as in Gatlinburg.

The duty ranger at Greenbriar station near Cosby said he had "about \$100 worth of broken china" after the tremor and a store in Cosby reported the tremor was strong enough to jar canned goods from shelves.

McClain said the southern Appalachian region is a mild earthquake zone and added that Saturday's tremor was just a minor adjustment of the deep crustal rocks.

4. Precip. in the Tn. River Basin

1971 October 9 12:43 p.m. E.S.T. Great Smoky Mountains. "A minor earth tremor occurred in the Great Smoky Mountain Region at 12:43 p.m. on October 9. The shock was felt from Cosby to Gatlinburg and on to Cherokee, North Carolina. Although a large number of dishes were broken and goods shaken from shelves, no serious damage resulted. The tremor, which lasted only a few seconds, registered between 3 and 4 on the Richter Scale."

5. Memo - U.S. Dept. of Interior

Mr. Berlen C. Moneymaker
4037 Stillwood Dr., SW
Knoxville, TN 37919

Dear Mr. Moneymaker:

Please excuse our delay in replying to your letter concerning information on earthquakes in areas of the park.

As far as we could determine, the Greenbrier Ranger Station received the most damage from the tremor on October 9, 1971. The vibration was felt at several other stations in the park (Elkmont and Tremont), as well as the Oconaluftee area in North Carolina.

If we can be of further assistance in reporting these occurrences, please contact us.

Sincerely yours,

Edward J. Widmer
Acting Chief Ranger

III. USGS [390]

D. USEQ [395]	1971	OCT 9	11:43 :33.8	35.9	83.5	TN	V
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Oct. 9: 11:43:33.8 (16.43). Epicenter 35.9° N., 83.5° W., Tennessee, at a depth of 18 km, mag. 3.4 (m) Int. V in Great Smokies National Forest at Greenbrier Ranger Station, near Cosby, where \$100 worth of china broke; also at Cosby and Gatlinburg, Tenn., and Oconaluftee Ranger Station, N.C., where canned goods tumbled from shelves (press). Int. V effects also occurred at Newport and Sevierville, Tenn. Int. IV at Flat Rock, N.C. Int. I-III at Burnsville, Franklin, and Sylva, N.C., and Townsend, Tenn.

E. PDE [320]	1971	OCT 9	16:43 :33.8	35.86	83.47	TN
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m = 3.4; h = 18 km. Minor damage in Gatlinburg - Cosby area

- IV. McClain [260] 1971 OCT 9 16:43 35.9 83.5 NC
 m = 3.4; damage in Gatlinburg and Cosby area
 A. PDE [320]
- V. Bollinger [33] 1971 OCT 9 16:43 35.9 83.5 East TN
 m = 3.4
 A. PDE [320]
- IX. Varma [400] 1971 OCT 9 16:43 35.9 83.5 Sevier Co., TN
 A. PDE [320]

V

IV-

223

I. TELC 1973 OCT 30 22:59 35.8 84.0 Alcoa, TN 6300 V

Location: Alcoa, TN; intensity; location

Intensity: Small objects shifted @ Alcoa, TN; @ Knoxville, TN, dishes were shaken from a cupboard

Extent: E TN; map; 6300 sq. km., USEQ [395]

Comment: F/S to NOV 30 event

A. Gordon [175] 1973 OCT 30 22:59 35.8 84.1

22:58:39.0; 35.759, 84.117; 0.7; 3.5 DG
Magnitude from Dewey [95]

II. TVA [380] 1973 OCT 30 22:59 35.7 84.0 Maryville, TN IV-V

8224

A. PDE [320]

B. USEQ [395]

C. Bollinger [33]

III. USGS

D. USEQ [395] 1973 OCT 30 22:58 35.8 84.0 Eastern TN 6300 V

Oct. 30. 17:58:39.0 (22:58), 18:09. Foreshock of November 30 earthquake. Macroseismic location 35.75 N., 84.00 W., eastern Tennessee, at a depth of about 33 km, mag. 3.4 (m_p), USGS. Felt over about 6,300 km (2,400 mi) of Blount, Greene, Knox, and Loudon counties, Tenn.; also felt in three towns in southeastern Kentucky and eastern North Carolina. Int. V. Small objects shifted at Alcoa, Tenn. The press reported dishes were shaken from a cupboard in Knoxville, but no damage occurred.

Intensity V in Tennessee

Alcoa, Friendsville, Knoxville (press; aftershock at 6:09 p.m.), and Maryville.

Intensity IV in Tennessee
Greenback, Lenoir City, Louisville, Midway, Rockford, Townsend, and Walland.

Intensity I-III in Kentucky

Hill Top and Pathfork.

Intensity II in North Carolina

Almond.

Intensity I-III in Tennessee

Concord (press), Lake City, and Tallassee.

