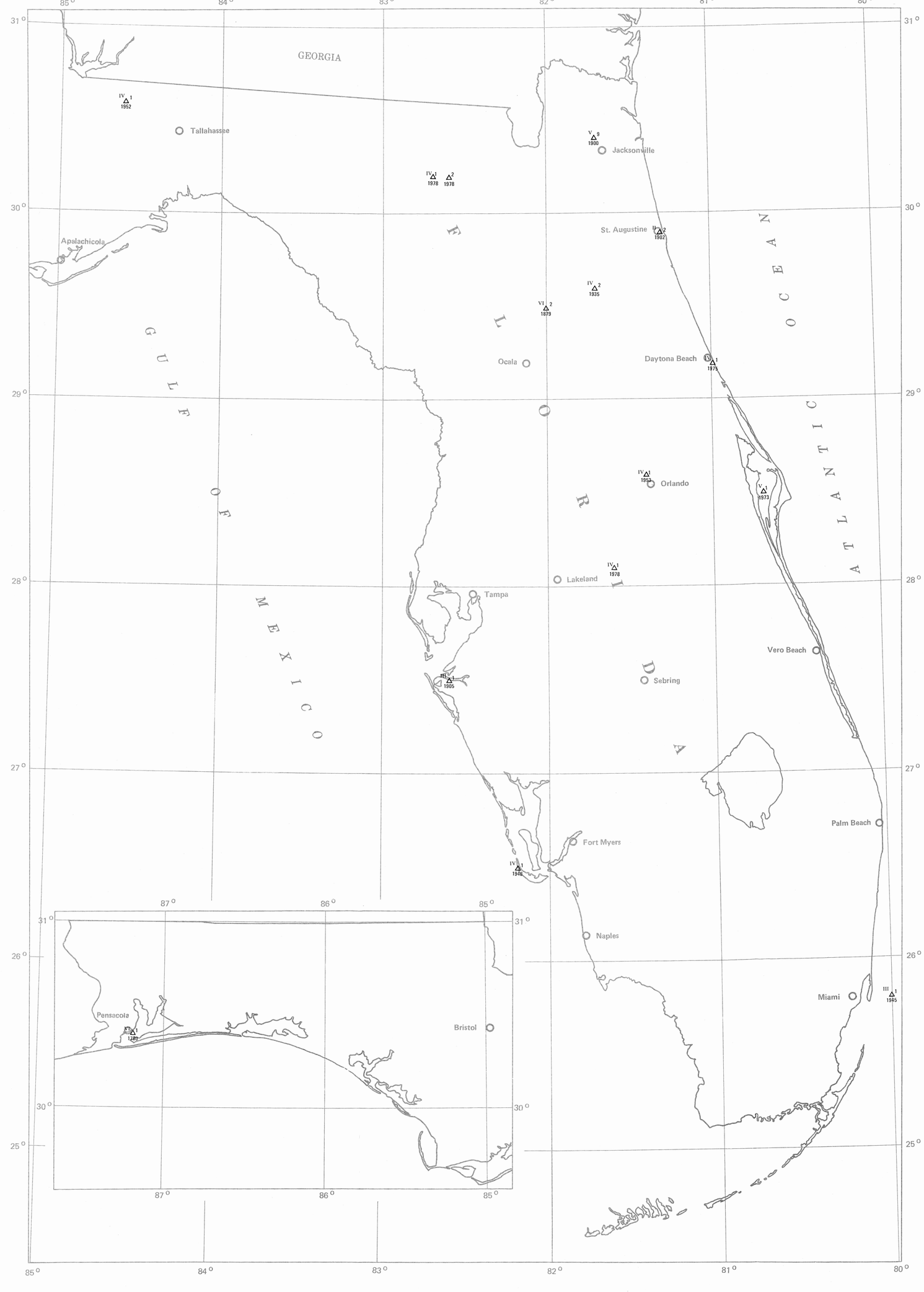
DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

MISCELLANEOUS FIELD STUDIES
MAP MF-1056



INTRODUCTION

This map is one of a series of seismicity maps produced by the U. S. Geological Survey that show earthquake data of individual states or groups of states at the scale of 1:1,000,000. This map shows only those earthquakes with epicenters located within the boundaries of Florida, even though earthquakes in nearby states or countries may have been felt or may have caused damage in Florida.