1. Unspecified press accounts

E. PDE [320]

1973	OCT 30	22:58 :39.0	35.75	84.00	TN
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Macroseismic location. Felt in Blount & Knox counties. Max. int. (V) Mag. 3.4 MBLg. d = N

IV. McClain [260]	1973	OCT 30	22:58 :39.0	35.8	84.0	East TN
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M = 3.4

A. PDE [320]

V. Bollinger [33]	1973	OCT 30	22:58 :39.0	35.8	84.0	Maryville, TN	2100	V
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M = 3.4

A. Bollinger (unpublished data)

B. PDE [320]

IX. Varma [400]

1973

OCT 30

35.8

84.0

Blount Co., TN

V

A. PDE [320]

I. TEIC 1973 NOV 30 07:49 35.8 84.0 Alcoa, TN 98,000 VI

Location: Alcoa, TN; F/S, A/S; intensity; center of area reporting damage; center of felt area

Intensity: Minor damage to walls, windows and chimneys in the Maryville-Alcoa, TN area; relay contacts @ Alcoa switching station disrupted causing loss of power; minor cracks in walls at University of Tennessee hospital near Knoxville, TN; chimneys damaged @ Louisville, TN, small objects shifted, plaster fell, objects fell off shelves and window sills; broken windows in Maryville, TN; chimney damage @ Midway, TN; small objects overturned @ Seymour, TN, furniture shifted, plaster cracked; small objects fell, windows cracked in Vonore, TN, some plaster cracked, broke, fell

Extent: C TN to W NC, KY - OH border to N GA; map; 98,000 sq. km.

Comment: A/S's for at least 2 weeks (see Bollinger [37])

A. Gordon [175] 1973 NOV 30 07:49 35.9 84.0

07:48:40.5; 35.889, 83.993; 12.2; 4.6B

Magnitude from Bollinger [38]

II. TVA [380] 1973 NOV 30 07:49 35.7 84.0 Maryville, TN VI

A. PDE [320]

B. USEQ [395]

III. USGS [390]

D. USEQ [395] 1973 NOV 30 07:49 35.8 84.0 Eastern TN 150,000 VI

Nov. 30. 02:48:41.2 (07:48), 03:51. Epicenter 35.799 N., 83.962 W., eastern Tennessee, at a depth of 3 km, mag. 4.6-4.7 (mb), USGS. Felt over approximately 150,000 km² (54,300 mi²) in seven states, including all or parts of Georgia, Kentucky, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia (fig. 7). Int. VI. Minor damage occurred in several towns of eastern Tennessee, Georgia, Kentucky, and North Carolina. The press reported minor cracks in walls at the University of Tennessee Hospital at Knoxville. Minor damage to walls, windows, and chimneys was reported from the Maryville-Alcoa area (figs. 8 and 9). The shock disrupted relay contacts at the Alcoa Switching Station, causing a loss of 300,000 kw of electricity for 11 minutes.

A team of U.S. Geological Survey seismologists was dispatched to the epicentral area to survey the damage and to set up aftershock equipment (fig. 10). According to a preliminary report by the USGS, 12 aftershocks (between magnitude—0.6—1.0) were located from December 3 to 6. Additional aftershocks were reported on November 30 at 03:51 and 04:27 (Cumberland Plateau Observatory, USGS); December 1 at 16:20 and 16:30 and December 2 at 01:25, 01:32, and 02:36. (Georgia Tech and Virginia Polytechnic Institute and State University portable seismic equipment). The aftershock on November 30 at 03:15 was felt by few at Alcoa, Knoxville, Louisville, and Maryville, Tenn. Additional aftershocks were reported felt on December 13 (about 10:00), December 14, and two on December 21 (03:00 and 13:30).

The largest historical seismic event in eastern Tennessee occurred on March 28, 1913 (epicenter 36.2 N., 83.7 W., near Knoxville, int. VII). The small felt area of that shock (7,000 km) may be attributed, in part, to the less dense population at that time.

Intensity VI in Tennessee

Alcoa: Felt by several, awakened and frightened all in home. Windows, doors, and dishes rattled. Building creaked. Moderate earth noises. Few cracks. Damage slight. (See Maryville-Alcoa description below.)

Knoxville: Felt by all in community; awakened and frightened many. Windows vibrated. Small trees shook. Loud earth noises "like loud thunder." Hanging objects swung violently. Small objects fell; furniture shifted (shook and moved back and forth). According to the press, the earthquake cracked a wall in the emergency room of the University of Tennessee Hospital. There were several other minor cracks in walls. Two injuries were reported.

1. Bollinger [37]

Louisville: Felt by and awakened all in community; frightened many. Severe shaking of windows, doors, and dishes. House shook. Loud earth noises, like thunder. Small objects shifted. "No damage in my home. Damage to houses in this area: Windows cracked. Plaster fell. Objects fell off shelves and window sills. Chimneys damaged."

Maryville-Alcoa: According to the Daily Times, the Tennessee Valley Authority said the shock disrupted relay contacts at the Alcoa Switching Station, located on Big Spring Road near the Maryville-Alcoa By-pass. TVA reported the facility lost some 300,000 kw of electricity for 11 minutes. The plate glass window was broken at a radio and television shop on West Broadway. Walls cracked and windows broke at Blount Memorial Hospital. A window broke at the Medical Arts Building. Part of a chimney was knocked down at a residence on Wilson Avenue. Windows broke at a home in the White's Mill area. The shock lasted about 5 to 8 seconds. Earth noise resembled extremely heavy thunder, but was heavier and lasted longer than even heavy thunder. Awakened all but the soundest sleepers.

A report by B. J. Morrill (USGS, Seismic Engineering, San Francisco, Calif.) stated: "In the area of Maryville, Alcoa, and Knoxville, it broke windows, cracked some plaster, knocked some stock from shelves, and caused other minor damage. No structural damage was reported. Most of the damage occurred at Maryville. At Old Piney Church, very near the epicenter, there was no evidence that a quake had occurred, even though the buildings are constructed of unreinforced brick. At Alcoa, bottles did not fall from shelves."

Midway: Felt by and awakened many; frightened few. Building creaked "like pulling nails." Hanging objects swung. Small objects shifted. Plaster cracked, broke, and fell. Stone fireplace cracked. Cracking around chimneys. Damage moderate.

Seymour: Felt by, awakened, and frightened all in community. Whole house shook. Loud earth noises. Hanging objects swung moderately. Small objects overturned. Furniture shifted. Plaster cracked. "The closer the earthquake the louder the noise. The shaking of the earth was tremendous. Small articles were turned over and larger articles shaken. The worst earthquake ever in this area."

Vonore: Felt by, awakened, and frightened many. Loud earth noises. Trees and bushes shook; vehicles rocked. Hanging objects swung violently. Small objects fell. Few windows cracked. Some plaster cracked, broke, and fell. Damage slight.

Intensity V in Georgia

Ball Ground, Cannon, Dahlonga, DeMorest (one instance of fallen plaster), Ellijay, Fairmount, Hurst, and Young Harris.

Intensity V in Kentucky

Falcon (blocks broke?), Frakes, Saul (windows cracked), and Raven.

Intensity V in North Carolina

Almond, Aquone, Barnardsville, Cherokee, Edneyville, Fontana Dam (plaster cracked), Franklin (plaster cracked), Hayesville, Murphy, Otto, Pisgah Forest (windows broke), Robbinsville, Tuckasegee, and Webster.

Intensity V in South Carolina

Easley, Richland, Tamassee, and Westminster.

Intensity V in Tennessee

Andersonville, Bean Station, Blaine, Bluff City, Bybee, Clinton (plaster cracked), Corryton, Cosby, Dandridge, Deer Lodge Ducktown, Emory Gap, Erie (plaster cracked), Friendsville (windows, walls, and ceiling cracked in some homes), Greenback, Harriman, Harrogate, Heiskell, Kimberlin Heights, Kingston, Kodak, LaFollette, Lenoir City (few wall cracks), Loudon, Luttrell, Madisonville, Mascot, Oakdale, Oliver Springs, Rafter, Rockford (some walls cracked), Sevierville, Shooks, Tallassee, Tellico Plains, Townsend, Walland, Wartburg, and White Pine.

Intensity V in Virginia

Marion.

Intensity IV in Georgia

Acworth, Alto, Atlanta, Blairsville, Blue Ridge, Buckhead, Buford, Cisco, Clermont, Conyers, Crandall, Duluth, Epworth, Habersham, Hamilton (press), Helen, Hiawassee, Jasper, Lula, Lyerly, McCaysville Morganton, Mountain City, Nelson, Oxford, Talking Rock, Talmo, Tunnel Hill, Turnerville, Waleska, Whitestone, and Winder.

Intensity IV in Kentucky

Bondville, Bow, Fonde, Germantown, Green Hall, Greenup, Guage, Ingram, Island, Middlesboro, Pathford, Revelo, Salt Gum, Straight Creek, Strunk, Tinsley, Totz, Waco, Walden, Wendover, Wheelwright, Winston, and Woodbury.

Intensity IV in North Carolina

Alexander, Andrews, Banner Elk, Brasstown, Bryson City, Canton, Cashiers, Chimney Rock, Columbus, Culberson, Cullowhee, Dana, Dillsboro, Ellenboro, Enka, Etowah, Flat Rock, Fletcher, Gerton, Glenwood, Harris, Hazelwood, Hendersonville, Highlands, Hot Springs, Kannapolis, Lake Lure, Lake Toxaway, Marble, Mars Hill, Marshall, Mill Spring, Montreat, Mooresboro, Mountain Home, Naples, Old Fort, Piney Creek, Ridgecrest, Rosman, Rutherfordton, Saluda, Sapphire, Scaly Mountain, Skyland, Spruce Pine, Sylva, Tuxedo, Warne, Waynesville, and Whittier.

Intensity IV in South Carolina

Belton, Cross Anchor, Duncan, Edgemoor, Jackson, Marietta, Pauline, Peak, Pickens, Reidville, Simpsonville, Slater, Starr, Startex, Townville, Union, Winnsboro, and Woodruff.

Intensity IV in Tennessee

Athens, Bone Cave, Briceville, Burrville, Celina, Charleston, Chuckey, Church Hill, Clarkrange, Coalfield, Coke Creek, Crossville, Decatur, Delano, Eagan, Englewood, Etowah, Greeneville, Grimsley, Jefferson City, Jonesboro, Kingsport, Lake City, Lancing, Limestone, Mooresburg, Newcomb, New Market, Newport, Niota, Norris, Oak Ridge, Oneida, Petros, Philadelphia, Pioneer, Postelle, Pruden, Reliance, Rockwood, Russellville, Rutledge, Sparta, and Sweetwater.

Intensity IV in Virginia

Abingdon, Austinville, Big Stone Gap, Broadford, Cripple Creek, Dungannon, Elk Creek, Ewing, Inman, McCoy, Nickelsville, Rose Hill, and Woodlawn.

Intensity IV in West Virginia

Algoma, Jenkinjones, Stirrat, Switzer, Thacker, and Welch.

Intensity I-III in Georgia

Rydal and Stockbridge.

Intensity I-III in Kentucky

Burkesville, Cubage, Davisport, Emma, Gausdale, Harold, Helton, Owingsville, Pine Knot, Putney, River, Scuddy, and Soldier.

Intensity I-III in North Carolina

Arden, Asheville, Clyde, Concord, Crossnore, Hamptonville, Henrietta, Horse Shoe, Oakboro, Penland, Taylorsville, and Union Mills.

Intensity I-III in South Carolina

Chesnee, Gramling, Greenville, and Walhalla.