The data in table 1 were used to compile the seismicity map; these data are a corrected, expanded, and updated (through 1983) version of the data used by Algermissen (1969) for a study of seismic risk in the United States. The locations and intensities of some earthquakes were revised and intensities were assigned where none had been before. Many earthquakes were added to the original list from new data sources as well as from some old data sources that had not been previously used. The data in table 1 represent best estimates of the location of the epicenter, magnitude, and intensity of each eqrthquake on the basis of historical and current information. Some of the aftershocks from large earthquakes are listed, but not all, especially for earthquakes that occurred before seismic instruments were universally used.

The latitude and longitude coordinates of each epicenter were rounded to the nearest tenth of a degree and sorted so that all identical locations were grouped and counted. These locations are represented on the map by a triangle. The number of earthquakes at each location is shown on the map by the arabic number to the right of the triangle. A Roman numeral to the left of a triangle is the maximum Modified Mercalli intensity (Wood and Neumann, 1931) of all earthquakes at that geographic location. The absence of an intensity value indicates that no intensities have been assigned to earthquakes at that location. The year shown below each triangle is the latest year for which the maximum intensity was recorded.

EXPLANATION OF THE TABLES

The data in table 1 are listed chronologically in the following categories: date, origin time in Coordinated Universal Time (UTC), N. latitude, W. longitude, depth, hypocenter quality and reference, magnitude, intensity (Modified Mercalli), and intensity reference. The letter F is recorded in the intensity column if an earthquake was felt but not enough information was available to assign an intensity. Table 1 has some basic limitations in terms of the size (magnitude or intensity) of the earthquakes listed. All felt earthquakes or those with computed magnitudes greater than 2.5 are listed. If no magnitude was computed and the earthquake was felt or an epicenter published, it was included in the earthquake list. The low-magnitude events located in recent years with data from dense seismograph networks have not been included.

Listed below is an explanation of the symbols and codes used in table 1:

1. Leaders (..) indicate information not available,
2. Latitude and longitude are listed to a hundredth of a degree if they have been published with that degree of accuracy or greater; however, most historical events have assigned locations based on felt or damage information and are listed in table 1 only to the nearest degree or tenth of a degree. An asterisk (*) to the right of the longitude indicates that the latitude and longitude were not given in the source reference but were assigned by the compilers of the data file. An x to the right of the longitude indicates that the event is an explosion, a suspected explosion, a rockburst, or some other nontectonic event; these have not been plotted on the map. A question mark (?) to the right of the longitude indicates that published descriptions of the event are inconclusive and it may or may not be an earthquake.
3. The letter code in the HYPOCENTER, QUAL column is defined below:
   a. Determinations of instrumental hypocenters are estimated to be accurate within the ranges of latitude and longitude listed below; each range is letter coded as indicated:

A	0.0°–0.1°
B	0.1°–0.2°
C	0.2°–0.5°
D	0.5°–1.0°
E	1.0° or larger

   b. Determinations of noninstrumental epicenters from felt data are estimated to be accurate within the ranges of latitude and longitude listed below; each range is letter coded as indicated:

F	0.0°–0.5°
G	0.5°–1.0°
H	1.0°–2.0°
I	2.0° or larger

4. The reference identification numbers in the HYPOCENTER, REF and INTENSITY, REF columns indicate the sources of the hypocenter and intensity data. They are listed in numerical order in the list of data sources.
5. The magnitudes listed under USGS are mb (modified from Gutenberg and Richter, 1956) or Ms (Bath, 1966) values published in the Preliminary Determination of Epicenters (PDE) by the National Earthquake Information Center, U. S. Geological Survey and predecessor organizations. Associated with the magnitude values listed under OTHER are the source code and type. Type is defined by mb (Gutenberg and Richter, 1956), Mn (Nuttli, 1973), Mnx (modified Mn). Magnitudes computed solely from epicentral intensity have not been included. The source codes are listed below:

   BLA - Virginia Polytechnic Institute and State University, Blacksburg, Va.
   JUN - Jennes, F. B., Long, L. T., and McKee, J. N., 1977, Seismological Society of America Bulletin, v. 67, no. 6, p. 1503-1513.

6. An asterisk (*) in the INTENSITY, MM column indicates that the intensity was assigned by the compiler on the basis of the available data at the time the catalog was compiled.

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Table 1.—Chronological listing of earthquakes for the State of Florida

DATE YEAR	MONTH	DAY	ORIGIN TIME H	M	S (UTC)	LAT.	LONG.	DEPTH (KM)	HYPOCENTER QUAL	HYPOCENTER REF	MAGNITUDE USGS (mb)	MAGNITUDE OTHER (Ms)	MAGNITUDE MOMENT (M)	INTENSITY MM	INTENSITY REF
1780	FEB	06	..	..	..	30.4 N.	87.2 W.	* ..	G	101	..	.. ...	.. ...	VI*	101
	Northwestern Florida. This quake occurred during a violent thunderstorm which produced raging seas together with thunder and lightning. The earthquake was said to be so violent that in the barracks the regimentals and the arm racks fell from the walls in a great many places; and everything was settled in the rooms. The doors were sprung, chimneys were thrown together. Neighboring houses clashed together and those people who were buried in the ruins cried for help.														
1879	JAN	13	04	45	..	29.5 N.	82.0 W.	..	H	38	..	.. ...	.. ...	VI	38
	Near St. Augustine, Florida. At St. Augustine, plaster cracked and articles were thrown from the shelves. The quake was felt from a line joining Tallahassee, Florida to Savannah, Georgia on the north to a line joining Punta Rassa and Daytona Beach, Florida on the south. This area was estimated to contain 25,000 sq mi. There were two shocks lasting 90 seconds.														
1879	JAN	13	04	55	..	29.5 N.	82.0 W.	..	H	38	..	.. ...	.. ...	F	38
1886	JAN	08	18	36	..	30.4 N.	81.7 W.	..	H	103	..	.. ...	.. ...	F	84
1886	SEP	01	..	..	..	30.4 N.	81.7 W.	* ..	H	69	..	.. ...	.. ...	IV	69
1886	SEP	03	21	..	..	30.4 N.	81.7 W.	* ..	H	84	..	.. ...	.. ...	IV	69
1886	SEP	04	09	..	..	30.4 N.	81.7 W.	..	H	103	..	.. ...	.. ...	IV	69
1886	SEP	05	..	..	..	30.4 N.	81.7 W.	* ..	H	69	..	.. ...	.. ...	IV	69
1886	SEP	08	..	..	..	30.4 N.	81.7 W.	* ..	H	69	..	.. ...	.. ...	IV	69
1886	SEP	09	18	47	..	30.4 N.	81.7 W.	..	H	103	..	.. ...	.. ...	IV	69
1893	JUN	21	07	07	..	30.4 N.	81.7 W.	* ..	H	84	..	.. ...	.. ...	IV	69
1900	OCT	10	..	..	..	30.3 N.	81.7 W.	x ..	H	84	..	.. ...	.. ...	V	84
1900	OCT	10	..	..	..	30.3 N.	81.7 W.	x ..	H	84	..	.. ...	.. ...	III*	84
1900	OCT	10	..	..	..	30.3 N.	81.7 W.	x ..	H	84	..	.. ...	.. ...	III*	84