Intensity I-III in Tennessee

Arthur, Caryville, Copperhill, Crab Orchard, Cumberland Gap, Duff, Elizabethton, Fairview, Hartford, Hixson, Joelton, Monterey, Riceville, Rogersville, Summitville, and Tazewell.

Intensity I-III in Virginia

Damascus, Rosedale, and Pineville.

E. PDE [320] 1973 NOV 30 07:48 35.799 83.962 TN VI
:41.2

m = 5.6;

Minor damage (VI) in Maryville, TN Felt in Ala., Ga., Ky., N.C., S.C., Va., W. Va. Mag. 4.6 MBLg. Mag. 4.6-47 Mslg.

IV. McClain [260] 1973 NOV 30 07:48 35.8 84.0 East TN
:41.2

m = 4.6; minor damage at Maryville

A. PDE [320]

V. Bollinger [33] 1973 NOV 30 07:48 35.8 84.0 Maryville, TN VI
:41.2 64,800

A. Bollinger (unpublished data)

B. PDE [320]

IX. Varma [400] 1973 NOV 3 35.8 84.0 Blount Co., TN VI

A. PDE [320]

I. TEIC 1974 MAY 30 21:29 37.3 80.6 Pembroke, VA 21,000 V

Location: Pembroke, VA; intensity

Intensity: Small objects shifted, houses, windows, rattled

Extent: SW VA - S WV; map; 21,000 sq. km.

A. Dewey [95] 1974 MAY 30 21:29 37.5 80.5

21:28:35.3; 37.457, 80.540; 5.4; 3.7J
Magnitude from Jones [222]

II. TVA [380] 1974 MAY 30 21:29 37.4 80.4 Simmonsville, VA V

A. PDE [320]

B. USEQ [395]

C. EUS [130]

III. USGS [390]

D. USEQ [395] 1974 MAY 30 16:28 37.38 80.42 VA 5400 V
:37.2

May 30. 16:28:37.2 (21.28). Epicenter 37.38° N., 80.42° W., Virginia, at a depth of 8 km, BLA. Felt over 5,400 km² (2,084 mi²) of southwestern Virginia and southeastern West Virginia. Int. V. No damage occurred, but small objects shifted, residents were frightened, and houses and windows rattled.

INT. V. IN WEST VIRGINIA

Gap Mills and Pickaway.

INT. V IN VIRGINIA

Belspring, Kimballton, Lafayette, and Pembroke.

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∞

INT. IV IN WEST VIRGINIA

Alderson, Lindsie, Sarton, Union, and Waiteville.

INT. IV IN VIRGINIA

Catawba, Fincastle, New Castle, Newport, and Ripplemead.

INT. I-III IN WEST VIRGINIA

Cucumber, Dingess, Drennen, Forest Hill, Gary, Greenville, Meadow Bridge, Peterstown, Sweet Springs, and Willow Bend.

INT. I-III IN VIRGINIA

Blairs, Eggleston, Emory, Glen Lyn, Paint Bank, Roanoke, and Vansant.

1. VPI seismograph

E. PDE [320] 1974 MAY 30 21:28 37.382 80.419 WV V

mag. = 3.6 M ; felt (V) in Montgomery and Pulaski cos.; felt in other parts of SW Va. and SE W. Va.

F. EUS [130] 1974 MAY 30 21:28 37.382 80.419 Southern VA V

30 May (V) Southern Virginia

Origin time: 21:28:37.2
 Epicenter: 37.382° N., 80.419° W.
 Depth: 8 km
 Magnitude: 3.6 m_b
 See figure 12.
 Intensity V:

Virginia - Bel Spring, Lafayette, Pembroke.

Intensity IV:

Virginia - Catawba, Fincastle, Kimballton, Newcastle, Newport, Ripplemead.

West Virginia - Alderson, Gap Mills, Lindsie, Pickaway, Sarton, Union, Waiteville, Willowbend.

Intensity III:

Virginia - Paint Bank, Roanoke.

West Virginia - Peterstown, Sweet Springs.

Intensity II:

Virginia - Blairs, Eggleston, Emory, Glen Lyn, Vansant.

West Virginia - Cucumber, Dingess, Drennon, Forest Hill, Gary, Greenville, Meadow Bridge.

IV. McClain [260] 1974 MAY 30 21:28 37.4 80.4 Montgomery Co., VA
:37.2

mag = 3.6

A. PDE [320]

V. Bollinger [33] 1974 MAY 30 21:28 37.4 80.4 Giles Co., VA
:37.2

mag. = 3.8

A. PDE [320]

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∞
∞

I. TEIC 1975 MAR 7 12:45 37.3 80.7 Pearisburg, VA 1300 III

Location: Pearisburg, VA

Intensity: Felt

Extent: Giles Co., SW VA; map; 1300 sq. km

II. TVA [380] 1975 MAR 7 12:45 37.3 80.7 Giles Co., VA

A. EUS [130]

III. USGS [390]

F. EUS [130] 1975 MAR 7 12:45 37.32 80.48 Southwestern VA II

84
56

7 March (V)

Southwestern Virginia

Origin time: 12 45 13.5
Epicenter: 37.32 N., 80.48 W* [co-ord?]
Depth: 5 km
Magnitude: 3.0 mblg
Intensity II: Bane, Fort Branch, Harrisburg, Pearisburg.