1900	OCT	10	..	..	..	30.3 N.	81.7 W.	x ..	H	84	..	.. ...	.. ...	III*	84
1900	OCT	10	..	..	..	30.3 N.	81.7 W.	x ..	H	84	..	.. ...	.. ...	III*	84
1900	OCT	10	..	..	..	30.3 N.	81.7 W.	x ..	H	84	..	.. ...	.. ...	III*	84
1900	OCT	31	16	15	..	30.4 N.	81.7 W.	..	H	38	..	.. ...	.. ...	V	38
1902	MAY	21	..	..	..	29.9 N.	81.3 W.	* ..	H	84	..	.. ...	.. ...	F	84
1902	MAY	21	00	..	..	29.9 N.	81.3 W.	* ..	H	84	..	.. ...	.. ...	II	84
1905	SEP	04	09	..	..	27.5 N.	82.6 W.	* ..	H	84	..	.. ...	.. ...	III	84
1930	JUL	19	18	53	..	25.8 N.	81.4 W.	x ..	H	103	..	.. ...	.. ...	V	103
1935	NOV	14	03	10	..	29.6 N.	81.7 W.	* ..	H	69	..	.. ...	.. ...	IV	69
1935	NOV	14	03	30	..	29.6 N.	81.7 W.	* ..	H	69	..	.. ...	.. ...	IV	69
1940	DEC	27	01	..	..	28.0 N.	82.5 W.	x ..	H	13	..	.. ...	.. ...	....	..
1942	JAN	19	19	..	..	26.5 N.	81.0 W.	x ..	I	69	..	.. ...	.. ...	IV*	69
1942	JAN	19	..	..	..	26.5 N.	81.0 W.	x ..	I	69	..	.. ...	.. ...	IV*	69
1942	JAN	19	..	..	..	26.5 N.	81.0 W.	x ..	I	69	..	.. ...	.. ...	IV*	69
1942	JAN	19	..	..	..	26.5 N.	81.0 W.	x ..	I	69	..	.. ...	.. ...	IV*	69
1942	JAN	19	..	..	..	26.5 N.	81.0 W.	x ..	I	69	..	.. ...	.. ...	IV*	69
1942	JAN	19	..	..	..	26.5 N.	81.0 W.	x ..	I	69	..	.. ...	.. ...	IV*	69
1942	JAN	19	..	..	..	26.5 N.	81.0 W.	x ..	I	69	..	.. ...	.. ...	IV*	69
1942	JAN	19	..	..	..	26.5 N.	81.0 W.	x ..	I	69	..	.. ...	.. ...	IV*	69
1942	JAN	19	..	..	..	26.5 N.	81.0 W.	x ..	I	69	..	.. ...	.. ...	IV*	69
1942	JAN	19	..	..	..	26.5 N.	81.0 W.	x ..	I	69	..	.. ...	.. ...	IV*	69
1942	JAN	19	..	..	..	26.5 N.	81.0 W.	x ..	I	69	..	.. ...	.. ...	IV*	69
1942	JAN	19	..	..	..	26.5 N.	81.0 W.	x ..	I	69	..	.. ...	.. ...	IV*	69
1942	JAN	19	..	..	..	26.5 N.	81.0 W.	x ..	I	69	..	.. ...	.. ...	IV*	69
1945	DEC	22	15	25	..	25.8 N.	80.0 W.	* ..	H	18	..	.. ...	.. ...	III*	18
1948	NOV	08	17	44	..	26.3 N.	82.2 W.	* ..	H	21	..	.. ...	.. ...	IV*	21
1952	NOV	18	20	12	..	30.6 N.	84.6 W.	..	H	103	..	.. ...	.. ...	IV	25
1953	MAR	26	..	..	..	28.6 N.	81.4 W.	..	H	103	..	.. ...	.. ...	IV	104
1973	OCT	27	06	21	02.0	28.476S.	80.654W.	005	D	349	..	3.9Mnx JUN	.. ...	V	46
1973	DEC	05	11	30	..	30.5 N.	86.5 W.	x ..	I	46	..	.. ...	.. ...	III*	46
1975	DEC	04	11	57	..	29.2 N.	81.0 W.	* ..	G	90	..	2.9Mn BLA	.. ...	IV	90
1978	JAN	12	21	10	..	28.1 N.	81.6 W.	* ..	G	240	..	.. ...	.. ...	IV	240
1978	NOV	06	23	00	..	30.20 N.	82.65 W.	..	F	240	..	.. ...	.. ...	IV	240
1978	NOV	14	20	14	..	30.2 N.	82.6 W.	* ..	G	240	..	.. ...	.. ...	F	240
1978	NOV	16	19	00	..	30.2 N.	82.6 W.	* ..	G	240	..	.. ...	.. ...	F	240

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MODIFIED MERCALLI INTENSITY SCALE OF 1931
Adapted from Sieberg's Mercalli-Cancani scale,
modified and condensed (Wood and Neumann, 1931)

I. Not felt – or, except rarely under especially favorable circumstances. Under certain conditions, at and outside the boundary of the area in which a great shock is felt: sometimes birds, animals, reported uneasy or disturbed; sometimes dizziness or nausea experienced; sometimes trees, structures, liquids, bodies of water, may sway—doors may swing, very slowly.

II. Felt indoors by few, especially on upper floors, or by sensitive or nervous persons. Also, as in grade I, but often more noticeably: sometimes hanging objects may swing, especially when delicately suspended; sometimes trees, structures, liquids, bodies of water, may sway, doors may swing, very slowly; sometimes birds, animals, reported uneasy or disturbed; sometimes dizziness or nausea experienced.

III. Felt indoors by several, motion usually rapid vibration. Sometimes not recognized to be an earthquake at first. Duration estimated in some cases. Vibration like that due to passing of light, or lightly loaded trucks, or heavy trucks some distance away. Hanging objects may swing slightly. Movements may be appreciable on upper levels of tall structures. Rocked standing motor cars slightly.

IV. Felt indoors by many, outdoors by few. Awakened few, especially light sleepers. Frightened no one, unless apprehensive from previous experiences. Vibration like that due to passing of heavy or heavily loaded trucks. Sensation like heavy body striking building or falling of heavy objects inside. Rattling of dishes, windows, doors; glassware and crockery clink and clash. Creaking of walls, frame, expecially in the upper range of this grade. Hanging objects swung, in numerous instances. Disturbed liquids in open vessels slightly. Rocked standing motor cars noticeably.

V. Felt indoors by practically all, outdoors by many or most: outdoors direction estimated. Awakened many, or most. Frightened few—slight excitement, a few ran outdoors. Buildings trembled throughout. Broke dishes, glassware to some extent. Cracked windows—in some cases, but not generally. Overturned vases, small or unstable objects, in many instances, with occasional fall. Hanging objects, doors, swing generally or considerably. Knocked pictures against walls, or swung them out of place. Opened, or closed, doors, shutters, abruptly. Pendulum clocks stopped, started, or ran fast or slow. Moved small objects, furnishings, the latter to slight extent. Spilled liquids in small amounts from well-filled open containers. Trees, bushes shaken slightly.

VI. Felt by all, indoors and outdoors. Frightened many, excitement general, some alarm, many ran outdoors. Awakened all. Persons made to move unsteadily. Trees, bushes, shaken slightly to moderately. Liquid set in strong motion. Small bells rang—church, chapel, school, etc. Damage slight in poorly built buildings. Fall of plaster in small amount. Cracked plaster somewhat, especially fine cracks, chimneys in some instances. Broke dishes, glassware, in considerable quantity, also some windows. Fall of knick-knacks, books, pictures. Overturned furniture in many instances. Moved furnishings of moderately heavy kind.