I. TEIC 1975 MAY 2 16:23 36.0 84.6 Oakdale, TN III

Location: Oakdale, TN

Intensity: Felt

A. Gordon [175] 1975 MAY 2 16:23 36.0 84.5

16:22:58.5; 35.961, 84.471; 12.4; 2.6 SLM
St. Louis University magnitude

II. TVA [380] 1975 MAY 2 16:23 36.0 84.6 Oakdale, TN

A. PDE [320]

III. USGS [390]

E. PDE [320] 1975 MAY 2 16:22 35.921 84.446 TN
:58.7

felt (III) at Oakdale; mag. = 2.6 m ; h = 15 km.

I. TEIC 1975 MAY 14 23:03 36.0 84.3 Oak Ridge, TN III

Location: Oak Ridge, TN

Intensity: Felt

A. Gordon [175] 1975 MAY 14 23:03 36.0 85.25

23:03:05.2; 35.981, 85.301; 1.0R; 2.7 SLM
Depth restrained; St. Louis University magnitude

II. TVA [380] 1975 MAY 14 23:03 36.0 84.3 Oak Ridge, TN

A. PDE [320]

B. EUS [130]

III. USGS [390]

E. PDE [320] 1975 MAY 14 23:03 35.947 85.249 TN

838

mag. = 2.7 m ; h = 5 km (G)

F. EUS [130] 1975 MAY 14 23:03 35.95 85.25 Eastern TN II

14 May (G)

Eastern Tennessee

Origin time: 23 03 05.9
Epicenter: 35.95 N., 85.25 W.*
Depth: 5 km
Magnitude: 2.7 mblg(S)
Intensity II: Oak Ridge area.

I. TEIC 1975 AUG 29 04:23 33.7 86.7 Palmerdale, AL 57,000 VI

Location: Palmerdale, AL; intensity; center of felt area

Intensity: Slight damage @ Palmerdale and Watson, AL

Extent: C AL to TN border; map; 57,000 sq. km.

A. Gordon [175] 1975 AUG 29 04:23 33.7 86.6

04:22:52.1; 33.659, 86.588; 4.2; 4.4 DG

Magnitude from Dewey [95]

II. TVA [380] 1975 AUG 29 04:23 33.8 86.6 Palmerdale, AL VI

A. EUS [130]

III. USGS [390]

28 23:22:51.9 (Aug. 29, 04:22). Epicenter 33.82°N, 86.60°W northern Alabama, USGS. Int. VI. Felt over an area of approximately 25,000 sq km (see fig.4) of northern Alabama and southern Tennessee. Slight damage occurred at Palmerdale and Watson, Ala.

Aug. 28 23:22:51.9 (Aug. 29, 04:22). Epicenter 33.82°N, 86.60°W northern Alabama, USGS. Int. VI. Felt over an area of approximately 25,000 sq km (see fig.4) of northern Alabama and southern Tennessee. Slight damage occurred at Palmerdale and Watson, Ala.

INT. VI IN ALABAMA

Palmerdale: Felt by and awakened all in home. Sheetrock ceiling cracked. Table lamps shifted. Hanging objects swung moderately. "Most thought it was an explosion."

Watson: Felt by several; awakened and frightened few. Furniture and small objects shifted slightly. Hanging objects swung moderately. Damage slight.

INT. V IN ALABAMA

Allgood, Altoona, Bon Air, Burnwell, Clay, Coalburg, Columbiana, Haleyville, Morris, Muscadine, New Hope, Trafford, and Wattsville.

INT IV IN ALABAMA

Acmar, Addison, Adger, Alden, Alexandria, Alpine, Alton, Arab, Arley, Baileytown, Bear Creek, Bessemer, Birmingham (press), Blountsville, Brilliant, Brookside, Bynum, Cardiff, Clanton, Collinsville, Cooks Springs, Cragford, Cropwell, Delta, Dixiana, Double Springs, Eldridge, Fairfield, Gadsden (press), Gallant, Geraldine, Goodwater, Hamilton, Harpersville, Hartselle, Heflin, Henagar, Huntsville, Joppa, Leeds, Lincoln, Moundville, New Castle, Odenville, Paint Rock, Pelham, Pinson, Ragland, Remlap, Riverside, Sayre, Shelby, Siluria, Sterrett, Sycamore, Sylacauga, Talladega, Tanner, Thorsby, Trussville, Union Grove, Verbena, and Walnut Grove.

INT. IV IN TENNESSEE

Five Points (press) and Taft.

INT. III IN ALABAMA

Belle Mina, Brent, Crossville, Dolomite, Grayson, Horton, Kimberly, Moulton, Springville, Trinity, Vinemont, and Wilsonville.

INT. II IN ALABAMA

Cedar Bluff, Choccolocco, Cleveland, and West Blockton.

F. EUS [130]	1975	AUG 29	04:22 :51.9	33.82	86.60	Northern AL	25,000	VI
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29 August (G)

Northern Alabama

Origin time:	04:22:51.9
Epicenter:	33.82 N., 86.60 W.
Depth:	5 km.
Magnitude:	3.5 mb, 4.4 mblg(S), 4.3 mblg(V)

Felt over an area of approximately 25,000 sq km (fig. 7).

Intensity VI: Palmerdale (ceiling damage), Watson (slight damage).

Intensity V: Allgood, Altoona, Burnwell, Coalburg, Columbiana, Haleyville, Trafford, Wattsville.