VII. Frightened all—general alarm, all ran outdoors. Some, or many, found it difficult to stand. Noticed by persons driving motor cars. Trees and bushes shaken moderately to strongly. Waves on ponds, lakes, and running water. Water turbid from mud stirred up. Incaving to some extent of sand or gravel stream banks. Rang large church bells, etc. Suspended objects made to quiver. Damage negligible in buildings of good design and construction, slight to moderate in well-built ordinary buildings, considerable in poorly built or badly designed buildings, adobe houses, old walls (especially where laid up without mortar), spires, etc. Cracked chimneys to considerable extent, walls to some extent. Fall of plaster in considerable to large amount, also some stucco. Broke numerous windows, furniture to some extent. Shook down loosened brickwork and tiles. Broke weak chimneys at the roof-line (sometimes damaging roofs). Fall of cornices from towers and high buildings. Dislodged bricks and stones. Overturned heavy furniture, with damage from breaking. Damage considerable to concrete irrigation ditches.

VIII. Fright general—alarm approaches panic. Distrubed persons driving motor cars. Trees shaken strongly—branches, trunks, broken off, especially palm trees. Ejected sand and mud in small amounts. Changes, temporary or permanent: in flow of springs and wells; dry wells renewed flow; in temperature of spring and well waters. Damage slight in structures (brick) built especially to withstand earthquakes. Considerable in ordinary substantial buildings, partial collapse: racked, tumbled down, wooden houses in some cases; threw out panel walls in frame structures, broke off decayed piling. Fall of walls. Cracked, broke, solid stone walls seriously. Wet ground to some extent, also ground on steep slopes. Twisting, fall, of chimneys, columns, monuments, also factory stacks, towers. Moved conspicuously, overturned, very heavy furniture.

IX. Panic general. Cracked ground conspicuously. Damage considerable in (masonry) structures built especially to withstand earthquakes: Threw out of plumb some wood-frame houses built especially to withstand earthquakes; great in substantial (masonry) buildings, some collapse in large part; or wholly shifted frame buildings off foundations, racked frames, serious to reservoirs; underground pipes sometime broken.

X. Cracked ground, especially when loose and wet, up to widths of several inches; fissures up to a yard in width ran parallel to canal and stream banks. Landslides considerable from river banks and steep coasts. Shifted sand and mud horizontally on beaches and flat land. Changed level of water in wells. Threw water on banks of canals, lakes, rivers, etc. Damage serious to dams, dikes, embankments. Severe to well-built wooden structures and bridges, some destroyed. Developed dangerous cracks in excellent brick walls. Destroyed most masonry and frame structures, also their foundations. Bent railroad rails slightly. Tore apart, or crushed endwise, pipe lines buried in earth. Open cracks and broad wavy folds in cement pavements and asphalt road surfaces.

XI. Disturbances in ground many and widespread, varying with ground material. Broad fissures, earth slumps, and land slips in soft, wet ground. Ejected water in large amounts charged with sand and mud. Caused sea-waves ("tidal" waves) of significant magnitude. Damage severe to wood-frame structures, especially near shock centers. Great to dams, dikes, embankments often for long distances. Few, if any (masonry) structures remained standing. Destroyed large well-built bridges by the wrecking of supporting piers, or pillars. Affected yielding wooden bridges less. Bent railroad rails greatly, and thrust them endwise. Put pipe lines buried in earth completely out of service.

XII. Damage total—practically all works of construction damaged greatly or destroyed. Disturbances in ground great and varied, numerous shearing cracks. Landslides, falls of rock of significant character, slumping of river banks, etc., numerous and extensive. Wrenched loose, tore off, large rock masses. Fault slips in firm rock, with notable horizontal and vertical offset displacements. Water channels, surface and underground, disturbed and modified greatly. Dammed lakes, produced waterfalls, deflected rivers, etc. Waves seen on ground surfaces (actually seen, probably, in some cases). Distorted lines of sight and level. Threw objects upward into the air.

SCALE 1:1 000 000

25 0 25 50 75 100 MILES

25 0 25 50 75 100 KILOMETERS

SEISMICITY MAP OF THE STATE OF FLORIDA

By
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