Intensity IV: Many in these communities awakened from sleep:

Alabama--Acmar, Addison, Adger, Alden, Alexandria, Alpine, Alton, Arab, Arley, Baileyton, Bear Creek, Bessemer, Birmingham (press report), Blountsville, Bon Air, Brilliant, Brookside, Bynum, Cardiff, Clanton, Clay, Collingsville, Cooks Springs, Cragford, Cropwell, Delta, Dixiana, Dora, Double Springs, Eldridge, Fairfield, Gadsden (press report), Gallant, Geraldine, Goodwater, Hamilton, Harpersville, Hartselle, Heflin, Henager, Huntsville, Joppa, Leeds, Lincoln, Morris, Moundville, Muscadine, New Castle, New Hope, Odenville, Paint Rock, Pelham, Pinson, Ragland, Remlap, Riverside, Sayre, Shelby, Siluria, Sterrett, Sycamore, Sylacauga, Talladega, Tanner, Thorsby, Trussville, Union Grove, Verbena, Walnut Grove.

Tennessee--Five Points (press report), Taft.

Intensity III: Belle Mina, Brent, Crossville, Dolomite, Grayson, Horton, Kimberly, Moulton, Springville, Trinity, Vinemont, Wilsonville.

Intensity II: Cedar Bluff, Choccolocco, Cleveland, Maplesville, West Blocton.

I. TEIC 1975 NOV 11 08:11 37.3 80.7 Ripplemead, VA 1100 V

Location: Ripplemead, VA; location

Intensity: EUS [130] indicates MMI V

Extent: Giles Co., SW VA; map; 1100 sq. km.

A. Dewey [95] 1975 NOV 11 08:11 37.2 80.9

08:10:37.6; 37.217, 80.892; 1.0R; 3.2 SLM
Depth restrained; St Louis University magnitude

II. TVA [380] 1975 NOV 11 08:11 37.3 80.7 Giles Co., VA V

A. PDE [320]

B. EUS [130]

III. USGS [390]

E. PDE [320] 1975 NOV 11 08:10 37.193 80.839 VA
:34.3

Maximum Intensity IV at Rich Creek - Pearisburg Area. Felt in Giles, Pulaski, Montgomery counties. Reports of broken windows in Blacksburg area h = 15 G

F. EUS [130] 1975 NOV 11 08:10 37.19 80.84 Southwestern VA V
:39.3

842

11 November (G) Southwestern Virginia

Origin time: 08 10 39.3

Epicenter: 37.19 N., 80.84 W.

Depth: 15 km

Magnitude: 3.2 mblg(S)

There were unconfirmed reports of window breakage in the Blacksburg area (press reports).

Intensity V: Ripplemead.

Intensity IV: Eggleston, Pearisburg, Radford, Rich Creek.

Intensity III: Giles, Pulaski, and Montgomery counties (press reports).

I. TEIC 1975 NOV 25 15:18 34.9 83.0 6100 IV

Location: Salem, SC

Intensity: EUS [130] indicates MMI IV

Extent: Extreme NW SC - SW NC border area; map; 6100 sq. km.

A. Dewey [95] 1975 NOV 25 15:18 34.9 82.9

15:17:34.8; 34.943, 82.896; 9.9; 3.2 SLM
Magnitude from St. Louis University

II. TVA [380] 1975 NOV 25 15:18 34.9 83.0 Salem, SC IV

A. PDE [320]

B. EUS [130]

844
III. USGS [390]

E. PDE [320] 1975 NOV 25 15:17 34.873 72.958 SC
:33.7

Max. Int. (IV) in Oconee Co., S.C. and Transylvania Co., N.C. Felt also in parts of Jackson and Swain co's., N.C.
mag. 3.2 mbLg; h = 5 km (G)

F. EUS [130] 1975 NOV 25 15:17 34.87 82.96 Northwestern SC IV
:33.7

25 November (G) Northwestern South Carolina

Origin time: 15 17 33.7
Epicenter: 34.87 N., 82.96 W.
Depth: 5 km
Magnitude: 3.2 mbLg(X)

Intensity IV:

South Carolina: Longcreek, Mountain Rest, Salem, Tamassee, and communities in Oconee County (press report)

North Carolina: Lake Toxaway and communities in Transylvania County (press report).

Intensity III:

South Carolina: Newry, Walhalla.

North Carolina: Almond, Brevard (press report), Cashiers, Roseman, Senaca (press report).

Intensity II:

South Carolina: Madison.

North Carolina: felt in parts of Jackson and Swain counties (press reports).

I. TEIC 1976 JAN 19 06:21 36.9 83.9 Barbourville, KY VI

Location: Barbourville, KY; intensity; location

Intensity: @ Barbourville, KY, plaster cracked, objects knocked from shelves and walls, furniture moved; plaster cracked @ Hinkle, Kettle Island, Woodbine, KY; walls cracked in Pineville and Walker, KY; @ Lafollette, TN, dishes were knocked from cabinets, tires fell on floor in auto store; windows broken @ Artemus and Flat Lick, KY; where objects were overturned

Extent: E KY - NE TN, also parts of WV, SW VA and W NC; map; --- sq. km.

A. Gordon [175] 1976 JAN 19 06:21 36.9 83.9

06:20:39.6; 36.866, 83.861; 1.0R; 3.8 SLM

Depth restrained; St Louis University magnitude

II. TVA [380] 1976 JAN 19 06:31 36.9 83.8 Knox Co., KY VI

A. PDE [320]

III. USGS [390]

D. USEQ [395] 1976 JAN 19 06:21 36.9 83.8 Eastern KY VI

19 January (G)

Eastern Kentucky

Origin time: 06:20:39.5
Epicenter: 36.88 N., 83.83 W.
Depth: 5 km
Magnitude: 4.0 mb, 3.8 ML (S).

This earthquake was felt in parts of southeastern Kentucky, northeastern Tennessee, northwestern North Carolina, southwestern West Virginia, and western Virginia.

USGS canvassed an area around the epicenter within a radius of 200 km and mailed 1,528 questionnaires. Figure 13 shows the results of this canvass and of the reevaluated questionnaires obtained from G.R. Keller, University of Kentucky, Lexington (Y), who made an onsite survey.

Intensity VI

Kentucky: Minor damage reported in Knox and Bell Counties (press report). Artemus (windows broken), Barbourville (plaster cracked at Union College; objects were knocked from shelves and walls. Furniture moved. Loud earth noises--Y). Bimble (fence fell on railroad tracks--telephone report), Flat Lick (window cracked; objects overturned. Loud noises--Y), Green Road (concrete sidewalk cracked), Himyar, Hinkle (plaster and dry wall cracked), Jenson, Julip, Kettle Island (plaster cracked), Lexington (at Eastover Mine rocks fell on tracks, material from ceiling fell--press report), Pineville (walls cracked), Trosper, Walker (cracks in brick school building), Woodbine (plaster cracked).

Intensity V

Kentucky: Bryants Store, Bypro, Callaway, Calvin, Cannon, Corbin, Crane Nest, Cubage, Emlyn, Four Mile, Frakes, Gausdale, Girdler, Gray, Hulien, Ingram, Jeffersonville, Lida, London, Marydell, Nevisdale, Pine Knot, Pulaski, Revelo, Salt Gum, Sasser, Scalf, Siler, Sizerock, Somerset (press report), Steubenville, Strunk, Tinsley, West Liberty, Williamsburg (press report).

North Carolina: Tuckasegee.

Tennessee: Andersonville (press report), Duff, Eagan, Jellico, Johnson City, (press report), La Follette (dishes were knocked from cabinets; tires fell on floor in auto store-- press report), Midway, Shawanee, Tri-County Airport (press report), Vonore, Walland.

Virginia: Ewing, Rose Hill.

West Virginia: Naugatuck.

Intensity IV

Kentucky: Arjay, Baileys Switch, Beauty, Bush, Buskirk, Dice, Garrard, Hazel Green (press report), Hector, Keavy, Kona, Loyall, Manchester, Mount Sterling, Napfor, Pointer, River, Ruth, Sitka, Tedders, Tuttle, Walden, Wendover, Wittensville.

North Carolina: Alexander, Montreat.

Tennessee: Clairfield, Gatlinburg, Jacksboro, Knoxville, Kodak, Maryville, Oneida, Speedwell, Tallassee.

West Virginia: Gary (V).

Intensity III

Kentucky: Chenoa, Dana, Faubush, Field, Harlan (Y), Hyden (Y), Middlesboro (press report).

North Carolina: Almond.

Tennessee: Lafayette.

Intensity II

Kentucky: Ashland (Y), Cumberland (press report), Molus (press report), Paint Lick, Summersville.

North Carolina: Arden.

West Virginia: Switzer.

21

E. PDE [320] 1976 JAN 19 06:30 36.883 83.825 TN VI
:39.5

Slight damage (VI) in Knox, Bell Co., Ky. Felt in SE. Ky., NE. Th., and western Va. mag. 3.8
mbLg. h = 5 km (G)

I. TEIC 1976 FEB 4 19:54 35.0 84.7 Conasauga, TN 6000 VI

Location: Conasauga, TN; intensity; location

Intensity: Slight damage @ Conasauga, TN; consisting of cracks in masonry, a wall and a chimney

Extent: TN - GA border area; map; 6000 sq. km.

Comment: Long [280] indicates felt radius of 70 km (about 15,000 sq. km.);
USEQ [395] reports of MMI V effects @ Baxley, Cisco, Lyons, Reidsville and
Uvalda, GA; at distances of greater than 250-300 km from the epicenter appear
unreasonable for this event

A. Dewey [95] 1976 FEB 4 35.0 84.7

19:53:53.0; 34.971, 84.702; 14.0; 3.6

II. TVA [380] 1976 FEB 4 19:54 35.0 84.7 Conasauga, TN VI

A. PDE [320]

B. Long [230] 1976 FEB 4 19:53:55 35.0 84.7 GA - TN border IV

On February 4. 1976 at 19:53:55 UT a magnitude ($M = 3.1$) earthquake occurred near the north Georgia-southeast Tennessee border ($35^{\circ}01' N$, $84^{\circ}40' W$). This epicenter area is located on the eastern edge of the Valley and Ridge province. The main event was felt within a radius of 70 km and had an epicentral intensity of at least IV. Three aftershocks were noted within eight hours of the main event. The depth was estimated at about 40 km. The preferred focal mechanism indicates thrusting on a plane striking $N 63^{\circ} W$ and dipping 60° to the NE. The focal mechanism appears to contradict an association of this event with existing major paleozoic faults or an explanation in terms of contemporary crustal bending as inferred by revealing data.

III. USGS [390]

4 February (G) Tennessee-Georgia border

Origin time: 19:53:52.9

Epicenter: 35.00 N., 84.75 W.

Depth: 5 km

Magnitude: 3.0 mbLg (V)

The epicenter of this earthquake is located east of Chattanooga, Tenn., near Conasauga, in the Lake Ocoee Dam area. The shock was felt at a few towns in that region.

Intensity VI

Tennessee: Conasauga (cracked masonry; cracks in 4-year-old cement-block building north of city; cracks in chimney of house 2 km from Ball Play Creek, along Highway 411 (N)).

Intensity V

Georgia: Baxley, Cisco, Lyons, Reidsville, Uvalda (N).

Intensity IV

Tennessee: Copperhill, Ducktown.

Intensity III

Tennessee: Chattanooga (telephone report).

Intensity II

Georgia: Dalton, Hiawassee.

E. PDE [320]	1976	FEB 4	19:53 :52.9	35.004	84.752	TN	VI
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Slight damage (VI) at Conasauga, Tn. Also felt at Copperhill, Ducktown, Chattanooga, Tn. and Cisco, Ga. h = 5 km (G)

I. TEIC 1976 JUN 19 05:54 37.4 81.6 Wilcoe, WV 1000 V

Location: Wilcoe, WV; intensity; location

Intensity: PDE [320] indicates intensity V effects @ Wilcoe and Berwind, WV

Extent: S WV; map; 1000 sq. km

Comment: Possible rockburst - same area as a number of events identified as rockbursts in Dewey [95]

A. Gordon [175] 1976 JUN 19 05:54 37.3 81.6

05:54:13.4; 37.344, 81.602; 0.9; 3.3 BLA

Magnitude from BLA (VPI) seismograph

II. TVA [380] 1976 JUN 19 05:54 37.4 81.6 Wilcoe, WV V

A. PDE [320]

III. USGS [390]

D. USEQ [395] 1976 JUN 19 05:54 37.4 81.6 WV V

19 June (G)
Origin time: 05:54:13.9
Epicenter: 37.36 N., 81.62 W.
Depth: 5 km
Magnitude: 4.7 mb, 3.0 mbLg (V)

Intensity V: Berwind, Wilcoe.

Intensity IV: Welch, Wilcoe.

Intensity III: Coalwood, Gary.

E. PDE [320] 1976 JUN 19 05:54 37.362 81.624 WV V
:13.9

Felt (V) at Wilcoe and Berwind. Mag. 3.0 mbLg (BLg) h = 5 km (G)

I. TEIC 1976 SEP 13 18:55 36.5 80.6 Toast, NC 18,000 VI

Location: Toast, NC; intensity

Intensity: Bricks fell from chimney, pictures fell off piano and dislodged from wall @ Mount Airy, NC; @ Toast, NC, masonry and plaster were cracked; small objects shifted and overturned in Dobson, NC and Fancy Gap, VA

Extent: NW NC - SW VA border area; map; 18,000 sq. km.
(USEQ [495])

II. TVA [380] 1976 SEP 13 18:55 36.5 80.6 Toast, NC VI

A. PDE [320]

III. USGS [390]

13 September (G) Virginia-North Carolina border
Origin time: 18:54:37.1
Epicenter: 36.60 N., 80.81 W.
Depth: 5 km
Magnitude: 3.3 mbLg (V)

USGS canvassed an area around the epicenter within a radius of 150 km and mailed 356 questionnaires. In addition, data were provided by G.A. Bollinger, Virginia Polytechnic Institute and State University, at Blacksburg, and by Law Engineering Testing Company, Marietta, Georgia. These data were evaluated by the USGS, and the combined results are listed below. The earthquake was felt over an area of approximately 17,500 sq km (fig 17).

Intensity VI

North Carolina: Mount Airy (bricks fell from chimney; pictures fell off piano; pictures dislodged from wall), Toast (cracked masonry and plaster; guards on fluorescent light fixtures and metal sorting cases in post office rattled violently; loud noises resembling explosions).

Intensity V

North Carolina: Advance, Dobson (small objects shifted), East Bend, Ennice, Glade Valley, Pilot Mountain, Piney Creek, Rural Hall, Siloam, Sparta (pictures tilted on wall), State Road, Thurmond, White Plains.

Virginia: Cana, Fancy Gap (small objects overturned), Fries, Galax, Lombsburg.

Intensity IV

North Carolina: Ararat, Barium Springs, Belle Island (two shocks felt several seconds apart at Currituck Sound), Boonville, Concord (north-south motion reported), Elkin (loud sound like an explosion rattled windows and doors; water in bathtub rippled), Grandy (three shocks felt), Hamptonville, Harmony, Hillsville, Jonesville, Kitty Hawk (6.3 km north on Currituck Sound; two tremors noted, each lasting several seconds and separated by several seconds, described as relatively high-frequency vibration that did not vary in intensity from beginning to end, but began and ceased abruptly), Knotts Island (rattling of windows and doors, lasting about 10 seconds), Landis, Lewisville, Lowgap, Maple (Currituck County; three shocks felt in about 5 minutes, two close together), Millers Creek, Pilot Mountain, Powells Point (on Albemarle Sound), Roaring River, Ronda, Salisbury (southern Rowan County), Scottville, Sparta, Statesville, Union Grove, Westfield, Whitehead, Wilbar, Woodleaf.

Virginia: Austinville, Claudville, Cripple Creek, Hillsville, Independence, Mouth of Wilson, Stuart, Woodlawn.

West Virginia: Anawalt.

Intensity III

North Carolina: Blowing Rock, Boomer, Denton, Kannapolis, Moyock (lasted longer than 10 seconds), Needmore, Traphill.

Virginia: Ararat, Fancy Gap, Roanoke, Trout Dale.

Intensity II

North Carolina: Charlotte, Longview, Manteo (two shocks felt), Mt. Pleasant.

South Carolina: Columbia (felt on upper floors of an eight-story building--telephone report), Greenville (telephone report).

Virginia: Indian Valley, Laurel Fork, Marion

E. PDE [320]	1976	SEP 13	18:54	36.604	80.810	NC	VI
			:37.1				

Slight damage (VI) at Toast, N.C. Felt in SW. Va. and NW. N.C. mag. 3.3 mblg (BLA) h = 5 km (G)

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